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Appendix C, CUSTOMER SUPPORT
This manual supports the following wireless controllers, service platforms, and access points:

- **Wireless Controllers** – RFS4000, RFS6000, RFS7000
- **Service Platforms** – NX4500, NX4524, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, NX9510
- **Access Points** – AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP7131, AP7161, AP7181, AP7502, AP7522, AP7532, AP8122, AP8132, AP8163, AP8222, AP8232

---

**NOTE:** ES6510 is an *Ethernet Switch* managed by a wireless controller or service platform, such as RFS4000, RFS6000, RFS7000, NX9000, NX9500, NX9510. 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 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.
- NX7500.
- NX7510, NX7520, and NX7530 are collectively represented as NX75XX 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, and AP7532
- 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, NX6500, NX6524, NX7500, NX7510, NX7520, NX7530, NX9000, NX9500, or NX9510 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 ...
| [] | 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,
```bash
rfs7000-37FABE#clear ...
```
is documented as:
```bash
clear [arp-cache|cdp|counters|crypto|
    event-history|firewall|gre|ip|ipv6|
    l2tpv3-stats|license|lldp|logging|
    mac-address-table|mint|role|rtls|
    spanning-tree|vrrp]
```
where:
- clear – is the command
- [arp-cache|cdp|counters|crypto|event-history|firewall|gre|ip|ipv6|
  l2tpv3-stats|license|lldp|logging|mac-address-table|mint|role|rtls|
  spanning-tree|vrrp] – indicates that nineteen 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,
```bash
rfs7000-37FABE> show adoption ....
```
is documented as:
```bash
show adoption info {on <DEVICE-NAME>}
```
here:
- show adoption info – is the command. This command can also be used as:
  ```bash
  show adoption info
  ```
The command can also be extended as:
```bash
show adoption info {on <DEVICE-NAME>}
```
here:
- {on <DEVICE-NAME>} – is the keyword, which is optional.

| command / keyword | 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,
```bash
rfs7000-37FABE>show wireless
```
is documented as:
```bash
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
(<URL>,email <EMAIL>,fqdn <FQDN>,ip-address <IP>)
```

here:

- `crypto pki export request generate-rsa-key <RSA-KEYPAIR-NAME>`
  - is the command
- `<RSA-KEYPAIR-NAME>` – is the RSA keypair name (in this example, the keypair name is ‘test’), and is a variable
- `<IP>` – is the set of recursive parameters (separated by commas) that can be used in any order.
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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>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits Per Second</td>
<td>19200</td>
</tr>
<tr>
<td>Data Bits</td>
<td>8</td>
</tr>
<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>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>admin</td>
<td>motorola</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.

### 1.1 CLI Overview

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.

![Figure 1-1 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)#
```

Table 1.1 summarizes available CLI commands.

<table>
<thead>
<tr>
<th><strong>User Exec Mode</strong></th>
<th><strong>Priv Exec Mode</strong></th>
<th><strong>Global Configuration Mode</strong></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>ap300</td>
</tr>
<tr>
<td>cluster</td>
<td>change-passwd</td>
<td>ap621</td>
</tr>
<tr>
<td>commit</td>
<td>clear</td>
<td>ap622</td>
</tr>
<tr>
<td>connect</td>
<td>clock</td>
<td>ap650</td>
</tr>
<tr>
<td>create-cluster</td>
<td>cluster</td>
<td>ap6511</td>
</tr>
<tr>
<td>crypto</td>
<td>commit</td>
<td>ap6521</td>
</tr>
<tr>
<td>crypto-cmp-cert-update</td>
<td>configure</td>
<td>ap6522</td>
</tr>
<tr>
<td>debug</td>
<td>connect</td>
<td>ap6532</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>copy</td>
<td>ap6562</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>disable</td>
<td>create-cluster</td>
<td>ap71xx</td>
</tr>
<tr>
<td>enable</td>
<td>crypto</td>
<td>ap81xx</td>
</tr>
<tr>
<td>help</td>
<td>crypto-cmp-cert-update</td>
<td>ap82xx</td>
</tr>
<tr>
<td>join-cluster</td>
<td>debug</td>
<td>association-acl-policy</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>delete</td>
<td>auto-provisioning-policy</td>
</tr>
<tr>
<td>logging</td>
<td>device-upgrade</td>
<td>bgp</td>
</tr>
<tr>
<td>mint</td>
<td>diff</td>
<td>bonjour-gw-discovery-policy</td>
</tr>
<tr>
<td>no</td>
<td>dir</td>
<td>bonjour-gw-forwarding-policy</td>
</tr>
<tr>
<td>on</td>
<td>disable</td>
<td>captive-portal</td>
</tr>
<tr>
<td>page</td>
<td>edit</td>
<td>clear</td>
</tr>
<tr>
<td>ping</td>
<td>enable</td>
<td>client-identity</td>
</tr>
<tr>
<td>ping6</td>
<td>erase</td>
<td>client-identity-group</td>
</tr>
<tr>
<td>revert</td>
<td>halt</td>
<td>clone</td>
</tr>
<tr>
<td>service</td>
<td>help</td>
<td>crypto-cmp-policy</td>
</tr>
<tr>
<td>show</td>
<td>join-cluster</td>
<td>customize</td>
</tr>
<tr>
<td>ssh</td>
<td>l2tpv3</td>
<td>device</td>
</tr>
<tr>
<td>telnet</td>
<td>logging</td>
<td>device-categorization</td>
</tr>
<tr>
<td>terminal</td>
<td>mint</td>
<td>dhcp-server-policy</td>
</tr>
<tr>
<td>time-it</td>
<td>mkdir</td>
<td>dhcp6-server-policy</td>
</tr>
<tr>
<td>traceroute</td>
<td>more</td>
<td>dns-whitelist</td>
</tr>
<tr>
<td>traceroutr6</td>
<td>no</td>
<td>event-system-policy</td>
</tr>
<tr>
<td>watch</td>
<td>on</td>
<td>device-categorization</td>
</tr>
<tr>
<td>write</td>
<td>page</td>
<td>firewall-policy</td>
</tr>
<tr>
<td>clrscr</td>
<td>ping</td>
<td>global-association-list</td>
</tr>
<tr>
<td>exit</td>
<td>ping6</td>
<td>help</td>
</tr>
<tr>
<td>smart-cache (NX45XX, NX65XX, NX9XXX)</td>
<td>pwd</td>
<td>host</td>
</tr>
<tr>
<td>virtual-machine (NX45XX, NX65XX, NX9XXX)</td>
<td>re-elect</td>
<td>igmp-snoop-policy</td>
</tr>
<tr>
<td></td>
<td>reload</td>
<td>inline-password-encryption</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>remote-debug</td>
<td>ip</td>
<td></td>
</tr>
<tr>
<td>rename</td>
<td>ipv6</td>
<td></td>
</tr>
<tr>
<td>revert</td>
<td>ipv6-router-advertisement-policy</td>
<td></td>
</tr>
<tr>
<td>rmdir</td>
<td>I2tpv3</td>
<td></td>
</tr>
<tr>
<td>self</td>
<td>mac</td>
<td></td>
</tr>
<tr>
<td>service</td>
<td>management-policy</td>
<td></td>
</tr>
<tr>
<td>show</td>
<td>meshpoint</td>
<td></td>
</tr>
<tr>
<td>ssh</td>
<td>meshpoint-qos-policy</td>
<td></td>
</tr>
<tr>
<td>telnet</td>
<td>mint-policy</td>
<td></td>
</tr>
<tr>
<td>terminal</td>
<td>nac-list</td>
<td></td>
</tr>
<tr>
<td>time-it</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>traceroute</td>
<td>passpoint-policy</td>
<td></td>
</tr>
<tr>
<td>traceroute6</td>
<td>password-encryption</td>
<td></td>
</tr>
<tr>
<td>upgrade</td>
<td>profile</td>
<td></td>
</tr>
<tr>
<td>upgrade-abort</td>
<td>radio-qos-policy</td>
<td></td>
</tr>
<tr>
<td>watch</td>
<td>radius-group</td>
<td></td>
</tr>
<tr>
<td>write</td>
<td>radius-server-policy</td>
<td></td>
</tr>
<tr>
<td>clrscr</td>
<td>radius-user-pool-policy</td>
<td></td>
</tr>
<tr>
<td>exit</td>
<td>rename</td>
<td></td>
</tr>
<tr>
<td>smart-cache (NX45XX, NX65XX, NX9XXX)</td>
<td>rf-domain</td>
<td></td>
</tr>
<tr>
<td>virtual-machine (NX45XX, NX65XX, NX9XXX)</td>
<td>rfs4000</td>
<td></td>
</tr>
<tr>
<td>raid (NX9500)</td>
<td>rfs6000</td>
<td></td>
</tr>
<tr>
<td>cpe (RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, NX9XXX)</td>
<td>rfs7000</td>
<td></td>
</tr>
<tr>
<td>t5 (RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, NX9XXX)</td>
<td>nx45xx series</td>
<td></td>
</tr>
<tr>
<td></td>
<td>nx65xx series</td>
<td></td>
</tr>
<tr>
<td></td>
<td>nx9000 series</td>
<td></td>
</tr>
<tr>
<td></td>
<td>role-policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>route-map</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>routing-policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>self</td>
</tr>
<tr>
<td></td>
<td></td>
<td>smart-rf-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>
<tr>
<td></td>
<td></td>
<td>smart-cache-policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(NX45XX, NX65XX, and NX9XXX)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>url-list</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(NX45XX, NX65XX, and NX9XXX)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>vx9000 (NX9000)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t5 (RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, NX9XXX)</td>
</tr>
</tbody>
</table>
1.2 Getting Context Sensitive Help

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&lt;Tab&gt;</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 ?
ap300 Set global AP300 parameters
block-adopter-config-update Block configuration updates from the adopter
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
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
wireless Command related to wireless

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:

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?').
1.3 Using the No Command

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, channelInfo.
- Enter commands in uppercase, lowercase, or mixed case. Only passwords are case sensitive.

1.4 Using CLI Editing Features and Shortcuts

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

Table 1.2 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. In Table 1.2, bold characters indicate the relation between a letter and its function.

<table>
<thead>
<tr>
<th>Keystrokes</th>
<th>Function Summary</th>
<th>Function Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Arrow</td>
<td>Back character</td>
<td>Moves the cursor one character to the left</td>
</tr>
<tr>
<td>or Ctrl-B</td>
<td></td>
<td>When entering a command that extends beyond a single line, press the Left Arrow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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>
<tr>
<td>Ctrl-K</td>
<td></td>
<td>Deletes from the cursor to end of the line</td>
</tr>
</tbody>
</table>
1.4.2 Completing a Partial Command Name

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#
```

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

---

### 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-P</td>
<td></td>
<td>Obtains the prior command from memory</td>
</tr>
<tr>
<td>Ctrl-N</td>
<td></td>
<td>Obtains the next command from memory</td>
</tr>
<tr>
<td>Esc-C</td>
<td></td>
<td>Converts the letter at the cursor to uppercase</td>
</tr>
<tr>
<td>Esc-L</td>
<td></td>
<td>Converts the letter at the cursor to lowercase</td>
</tr>
<tr>
<td>Esc-D</td>
<td></td>
<td>Deletes the remainder of a word</td>
</tr>
<tr>
<td>Ctrl-W</td>
<td></td>
<td>Deletes the word up to the cursor</td>
</tr>
<tr>
<td>Ctrl-Z</td>
<td></td>
<td>Returns to the root prompt</td>
</tr>
<tr>
<td>Ctrl-T</td>
<td></td>
<td>Transposes the character to the left of the cursor with the character located at the cursor</td>
</tr>
<tr>
<td>Ctrl-L</td>
<td></td>
<td>Clears the screen</td>
</tr>
</tbody>
</table>
1.4.3 Command Output pagination

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.

1.4.4 Creating Profiles

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, NX6500, NX6524, NX9000, NX9500, NX9510
- a default profile for each of the following access points:
  - AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX

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

```bash
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:

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

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

```bash
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
--More--
```
1.4.5 Change the default profile by creating vlan 150 and mapping to ge3 Physical interface

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-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
```

1.4.5.1 Viewing Configured APs

To view previously configured APs, enter the following command:

```
rfs7000-37FABE(config)#show wireless ap configured
-------------------------------------------------------------------------------------
IDX  NAME             MAC             PROFILE       RF-DOMAIN   ADOPTED-BY
-------------------------------------------------------------------------------------
  1  ap7131-4AA708    00-04-96-4A-A7-08  default-ap71xx  default     un-adopted
  2  ap7131-11E6C4    00-23-68-11-E6-C4  default-ap71xx  default     un-adopted
  3  ap650-000001     00-A0-F8-00-00-01  default-ap650   default     un-adopted
-------------------------------------------------------------------------------------
rfs7000-37FABE(config)#
```

1.4.6 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. Consider using SSH for remote administration tasks.

1.4.6.1 Configuring Telnet for Management Access

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.
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>admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Password</td>
<td>motorola</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.

   ```bash
   rfs7000-37FABE(config-management-policy-default)#user testuser password motorola 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 ba7da2bf2f7945af1d3ae1b8b762b541bd5bac1f80a54cd4488f38ed44b91ecd role superuser access all
   user operator password 1 0be97e9e30d2b9dfc4733e7c5f74a7be54570c2450e855cea1a696b0558a40401 role monitor access all
   user testuser password 1 bca381b5b93cdddb0c209e1da8a9d387fa09bfae14cc987438a4d144cb516ffcb role helpdesk access all
   snmp-server community public ro
   snmp-server community private rw
   snmp-server user snmptrap v3 encrypted des auth md5 0 motorola
   snmp-server user snmpoperator v3 encrypted des auth md5 0 operator
   snmp-server user snmpmanager v3 encrypted des auth md5 0 motorola
   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.

   ```bash
   rfs7000 release 5.6.0.0-029B
   rfs7000-37FABE login: testuser
   Password: Welcome to CLI
   Starting CLI...
   rfs7000-37FABE>
   ``

1.4.6.2 Configuring SSH

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.

   ```bash
   rfs7000-37FABE> en
   rfs7000-37FABE# configure
   Enter configuration commands, one per line. End with CNTL/Z.
   ``

2. Go to 'config-management-policy-default' mode.

   ```bash
   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>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>admin</td>
<td>motorola</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 5.6.0.0-029B
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
debug Debugging functions
device-upgrade Device firmware upgrade
disable Turn off privileged mode command
enable Turn on privileged mode command
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 defaultss
on On RF-Domain
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
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>watch</td>
<td>Repeat the specific CLI command at a periodic interval</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>exit</td>
<td>Exit from the CLI</td>
</tr>
</tbody>
</table>
2.1 User Exec Commands

Table 2.1 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 2-7</td>
</tr>
<tr>
<td>clear</td>
<td>Resets the last saved command</td>
<td>page 2-8</td>
</tr>
<tr>
<td>clock</td>
<td>Configures the system clock</td>
<td>page 2-18</td>
</tr>
<tr>
<td>cluster</td>
<td>Accesses the cluster context</td>
<td>page 2-19</td>
</tr>
<tr>
<td>connect</td>
<td>Establishes a console connection to a remote device</td>
<td>page 2-20</td>
</tr>
<tr>
<td>create-cluster</td>
<td>Creates a new cluster on a specified device</td>
<td>page 2-21</td>
</tr>
<tr>
<td>crypto</td>
<td>Enables encryption</td>
<td>page 2-23</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>device-upgrade</td>
<td>Configures device firmware upgrade settings</td>
<td>page 2-35</td>
</tr>
<tr>
<td>disable</td>
<td>Turns off (disables) the privileged mode command set</td>
<td>page 2-47</td>
</tr>
<tr>
<td>enable</td>
<td>Turns on (enables) the privileged mode command set</td>
<td>page 2-48</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 2-49</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>Establishes or brings down Layer 2 Tunneling Protocol Version 3 (L2TPV3) tunnels</td>
<td>page 2-51</td>
</tr>
<tr>
<td>logging</td>
<td>Modifies message logging facilities</td>
<td>page 2-53</td>
</tr>
<tr>
<td>mint</td>
<td>Configures MiNT protocol</td>
<td>page 2-54</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 2-56</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 2-61</td>
</tr>
<tr>
<td>page</td>
<td>Toggles a device’s (access point, wireless controller, or service platform) paging function</td>
<td>page 2-62</td>
</tr>
<tr>
<td>ping</td>
<td>Sends ICMP echo messages to a user-specified location</td>
<td>page 2-63</td>
</tr>
<tr>
<td>ping6</td>
<td>Sends ICMPv6 echo messages to a user-specified IPv6 address</td>
<td>page 2-64</td>
</tr>
<tr>
<td>ssh</td>
<td>Opens an SSH connection between two network devices</td>
<td>page 2-65</td>
</tr>
<tr>
<td>telnet</td>
<td>Opens a Telnet session</td>
<td>page 2-66</td>
</tr>
<tr>
<td>terminal</td>
<td>Sets the length and width of the terminal window</td>
<td>page 2-67</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>time-it</td>
<td>Verifies the time taken by a particular command between request and response</td>
<td>page 2-68</td>
</tr>
<tr>
<td>traceroute</td>
<td>Traces the route to its defined destination</td>
<td>page 2-69</td>
</tr>
<tr>
<td>traceroute6</td>
<td>Traces the route to a specified IPv6 destination</td>
<td>page 2-70</td>
</tr>
<tr>
<td>watch</td>
<td>Repeats a specific CLI command at a periodic interval</td>
<td>page 2-71</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 2-73</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 2-74</td>
</tr>
<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>help</td>
<td>Displays the interactive help system</td>
<td>page 5-6</td>
</tr>
<tr>
<td>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-14</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 5-14</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current CLI session and closes the session window</td>
<td>page 2-72</td>
</tr>
</tbody>
</table>
2.1.1 captive-portal-page-upload

Uploads captive portal advanced pages

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

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

{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 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 of the captive-portal identified by the &lt;CAPTIVE-PORTAL-NAME&gt; parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;MAC/HOSTNAME&gt;</td>
<td>Uploads to a specified AP</td>
</tr>
<tr>
<td>all</td>
<td>Uploads to all APs</td>
</tr>
<tr>
<td>upload-time &lt;TIME&gt;</td>
<td>Optional. Configures an AP upload time</td>
</tr>
<tr>
<td></td>
<td>&lt;TIME&gt; – Specify upload time in the MM/DD/YYYY-HH:MM or HH:MM format.</td>
</tr>
</tbody>
</table>

| captive-portal-page-upload <CAPTIVE-PORTAL-NAME> rf-domain [<DOMAIN-NAME]|all] | Uploads advanced pages of the captive portal identified by the <CAPTIVE-PORTAL-NAME> parameter |
|---------------------------------------------|------------------------------------------------------------------------------------------------|
| 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 |
| from-controller | Optional. Uploads to APs from the adopted device |
## captive-portal-page-upload cancel-upload

Cancels a scheduled AP upload

**cancel-upload **

- `<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

### Examples

```bash
rfs4000-229D58>captive-portal-page-upload test1 00-04-96-4A-A7-08 upload-time 03/01/2013-12:30
```

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-23-68-22-9D-58</td>
<td>Fail</td>
<td>Failed to initiate page upload</td>
</tr>
</tbody>
</table>

```bash
rfs4000-229D58>
```

```bash
rfs4000-229D58>captive-portal-page-upload cancel-upload 00-04-96-4A-A7-08
```

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-23-68-22-9D-58</td>
<td>Success</td>
<td>Cancelled upgrade of 1 APs</td>
</tr>
</tbody>
</table>

```bash
rfs4000-229D58>
```
2.1.2 change-passwd

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

NOTE: Refer to the interface details below when using clear

- ge <index> – RFS4000 supports 5 GEs, RFS6000 supports 8 GEs, NX45XX and NX65XX series support 24 GEs
- me1 – Available in both RFS7000 and RFS6000
- up1 – Uplink interface on RFS4000

Syntax

```plaintext
clear [arp-cache|cdp|counters|crypto|event-history|gre|ip|ipv6|lldp|mac-address-table|mint|role|rtls|smart-cache|spanning-tree|vrrp]
clear arp-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>} {<1-3>}|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] {in|on|out|soft}
clear ip bgp [<IP> all external] {in prefix-filter} {on <DEVICE-NAME>}
clear ip bgp [<IP> all external] {on <DEVICE-NAME> out} {on <DEVICE-NAME>}
clear ip bgp [<IP> {soft [in/out]} {on <DEVICE-NAME>}
clear ip bgp [all|external] {soft [in/out]} {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] {<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 <1-5>|me1|
   port-channel <1-3>|pppoel|up1|vlan <1-4094>|wwan1\} \{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>\}**

  | arp-cache | Clears *Address Resolution Protocol* (ARP) cache entries on a AP, wireless controller, or service platform. This protocol matches the layer 3 IP addresses to the layer 2 MAC addresses. |
  | 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 [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>\|<1-3>\}|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> | Specify the AP's MAC address. |
  | Note: If no MAC address is specified, all AP counters are cleared. |

<p>| radio &lt;MAC/DEVICE-NAME&gt; | Clears radio interface counters on a specified device or on all devices |
| &lt;1-3&gt; | &lt;MAC/DEVICE-NAME&gt; | 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). |
| &lt;1-3&gt; | Optional. Identifies the radio interface by its index. Specify the radio interface index, if not specified as part of the radio ID. |
| Note: If no device name or MAC address is specified, all radio interface counters are cleared. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>clear wireless-client &lt;MAC&gt;</code></td>
<td>Clears counters for all wireless clients or a specified wireless client.</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;MAC&gt;</code> – Optional. Specify the wireless client’s MAC address.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> If no MAC address is specified, all wireless client counters are cleared.</td>
</tr>
<tr>
<td></td>
<td><strong>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</strong> – This keyword is common to all of the above keywords.</td>
</tr>
<tr>
<td></td>
<td><strong>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</strong> – Optional. Clears AP, radio, or wireless client counters on</td>
</tr>
<tr>
<td></td>
<td>a specified AP, wireless controller, service platform, or RF Domain.</td>
</tr>
<tr>
<td></td>
<td>• clear crypto ike sa [&lt;IP&gt;</td>
</tr>
<tr>
<td><code>crypto</code></td>
<td>Clears encryption module database</td>
</tr>
<tr>
<td>`ike sa [&lt;IP&gt;</td>
<td>all]`</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;IP&gt;</code> – Clears IKE SA entries for the peer identified by the <code>&lt;IP&gt;</code> keyword</td>
</tr>
<tr>
<td></td>
<td>- all – Clears IKE SA entries for all peers</td>
</tr>
<tr>
<td></td>
<td><strong>on &lt;DEVICE-NAME&gt;</strong> – Optional. Clears IKE SA entries, for a specified peer or all peers,</td>
</tr>
<tr>
<td></td>
<td>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><code>crypto ipsec sa</code></td>
<td>Clears Internet Protocol Security (IPSec) database SAs</td>
</tr>
<tr>
<td><code>gre stats</code></td>
<td>Clears GRE tunnel statistics</td>
</tr>
<tr>
<td></td>
<td><strong>on &lt;DEVICE-NAME&gt;</strong> – Optional. GRE tunnel statistics 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></td>
<td>• clear event-history</td>
</tr>
<tr>
<td><code>event-history</code></td>
<td>Clears event history cache entries</td>
</tr>
<tr>
<td></td>
<td>**clear ip bgp [&lt;IP&gt;</td>
</tr>
<tr>
<td>`ip bgp [&lt;IP&gt;</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;IP&gt;</code> – Clears BGP session with the peer identified by the <code>&lt;IP&gt;</code> keyword. Specify the BGP</td>
</tr>
<tr>
<td></td>
<td>peer’s IP address.</td>
</tr>
<tr>
<td></td>
<td>- all – Clears all BGP peer sessions</td>
</tr>
<tr>
<td></td>
<td>- external – Clears external BGP (eBGP) peer sessions</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> This command is applicable only to the RFS4000, RFS7000, NX45XX, NX65XX, and</td>
</tr>
<tr>
<td></td>
<td>NX9000 platforms.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Modifications made to BGP settings (BGP access lists, weight, distance, route-maps,</td>
</tr>
<tr>
<td></td>
<td>versions, routing policy etc.) take effect only after on-going BGP sessions are cleared.</td>
</tr>
<tr>
<td></td>
<td>The <code>clear ip bgp</code> command clears BGP sessions. To reduce lose of route updates during the</td>
</tr>
<tr>
<td></td>
<td>process, use the ‘soft’ option. Soft reconfiguration stores inbound/outbound route updates to</td>
</tr>
<tr>
<td></td>
<td>be processed later and updated to the routing table. This requires high memory usage.</td>
</tr>
</tbody>
</table>
clear ip bgp [<IP>|all|external] {on <DEVICE-NAME>|out {on <DEVICE-NAME>}}

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] {on <DEVICE-NAME>|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

Note: This command is applicable only to the RFS4000, RFS7000, NX45XX, NX65XX, and NX9000 platforms.

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 lose 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 BGP sessions on a specified device
- <DEVICE-NAME> – Specify the name of the AP or service platform.

out
{on <DEVICE-NAME>}
Optional. Clears outbound route updates
- on <DEVICE-NAME> – Specify the name of the AP or service platform.

• clear ip bgp <IP> {soft {in|out}} {on <DEVICE-NAME>}

ip bgp <IP>
Clears the BGP session with the peer identified by the <IP> keyword. Specify the BGP peer’s IP address.

Note: This command is applicable only to the RFS4000, RFS7000, NX45XX, NX65XX, and NX9000 platforms.

soft [in|out]
Optional. Enables soft reconfiguration of route updates for the specified IP address
- inbound – Initiates soft reconfiguration of inbound route updates
- outbound – Initiates 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 lose 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. Initiates soft reconfiguration on inbound/outbound route updates (for the peer identified by the <IP> keyword) on a specified device
- <DEVICE-NAME> – Specify the name of the AP or service platform.
### clear ip bgp [all|external] {soft {in|out}} {on <DEVICE-NAME>}

- **ip bgp [all|external]**: Clears on-going BGP sessions based on the option selected.
  - *all*: Clears all BGP peer sessions
  - *external*: Clears eBGP peer sessions

**Note:** This command is applicable only to the RFS4000, RFS7000, NX45XX, NX65XX, and NX9000 platforms.

- **soft {in|out}**: Optional. Initiates soft-reconfiguration of route updates for the specified IP address.
  - *inbound*: Optional. Enables soft reconfiguration of inbound route updates
  - *outbound*: 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. Initiates soft reconfiguration inbound/outbound route updates on a specified device.
  - `<DEVICE-NAME>`: Specify the name of the AP or service platform.

### clear ip dhcp bindings [<IP>|all] {on <DEVICE-NAME>}

- **ip dhcp bindings**: Clears DHCP connections and server bindings.
- **<IP>**: Clears specific address binding entries. Specify the IP address to clear binding entries.
- **all**: Clears all address binding entries.

- **on <DEVICE-NAME>**: Optional. Clears a specified address binding or all address bindings on a specified device.
  - `<DEVICE-NAME>`: Specify the name of the AP, wireless controller, or service platform.

### clear ip ospf process {on <DEVICE-NAME>}

- **ip ospf process**: Clears already enabled Open Shortest Path First (OSPF) process and restarts the process.

- **on <DEVICE-NAME>**: Optional. Clears OSPF process on a specified device.
  - `<DEVICE-NAME>`: Specify the name of the AP, wireless controller, or service platform.

### clear ipv6 neighbor-cache {on <DEVICE-NAME>}

- **clear ipv6 neighbor-cache**: Clears IPv6 neighbor cache entries.

- **on <DEVICE-NAME>**: Optional. Clears IPv6 neighbor cache entries on a specified device.
  - `<DEVICE-NAME>`: Specify the name of the AP, wireless controller, or service platform.
clear mac-address-table \{address <MAC>|vlan <1-4094>\} \{on <DEVICE-NAME>\}

<table>
<thead>
<tr>
<th>mac-address-table</th>
<th>Clears the MAC address forwarding table</th>
</tr>
</thead>
<tbody>
<tr>
<td>address &lt;MAC&gt;</td>
<td>Optional. Clears a specified MAC address from the MAC address table.</td>
</tr>
<tr>
<td></td>
<td>• &lt;MAC&gt; – Specify the MAC address in one of the following formats: AA-BB-CC-DD-EE-FF or AA:BB:CC:DD:EE:FF or AABB.CCDD.EEFF</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>Optional. Clears all MAC addresses for a specified VLAN</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4094&gt; – Specify the VLAN ID from 1 - 4094</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears a single MAC entry or all MAC entries, for the specified VLAN 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>

Note: 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.

clear mac-address-table interface \{<IF-NAME>|ge <1-X>|port-channel <1-X>|t1e1 <1-4> <1-1>|up <1-2>|vmif <1-X>|xge <1-4>\} \{on <DEVICE-NAME>\}

<table>
<thead>
<tr>
<th>mac-address-table</th>
<th>Clears the MAC address forwarding table</th>
</tr>
</thead>
<tbody>
<tr>
<td>interface</td>
<td>Clears all MAC addresses for the selected interface. Use the options available to specify the interface.</td>
</tr>
<tr>
<td>&lt;IF-NAME&gt;</td>
<td>Clears MAC address forwarding table for the specified layer 2 interface (Ethernet port)</td>
</tr>
<tr>
<td></td>
<td>• &lt;IF-NAME&gt; – Specify the layer 2 interface name.</td>
</tr>
<tr>
<td>ge &lt;1-X&gt;</td>
<td>Clears MAC address forwarding table for the specified GigabitEthernet interface</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-X&gt; – Specify the GigabitEthernet interface index from 1 - X.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>port-channel &lt;1-X&gt;</td>
<td>Clears MAC address forwarding table for the specified port-channel interface</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-X&gt; – Specify the port-channel interface index from 1 - X.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>t1e1 &lt;1-4&gt; &lt;1-1&gt;</td>
<td>Clears MAC address forwarding table for the specified T1E1L interface</td>
</tr>
<tr>
<td></td>
<td>• &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.</td>
</tr>
<tr>
<td></td>
<td>Note: The T1E1 interfaces are supported only on the NX45XX and NX65XX series service platforms.</td>
</tr>
<tr>
<td>up &lt;1-X&gt;</td>
<td>Clears MAC address forwarding table for the WAN Ethernet interface</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| 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, 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.  
**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. |
| 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 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. |
| rtls [aeroscout|ekahau] | Clears Real Time Location Service (RTLS) statistics  
- `<DEVICE-NAME>`  
- `<DEVICE-OR-DOMAIN-NAME>`  
- `<DEVICE-NAME>`  
- `<DEVICE-OR-DOMAIN-NAME>` | This keyword is common to the ‘aeroscout’ and ‘ekahau’ parameters.  
- on <DEVICE-NAME> – Optional. Clears Aeroscout or Ekahau RTLS statistics on a specified AP, wireless controller, or service platform  
- on <DEVICE-OR-DOMAIN-NAME> – Optional. Clears Aeroscout or Ekahau RTLS statistics on a specified AP, wireless controller, service platform, or RF Domain |
| spanning-tree detected-protocols | Clears spanning tree entries on an interface, and restarts protocol migration  
**on <DEVICE-NAME>** | Optional. Clears spanning tree entries on a specified device  
- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform. |
• clear spanning-tree detected-protocols {interface [<INTERFACE-NAME>|ge <1-5>| me1|port-channel <1-3>|pppoe1|up1|vlan <1-4094>|wwan1]} {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>spanning-tree</td>
<td>Clears spanning tree entries 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>` – Clears detected spanning tree entries on a specified interface. Specify the interface name.
- `ge <1-5>` – Clears detected spanning tree entries for the selected GigabitEthernet interface. Select the GigabitEthernet interface index from 1 - 5.
- `me1` – Clears FastEthernet interface status
- `port-channel <1-3>` – Clears detected spanning tree entries for the selected port channel interface. Select the port channel index from 1 - 3.
- `pppoe1` – Clears detected spanning tree entries for Point-to-Point Protocol over Ethernet (PPPoE) interface
- `up1` – Clears detected spanning tree entries for the WAN Ethernet interface
- `vlan <1-4094>` – Clears detected spanning tree entries for the selected VLAN interface. Select a Switch Virtual Interface (SVI) VLAN ID from 1 - 4094.
- `wwan1` – Clears detected spanning tree entries for wireless WAN interface.

**on <DEVICE-NAME>**
- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

• 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 a device’s Virtual Router Redundancy Protocol (VRRP) statistics. 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>error-stats</td>
<td>Clears global error statistics</td>
</tr>
<tr>
<td>stats</td>
<td>Clears VRRP related statistics</td>
</tr>
</tbody>
</table>

**on <DEVICE-NAME>**
- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

• 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 storage</td>
<td>Clears the smart-cache storage</td>
</tr>
</tbody>
</table>

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\ltraffic\(flv|mp4) |

### Optional. Clears stored content on a specified device

- <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

### Examples

```plaintext
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 5.6.0.0-029B
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>
```

```plaintext
rfs4000-229D58>clear lldp neighbors
rfs4000-229D58>show cdp neighbors
--------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>Device ID</th>
<th>Platform</th>
<th>Local Intrfce</th>
<th>Port ID</th>
<th>Duplex</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs4000-880DA7</td>
<td>RFS-4011-11110-US</td>
<td>ge1</td>
<td>ge1</td>
<td>full</td>
</tr>
<tr>
<td>rfs7000-377FDF2</td>
<td>RFS-7010-1000-WR</td>
<td>ge1</td>
<td>ge1</td>
<td>full</td>
</tr>
<tr>
<td>rfs6000-434CAA</td>
<td>RFS6000</td>
<td>ge1</td>
<td>ge1</td>
<td>full</td>
</tr>
<tr>
<td>ap7131-139B34</td>
<td>AP7131N</td>
<td>ge1</td>
<td>ge1</td>
<td>full</td>
</tr>
</tbody>
</table>
--------------------------------------------------------------------------------
rfs4000-229D58>
```

```plaintext
rfs4000-229D58>clear cdp neighbors
rfs4000-229D58>show cdp neighbors
--------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>Device ID</th>
<th>Platform</th>
<th>Local Intrfce</th>
<th>Port ID</th>
<th>Duplex</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
--------------------------------------------------------------------------------
rfs4000-229D58>
```

```plaintext
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

<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>00-02-B3-28-D1-55</td>
<td>forward</td>
</tr>
<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>5C-0E-8B-18-10-91</td>
<td>forward</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>ge5</td>
<td>3C-CE-73-F4-47-83</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: 16
rfs4000-229D58>

rfs4000-229D58>clear mac-address-table address 00-02-B3-28-D1-55

In the following example the first MAC address in the table has been cleared. Now the table has only 15 entries.

rfs4000-229D58>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>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>3C-CE-73-F4-47-83</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
rfs4000-229D58>
### 2.1.4 clock

**User Exec Commands**

Sets a device's system clock

Supported in the following platforms:
- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>&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**

```
rfs4000-229D58>clock set 14:25:35 15 Feb 2013
rfs4000-229D58>show clock
2013-02-15 14:25:40 UTC
rfs4000-229D58>
```
### 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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
cluster start-election
```

**Parameters**
- `cluster start-election`

| start-election | Starts a new cluster master election |

**Examples**

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

**Related Commands**

| `create-cluster` | Creates a new cluster on the specified device |
| `join-cluster`    | Adds a wireless controller or service platform, as a member, to an existing cluster of controllers |
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

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

Parameters

- **mint-id** `<MINT-ID>` — Connects to the remote system using its MiNT ID.
- `<REMOTE-DEVICE-NAME>` — Connects to the remote system using its name.

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.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 19.71.17.28 at level 1, hostname "ap8132-711728", 5 adjacencies, seqnum 323509

nx4500-5CFA2B>connect mint-id 19.71.17.28
Entering character mode
Escape character is '^]'.
AP8132 release 5.6.0.0-023B
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 balance 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, NX6500, NX6524, NX9000, NX9500, NX9510

**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>ip &lt;IP&gt;</td>
<td>Specifies the device's IP address used for cluster creation</td>
</tr>
<tr>
<td>level [1/2]</td>
<td>Optional. Configures the cluster's routing level</td>
</tr>
</tbody>
</table>

- `<CLUSTER-NAME>` – 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.
- `<IP>` – Specify the device's IP address in the A.B.C.D format.
- `1` – Configures level 1 (local) routing
- `2` – Configures level 2 (inter-site) routing

**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 5.6.0.0-023B |
| version 2.3 |
| 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 2001:10:10:10:10:10:2/64 |
| 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>cluster</td>
<td>Initiates 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 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 {on <DEVICE-NAME>}|on <DEVICE-NAME>}
crypto key export rsa <RSA-KEYPAIR-NAME> <EXPORT-TO-URL>
{passphrase <KEY-PASSPHRASE> {background {on <DEVICE-NAME>}|on <DEVICE-NAME>}}
crypto key generate rsa <RSA-KEYPAIR-NAME> <1024-2048>
{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 {on <DEVICE-NAME>}|on <DEVICE-NAME>}
crypto key import rsa <RSA-KEYPAIR-NAME> <IMPORT-FROM-URL>
{passphrase <KEY-PASSPHRASE> {background {on <DEVICE-NAME>}|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|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|use-rsa-key] <RSA-KEYPAIR-NAME>
autogen-subject-name <EXPORT-TO-URL> {background {on <DEVICE-NAME>}}
on <DEVICE-NAME>
crypto pki export request [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 {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] <WORD> 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>}|on <DEVICE-NAME>}
crypto pki import trustpoint <TRUSTPOINT-NAME> <IMPORT-FROM-URL>
  {background {on <DEVICE-NAME>}|on <DEVICE-NAME>|passphrase <KEY-PASSPHRASE>
  {on <DEVICE-NAME>})
crypto pki zeroize trustpoint <TRUSTPOINT-NAME> {del-key {on <DEVICE-NAME>}}
  on <DEVICE-NAME>}

Parameters
• crypto key export rsa <RSA-KEYPAIR-NAME> <EXPORT-TO-URL>
  {background {on <DEVICE-NAME>}|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>
<tbody>
<tr>
<td>export rsa &lt;RSA-KEYPAIR-NAME&gt;</td>
<td>Exports an existing RSA Keypair to a specified destination</td>
</tr>
<tr>
<td>&lt;EXPORT-TO-URL&gt;</td>
<td>Specify the RSA Keypair destination address in the following format:</td>
</tr>
<tr>
<td>tftp://&lt;hostname</td>
<td>IP&gt;[:port]/path/file</td>
</tr>
<tr>
<td>ftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname</td>
<td>IP&gt;[:port]/path/file</td>
</tr>
<tr>
<td>http://&lt;hostname</td>
<td>IP&gt;[:port]/path/file</td>
</tr>
<tr>
<td>usb&lt;n&gt;:/path/file</td>
<td>Optional. Performs export operation in the background. Optionally specify the device to perform export on.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Performs export operation on a specific device.</td>
</tr>
<tr>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Performs export operation on a specific device</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>

• crypto key export rsa <RSA-KEYPAIR-NAME> <EXPORT-TO-URL>
  {passphrase <KEY-PASSPHRASE> {background {on <DEVICE-NAME>}|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>
<tbody>
<tr>
<td>export rsa</td>
<td>Exports a RSA Keypair to a specified destination</td>
</tr>
<tr>
<td>• &lt;RSA-KEYPAIR-NAME&gt; – Specify the RSA Keypair name.</td>
<td></td>
</tr>
</tbody>
</table>
### USER EXEC MODE COMMANDS

#### crypto key generate rsa

<table>
<thead>
<tr>
<th>EXPORT-TO-URL</th>
<th>Specify the RSA Keypair destination address in the following format:</th>
</tr>
</thead>
<tbody>
<tr>
<td>passphrase</td>
<td>tftp://&lt;hostname</td>
</tr>
<tr>
<td>KEY-PASSPHRASE&gt;</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>
<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>&lt;1024-2048&gt;</td>
<td>• passphrase – Optional. Encrypts RSA Keypair before exporting</td>
</tr>
<tr>
<td></td>
<td>• &lt;KEY-PASSPHRASE&gt; – Specify a passphrase to encrypt the RSA Keypair.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEVICE-NAME</th>
<th>Optional. Generates the new RSA Keypair on a specified device</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

#### crypto key import rsa

<table>
<thead>
<tr>
<th>IMPORT-FROM-URL</th>
<th>Specify the RSA Keypair source address in the following format:</th>
</tr>
</thead>
<tbody>
<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>
<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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEVICE-NAME</th>
<th>Optional. Performs import operation on a specified device</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEVICE-NAME</th>
<th>Optional. Performs import operation in the background</th>
</tr>
</thead>
<tbody>
<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>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>\texttt{crypto key import rsa &lt;RSA-KEYPAIR-NAME&gt; &lt;IMPORT-FROM-URL&gt;{passphrase &lt;KEY-PASSPHRASE}{background {on \textit{DEVICE-NAME}}</td>
<td>on \textit{DEVICE-NAME}}}</td>
</tr>
<tr>
<td>\texttt{&lt;RSA-KEYPAIR-NAME&gt;}</td>
<td>Specify the RSA Keypair name.</td>
</tr>
<tr>
<td>\texttt{&lt;IMPORT-FROM-URL}{passphrase &lt;KEY-PASSPHRASE}}</td>
<td>Specify the RSA Keypair source address in the following format: tcp://&lt;hostname</td>
</tr>
<tr>
<td>\texttt{passphrase}</td>
<td>Optional. Decrypts the RSA Keypair before importing</td>
</tr>
<tr>
<td>\texttt{&lt;KEY-PASSPHRASE&gt;}</td>
<td>Specify the passphrase to decrypt the RSA Keypair.</td>
</tr>
<tr>
<td>\texttt{on \textit{DEVICE-NAME}}</td>
<td>Optional. Performs import operation on a specified device</td>
</tr>
<tr>
<td>\texttt{&lt;DEVICE-NAME&gt;}</td>
<td>Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td>\texttt{crypto key zeroize rsa &lt;RSA-KEYPAIR-NAME}{force {on \textit{DEVICE-NAME}}</td>
<td>on \textit{DEVICE-NAME}}}</td>
</tr>
<tr>
<td>\texttt{&lt;RSA-KEYPAIR-NAME&gt;}</td>
<td>Specify the RSA Keypair name.</td>
</tr>
<tr>
<td>\texttt{force {on \textit{DEVICE-NAME}}}</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>\texttt{on \textit{DEVICE-NAME}}</td>
<td>Optional. Deletes all certificates associated with the RSA Keypair on a specified device</td>
</tr>
<tr>
<td>\texttt{&lt;DEVICE-NAME&gt;}</td>
<td>Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td>\texttt{crypto pki authenticate &lt;TRUSTPOINT-NAME&gt; &lt;URL}{background {on \textit{DEVICE-NAME}}</td>
<td>on \textit{DEVICE-NAME}}}</td>
</tr>
<tr>
<td>\texttt{&lt;TRUSTPOINT-NAME&gt;}</td>
<td>Specify the trustpoint name.</td>
</tr>
<tr>
<td>Syntax</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| `<URL>` | Specify CA's location in the following format:  
|         | tftp://<hostname|IP|[:port]/path/file  
|         | ftp://<user>:<passwd>@<hostname|IP|[:port]/path/file  
|         | sftp://<user>@<hostname|IP|[:port]/path/file  
|         | http://<hostname|IP|[:port]/path/file  
|         | cf:/path/file  
|         | usb<n>:/path/file  
| **Note:** The CA certificate is imported from the specified location. |
| `background` \ {on `<DEVICE-NAME>`} | Optional. Performs authentication in the background. Optionally specify a device on which to perform authentication. |
| `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. |
| `pki` | Exports CSR to the CA for digital identity certificate. The CSR contains applicant’s details and RSA Keypair’s public key. |
| `export request` | 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>` \ {background \ {on `<DEVICE-NAME>`} | Specify the CA's location in the following format:  
|         | tftp://<hostname|IP|[:port]/path/file  
|         | ftp://<user>:<passwd>@<hostname|IP|[:port]/path/file  
|         | sftp://<user>@<hostname|IP|[:port]/path/file  
|         | http://<hostname|IP|[:port]/path/file  
|         | cf:/path/file  
|         | usb<n>:/path/file  
| **Note:** The CSR is exported to the specified location.  
| | • `background` – Optional. Performs export operation in the background  
| | • `on `<DEVICE-NAME>` – Optional. Performs export operation on a specified device  
| | • `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform. |
| `email` `<SEND-TO-EMAIL>` | Exports CSR to a specified e-mail address  
<p>| | • <code>&lt;SEND-TO-EMAIL&gt;</code> – Specify the CA's e-mail address. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>crypto pki export request</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>[generate-rsa-key</td>
<td>use-rsa-key] &lt;RSA-KEYPAIR-NAME&gt;</td>
</tr>
<tr>
<td>subject-name &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;)</td>
<td>Specifies subject name to identify the certificate</td>
</tr>
<tr>
<td>ip address &lt;IP&gt;</td>
<td>Exports CSR to a specified device or system</td>
</tr>
<tr>
<td>fqn &lt;FQDN&gt;</td>
<td>Exports CSR to a specified Fully Qualified Domain Name (FQDN)</td>
</tr>
<tr>
<td>email &lt;SEND-TO-EMAIL&gt;</td>
<td>Exports CSR to a specified e-mail address</td>
</tr>
<tr>
<td>pki</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>export request</td>
<td>Exports CSR to the CA for a digital identity certificate. The CSR contains applicant’s details and RSA Keypair’s public key.</td>
</tr>
<tr>
<td>[generate-rsa-key</td>
<td>use-rsa-key] &lt;RSA-KEYPAIR-NAME&gt;</td>
</tr>
<tr>
<td>subject-name &lt;COMMON-NAME&gt;</td>
<td>Specifies subject name to identify the certificate</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>&lt;EXPORT-TO-URL&gt;</td>
<td>Specify the CA’s location in the following format:</td>
</tr>
<tr>
<td>{background} {on &lt;DEVICE-NAME&gt;}</td>
<td>Note: The CSR is exported to the specified location.</td>
</tr>
<tr>
<td>background – Optional. Performs export operation in the background</td>
<td>Note: The CSR is exported to the specified location.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt; – Optional. Performs export operation on a specific device</td>
<td>Note: The CSR is exported to the specified location.</td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
<td>Note: The CSR is exported to the specified location.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>crypto pki export trustpoint</code></td>
<td>Enables PKI management. Use this command to authenticate, export, generate, or delete a</td>
</tr>
<tr>
<td><code>&lt;TRUSTPOINT-NAME&gt;</code></td>
<td>trustpoint and its associated CA certificates.</td>
</tr>
<tr>
<td><code>&lt;EXPORT-TO-URL&gt;</code></td>
<td>Specify the destination address 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>
<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><strong>background</strong><code>{on &lt;DEVICE-NAME&gt;}</code></td>
<td>Optional. Performs export operation in the background</td>
</tr>
<tr>
<td><strong>on &lt;DEVICE-NAME&gt;</strong></td>
<td>Optional. Performs export operation on a specified device</td>
</tr>
<tr>
<td></td>
<td>Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td><strong>passphrase</strong> <code>&lt;KEY-PASSPHRASE&gt;</code></td>
<td>Optional. Encrypts the key with a passphrase before exporting</td>
</tr>
<tr>
<td><strong>background</strong> <code>{on &lt;DEVICE-NAME&gt;}</code></td>
<td>Optional. Performs export operation in the background</td>
</tr>
<tr>
<td><strong>on &lt;DEVICE-NAME&gt;</strong></td>
<td>Optional. Performs export operation on a specified device</td>
</tr>
<tr>
<td></td>
<td>Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td></td>
<td>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 generate self-signed</code></td>
<td>Enables PKI management. Use this command to authenticate, export, generate, or delete a</td>
</tr>
<tr>
<td><code>&lt;TRUSTPOINT-NAME&gt;</code></td>
<td>trustpoint and its associated CA certificates.</td>
</tr>
<tr>
<td><code>&lt;RSA-KEYPAIR-NAME&gt;</code></td>
<td>Generates a self-signed CA certificate and a trustpoint</td>
</tr>
<tr>
<td><strong>autogen-subject-name</strong> <code>{(email </code>&lt;SEND-TO-EMAIL&gt;<code>),</code>&lt;FQDN&gt;<code>, `ip-address `&lt;IP&gt;</code>, on <code>&lt;DEVICE-NAME&gt;</code>}`</td>
<td>Generates a self-signed CA certificate and a trustpoint</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>pki</code></td>
<td>Enables PKI management. Use this command to authenticate, export, generate, or delete a</td>
</tr>
<tr>
<td></td>
<td>trustpoint and its associated CA certificates.</td>
</tr>
<tr>
<td><code>generate</code></td>
<td>Generates a CA certificate and a trustpoint</td>
</tr>
<tr>
<td><code>self-signed</code></td>
<td>Generates a self-signed CA certificate and a trustpoint</td>
</tr>
<tr>
<td><code>&lt;TRUSTPOINT-NAME&gt;</code></td>
<td>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>crypto pki generate self-signed &lt;TRUSTPOINT-NAME&gt; [generate-rsa-key</td>
<td>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;email &lt;SEND-TO-EMAIL&gt;,fqdn &lt;FQDN&gt;,ip-address &lt;IP&gt;,on &lt;DEVICE-NAME&gt;}}</td>
</tr>
<tr>
<td>crypto pki generate self-signed &lt;TRUSTPOINT-NAME&gt; [generate-rsa-key</td>
<td>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;email &lt;SEND-TO-EMAIL&gt;,fqdn &lt;FQDN&gt;,ip-address &lt;IP&gt;,on &lt;DEVICE-NAME&gt;}}</td>
</tr>
<tr>
<td>[generate-rsa-key</td>
<td>use-rsa-key] &lt;RSA-KEYPAIR-NAME&gt;</td>
</tr>
<tr>
<td>pki generate self-signed</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>pki generate self-signed</td>
<td>Generates a self-signed CA certificate and a trustpoint</td>
</tr>
<tr>
<td>pki generate self-signed</td>
<td>Generates a new RSA Keypair, or uses an existing RSA Keypair</td>
</tr>
<tr>
<td>subject-name &lt;COMMON-NAME&gt;</td>
<td>Specify a subject name to identify the certificate.</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 &lt;SEND-TO-EMAIL&gt;</td>
<td>Optional. Exports the CSR to a specified e-mail address</td>
</tr>
<tr>
<td></td>
<td>• &lt;SEND-TO-EMAIL&gt; – Specify the CA's e-mail address.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>crypto pki import certificate &lt;TRUSTPOINT-NAME&gt; &lt;IMPORT-FROM-URL&gt; (background {on &lt;DEVICE-NAME&gt;})</td>
<td>Imports a signed server certificate or CRL&lt;br&gt;• certificate – Imports signed server certificate&lt;br&gt;• &lt;TRUSTPOINT-NAME&gt; – Specify the trustpoint name (should be authenticated).</td>
</tr>
<tr>
<td>crypto pki import crl &lt;TRUSTPOINT-NAME&gt; &lt;IMPORT-FROM-URL&gt; (background {on &lt;DEVICE-NAME&gt;})</td>
<td>Imports CRL&lt;br&gt;• &lt;TRUSTPOINT-NAME&gt; – Specify the trustpoint name (should be authenticated).</td>
</tr>
<tr>
<td>crypto pki import trustpoint &lt;TRUSTPOINT-NAME&gt; &lt;IMPORT-FROM-URL&gt; (background {on &lt;DEVICE-NAME&gt;})</td>
<td>Imports a trustpoint and its associated CA certificate, server certificate, and private key&lt;br&gt;• &lt;TRUSTPOINT-NAME&gt; – Specify the trustpoint name (should be authenticated).</td>
</tr>
</tbody>
</table>

**Optional Arguments:**
- **fqdn <FQDN>**<br>Optional. Exports the CSR to a specified FQDN<br>• <FQDN> – Specify the CA’s FQDN.
- **ip address <IP>**<br>Optional. Exports the CSR to a specified device or system<br>• <IP> – Specify the CA’s IP address.
- **background {on <DEVICE-NAME>}}**<br>Optional. Performs import operation in the background<br>• on <DEVICE-NAME> – Optional. Performs import operation on a specified device<br>• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.
- **on <DEVICE-NAME>**<br>Optional. Performs import operation on a specified device<br>• <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.
<IMPORT-FROM-URL> Specify the trustpoint source address in the following format:
- 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

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

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

passphrase Optional. Encrypts trustpoint with a passphrase before importing
  <KEY-PASSPHRASE> • <KEY-PASSPHRASE> – Specify a passphrase.
  {background • background – Optional. Imports the encrypted trustpoint in the background
  {on <DEVICE-NAME>} • on <DEVICE-NAME> – Optional. Imports the encrypted trustpoint 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>}}
on <DEVICE-NAME>
pki Enables PKI management. Use this command to authenticate, export, generate, or delete a
  trustpoint and its associated CA certificates.

zeroize Deletes a trustpoint and its associated CA certificate, server certificate, and private key
  <TRUSTPOINT-NAME> • <TRUSTPOINT-NAME> – Specify the trustpoint name (should be authenticated).

del-key Optional. Deletes the private key associated with the server certificate
  {on <DEVICE-NAME>} • on <DEVICE-NAME> – Optional. Deletes private key on a specific device
  • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.
on <DEVICE-NAME> Optional. Deletes the trustpoint on a specified device
  • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

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

rfs7000-37FABE>crypto key import rsa moto123 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>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

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

Parameters

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

| crypto-cmp-cert-update <TRUSTPOINT-NAME> {on <DEVICE-RF-DOMAIN-NAME>} | Triggers a CMP certificate update on a specified device or devices
|-----------------------------|---------------------------------------------------------------|
| on <DEVICE-NAME> — Optional. Triggers a CMP certificate update and response 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.
| <DEVICE-RF-DOMAIN-NAME> — Specify the name of the AP, wireless controller, service platform, or RF Domain. 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 **device-upgrade**

<table>
<thead>
<tr>
<th>User Exec Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables firmware upgrade on an adopted device or a set of adopted devices (access points, wireless controllers, and service platforms)</td>
</tr>
</tbody>
</table>

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 an 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 completed, 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)
- Site controller – RFS4000, RFS6000, RFS7000, NX45XX, 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

device-upgrade [<MAC/HOSTNAME>|all|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rf4000|rf6000|rf7000|nx45xx|nx65xx|nx9000|vx9000]

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>}

{staggered-reboot}

device-upgrade cancel-upgrade [<MAC/HOSTNAME]|all|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rf4000|rf6000|rf7000|nx45XX|nx65XX|nx9000|vx9000|cn]
device-upgrade cancel-upgrade  [<MAC/HOSTNAME>|all]
device-upgrade cancel-upgrade  [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rf4000|rf6000|rf7000|nx45XX|nx65XX|nx9000|vx9000] all
device-upgrade cancel-upgrade on rf-domain  [<RF-DOMAIN-NAME]|all]
device-upgrade load-image  [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rf4000|rf6000|rf7000|nx45XX|nx65XX|nx9000|vx9000] <IMAGE-URL>
device-upgrade rf-domain  [<RF-DOMAIN-NAME]|all|containing <WORD>|filter location <WORD>]
  [all|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rf4000|rf6000|rf7000|nx45XX|nx65XX|nx9000|vx9000]
  {force|no-reboot|from-controller|reboot-time <TIME>|staggered-reboot|
   upgrade-time <TIME>}
device-upgrade rf-domain  [<RF-DOMAIN-NAME]|all|containing <WORD>|filter location <WORD>]
  [all|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rf4000|rf6000|rf7000|nx45XX|nx65XX|nx9000|nx9000]
  {force|no-reboot|reboot-time <TIME>}
  {(staggered-reboot)}
device-upgrade rf-domain  [<RF-DOMAIN-NAME]|all|containing <WORD>|filter location <WORD>]
  [all|ap621|ap622|ap650|ap6511|ap6521|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rf4000|rf6000|rf7000|nx45XX|nx65XX|nx9000]
  {force|no-reboot|reboot-time <TIME>}
  {from-controller {no-reboot|reboot-time <TIME>|upgrade-time <TIME>}} {no-reboot|
   reboot-time <TIME>}
  {(staggered-reboot)}
device-upgrade rf-domain  [<RF-DOMAIN-NAME]|all|containing <WORD>|filter location <WORD>]
  [all|ap621|ap622|ap650|ap6511|ap6521|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rf4000|rf6000|rf7000|nx45XX|nx65XX|nx9000]
  {force|no-reboot|reboot-time <TIME>}
  {upgrade-time <TIME>}
  {no-reboot|reboot-time <TIME>} {(staggered-reboot)}

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</td>
</tr>
<tr>
<td>{no-reboot</td>
<td>reboot-time &lt;TIME&gt;}</td>
</tr>
<tr>
<td>all</td>
<td>Upgrades firmware on all devices</td>
</tr>
<tr>
<td>force</td>
<td>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.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>Upgrades firmware on all devices of a specific type. Select the device type.</td>
</tr>
<tr>
<td>ap621</td>
<td>ap622</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 firmware upgrade on all devices</td>
</tr>
<tr>
<td>staggered-reboot</td>
<td>This keyword is common to all of the above.</td>
</tr>
<tr>
<td>force</td>
<td>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.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>no-reboot</td>
<td>Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted)</td>
</tr>
</tbody>
</table>
| 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  
|                  | • <TIME> – 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:  
|                  | • no-reboot – Optional. Disables automatic reboot after a successful upgrade  
|                  | • 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 common to all of the above.  
|                  | • Optional. Enables staggered reboot (one at a time), without network impact |
| cancel-upgrade   | Cancels a scheduled firmware upgrade on a specified device or on all devices  
| [<MAC/HOSTNAME>]| • <MAC/HOSTNAME> – Cancels a scheduled upgrade on the device identified by the <MAC/HOSTNAME> keyword. Specify the device’s MAC address or hostname.  
| all]             | • all – Cancels scheduled upgrade on all devices |
| device-upgrade   | cancels scheduled firmware upgrade on all devices of a specific type. Select the device type.  
| [ap621|ap622|ap650|ap651|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000] all | • AP621 all – Cancels scheduled upgrade on all AP621s  
|                  | • AP622 all – Cancels scheduled upgrade on all AP622s  
|                  | • AP650 all – Cancels scheduled upgrade on all AP650s  
|                  | • AP651 all – Cancels scheduled upgrade on all AP651s  
|                  | • AP6521 all – Cancels scheduled upgrade on all AP6521s  
|                  | • AP6522 all – Cancels scheduled upgrade on all AP6522s  
|                  | • AP6532 all – Cancels scheduled upgrade on all AP6532s  
|                  | • AP6562 all – Cancels scheduled upgrade on all AP6562s  
|                  | • AP71XX all – Cancels scheduled upgrade on all AP71XXs  
|                  | • AP81XX all – Cancels scheduled upgrade on all AP81XXs  
|                  | • AP82XX all – Cancels scheduled upgrade on all AP82XXs  
|                  | • RFS4000 all – Cancels scheduled upgrade on all RFS4000s  
|                  | • RFS6000 all – Cancels scheduled upgrade on all RFS6000s  
|                  | • RFS7000 all – Cancels scheduled upgrade on all RFS7000s  
|                  | • NX45XX all – Cancels scheduled upgrade on all NX45XX series service platforms  
|                  | • NX65XX all – Cancels scheduled upgrade on all NX65XX series service platforms  
|                  | • NX9000 all – Cancels scheduled upgrade on all NX9000 series service platforms  
|                  | • VX9000 all – Cancels scheduled upgrade on all VX9000 devices |
### device-upgrade cancel-upgrade on rf-domain ["<DOMAIN-NAME>|all"]

#### cancel-upgrade on rf-domain ["<RF-DOMAIN-NAME>|all"]

**Cancels scheduled firmware upgrade in a specified RF Domain or all RF Domains**
- **<RF-DOMAIN-NAME>** – Cancels scheduled device upgrade in a specified RF Domain. Specify the RF Domain name.
- **all** – Cancels scheduled device upgrades across all RF Domains

#### load-image ["ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rf5400|rf5600|rf5700|nx45xx|nx65xx|nx9000|vx9000"] <IMAGE-URL>

**Loads device firmware image from a specified location. Select the device type and provide the location of the required device firmware image.**
- **AP621** <IMAGE-URL> – Loads AP621 firmware image
- **AP622** <IMAGE-URL> – Loads AP622 firmware image
- **AP650** <IMAGE-URL> – Loads AP650 firmware image
- **AP6511** <IMAGE-URL> – Loads AP6511 firmware image
- **AP6521** <IMAGE-URL> – Loads AP6521 firmware image
- **AP6522** <IMAGE-URL> – Loads AP6522 firmware image
- **AP6532** <IMAGE-URL> – Loads AP6532 firmware image
- **AP6562** <IMAGE-URL> – Loads AP6562 firmware image
- **AP71XX** <IMAGE-URL> – Loads AP71XX firmware image
- **AP81XX** <IMAGE-URL> – Loads AP81XX firmware image
- **AP82XX** <IMAGE-URL> – Loads AP82XX firmware image
- **RFS4000** <IMAGE-URL> – Loads RFS4000 firmware image
- **RFS6000** <IMAGE-URL> – Loads RFS6000 firmware image
- **RFS7000** <IMAGE-URL> – Loads RFS7000 firmware image
- **NX45XX** <IMAGE-URL> – Loads NX45XX series service platform firmware image
- **NX65XX** <IMAGE-URL> – Loads NX65XX series service platform firmware image
- **NX9000** <IMAGE-URL> – Loads NX9000 series service platform firmware image
- **VX9000** <IMAGE-URL> – Loads VX9000 device firmware image

**<IMAGE-URL>**

*Specify the device’s firmware image location in one of the following formats:*

**IPv4 URLs:**
- tftp://<hostname>|IP|[:port]/path/file
- ftp://<user>:<password>@<hostname>|IP|[:port]/path/file
- sftp://<user>:<password>@<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>:<password>@<hostname>|IPv6|[:port]/path/file
- sftp://<user>:<password>@<hostname>|IPv6|[:port]/path/file
- http://<hostname>|IPv6|[:port]/path/file
- **device-upgrade rf-domain** [\(<RF-DOMAIN-NAME>\)](\<\)? \[all\]|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000] \{force\}|no-reboot|reboot-time\}<TIME>{staggered-reboot}\)

<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>(&lt;RF-DOMAIN-NAME&gt;) - Upgrades devices in a specified RF Domain. Specify the RF Domain name.</td>
<td></td>
</tr>
<tr>
<td>all - Upgrades devices across all RF Domains</td>
<td></td>
</tr>
<tr>
<td>containing &lt;WORD&gt; - Filters RF Domains containing the sub-string identified by the &lt;WORD&gt; keyword. Devices on the filtered RF Domains are upgraded.</td>
<td></td>
</tr>
<tr>
<td>filter location &lt;WORD&gt; - Filters devices by their location. All devices with location matching the &lt;WORD&gt; keyword are upgraded.</td>
<td></td>
</tr>
</tbody>
</table>

| [all|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000] | After specifying the RF Domain, select the device type.  |
| --- | --- |
| all - Upgrades firmware on all devices  |
| AP621 - Upgrades firmware on all AP621s  |
| AP622 - Upgrades firmware on all AP622s  |
| AP650 - Upgrades firmware on all AP650s  |
| AP6511 - Upgrades firmware on all AP6511s  |
| AP6521 - Upgrades firmware on all AP6521s  |
| AP6522 - Upgrades firmware on all AP6522s  |
| AP6532 - Upgrades firmware on all AP6532s  |
| AP6562 - Upgrades firmware on all AP6562s  |
| AP71XX - Upgrades firmware on all AP71XXs  |
| AP81XX - Upgrades firmware on all AP81XXs  |
| AP82XX - Upgrades firmware on all AP82XXs  |
| RFS4000 - Upgrades firmware on all RFS4000s  |
| RFS6000 - Upgrades firmware on all RFS6000s  |
| RFS7000 - Upgrades firmware on all RFS7000s  |
| NX45XX - Upgrades firmware on all NX45XX series service platforms  |
| NX65XX - Upgrades firmware on all NX65XX series service platforms  |
| NX9000 - Upgrades firmware on all NX9000 series service platforms  |
| VX9000 - Upgrades firmware on all VX9000 devices  |

| 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.  |

| 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.  |
### device-upgrade rf-domain

```bash
device-upgrade rf-domain [<RF-DOMAIN-NAME> | all | containing <WORD> | filter location <WORD>]
```

- `<RF-DOMAIN-NAME>` – Upgrades devices in a specified RF Domain. Specify the RF Domain name.
- `all` – Upgrades devices across all RF Domains
- `containing <WORD>` – Filters RF Domains containing the sub-string identified by the `<WORD>` keyword. 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.

#### Examples

- `device-upgrade rf-domain [ap621]` upgrades all AP621 devices.
- `device-upgrade rf-domain containing "X"` upgrades all RF Domains containing the string "X".

### command Options

- `from-controller` Optional. Upgrades a device through the adopted device
- `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

### rf-domain

- `<RF-DOMAIN-NAME>` – Upgrades devices in a specified RF Domain. Specify the RF Domain name.
- `all` – Upgrades devices across all RF Domains
- `containing <WORD>` – Filters RF Domains containing the sub-string identified by the `<WORD>` keyword. 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.

### Examples

- `rf-domain [ap621]` upgrades all AP621 devices.
- `rf-domain containing "X"` upgrades all RF Domains containing the string "X".

### Command Options

- `from-controller` Optional. Upgrades a device through the adopted device
- `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.
<table>
<thead>
<tr>
<th>Command Details</th>
<th>Description</th>
</tr>
</thead>
</table>
| **device-upgrade rf-domain**  
  `<RF-DOMAIN-NAME>|all|containing <WORD>|filter location <WORD>`  
  `{upgrade-time <TIME> {no-reboot|reboot-time <TIME>}} {(staggered-reboot)}` | Upgrades firmware on devices in a specified RF Domain or all RF Domains  
  - `<RF-DOMAIN-NAME>` – Upgrades devices in a specified RF Domain. Specify the RF Domain name.  
  - all – Upgrades devices across all RF Domains  
  - containing <WORD> – Filters RF Domains containing the sub-string identified by the <WORD> keyword. 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.  
  - upgrade-time <TIME> – Specifies 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 – Optional. Enables staggered reboot (one at a time), without network impact. |
| **upgrade-time <TIME>**  
  `{no-reboot|reboot-time <TIME>}` | Optional. Schedules an automatic firmware upgrade  
  - <TIME> – Specify the upgrade time in the MM/DD/YYYY-HH:MM or HH:MM format. 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. |
| **rf-domain**  
  `<RF-DOMAIN-NAME>|all|containing <WORD>|filter location <WORD>`  
  `{all|ap621|ap622|ap650|ap6511|ap6521|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000}`  
  `upgrade-time <TIME> {no-reboot|reboot-time <TIME>}`  
  `(staggered-reboot)` | After specifying the RF Domain, select the device type.  
  - all – Upgrades firmware on all devices  
  - AP621 – Upgrades firmware on all AP621s  
  - AP622 – Upgrades firmware on all AP622s  
  - AP650 – Upgrades firmware on all AP650s  
  - AP6511 – Upgrades firmware on all AP6511s  
  - AP6521 – Upgrades firmware on all AP6521s  
  - AP6522 – Upgrades firmware on all AP6522s  
  - AP6532 – Upgrades firmware on all AP6532s  
  - AP6562 – Upgrades firmware on all AP6562s  
  - AP71XX – Upgrades firmware on all AP71XXs  
  - AP81XX – Upgrades firmware on all AP81XXs  
  - AP82XX – Upgrades firmware on all AP82XXs  
  - RFS4000 – Upgrades firmware on all RFS4000s  
  - RFS6000 – Upgrades firmware on all RFS6000s  
  - RFS7000 – Upgrades firmware on all RFS7000s  
  - NX45XX – Upgrades firmware on all NX45XX series service platforms  
  - NX65XX – Upgrades firmware on all NX65XX series service platforms  
  - NX9000 – Upgrades firmware on all NX9000 series service platforms  
  - VX9000 – Upgrades firmware on all VX9000 devices |
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>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

rfs4000-229D58>device-upgrade rfs4000-229D58 no-reboot
rfs4000-229D58>

rfs4000-229D58>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

rfs4000-229D58>

rfs4000-229D58>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>ap71xx-0F43D8</td>
<td>failed</td>
<td>2013-01-05</td>
<td>00:21:08</td>
<td>3</td>
<td>00-23-68-22-9D-58</td>
</tr>
<tr>
<td>ap6532-986C50</td>
<td>failed</td>
<td>2013-01-05</td>
<td>00:26:31</td>
<td>3</td>
<td>00-23-68-22-9D-58</td>
</tr>
</tbody>
</table>
|                  | error: Unable to get update file, failure in ftp/openssl/tar
|                  | error: Bad file, failure in tar. tar: invalid tar magic
|                  | Total number of entries displayed: 2
rfs4000-229D58>
The following example shows two adopted devices adopted on the RF domain 'TechPubs':

```
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 these 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.

```
use6000-6DB5D4#device-upgrade rf-domain TechPubs ap6522 force
```

In progress ....

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4-C7-99-6D-B5-D4</td>
<td>Success</td>
<td>TechPubs(device type(s) ap6522 added for upgrade),</td>
</tr>
</tbody>
</table>

```
use6000-6DB5D4>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
------------------
```

```
use6000-6DB5D4>
```
2.1.11 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
disable

Parameters
None

Examples
rfs7000-37FABE#disable
rfs7000-37FABE>
2.1.12 **enable**

**User Exec 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
enable
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE>enable
rfs7000-37FABE#
```
2.1.13 **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, NX6500, NX6524, NX9000, NX9500, NX9510

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

**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 5.6.0.0-023B
! version 2.3
!```
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>cluster</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>create-cluster</td>
<td>Creates a new cluster on a specified device</td>
</tr>
</tbody>
</table>
### 2.1.14 l2tpv3

#### User Exec Commands

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

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>l2tpv3 tunnel [TUNNEL-NAME]</td>
<td>Establishes or brings down L2TPv3 tunnels&lt;br&gt;down – Brings down the specified tunnel&lt;br&gt;up – Establishes the specified tunnel</td>
</tr>
<tr>
<td>l2tpv3 tunnel &lt;TUNNEL-NAME&gt; session &lt;SESSION-NAME&gt;</td>
<td>Establishes or brings down a specified session inside an L2TPv3 tunnel&lt;br&gt;down – Brings down the specified session&lt;br&gt;up – Establishes the specified session</td>
</tr>
<tr>
<td>l2tpv3 tunnel all</td>
<td>Establishes or brings down all L2TPv3 tunnels&lt;br&gt;down – Brings down all tunnels&lt;br&gt;up – Establishes all tunnels</td>
</tr>
</tbody>
</table>

#### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUNNEL-NAME</td>
<td>Specifies the tunnel name to establish or bring down&lt;br&gt;down – Brings down the specified tunnel&lt;br&gt;up – Establishes the specified tunnel</td>
</tr>
<tr>
<td>SESSION-NAME</td>
<td>Specifies the session name.</td>
</tr>
<tr>
<td>DEVICE-NAME</td>
<td>Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

- 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>}

- Optional. Establishes or brings down a tunnel on a specified device
- Specify the name of the AP, wireless controller, or service platform.
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.*
2.1.15 logging

User Exec Commands

Modifies message logging settings

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>parameter</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>monitor</td>
<td>Sets the 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.</td>
</tr>
<tr>
<td>&lt;0-7&gt;</td>
<td>Optional. Specify the logging severity level from 0-7. The various levels and their implications are as follows:</td>
</tr>
<tr>
<td>alerts</td>
<td>Optional. Immediate action needed (severity=1)</td>
</tr>
<tr>
<td>critical</td>
<td>Optional. Critical conditions (severity=2)</td>
</tr>
<tr>
<td>debugging</td>
<td>Optional. Debugging messages (severity=7)</td>
</tr>
<tr>
<td>emergencies</td>
<td>Optional. System is unusable (severity=0)</td>
</tr>
<tr>
<td>errors</td>
<td>Optional. Error conditions (severity=3)</td>
</tr>
<tr>
<td>informational</td>
<td>Optional. Informational messages (severity=6)</td>
</tr>
<tr>
<td>notifications</td>
<td>Optional. Normal but significant conditions (severity=5)</td>
</tr>
<tr>
<td>warnings</td>
<td>Optional. Warning conditions (severity=4)</td>
</tr>
</tbody>
</table>

Examples

```
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):

Dec 03 08:41:58 2013: rfs4000-229D58 : %NSM-4-IFUP: Interface ge4 is up
Dec 03 08:41:56 2013: rfs4000-229D58 : %NSM-4-IFDOWN: Interface ge4 is down
Dec 02 11:41:17 2013: rfs4000-229D58 : %NSM-4-IFUP: Interface ge4 is up
Dec 02 11:41:16 2013: rfs4000-229D58 : %NSM-4-IFUP: Interface ge4 is up
```

Related Commands

```
no
```

Resets terminal lines logging levels
2.1.16 mint

User Exec Commands

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

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>) }

| ping <MINT-ID> | Sends a MiNT echo message to a specified destination
|---------------|--------------------------------------------------|
| count <1-10000> | Optional. Sets the pings to the MiNT destination
| size <1-64000> | Optional. Sets the MiNT payload size in bytes
| timeout <1-10> | Optional. Sets a response time in seconds

- mint traceroute <MINT-ID> { (destination-port <1-65535>|max-hops <1-255>|source-port <1-65535>|timeout <1-255>) }

| traceroute <MINT-ID> | Prints the route packets trace to a device
|---------------------|--------------------------------------------------------------------------------|
| destination-port <1-65535> | Optional. Sets the Equal-cost Multi-path (ECMP) routing destination port
| max-hops <1-255> | Optional. Sets the maximum number of hops a traceroute packet traverses in the forward direction
| source-port <1-65535> | Optional. Sets the ECMP source port
| timeout <1-255> | Optional. Sets the minimum response time period in seconds

Sends a MiNT echo message to a specified destination

• <MINT-ID> — Specify the destination device’s MiNT ID.

Optional. Sets the pings to the MiNT destination

• <1-10000> — Specify a value from 1 - 10000. The default is 3.

Optional. Sets the MiNT payload size in bytes

• <1-64000> — Specify a value from 1 - 64000 bytes. The default is 64 bytes.

Optional. Sets a response time in seconds

• <1-10> — Specify a value from 1 sec - 10 sec. The default is 1 second.

Optional. Sets the Equal-cost Multi-path (ECMP) routing destination port

• <1-65535> — Specify a value from 1 - 65535. The default port is 45.

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.

Optional. Sets the ECMP source port

• <1-65535> — Specify a value from 1 - 65535. The default port is 45.

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>
### 2.1.17 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
no [adoption|captive-portal|crypto|debug|logging|mac-user-db|page|service|terminal|
    virtual-machine|wireless]
no adoption {on <DEVICE-OR-DOMAIN-NAME>}
no captive-portal client [captive-portal <CAPTIVE-PORTAL-NAME>|mac <MAC>]
    {on <DEVICE-OR-DOMAIN-NAME>}
no crypto pki [server|trustpoint]
no crypto pki [server|trustpoint] <TRUSTPOINT-NAME> {del-key {on <DEVICE-NAME>}}
    {on <DEVICE-NAME>}
no logging monitor
no mac-user-db user [{USER-NAME}|all]g
no page
no service [ap300|block-adopter-config-update|locator|snmp|ssm|wireless]
no service ap300 locator <MAC>
no service snmp sysoid wing5
no service block-adopter-config-update
no service ssm trace pattern {<WORD>} {on <DEVICE-NAME>}
no service wireless [trace pattern {<WORD>} {on <DEVICE-NAME>}]
    unsanctioned ap air-terminate <BSSID> {on <DOMAIN-NAME>}
no service locator {on <DEVICE-NAME>}
no terminal [length|width]
no virtual-machine assign-usb-ports {on <DEVICE-NAME>}
no wireless client [all|<MAC>]
no wireless client all {filter|on}
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 adoption {on <DEVICE-OR-DOMAIN-NAME>**}

  Resets the adoption status of a specified device or all devices
  
  - `<DEVICE-OR-DOMAIN-NAME>` – Optional. Specify the name of the AP, wireless controller, service platform, or RF Domain. If an RF Domain is specified, the system resets status of all adopted devices within the specified domain.

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

  Disconnects captive portal clients from the network
  
  - `<CAPTIVE-PORTAL-NAME>` – Specify the captive portal name.
  - `<MAC>` – Specify the client’s MAC address.

- **no crypto pki [server|trustpoint] <TRUSTPOINT-NAME> {del-key {on <DEVICE-NAME>}} {on <DEVICE-OR-DOMAIN-NAME>**}

  Deletes all PKI authentications
  
  - `server` – Deletes server certificates
  - `trustpoint` – Deletes a trustpoint and its associated certificates

  The following keyword is common to the ‘server’ and ‘trustpoint’ parameters:
  
  - `<TRUSTPOINT-NAME>` – Deletes a trustpoint or its server certificate. Specify the trustpoint name.

- **no logging monitor**

  Resets terminal lines message logging levels

- **no mac-user-db user [<USER-NAME>|all]**

  Deletes a specified user or all users from the MAC registration user database
  
  **Note:** This command is available only on the NX9000 series service platforms.
  
  - `<USER-NAME>` – Specify the username.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no service all</code></td>
<td>Deletes all users from the MAC registration user database</td>
</tr>
<tr>
<td><strong>• no page</strong></td>
<td>Resets paging to its default. Disabling paging displays the CLI command output at once, instead of page by page.</td>
</tr>
<tr>
<td><strong>• no service ap300 locator &lt;MAC&gt;</strong></td>
<td>Disables LEDs on a specified AP300</td>
</tr>
<tr>
<td>- <code>&lt;MAC&gt;</code> – Specify the AP300’s MAC address.</td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> If no MAC address is specified, the system disables LEDs on all AP300s.</td>
<td></td>
</tr>
<tr>
<td><code>no service block-adopter-config-update</code></td>
<td>Enables configuration updates from the NOC controller. If the configuration update from the NOC controller feature is blocked, use the <code>no &gt; service &gt; block-adopter-config-update</code> command to enable it.</td>
</tr>
<tr>
<td><code>no service snmp sysoid wing5</code></td>
<td>Disables the configuration of new <code>sysObjectID</code> (sysoid), in the MIB, for devices running WiNG 5.X devices</td>
</tr>
<tr>
<td>- <code>sysoid wing5</code></td>
<td>Reverts back to the original sysoid used for WiNG 4.X</td>
</tr>
<tr>
<td>Use the <code>service &gt; snmp &gt; sysoid &gt; wing5</code> command to enable the SNMP manager return sysoid for WiNG 5.X OS.</td>
<td></td>
</tr>
<tr>
<td>The WiNG 4.X sysoids are:</td>
<td></td>
</tr>
<tr>
<td>• RFS4000 – 1.3.6.1.4.1.388.18</td>
<td></td>
</tr>
<tr>
<td>• RFS6000 – 1.3.6.1.4.1.388.16</td>
<td></td>
</tr>
<tr>
<td>• RFS7000 – 1.3.6.1.4.1.388.15</td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> for more information on enabling this feature, see <code>service</code>.</td>
<td></td>
</tr>
<tr>
<td><strong>• no service ssm trace pattern {&lt;WORD&gt;} {on &lt;DEVICE-NAME&gt;}</strong></td>
<td>Disables certain specified services or features</td>
</tr>
<tr>
<td>- <code>ssm</code></td>
<td>Disables Security Services Module (SSM) related services</td>
</tr>
<tr>
<td>- <code>trace pattern {&lt;WORD&gt;} {on &lt;DEVICE-NAME&gt;}</code></td>
<td>Disables SSM related service tracing</td>
</tr>
<tr>
<td>• <code>pattern</code> – Configures the pattern to match</td>
<td></td>
</tr>
<tr>
<td>- <code>&lt;WORD&gt;</code> – Optional. Specify the pattern to ignore. Reverses the match pattern specified.</td>
<td></td>
</tr>
<tr>
<td>- on <code>&lt;DEVICE-NAME&gt;</code> – Optional. Matches the specified pattern on specified device. Specifies the name of the AP, wireless controller, or service platform.</td>
<td></td>
</tr>
<tr>
<td><strong>• no service wireless [trace pattern {&lt;WORD&gt;} {on &lt;DEVICE-NAME&gt;}] unsanctioned ap air-terminate &lt;BSSID&gt; {on &lt;DOMAIN-NAME&gt;}]</strong></td>
<td>Disables certain specified services or features</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>wireless</strong></td>
<td>Disables wireless related services</td>
</tr>
<tr>
<td><strong>trace pattern {&lt;WORD&gt;}</strong></td>
<td>Enables wireless-related service tracing</td>
</tr>
<tr>
<td>{on &lt;DEVICE-NAME&gt;}</td>
<td>• pattern – Configures the pattern to match</td>
</tr>
<tr>
<td></td>
<td>• &lt;WORD&gt; – Optional. Specify the pattern to ignore. Reverses the match pattern specified.</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Matches the specified pattern on specified device. Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td><strong>unsanctioned ap</strong></td>
<td>Terminates a specified access point</td>
</tr>
<tr>
<td><strong>air-terminate</strong></td>
<td>• &lt;BSSID&gt; – Specify the BSSID of the access point.</td>
</tr>
<tr>
<td>{on &lt;DOMAIN-NAME&gt;}</td>
<td>• on &lt;DOMAIN-NAME&gt; – Optional. Provides the specified access point’s RF Domain name</td>
</tr>
<tr>
<td></td>
<td>• &lt;DOMAIN-NAME&gt; – Specify the name of the RF Domain.</td>
</tr>
<tr>
<td><strong>no service locator</strong></td>
<td>Disables LEDs on a specified device</td>
</tr>
<tr>
<td>{on &lt;DEVICE-NAME&gt;}</td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td>**no terminal [length</td>
<td>width]**</td>
</tr>
<tr>
<td></td>
<td>• length – Resets the number of lines displayed on the terminal window to its default</td>
</tr>
<tr>
<td></td>
<td>• width – Resets the width of the terminal window to its default</td>
</tr>
<tr>
<td><strong>no virtual-machine assign-usb-ports</strong></td>
<td>Reverts ports assigned for virtual-machines back to WiNG</td>
</tr>
<tr>
<td>{on &lt;DEVICE-NAME&gt;}</td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
<tr>
<td><strong>no wireless client all</strong></td>
<td>Disassociates all clients on a specified device or domain</td>
</tr>
<tr>
<td>filter [wlan &lt;WLAN-NAME&gt;]</td>
<td>Optional. Specifies additional client selection filter</td>
</tr>
<tr>
<td>{on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td>• wlan – Filters clients on a specified WLAN</td>
</tr>
<tr>
<td></td>
<td>• &lt;WLAN-NAME&gt; – Specify the WLAN name.</td>
</tr>
<tr>
<td><strong>no wireless client all</strong></td>
<td>Disassociates all wireless clients on a specified device or domain</td>
</tr>
<tr>
<td>{on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td>• on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>
no wireless client mac <MAC> {on <DEVICE-OR-DOMAIN-NAME>}

Disassociates a single wireless client on a specified device or RF Domain
- mac <MAC> – Specify the wireless client’s MAC address in the AA-BB-CC-DD-EE-FF format.
- on <DEVICE-OR-DOMAIN-NAME> – Optional. Specifies the name of the AP, wireless controller, service platform, or RF Domain to which the specified client is associated.

**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
rfs7000-37FABE>no service cli-tables-expand line

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>auto-provisioning-policy</td>
<td>Resets the adoption state of a device and all devices adopted to it</td>
</tr>
<tr>
<td>captive portal</td>
<td>Manages captive portal clients</td>
</tr>
<tr>
<td>crypto</td>
<td>Enables digital certificate configuration and RSA Keypair management.</td>
</tr>
<tr>
<td>logging</td>
<td>Modifies message logging settings</td>
</tr>
<tr>
<td>page</td>
<td>Resets paging to its default</td>
</tr>
<tr>
<td>service</td>
<td>Performs different functions depending on the parameter passed</td>
</tr>
<tr>
<td>terminal</td>
<td>Sets the length or the number of lines displayed within the terminal window</td>
</tr>
<tr>
<td>virtual-machine</td>
<td>Installs, configures, and monitors the status of third-party virtual machines (VMs). This command is specific to the NX45XX, NX65XX, NX9500, and NX9510 series service platforms.</td>
</tr>
<tr>
<td>wireless-client</td>
<td>Manages wireless clients</td>
</tr>
</tbody>
</table>
2.1.18 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>                    | - <RF-DOMAIN-NAME> – Specify the RF Domain name. Enters the specified RF Domain context. |
| 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)>
2.1.19 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
pages
```

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>
### 2.1.20 ping

**User Exec Commands**

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

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ping <IP/HOSTNAME> {count 1-10000} | dont-fragment {count|size} | size 1-64000}
```

**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.

**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>
```
2.1.21 ping6

User Exec Commands

Sends ICMPv6 echo messages to a user-specified IPv6 address

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IPv6/HOSTNAME&gt;</td>
<td>Specify the destination IPv6 address or hostname.</td>
</tr>
<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,

Examples

rfs4000-1B3596(config-device-00-23-68-1B-35-96-if-ge4)#show ipv6 interface brief

<table>
<thead>
<tr>
<th>INTERFACE</th>
<th>IPV6 MODE</th>
<th>IPV6-ADDRESS/MASK</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>vlan1</td>
<td>True</td>
<td>fe80::223:68ff:fe88:da7/64</td>
<td>Link-Local</td>
</tr>
<tr>
<td>vlan1</td>
<td>True</td>
<td>2001:10:10:10:10:10:10:1/64</td>
<td>Global-Permanent</td>
</tr>
<tr>
<td>vlan2</td>
<td>False</td>
<td>UNASSIGNED</td>
<td>None</td>
</tr>
</tbody>
</table>

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
108 bytes from 2001:10:10:10:10:10:10:1: icmp_seq=7 ttl=64 time=0.299 ms
108 bytes from 2001:10:10:10:10:10:10:1: icmp_seq=8 ttl=64 time=0.312 ms

8 packets transmitted, 8 received, 0% packet loss, time 6999ms
rtt min/avg/max/mdev = 0.299/0.318/0.401/0.031 ms
rfs4000-229D58>
2.1.22 ssh

User Exec Commands

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

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

ssh <IP/HOSTNAME> <USER-NAME>

Parameters

- ssh <IP/HOSTNAME> <USER-NAME>

<table>
<thead>
<tr>
<th>&lt;IP/HOSTNAME&gt;</th>
<th>Specify the remote system's IP address or hostname.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;USERNAME&gt;</td>
<td>Specify the name of the user requesting SSH connection with the remote system.</td>
</tr>
</tbody>
</table>

Examples

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

User Exec Commands

Opens a Telnet session between two network devices

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

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

Parameters

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

<table>
<thead>
<tr>
<th>&lt;IP/HOSTNAME&gt;</th>
<th>Configures the destination remote system's IP address or hostname. The Telnet session is established between the connecting system and the remote system.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;TCP-PORT&gt;</td>
<td>Optional. Specify the Transmission Control Protocol (TCP) port number.</td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58#telnet 192.168.13.23
Entering character mode
Escape character is '^]'.

AP7131 release 5.6.0.0-023B
ap7131-11B6C4 login: admin
Password:
ap7131-11B6C4>
2.1.24 **terminal**

* User Exec Commands

Sets the length or the number of lines displayed within the terminal window

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>length &lt;0-512&gt;</td>
<td>Sets the number of lines displayed on a terminal window</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;0-512&gt;</code> — Specify a value from 0 - 512.</td>
</tr>
<tr>
<td>width &lt;0-512&gt;</td>
<td>Sets the width (the number of characters displayed) of the terminal window</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;0-512&gt;</code> — Specify a value from 0 - 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
rfs7000-37FABE>
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets the width and length of the terminal window</td>
</tr>
</tbody>
</table>
2.1.25 **time-it**

*User Exec Commands*

Verifies the time taken by a particular command between request and response

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE>time-it enable
That took 0.00 seconds..
rfs7000-37FABE#
2.1.26 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
traceroute <LINE>

Parameters
- traceroute <LINE>

<table>
<thead>
<tr>
<th>traceroute &lt;LINE&gt;</th>
<th>Traces the route to a destination IP address or hostname</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;LINE&gt;</td>
<td>Specify a traceroute argument. For example, “service traceroute-h”.</td>
</tr>
</tbody>
</table>

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

Usage: traceroute [-FIlndnrv] [-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 Verbosity
- 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 (8 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>
2.1.27 traceroute6

- **User Exec Commands**

Traces the route to a specified IPv6 destination

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

traceroute6 <LINE>

**Parameters**

- traceroute6 <LINE>

<table>
<thead>
<tr>
<th>traceroute &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>Specify the destination IPv6 address or hostname.</td>
</tr>
</tbody>
</table>

**Examples**

rfs4000-229D58> traceroute6 2001:10:10:10:10:10:10:1  
2001:10:10:10:10:10:10:2, 30 hops max, 16 byte packets  
rfs4000-229D58>
2.1.28 watch

Repeats the specified CLI command at periodic intervals

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
watch <1-3600> <LINE>

Parameters
- watch <1-3600> <LINE>

Examples
rfs7000-37FABE> watch 45 page
rfs7000-37FABE> watch 45 ping 172.16.10.2
PING 172.16.10.2 (172.16.10.2): 100 data bytes
108 bytes from 172.16.10.2: seq=0 ttl=64 time=0.725 ms
108 bytes from 172.16.10.2: seq=1 ttl=64 time=0.464 ms
108 bytes from 172.16.10.2: seq=2 ttl=64 time=0.458 ms
108 bytes from 172.16.10.2: seq=3 ttl=64 time=0.378 ms
108 bytes from 172.16.10.2: seq=4 ttl=64 time=0.364 ms
--- 172.16.10.2 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 0.364/0.477/0.725 ms
rfs7000-37FABE>
2.1.29 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`exit`

**Parameters**

None

**Examples**

`rfs7000-37FABE>exit`


2.1.30 smart-cache

User Exec 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, 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</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#
2.1.31 virtual-machine

User Exec Commands

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

In addition to the shipped 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:
- SyntaxNX45XX, NX65XX
- SyntaxNX9500 and NX9510

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9500, NX9510

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 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]


vif-count <0-2> |vif-mac <VIF-INDEX> <MAC-INDEX> |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} {on <DEVICE-NAME>}

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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>virtual-machine stop hard</td>
<td>Stops a virtual machine and releases all assigned resources. It can be</td>
</tr>
<tr>
<td></td>
<td>used with or without the hard parameter to stop the virtual machine and</td>
</tr>
<tr>
<td></td>
<td>release all resources assigned to it.</td>
</tr>
<tr>
<td>virtual-machine uninstall</td>
<td>Uninstalls a virtual machine.</td>
</tr>
<tr>
<td></td>
<td>It requires specifying the virtual machine name.</td>
</tr>
<tr>
<td></td>
<td>Note: TEAM-RLS VM cannot be installed when USB ports are assigned to</td>
</tr>
<tr>
<td></td>
<td>TEAM-VoWLAN.</td>
</tr>
</tbody>
</table>

**Parameters NX45XX, NX65XX**

- **virtual-machine assign-usb-ports team-vowlan on <DEVICE-NAME>**
  - Assigns USB ports to TEAM-VoWLAN on a specified device.
  - **on <DEVICE-NAME>** – Optional. Specify the device name.
  - **Note:** Use the `no > virtual-machine > assign-usb-ports` 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 on <DEVICE-NAME>**
  - 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:
    - `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`
  - `<DEVICE-NAME>` – Optional. Executes the command on a specified device or devices.
  - **Note:** The VM should be in a stop state during the export process.
  - **Note:** If the destination is a device, the image is copied to a predefined location (VM archive).
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}

<table>
<thead>
<tr>
<th>virtual-machine install</th>
<th>Installs the VM. The install command internally creates a VM template, consisting of the specified parameters, and starts the installation process.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;VM-NAME&gt;</td>
<td>Specify the VM name.</td>
</tr>
<tr>
<td>type</td>
<td>Specify the install-media (image) type. The options are:</td>
</tr>
<tr>
<td>disk</td>
<td>Specifies the install media type as pre-installed OS disk image (located in the flash memory)</td>
</tr>
<tr>
<td>iso disk-size &lt;SIZE&gt;</td>
<td>Specifies the install media type as ISO file. This is a single file, which contains the OS bootable install media.</td>
</tr>
<tr>
<td>disk-size &lt;SIZE&gt;</td>
<td>If the install media type is ISO, specify the disk size in GB.</td>
</tr>
<tr>
<td>vm-archive</td>
<td>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.</td>
</tr>
</tbody>
</table>

**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>] | 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:

<table>
<thead>
<tr>
<th>autostart</th>
<th>Optional. Specifies whether to autostart the VM on system reboot</th>
</tr>
</thead>
<tbody>
<tr>
<td>ignore</td>
<td>Enables autostart on each system boot/reboot</td>
</tr>
<tr>
<td>start</td>
<td>Disables autostart (default setting)</td>
</tr>
<tr>
<td>memory</td>
<td>Optional. Defines the VM memory size</td>
</tr>
<tr>
<td>&lt;512-8192&gt;</td>
<td>Specify the VM memory from 512 - 8192 MB. The default is 2048 MB.</td>
</tr>
<tr>
<td>on</td>
<td>Optional. Executes the command on a specified device</td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt;</td>
<td>Specify the service platform name.</td>
</tr>
<tr>
<td>vcpus</td>
<td>Optional. Specifies the number of VCPUS for this VM</td>
</tr>
<tr>
<td>&lt;1-4&gt;</td>
<td>Specify the number of VCPUS from 1- 4. The default setting is 4.</td>
</tr>
</tbody>
</table>

Contd...
### USER EXEC MODE COMMANDS

**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

**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

**Note:** The option ‘hard’ forces the specified VM to restart.

---

- **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 or disables 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>}

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

---

- virtual-machine install 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

**Note:** The option ‘hard’ forces the specified VM to restart.
### virtual-machine set

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>virtual-machine set</td>
<td>Configures the VM settings</td>
</tr>
<tr>
<td>autostart</td>
<td>Specifies whether to autostart the VM on system reboot</td>
</tr>
<tr>
<td>ignore</td>
<td>Enables autostart on each system reboot</td>
</tr>
<tr>
<td>start</td>
<td>Disables autostart</td>
</tr>
<tr>
<td>memory</td>
<td>Defines the VM memory size</td>
</tr>
<tr>
<td>&lt;512-8192&gt;</td>
<td>Specify the VM memory from 512 - 8192 MB. The default is 1024 MB.</td>
</tr>
<tr>
<td>vcpus</td>
<td>Specifies the number of VCPUS for this VM</td>
</tr>
<tr>
<td>&lt;1-4&gt;</td>
<td>Specify the number of VCPUS from 1 - 4.</td>
</tr>
<tr>
<td>vif-count</td>
<td>Configures or resets the VM's VIFs</td>
</tr>
<tr>
<td>&lt;0-2&gt;</td>
<td>Specify the VIF number from 0 - 2.</td>
</tr>
<tr>
<td>vif-mac</td>
<td>Configures the MAC address of the selected virtual network interface</td>
</tr>
<tr>
<td>&lt;1-2&gt;</td>
<td>Select the VIF</td>
</tr>
<tr>
<td>&lt;1-8&gt;</td>
<td>Specify the MAC index for the selected VIF</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>Specify the customized MAC address for the selected VIF in the AA-BB-CC-DD-EE-FF format.</td>
</tr>
<tr>
<td>vif-to-vmif</td>
<td>Maps the virtual interface (1 or 2) to the selected VMIF interface. Specify the VMIF interface index from 1 - 8.</td>
</tr>
<tr>
<td>vnc</td>
<td>Disables/enables VNC port option for an existing VM. When enabled, provides remote access to VGA through the noVNC client.</td>
</tr>
<tr>
<td>disable</td>
<td>Disables VNC port</td>
</tr>
<tr>
<td>enable</td>
<td>Enables VNC port</td>
</tr>
</tbody>
</table>

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. WiNG 5.6 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.

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 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 |

Contd...
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

**virtual-machine start**

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

**virtual-machine stop**

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

**Note:** The option ‘hard’ forces the selected VM to shutdown.

**virtual-machine uninstall**

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

**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
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`

<table>
<thead>
<tr>
<th>virtual-machine console</th>
<th>Connects to the Air-Defense Services Platform (ADSP) VM’s management console</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>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 <code>tree-node</code>.</td>
</tr>
</tbody>
</table>
• **virtual-machine install adsp** `{on <DEVICE-NAME>}`

**virtual-machine install**
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.

**Note:** 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-9.1.1 Aug 20 15:12:41 2013:
%DAEMON-6-INFO: lighttpd[2405]: 127.0.0.1 127.0.0.1:443 -
"POST /mapi.fcgi HTTP/1.1" 200 192 "-" "-"
-03-5.6.0.0-029B.img
Aug 20 15:12:51 2013: 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)......Aug 20
15:12:53 2013: %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>}`

**virtual-machine restart**
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>}`

**virtual-machine set disk-size**
Sets the ADSP VM's disk size (in GB). Specify a value from 100 - 500 GB.

- `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:** Stop the ADSP VM before executing this command.

• **virtual-machine set memory <512-8192> adsp** `{on <DEVICE-NAME>}`

**virtual-machine set memory**
Modifies the ADSP VM's memory. Specify a value from 512 - 8192 MB.

- `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

**Note:** 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.

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

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

Starts/stops the ADSP VM

- **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

- 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.
x4500-5CFA2B>

NOTE: Use the `show > virtual-machine > [configuration|debugging|export|statistics]` command to view installed VM details.
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 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 from one file to another
cpe                         T5 CPE configuration
create-cluster              Create a cluster
crypto                      Encryption related commands
crypto-cmp-cert-update      Update the cmp certs
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
dev                          Edit a text file
enable                      Turn on privileged mode command
erase                       Erase a filesystem
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 defaultss
on                          On RF-Domain
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>#
### 3.1 Privileged Exec Mode Commands

Table 3.1 summarizes the PRIV EXEC Mode 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 3-11</td>
</tr>
<tr>
<td>change-passwd</td>
<td>Changes the password of a logged user</td>
<td>page 3-12</td>
</tr>
<tr>
<td>clear</td>
<td>Clears parameters, cache entries, table entries, and other similar entries</td>
<td>page 3-13</td>
</tr>
<tr>
<td>clock</td>
<td>Configures the system clock</td>
<td>page 3-25</td>
</tr>
<tr>
<td>cluster</td>
<td>Initiates a cluster context</td>
<td>page 3-26</td>
</tr>
<tr>
<td>configure</td>
<td>Enters the configuration mode</td>
<td>page 3-27</td>
</tr>
<tr>
<td>connect</td>
<td>Begins a console connection to a remote device</td>
<td>page 3-27</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 3-29</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 3-30</td>
</tr>
<tr>
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</tr>
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<td>page 3-34</td>
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<td>page 3-45</td>
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<tr>
<td>delete</td>
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</tr>
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<td>Displays the differences between two files</td>
<td>page 3-57</td>
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<tr>
<td>dir</td>
<td>Displays the list of files on a file system</td>
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</tr>
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<td>page 3-60</td>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
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### Table 3.1 Privileged Exec Commands

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<th>Description</th>
<th>Reference</th>
</tr>
</thead>
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<td>page 3-69</td>
</tr>
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<td><strong>mint</strong></td>
<td>Configures MiNT protocols</td>
<td>page 3-71</td>
</tr>
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<td>Creates a new directory in the file system</td>
<td>page 3-73</td>
</tr>
<tr>
<td><strong>more</strong></td>
<td>Displays the contents of a file</td>
<td>page 3-74</td>
</tr>
<tr>
<td><strong>no</strong></td>
<td>Reverts a command or sets values to their default</td>
<td>page 3-75</td>
</tr>
<tr>
<td><strong>on</strong></td>
<td>Executes the following commands in the RF Domain context: clrscr, do, end, exit, help, service, show</td>
<td>page 3-81</td>
</tr>
<tr>
<td><strong>page</strong></td>
<td>Toggles a device’s (access point, wireless controller, or service platform) paging function</td>
<td>page 3-82</td>
</tr>
<tr>
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<td>Sends ICMP echo messages to a user-specified location</td>
<td>page 3-83</td>
</tr>
<tr>
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<td>Sends ICMPv6 echo messages to a user-specified location</td>
<td>page 3-84</td>
</tr>
<tr>
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<td>Displays the current directory</td>
<td>page 3-85</td>
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<td>page 3-86</td>
</tr>
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</tr>
<tr>
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</tr>
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<td>page 3-89</td>
</tr>
<tr>
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<td>page 3-90</td>
</tr>
<tr>
<td><strong>ssh</strong></td>
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<td>page 3-91</td>
</tr>
<tr>
<td><strong>t5</strong></td>
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<td>page 3-92</td>
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<td>page 3-94</td>
</tr>
<tr>
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<td>page 3-95</td>
</tr>
<tr>
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<td>Traces the route to a defined destination</td>
<td>page 3-96</td>
</tr>
<tr>
<td><strong>traceroute6</strong></td>
<td>Sends ICMPv6 echo messages to a user-specified location</td>
<td>page 3-97</td>
</tr>
<tr>
<td><strong>upgrade</strong></td>
<td>Upgrades the software image</td>
<td>page 3-98</td>
</tr>
<tr>
<td><strong>upgrade-abort</strong></td>
<td>Aborts an ongoing software image upgrade</td>
<td>page 3-99</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>watch</td>
<td>Repeats a specified CLI command at a periodic interval</td>
<td>page 3-100</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 3-102</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, and NX9510 series service platforms.</td>
<td>page 3-103</td>
</tr>
<tr>
<td>raid</td>
<td>Enables RAID management. This command is specific to the NX9500 series service platforms.</td>
<td>page 3-113</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
<td>page 5-3</td>
</tr>
<tr>
<td>commit</td>
<td>Commits (saves) the changes made in the current session</td>
<td>page 5-4</td>
</tr>
<tr>
<td>help</td>
<td>Displays interactive help system</td>
<td>page 5-6</td>
</tr>
<tr>
<td>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current CLI session and closes the session window</td>
<td>page 3-101</td>
</tr>
</tbody>
</table>
3.1.1 archive

Privileged Exec Mode Commands

Manages file archive operations

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

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

Parameters

- archive tar /table [<FILE>|<URL>]
  
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tar</td>
<td>Manipulates (creates, lists, or extracts) a tar file</td>
</tr>
<tr>
<td>/table</td>
<td>Lists the files in a tar file</td>
</tr>
<tr>
<td>&lt;FILE&gt;</td>
<td>Defines a tar filename</td>
</tr>
<tr>
<td>&lt;URL&gt;</td>
<td>Sets the tar file URL</td>
</tr>
</tbody>
</table>

- archive tar /create [<FILE>|<URL>] <FILE>
  
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tar</td>
<td>Manipulates (creates, lists or extracts) a tar file</td>
</tr>
<tr>
<td>/create</td>
<td>Creates a tar file</td>
</tr>
<tr>
<td>&lt;FILE&gt;</td>
<td>Defines tar filename</td>
</tr>
<tr>
<td>&lt;URL&gt;</td>
<td>Sets the tar file URL</td>
</tr>
</tbody>
</table>

- archive tar /xtract [<FILE>|<URL>] <DIR>
  
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tar</td>
<td>Manipulates (creates, lists or extracts) a tar file</td>
</tr>
<tr>
<td>/xtract</td>
<td>Extracts content from a tar file</td>
</tr>
<tr>
<td>&lt;FILE&gt;</td>
<td>Defines tar filename</td>
</tr>
<tr>
<td>&lt;URL&gt;</td>
<td>Sets the tar file URL</td>
</tr>
<tr>
<td>&lt;DIR&gt;</td>
<td>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.</td>
</tr>
</tbody>
</table>
Examples

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

```
  rfs4000-229D58# dir flash:/
  Directory of flash: /

  drwx   Wed Jan 30 02:45:10 2013   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 2013   crashinfo
  drwx   Wed Jan 16 22:57:14 2013   archived_logs
  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

  rfs4000-229D58#
```

```
  rfs4000-229D58#archive tar /create flash:/out.tar flash:/log log/
  log/cfgd.log
  log/cfgd.log.1
  log/vlan-usage.log
  log/anald.log
  log/anald.startup
  log/dpd2.log
  log/dpd2.startup
  log/upgrade.log
  log/messages.log
  log/startup.log
  log/hotplug/
  log/hotplug/events
  log/radius/

  rfs4000-229D58#
```

```
  rfs4000-229D58# dir flash:/
  Directory of flash:/

  drwx   Wed Jan 30 02:45:10 2013   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 2013   crashinfo
  drwx   Wed Jan 16 22:57:14 2013   archived_logs
  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 2013   out.tar

  rfs4000-229D58#
```
3.1.2 boot

Privileged Exec Mode Commands

Specifies the image used after reboot.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

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

Parameters

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

<table>
<thead>
<tr>
<th>parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>system</td>
<td>Specifies the image used after a device reboot</td>
</tr>
<tr>
<td>[primary</td>
<td>secondary]</td>
</tr>
<tr>
<td></td>
<td>- secondary – Uses the secondary image after reboot</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Specifies the primary or secondary image location 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 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>12/13/2013 11:44:17</td>
<td>12/16/2013 00:07:14</td>
<td>5.6.0.0-026B</td>
</tr>
<tr>
<td>Secondary</td>
<td>12/05/2013 14:53:32</td>
<td>12/09/2013 02:09:31</td>
<td>5.6.0.0-025B</td>
</tr>
</tbody>
</table>

Current Boot : Primary
Next Boot : Primary
Software Fallback : Enabled
VM support : Present

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

```
nx9500-6C8809# 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>12/13/2013 11:44:17</td>
<td>12/16/2013 00:07:14</td>
<td>5.6.0.0-026B</td>
</tr>
<tr>
<td>Secondary</td>
<td>12/05/2013 14:53:32</td>
<td>12/09/2013 02:09:31</td>
<td>5.6.0.0-025B</td>
</tr>
</tbody>
</table>

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

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

**Privileged Exec Mode Commands**

Uploads captive portal advanced pages

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
captive-portal-page-upload [<CAPTIVE-PORTAL-NAME>|cancel-upload|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 load-file <CAPTIVE-PORTAL-NAME> <URL>
```

**Parameters**

- `captive-portal-page-upload <CAPTIVE-PORTAL-NAME> [<MAC/HOSTNAME]|all]
  {upload-time <TIME>}`
  - Uploads advanced pages specified by the `<CAPTIVE-PORTAL-NAME>` parameter
  - `<CAPTIVE-PORTAL-NAME>` – Specify captive portal name (should be existing and configured).
  - `<MAC/HOSTNAME>` – Specify the AP’s MAC address or hostname.
  - `all` – Uploads to all APs
  - `upload-time <TIME>` – Optional. Schedules an upload time
    - `<TIME>` – Specify upload time in the MM/DD/YYYY-HH:MM or HH:MM format.

- `captive-portal-page-upload <CAPTIVE-PORTAL-NAME> rf-domain [<DOMAIN-NAME]|all]
  {from-controller} {(upload-time <TIME>))`
  - Uploads advanced pages specified by the `<CAPTIVE-PORTAL-NAME>` parameter
  - `<CAPTIVE-PORTAL-NAME>` – Specify captive portal name (should be existing and configured).
  - `<MAC/HOSTNAME>` – Specify the AP’s MAC address or hostname.
  - `all` – Uploads to all APs
  - `rf-domain` – Uploads to all APs within a specified RF Domain or all RF Domains
    - `<DOMAINT-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>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>captive-portal-page-upload cancel-upload [&lt;MAC/HOSTNAME&gt;</td>
<td>all</td>
</tr>
<tr>
<td>captive-portal-page-upload load-file &lt;CAPTIVE-PORTAL-NAME&gt; &lt;URL&gt;</td>
<td>Loads captive-portal advanced pages</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs4000-229D58#captive-portal-page-upload test1 00-04-96-4A-A7-08 upload-time 03/01/2013-12:30
```

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-23-68-22-9D-58</td>
<td>Fail</td>
<td>Failed to initiate page upload</td>
</tr>
</tbody>
</table>

```plaintext
rfs4000-229D58# |
```

```plaintext
rfs4000-229D58#captive-portal-page-upload cancel-upload 00-04-96-4A-A7-08
```

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>STATUS</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-23-68-22-9D-58</td>
<td>Success</td>
<td>Cancelled upgrade of 1 APs</td>
</tr>
</tbody>
</table>

```plaintext
rfs4000-229D58# |
```
### 3.1.4 cd

#### Privileged Exec Mode Commands

Changes the current directory

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

cd {<DIR>}

**Parameters**
- cd {<DIR>}

---

**<DIR>**

**Optional. Changes the current directory to <DIR>. 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#
### 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

**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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**NOTE:** Refer to the interface details below when using clear

- ge <index> – RFS4000 supports 5 GEs, RFS6000 supports 8 GEs, RFS7000 supports 4 GEs, and NX45XX and NX65XX series support 24 GEs
- me1 – Available in both RFS7000 and RFS6000
- up1 – Uplink interface on RFS4000

**Syntax**

- clear [arp-cache|cdp|counters|crypto|event-history|firewall|gre|ip|ipv6|l2tpv3-stats|license|lldp|logging|mac-address-table|mint|role|rtls|smart-cache|spanning-tree|vrrp]
- clear arp-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>} {(on <DEVICE-OR-DOMAIN-NAME>)}
- clear counters interface [{INTERFACE-NAME}|all|ge <1-5>|me1|port-channel <1-3>|pppoel|vlan <1-4094>|wwan1]
- clear counters radio {<MAC/hostname>|on}
- clear counters radio {<MAC/hostname> <1-3>} {(on <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|neighbors snoop-table] {on <DEVICE-NAME>}
- clear gre stats {on <DEVICE-NAME>}
- clear ip [bgp|dhcp|ospf]
- 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] {on <DEVICE-NAME> out} {on <DEVICE-NAME>}
- clear ip bgp [all|external] {soft {in|out}} {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> {on <DEVICE-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>]
                        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-history {on <DEVICE-NAME>}
clear role ldap-stats {on <DEVICE-NAME>}
clear rtls [aeroscout|ekahau] {on <DEVICE-NAME> {on <DEVICE-OR-DOMAIN-NAME>}}
clear spanning-tree detected-protocols {interface|on <DEVICE-NAME>}
clear spanning-tree detected-protocols {interface [{INTERFACE-NAME}|ge <1-5>|me1|
                        port-channel <1-3>|pppo1|vlan <1-4094>|wwan1]} {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

<table>
<thead>
<tr>
<th>clear arp-cache {on &lt;DEVICE-NAME&gt;}</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>arp-cache</strong></td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt;</td>
</tr>
</tbody>
</table>

| clear [cdp|lldp] neighbors {on <DEVICE-NAME>} |
|-----------------------------------------------|
| **cdp** | Clears *Cisco Discovery Protocol* (CDP) table entries |
| **lldp** | Clears *Link Layer Discovery Protocol* (LLDP) neighbor 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 [all|bridge|router|thread] |
|------------------------------------------|
| **counters** | Clears counters on a system |
| [all|bridge|router|thread] | all – Clears all counters irrespective of the interface type |
| bridge | Clears bridge counters |
| router | Clears router counters |
| thread | Clears per-thread counters |
### clear counters [ap|wireless-client] \{<MAC>\} \{on <DEVICE-OR-DOMAIN-NAME>\}

| counters [ap|wireless-client] | Clears counters on a system  
|--------------------------------|---------------------------------|
|                               | • ap – Clears access point wireless counters  
|                               | • wireless-client – Clears wireless client counters  

| <MAC> | The following keyword is common to the ‘ap’ and ‘wireless-client’ parameters:  
|-------|---------------------------------|
|       | • <MAC> – Optional. Clears counters of the AP/wireless client identified by the <MAC> keyword. Specify the MAC address of the AP or wireless client.  
|       | **Note:** The system clears all AP or wireless client counters, if no MAC address is specified.  

| on <DEVICE-OR-DOMAIN-NAME> | The following keyword is recursive and is applicable to the <MAC> parameter:  
|-----------------------------|---------------------------------|
|                             | • on <DEVICE-OR-DOMAIN-NAME> – 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 counters interface \[<INTERFACE-NAME>|all|ge <1-5>|me1|port-channel <1-3>| pppoe1|vlan <1-4094>|wwan1\]

| counters interface \[<INTERFACE-NAME>|all|ge <1-5>|me1|port-channel <1-3>| pppoe1|vlan <1-4094>|wwan1\] | Clears interface counters for a specified interface  
|-------------------------------------------------|---------------------------------|
|                                                 | • <INTERFACE-NAME> – Clears a specified interface counters. Specify the interface name.  
|                                                 | • all – Clears all interface counters  
|                                                 | • ge <1-5> – Clears GigabitEthernet interface counters. Specify the GigabitEthernet interface index from 1 - 5.  
|                                                 | • me1 – Clears FastEthernet interface counters  
|                                                 | • port-channel <1-3> – Clears port-channel interface counters. Specify the port channel interface index from 1 - 3.  
|                                                 | • pppoe1 – Clears Point-to-Point Protocol over Ethernet (PPPoE) interface counters  
|                                                 | • vlan <1-4094> – Clears interface counters. Specify the Switch Virtual Interface (SVI) VLAN ID from 1 - 4094.  
|                                                 | • wwan1 – Clears wireless WAN interface counters  

### clear counters radio \{<MAC/HOSTNAME> <1-3>\} \{on <DEVICE-OR-DOMAIN-NAME>\}

| counters radio | Clears wireless radio counters  
|----------------|---------------------------------|
|                | • <MAC/HOSTNAME> – 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  
| <MAC/HOSTNAME> | • <1-3> – Optional. Specify the radio index (if not specified as part of the radio ID).  
| <1-3>          | **Note:** The system clears all radio counters, if no MAC address or radio index is specified.  

| on <DEVICE-OR-DOMAIN-NAME> | The following keyword is recursive and is applicable to the <MAC> parameter:  
|-----------------------------|---------------------------------|
|                             | • on <DEVICE-OR-DOMAIN-NAME> – 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> {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>crypto</th>
<th>Clears encryption module database</th>
</tr>
</thead>
<tbody>
<tr>
<td>ike sa `&lt;IP&gt;</td>
<td>all&gt;`</td>
</tr>
<tr>
<td>on <code>&lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Clears IKE SA entries, for a specified peer or all peers</td>
</tr>
<tr>
<td><code>&lt;DEVICE-NAME&gt;</code></td>
<td>Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

- **clear crypto ipsec sa** `{on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>crypto</th>
<th>Clears encryption module database</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipsec sa <code>{on &lt;DEVICE-NAME&gt;}</code></td>
<td>Clears Internet Protocol Security (IPSec) database SAs</td>
</tr>
<tr>
<td>on <code>&lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Clears IPSec SA entries on a specified device</td>
</tr>
<tr>
<td><code>&lt;DEVICE-NAME&gt;</code></td>
<td>Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

- **clear event-history**

| event-history | Clears event history cache entries |

- **clear firewall** `[dhcp snoop-table|dos stats|flows|neighbors snoop-table] {on <DEVICE-NAME>}`

| firewall | Clears firewall event entries |
| DHCP snoop-table | Clears DHCP snoop table entries |
| dos stats | Clears denial of service statistics |
| flows | Clears established firewall sessions |
| neighbors snoop-table | Clears IPv6 neighbors snoop-table entries |
| on `<DEVICE-NAME>` | The following keywords are common to the DHCP, DOS, and flows parameters: |
| `<DEVICE-NAME>` | Optional. Clears DHCP snoop table entries, denial of service statistics, or the established firewall sessions on a specified device |
| `<DEVICE-NAME>` | Specify the name of the AP, wireless controller, or service platform. |

- **clear gre stats** `{on <DEVICE-NAME>}`

| gre stats | Clears GRE tunnel statistics |
| on `<DEVICE-NAME>` | Optional. GRE tunnel statistics on a specified device |
| `<DEVICE-NAME>` | Specify the name of the AP, wireless controller, or service platform. |
### clear ip bgp [<IP>|all|external] {in prefix-filter} {on <DEVICE-NAME>}

**ip bgp [<IP>|all|external]**
- Clears BGP routing table information based on the option selected
  - **<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 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.

<table>
<thead>
<tr>
<th>in prefix-filter</th>
<th>Optional. Clears soft-reconfiguration inbound route updates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>* prefix-filter – Optional. Clears the existing Outbound Route Filtering (ORF) prefix-list.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>on &lt;DEVICE-NAME&gt;</th>
<th>Optional. Clears soft-reconfiguration inbound route updates on a specified device</th>
</tr>
</thead>
<tbody>
<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] {on <DEVICE-NAME>|out {on <DEVICE-NAME>}}

**ip bgp [<IP>|all|external]**
- Clears BGP routing table information based on the option selected
  - **<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 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.

<table>
<thead>
<tr>
<th>on &lt;DEVICE-NAME&gt;</th>
<th>Optional. Clears BGP routing table information on a specified device</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>* &lt;DEVICE-NAME&gt; – Specify the name of the AP or service platform.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>out {on &lt;DEVICE-NAME&gt;}]</th>
<th>Optional. Clears soft-reconfiguration outbound route updates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>* on &lt;DEVICE-NAME&gt; – Specify the name of the AP or service platform.</td>
</tr>
</tbody>
</table>

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

**ip bgp <IP>**
- Clears BGP routing table information based on the option selected
  - **<IP>** – Clears the BGP peer identified by the <IP> keyword. Specify the BGP peer's IP address.

**Note:** This command is applicable only to the 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.

<p>| 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 |
|--------------|---------------------------------------------------------------|
|              | * inbound – Enables soft reconfiguration of inbound route updates |
|              | * outbound – Enables soft reconfiguration of outbound route updates |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear ip bgp [all</td>
<td>external] {soft {in</td>
</tr>
<tr>
<td>ip bgp [all</td>
<td>external]</td>
</tr>
<tr>
<td>soft {in</td>
<td>out}</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears soft-reconfiguration inbound/outbound route updates on a specified device.</td>
</tr>
<tr>
<td>clear ip dhcp bindings [&lt;IP]</td>
<td>all} {on &lt;DEVICE-NAME&gt;}</td>
</tr>
<tr>
<td>ip</td>
<td>Clears DHCP server’s connections and address binding entries.</td>
</tr>
<tr>
<td>dhcp bindings</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>clear ip ospf process {on &lt;DEVICE-NAME&gt;}</td>
<td>Clears already enabled open shortest path first (OSPF) process and restarts the process.</td>
</tr>
<tr>
<td>ip ospf process</td>
<td>Optional. Clears OSPF process on a specified device.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>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>clear ipv6 neighbor-cache {on &lt;DEVICE-NAME&gt;}</td>
<td>Clears IPv6 neighbor cache entries.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>`clear l2tpv3-stats tunnel &lt;L2TPV3-TUNNEL-NAME&gt; {on &lt;DEVICE-NAME&gt;</td>
<td>session &lt;SESSION-NAME&gt; {on &lt;DEVICE-NAME&gt;}}`</td>
</tr>
<tr>
<td><code>clear license borrowed {on &lt;DEVICE-NAME&gt;}</code></td>
<td>Releases or revokes all licenses borrowed by a site controller</td>
</tr>
<tr>
<td><code>clear license lent to &lt;DEVICE-NAME&gt; {on &lt;DEVICE-NAME&gt;}</code></td>
<td>NOC controller releases or revokes all licenses loaned to a site controller</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>
</tbody>
</table>

### Notes:
- If no optional parameters are specified, the system clears all L2TPv3 tunnel session statistics.
- If no device name is specified, the system clears all borrowed licenses on the logged device.
- If no device name is specified, the system clears all loaned licenses on the logged device.
on `<DEVICE-NAME>` Optional. Clears a single entry or all MAC entries for the specified VLAN in the MAC address forwarding table on a specified device
- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

**Note:** 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.

```
clear mac-address-table interface [<IF-NAME>|ge <1-X>|port-channel <1-X>|t1e1 <1-4> <1-1>|up <1-2>|vmif <1-X>|xge <1-4>] {on <DEVICE-NAME>}
```

<table>
<thead>
<tr>
<th>mac-address-table</th>
<th>Clears the MAC address forwarding table</th>
</tr>
</thead>
<tbody>
<tr>
<td>interface</td>
<td>Clears all MAC addresses for the selected interface. Use the options available to specify the interface.</td>
</tr>
<tr>
<td><code>&lt;IF-NAME&gt;</code></td>
<td>Clears MAC address forwarding table for the specified layer 2 interface (Ethernet port)</td>
</tr>
<tr>
<td>ge <code>&lt;1-X&gt;</code></td>
<td>Clears MAC address forwarding table for the specified GigabitEthernet interface</td>
</tr>
<tr>
<td>port-channel <code>&lt;1-X&gt;</code></td>
<td>Clears MAC address forwarding table for the specified port-channel interface</td>
</tr>
<tr>
<td>t1e1 <code>&lt;1-4&gt; &lt;1-1&gt;</code></td>
<td>Clears MAC address forwarding table for the specified T1E1L interface</td>
</tr>
<tr>
<td>up <code>&lt;1-X&gt;</code></td>
<td>Clears MAC address forwarding table for the WAN Ethernet interface</td>
</tr>
<tr>
<td>vmif <code>&lt;1-X&gt;</code></td>
<td>Clears MAC address forwarding table for the VM interface</td>
</tr>
<tr>
<td>xge <code>&lt;1-4&gt;</code></td>
<td>Clears MAC address forwarding table for the specified TenGigabitEthernet interface</td>
</tr>
</tbody>
</table>

- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

**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.

- `<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 13 port-channels. Where as, RFS4000 supports 3 port-channels.

- `<1-4>` – Specify the GigabitEthernet interface index from 1 - 4.

**Note:** This interface is supported only on the NX9000 series service platforms.

- `<1-1>` – Specify the slot to clear the MAC address forwarding table.

**Note:** The T1E1 interfaces are supported only on the NX45XX and NX65XX series service platforms.

- `<1-2>` – Specify the GigabitEthernet interface index from 1 - 4.

**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.

- `<1-X>` – Specify the VM interface index from 1 - X.

**Note:** 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.

- `<1-4>` – Specify the GigabitEthernet interface index from 1 - 4.
### clear mint mlcp history (on <DEVICE-NAME>)

- **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>)

- **role ldap-stats**
  - Clears role based LDAP server statistics.

- **on <DEVICE-NAME>**
  - Optional. 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] (on <DEVICE-NAME> {on <DEVICE-OR-DOMAIN-NAME>})

- **rtls**
  - Clears Real Time Location Service (RTLS) statistics.

- **aeroscout**
  - Clears RTLS Aeroscout statistics.

- **ekahau**
  - Clears RTLS Ekahau statistics.

- **<DEVICE-NAME>**
  - This keyword is common to the ‘aeroscout’ and ‘ekahau’ parameters.
  - **<DEVICE-NAME>** – Optional. Clears Aeroscout or Ekahau RTLS statistics on a specified AP, wireless controller, or service platform.

- **<DEVICE-OR-DOMAIN-NAME>**
  - This keyword is common to the ‘aeroscout’ and ‘ekahau’ parameters.
  - **<DEVICE-OR-DOMAIN-NAME>** – Optional. Clears Aeroscout or Ekahau RTLS statistics on a specified device or RF Domain. Specify the name of the AP, wireless controller, service platform, or RF Domain.

### clear spanning-tree detected-protocols (on <DEVICE-NAME>)

- **spanning-tree**
  - Clears spanning tree protocols on an interface, and also restarts protocol migration.

- **detected-protocols**
  - Restarts protocol migration.

- **on <DEVICE-NAME>**
  - Optional. Clears spanning tree protocols on a specified device.
  - **<DEVICE-NAME>** – Optional. Specify the name of the AP, wireless controller, or service platform.

### clear spanning-tree detected-protocols (interface [interface <INTERFACE-NAME>|ge <1-5>|me1|port-channel <1-3>|pppoel|vlan <1-4094>|wwan1]) (on <DEVICE-NAME>)

- **spanning-tree**
  - Clears spanning tree protocols on an interface and restarts protocol migration.

- **detected-protocols**
  - Restarts protocol migration.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>**clear vrrp [error-stats</td>
<td>stats] {on &lt;DEVICE-NAME&gt;}**</td>
</tr>
<tr>
<td><strong>vrrp</strong></td>
<td>Clears Virtual Router Redundancy Protocol (VRRP) statistics for a device.</td>
</tr>
<tr>
<td><strong>error-stats {on &lt;DEVICE-NAME&gt;}</strong></td>
<td>Clears VRRP global error statistics.</td>
</tr>
<tr>
<td><strong>stats {on &lt;DEVICE-NAME&gt;}</strong></td>
<td>Clears VRRP related statistics.</td>
</tr>
<tr>
<td>**clear smart-cache storage [all</td>
<td>url-regex &lt;WORD&gt;] {on &lt;DEVICE-NAME&gt;}**</td>
</tr>
<tr>
<td>**storage [all</td>
<td>regex &lt;WORD&gt;]**</td>
</tr>
<tr>
<td><strong>on &lt;DEVICE-NAME&gt;</strong></td>
<td>Optional. Clears stored content on a specified device.</td>
</tr>
</tbody>
</table>

**interface**
- Optional. Clears spanning tree entries on different interfaces.
  - `<INTERFACE-NAME>` – Clears detected spanning tree entries on a specified interface. Specify the interface name.
  - `ge <1-5>|me1` – Clears detected spanning tree entries for the selected GigabitEthernet interface. Select the GigabitEthernet interface index from 1 - 5.
  - `port-channel <1-3>` – Clears detected spanning tree entries for the selected port channel interface. Select the port channel index from 1 - 3.
  - `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.
  - `wwan1` – Clears detected spanning tree entries for wireless WAN interface.

**on <DEVICE-NAME>**
- Optional. Clears spanning tree protocol entries on a selected device.
  - `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

**clear vrrp [error-stats|stats] {on <DEVICE-NAME>}**
- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

**smart-cache storage [all|url-regex <WORD>] {on <DEVICE-NAME>}**
- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.
Examples

rfs4000-229D58#clear crypto ike sa all
rfs4000-229D58#

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>
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</tr>
</tbody>
</table>

Total IKE SAs: 0

rfs7000-37FABE#clear spanning-tree detected-protocols interface port-channel 1
rfs7000-37FABE#

rfs7000-37FABE#clear ip dhcp bindings 172.16.10.9
rfs7000-37FABE#

rfs7000-37FABE#clear cdp neighbors
rfs7000-37FABE#

rfs4000-229D58#clear spanning-tree detected-protocols interface ge 1
rfs4000-229D58#

rfs4000-229D58#clear lldp neighbors
rfs4000-229D58#

rfs4000-229D58#show event-history

EVENT HISTORY REPORT
Generated on '2013-02-15 14:40:22 UTC' by 'admin'

2013-01-31 01:06:24     rfs4000-229D58  SYSTEM     UI_USER_AUTH_SUCCESS UI user 'admin' from: '192.168.100.224' authentication successful
2013-01-31 00:58:28     rfs4000-229D58  SYSTEM     CONFIG_COMMIT        Configuration commit by user 'admin' from '192.168.100.225'
2013-01-31 00:49:54     rfs4000-229D58  SYSTEM     LOGIN                Successfully logged in user 'admin' with privilege 'superuser' from 'ssh'
2013-01-31 00:49:31     rfs4000-229D58  SYSTEM     LOGOUT               Logged out user 'admin' with privilege 'superuser' from 'ssh'
2013-01-30 23:43:10     rfs4000-229D58  SYSTEM     UI_USER_AUTH_SUCCESS UI user 'admin' from: '192.168.100.224' authentication successful
2013-01-30 03:47:47     rfs4000-229D58  SYSTEM     LOGOUT               Logged out user 'admin' with privilege 'superuser' from 'ssh'
2013-01-30 02:45:08     rfs4000-229D58  SYSTEM     UI_USER_AUTH_SUCCESS UI user 'admin' from: '192.168.100.231' authentication successful

rfs4000-229D58#clear event-history

rfs4000-229D58#show event-history

EVENT HISTORY REPORT
Generated on '2013-02-15 14:42:51 UTC' 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-C7-99-71-17-28</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: 9

nx4500-5CFA2B#
3.1.7 clock

Privileged Exec Mode Commands

Sets a device’s system clock

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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><a href="">HH:MM:SS</a></td>
<td>Sets the current time (in military format hours, minutes and seconds)</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 from Jan - 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

rfs4000-229D58#clock set 14:45:30 15 Feb 2013
rfs4000-229D58#

rfs4000-229D58#show clock
2013-02-15 14:45:43 UTC
rfs4000-229D58#
### 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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`cluster start-election`

**Parameters**

- `cluster start-election`

  | start-election | Starts a new cluster master election |

**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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
configure {self|terminal}
```

**Parameters**

- `configure {self|terminal}`

<table>
<thead>
<tr>
<th>self</th>
<th>Optional. Enables the current device’s configuration mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>terminal</td>
<td>Optional. Enables configuration from the terminal</td>
</tr>
</tbody>
</table>

**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)#
```
3.10 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

Parameters
- mint-id <MINT-ID> Connects to a remote system using the MiNT ID
  - <MINT-ID> – Specify the remote device’s MiNT ID.
- <REMOTE-DEVICE-NAME> Connects to a remote system using its name
  - <REMOTE-DEVICE-NAME> – Specify the remote device’s name.

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, segnum 748149
LSP 19.5C.FA.2B at level 1, hostname "nx4500-5CFA2B", 5 adjacencies, segnum 337443
LSP 19.5C.FA.8E at level 1, hostname "nx4500-5CFA8E", 5 adjacencies, segnum 333443
LSP 19.6C.88.09 at level 1, hostname "nx9500-6C8809", 5 adjacencies, segnum 333247
LSP 19.6D.CD.4B at level 1, hostname "rfs7000-6DCD4B", 5 adjacencies, segnum 152431
LSP 19.71.17.28 at level 1, hostname "ap8132-711728", 5 adjacencies, segnum 363523
rfs7000-6DCD4B#

rfs7000-6DCD4B#connect mint-id 19.6C.88.09

Entering character mode
Escape character is '"'.

NX9500 release 5.6.0.0-026B
nx9500-6C8809 login:admin
Password:
nx9500-6C8809>
3.1.11 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
copy [<SOURCE-FILE>|<SOURCE-URL>] [<DESTINATION-FILE>|<DESTINATION-URL>]  
```

**Parameters**

- `<SOURCE-FILE>` Specify the source file to copy.
- `<SOURCE-URL>` Specify the source file’s location (URL).
- `<DESTINATION-FILE>` Specify the destination file to copy to.
- `<DESTINATION-URL>` Specify the destination file’s location (URL).

**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 Equipments (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 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, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

cpe [boot|led|reload|upgrade]

cpe boot system cpe [<1-24>|all] [primary|secondary] {on <T5-DEVICE-NAME>}

cpe [led|reload|upgrade] cpe {<1-24>|all] {on <T5-DEVICE-NAME>}

Parameters

- cpe boot system cpe [<1-24>|all] [primary|secondary] {on <DEVICE-NAME>}

<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>cpe [&lt;1-24&gt;</td>
<td>all]</td>
</tr>
<tr>
<td>[primary</td>
<td>secondary]</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Performs this operation on a specified T5 device. Specify the T5 device’s hostname.</td>
</tr>
</tbody>
</table>

- cpe [led|reload|upgrade] cpe {<1-24>|all] {on <DEVICE-NAME>}

| cpe [led|reload|upgrade] | Performs the following operations on CPEs                                             |
|---------------------------|---------------------------------------------------------------------------------------|
| led – Enables/disables flashing of LEDs |
| reload – Reloads the device |
| upgrade – Upgrades the device |

Note: After specifying the operation to perform, identify the device(s)

| cpe [<1-24>|all] | Identifies the CPE(s) on which the operation is performed                           |
|-----------------|-------------------------------------------------------------------------------------|
| on <DEVICE-NAME> | Optional. Performs this operation on a specified T5 device. Specify the T5 device’s hostname. |
Examples

```
rfs7000-37FABE#cpe led cpe all on t5-ED5C2C
Updated T5 CPE led state
rfs7000-37FABE#
```
### 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 balance 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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

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

**Parameters**
- `create-cluster name <CLUSTER-NAME> ip <IP> {level [1|2]}`
  - `name <CLUSTER-NAME>`: Configures the cluster name
    - `<CLUSTER-NAME>` – 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.
  - `ip <IP>`: Specifies the device’s IP address used for cluster creation
    - `<IP>` – Specify the device’s IP address in the A.B.C.D format.
  - `level [1|2]`: Optional. Configures the routing level for this cluster
    - `1` – Configures level 1 (local) routing
    - `2` – Configures level 2 (inter-site) routing

**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

```
rfs4000-229D58#
```

```
rfs4000-229D58# show context
```

```
! Configuration of RFS4000 version 5.6.0.0-026B
!
!
version 2.3
```
```
!  
sage-type request option 60 exact ascii "dhcpcd 4.0.15"

!!
 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
 mint mlcp vlan
 mint mlcp ip
 wep-shared-key-auth
 ip default-gateway 192.168.13.2
 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
 interface vlan2
     ip address 1.2.3.5/24
 cluster name TechPubsLAN
 cluster mode active
 cluster member ip 192.168.13.8 level 2
 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><strong>cluster</strong></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><strong>join-cluster</strong></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

Enables digital certificate configuration and RSA Keypair management. Digital certificates are issued by Certificate Authorities (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 CAs identity and configuration parameters.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 {on <DEVICE-NAME>}|on <DEVICE-NAME>}
crypto key export rsa <RSA-KEYPAIR-NAME> <EXPORT-TO-URL> {passphrase <KEY-PASSPHRASE> {background {on <DEVICE-NAME>}|on <DEVICE-NAME>}}
crypto key generate rsa <RSA-KEYPAIR-NAME> <1024-2048> {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 {on <DEVICE-NAME>}|on <DEVICE-NAME>}
crypto key import rsa <RSA-KEYPAIR-NAME> <IMPORT-FROM-URL> {passphrase <KEY-PASSPHRASE> {background {on <DEVICE-NAME>}|on <DEVICE-NAME>}}
crypto key zeroize rsa <RSA-KEYPAIR-NAME> {force {on <DEVICE-NAME>}|on <DEVICE-NAME>}
crypto pki [authenticate|export|generate|import|zeroize]
crypto pki export <TRUSTPOINT-NAME> <LOCATION-URL> {background {on <DEVICE-NAME>}|on <DEVICE-NAME>}
crypto pki export request [generate-rsa-key|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|use-rsa-key] <RSA-KEYPAIR-NAME> autogen-subject-name <EXPORT-TO-URL> {background {on <DEVICE-NAME>}|on <DEVICE-NAME>}
crypto pki export request [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 {on <DEVICE-NAME>}|on <DEVICE-NAME>}{passphrase <KEY-PASSPHRASE> {background {on <DEVICE-NAME>}|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] 
<WORD> subject-name <COMMON-NAME> <COUNTRY> <STATE> <CITY> <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 {on <DEVICE-NAME>}}
crypto pki zeroize trustpoint <TRUSTPOINT-NAME> {del-key {on <DEVICE-NAME>}}
on <DEVICE-NAME>

Parameters
- crypto key export rsa <RSA-KEYPAIR-NAME> <EXPORT-TO-URL> 
{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 in the following format:
  tftp://<hostname|IP>:<port>/path/file
  ftp://<user>:<passwd>@<hostname|IP>:<port>/path/file
  sftp://<user>@<hostname|IP>:<port>/path/file
  http://<hostname|IP>:<port>/path/file
  cf:/path/file
  usb<n>:/path/file

background {on <DEVICE-NAME>} Optional. Performs an export operation in the background. Optionally specify the device to export to.
on <DEVICE-NAME> Optional. Performs an export operation on a specific device.
- <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

- crypto key export rsa <RSA-KEYPAIR-NAME> <EXPORT-TO-URL> {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 Exports a RSA Keypair to a specified destination
- <RSA-KEYPAIR-NAME> – Specify the RSA Keypair name.
| **<EXPORT-TO-URL>** | Specify the RSA Keypair destination address in the following format:  
| {passphrase <KEY-PASSPHRASE>} |  
| tftp://<hostname|IP|>{port|path|file  
| ftp://<user|:<passwd>@<hostname|IP|>{port|path|file  
| sftp://<user>@<hostname|IP|>{port|path|file  
| http://<hostname|IP|>{port|path|file  
| cf:/path|file  
| usb<n>:/path|file  
| • passphrase – Optional. Encrypts RSA Keypair before exporting  
| • <KEY-PASSPHRASE> – Specify a passphrase to encrypt the RSA Keypair.  
| **on <DEVICE-NAME>** | Optional. Performs an 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> </1024-2048> {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> </1024-2048> | Generates a new RSA Keypair  
| • <RSA-KEYPAIR-NAME> – Specify the RSA Keypair name.  
| • <1024-2048> – Sets the size of the RSA key in bits from 1024 - 2048. The default size is 1024.  
| **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 {on <DEVICE-NAME>}} on <DEVICE-NAME>** |  
| key | Enables RSA Keypair management. Use this command to export, import, generate, or delete a RSA key.  
| 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 in the following format:  
| tftp://<hostname|IP|>{port|path|file  
| ftp://<user|:<passwd>@<hostname|IP|>{port|path|file  
| sftp://<user>@<hostname|IP|>{port|path|file  
| http://<hostname|IP|>{port|path|file  
| cf:/path|file  
| usb<n>:/path|file  
| **on <DEVICE-NAME>** | Optional. Performs an import operation on a specified device  
| • <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.  
| background {on <DEVICE-NAME>} | Optional. Performs an import operation in the background  
| • 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 key import rsa** `<RSA-KEYPAIR-NAME>` `<IMPORT-FROM-URL>`
  
  `<passphrase <KEY-PASSPHRASE>>` `{background {on <DEVICE-NAME>}|on <DEVICE-NAME>}

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

  **import rsa**  
  `<RSA-KEYPAIR-NAME>`  
  Decrypts and imports a RSA Keypair from a specified source  
  * `<RSA-KEYPAIR-NAME>` – Specify the RSA Keypair name.

  `<IMPORT-FROM-URL>` `{passphrase <KEY-PASSPHRASE>>}

  Specify the RSA Keypair source address in the following format:
  - tftp://<hostname|IP>:[port]/path/file
  - ftp://<user>:<passwd>@<hostname|IP>:[port]/path/file
  - sftp://<user>@<hostname|IP>:[port]/path/file
  - http://<hostname|IP>:[port]/path/file
  - cf:/path/file
  - usb<n>:/path/file

  * `<passphrase` – Optional. Decrypts the RSA Keypair before importing it
  * `<KEY-PASSPHRASE>` – Specify the passphrase to decrypt the RSA Keypair.

  `<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 key zeroize rsa** `<RSA-KEYPAIR-NAME>` `{force {on <DEVICE-NAME>}|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 {on <DEVICE-NAME>}|on <DEVICE-NAME>}`

  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>>` 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>}|on <DEVICE-NAME>}

  **key** Enables Private Key Infrastructure (PKI) management. Use this command to authenticate, export, generate, or delete a trustpoint and its associated CA certificates.

  **authenticate**  
  `<TRUSTPOINT-NAME>`  
  Authenticates a trustpoint and imports the corresponding CA certificate

  * `<TRUSTPOINT-NAME>` – Specify the trustpoint name.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>crypto pki export request</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>[generate-rsa-key</td>
<td>use-rsa-key] &lt;RSA-KEYPAIR-NAME&gt;</td>
</tr>
<tr>
<td>autogen-subject-name</td>
<td>Auto generates subject name from configuration parameters. The subject name identifies the certificate.</td>
</tr>
<tr>
<td>url &lt;EXPORT-TO-URL&gt;</td>
<td>Specify the CA's location in the following format:</td>
</tr>
<tr>
<td>{background {on &lt;DEVICE-NAME&gt;}}</td>
<td>Optional. Performs export operation in the background. Optionally specify a device on which to perform authentication.</td>
</tr>
<tr>
<td>email &lt;SEND-TO-EMAIL&gt;</td>
<td>Exports CSR to a specified e-mail address</td>
</tr>
</tbody>
</table>

**Note:** The CSR is exported to the specified location.

**Note:** The CA certificate is imported from the specified location.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>crypto pki export request</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>**[generate-rsa-key</td>
<td>use-rsa-key]** &lt;RSA-KEYPAIR-NAME&gt;</td>
</tr>
<tr>
<td><strong>subject-name</strong> &lt;COMMON-NAME&gt;</td>
<td>Specifies subject name to identify the certificate</td>
</tr>
<tr>
<td><strong>&lt;COMMON-NAME&gt;</strong></td>
<td>Sets 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 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>
<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><strong>&lt;SEND-TO-EMAIL&gt;</strong></td>
<td>Exports CSR to a specified e-mail address</td>
</tr>
</tbody>
</table>

**Note:** The CSR is exported to the specified location.
- **background** – Optional. Performs an export operation in the background
- **on <DEVICE-NAME>** – Optional. Performs an export operation on a specific device
  - **<DEVICE-NAME>** – Specify the name of the AP, wireless controller, or service platform.

**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|use-rsa-key] <RSA-KEYPAIR-NAME>**
- **subject-name <COUNTRY> <STATE> <CITY> <ORGANIZATION> <ORGANIZATION-UNIT>**
  - **(<EXPORT-TO-URL>,email <SEND-TO-EMAIL>,fqdn <FQDN>,ip-address <IP>)**
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>crypto pki export trustpoint</code></td>
<td>Exports a trustpoint along with CA certificate, Certificate Revocation List (CRL), server certificate, and private key.</td>
</tr>
<tr>
<td><code>&lt;TRUSTPOINT-NAME&gt;</code></td>
<td>Specifies the trustpoint name.</td>
</tr>
<tr>
<td><code>&lt;EXPORT-TO-URL&gt;</code></td>
<td>Specify the destination address in the following format:</td>
</tr>
<tr>
<td></td>
<td>tftp://&lt;hostname/IP&gt;[:port]/path/file</td>
</tr>
<tr>
<td></td>
<td>ftp://&lt;user&gt;:&lt;passwd&gt;@&lt;hostname/IP&gt;[:port]/path/file</td>
</tr>
<tr>
<td></td>
<td>sftp://&lt;user&gt;@&lt;hostname/IP&gt;[:port]/path/file</td>
</tr>
<tr>
<td></td>
<td>http://&lt;hostname/IP&gt;[:port]/path/file</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></td>
<td>Optional. Performs an export operation in the background</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Performs an export 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>
<tr>
<td><code>crypto pki generate self-signed</code></td>
<td>Generates a self-signed CA certificate and a trustpoint</td>
</tr>
<tr>
<td><code>&lt;TRUSTPOINT-NAME&gt;</code></td>
<td>Specifies a name for the certificate and its trustpoint.</td>
</tr>
<tr>
<td><code>pki</code></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><code>generate</code></td>
<td>Generates a CA certificate and a trustpoint</td>
</tr>
<tr>
<td><code>self-signed</code></td>
<td>Generates a self-signed CA certificate and a trustpoint</td>
</tr>
<tr>
<td><code>&lt;TRUSTPOINT-NAME&gt;</code></td>
<td>Specifies 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><code>crypto pki generate self-signed &lt;TRUSTPOINT-NAME&gt;</code></td>
<td>Generates a self-signed CA certificate and a trustpoint</td>
</tr>
<tr>
<td><code>&lt;RSA-KEYPAIR-NAME&gt;</code></td>
<td>Specify a name for the certificate and its trustpoint.</td>
</tr>
<tr>
<td><code>generate self-signed &lt;TRUSTPOINT-NAME&gt;</code></td>
<td>Generates a self-signed CA certificate and a trustpoint</td>
</tr>
<tr>
<td><code>&lt;RSA-KEYPAIR-NAME&gt;</code></td>
<td>Specify a name for the certificate and its trustpoint.</td>
</tr>
<tr>
<td><code>subject-name &lt;COMMON-NAME&gt;</code></td>
<td>Specify a subject name to identify the certificate.</td>
</tr>
<tr>
<td><code>&lt;COUNTRY&gt;</code></td>
<td>Sets the deployment country code (2 character ISO code)</td>
</tr>
<tr>
<td><code>&lt;STATE&gt;</code></td>
<td>Sets the state name (2 to 64 characters in length)</td>
</tr>
<tr>
<td><code>&lt;CITY&gt;</code></td>
<td>Sets the city name (2 to 64 characters in length)</td>
</tr>
<tr>
<td><code>&lt;ORGANIZATION&gt;</code></td>
<td>Sets the organization name (2 to 64 characters in length)</td>
</tr>
<tr>
<td><code>&lt;ORGANIZATION-UNIT&gt;</code></td>
<td>Sets the organization unit (2 to 64 characters in length)</td>
</tr>
<tr>
<td><code>email &lt;SEND-TO-EMAIL&gt;</code></td>
<td>Optional. Exports the CSR to a specified e-mail address</td>
</tr>
<tr>
<td><code>&lt;SEND-TO-EMAIL&gt;</code></td>
<td>Specify the CA's e-mail address.</td>
</tr>
</tbody>
</table>
crypto pki import [certificate|crl] <TRUSTPOINT-NAME> <IMPORT-FROM-URL>
{background {on <DEVICE-NAME>}}

fqdn <FQDN> Optional. Exports the CSR to a specified FQDN
  • <FQDN> – Specify the CA’s FQDN.

ip address <IP> Optional. Exports the CSR to a specified device or system
  • <IP> – Specify the CA’s IP address.

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

<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 signed server certificate or CRL source address in the following format:
  tftp://<hostname|IP>[:port]/path/file
  ftp://<user>:<passwd>@<hostname|IP>[:port]/path/file
  sftp://<user>@<hostname|IP>[:port]/path/file
  http://<hostname|IP>[:port]/path/file
cf:/path/file
  usb<n>:/path/file

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

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>}}

**Examples**

```bash
crypto key generate rsa key 1025
crypto key import rsa moto123 url passphrase word background
crypto pki generate self-signed word generate-rsa-key word autogenerated subject-name fqdn word
```
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

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

**Parameters**

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

<table>
<thead>
<tr>
<th>crypto-cmp-cert-update &lt;TRUSTPOINT-NAME&gt; {on &lt;DEVICE-RF-DOMAIN-NAME&gt;}</th>
<th>Triggers a CMP certificate update on a specified device or devices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Triggers a CMP certificate update and response on a specified device or devices</td>
</tr>
<tr>
<td></td>
<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 mode to configure the trustpoint.</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-RF-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain. Multiple devices can be provided as a comma separated list.</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 delete

> Privileged Exec Mode Commands

Deletes a specified file from the device’s file system

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

delete [/force <FILE>|/recursive <FILE>|<FILE>]

Parameters
- delete [/force <FILE>|/recursive <FILE>|<FILE>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/force &lt;FILE&gt;</td>
<td>Forces deletion without a prompt</td>
</tr>
<tr>
<td>/recursive &lt;FILE&gt;</td>
<td>Performs a recursive delete</td>
</tr>
<tr>
<td>&lt;FILE&gt;</td>
<td>Specifies the file name</td>
</tr>
</tbody>
</table>
- 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#
### 3.1.17 *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)
- **Site controller** – RFS4000, RFS6000, RFS7000, NX45XX, 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)*.

**Supported in the following platforms:**

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
device-upgrade [MAC/HOSTNAME]|all|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|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>}} {(staggered-reboot)}

device-upgrade [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000] all
  {force|no-reboot|reboot-time <TIME>}/upgrade-time <TIME> {no-reboot|
  reboot-time <TIME>}} {(staggered-reboot)}

device-upgrade cancel-upgrade [MAC/HOSTNAME]|all|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000|on

device-upgrade cancel-upgrade [<MAC/HOSTNAME]|all

device-upgrade cancel-upgrade [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000] all
  device-upgrade cancel-upgrade on rf-domain [<RF-DOMAIN-NAMESPACE>|all]

device-upgrade load-image [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000|<IMAGE-URL>

device-upgrade rf-domain [<RF-DOMAIN-NAMESPACE>|all] containing <WORD>|filter location
  <WORD> [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000|vx9000]
  {force|no-reboot|from-controller|reboot-time <TIME>|staggered-reboot}/
  upgrade-time <TIME>]
```
device-upgrade rf-domain [<RF-DOMAIN-NAME>|all|containing <WORD>|filter location <WORD>] [ap621|ap622|ap650|ap6511|ap6522|ap6521|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rf6000|rf6500|rf7000|nx45XX|nx65XX|nx9000|vx9000] {force|no-reboot|reboot-time <TIME>} {(staggered-reboot)}

device-upgrade rf-domain [<RF-DOMAIN-NAME>|all|containing <WORD>|filter location <WORD>] [ap621|ap622|ap650|ap6511|ap6522|ap6521|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45XX|nx65XX|nx9000|vx9000] {from-controller {no-reboot|reboot-time <TIME>|upgrade-time <TIME> {no-reboot|reboot-time <TIME>}} {(staggered-reboot)}

device-upgrade rf-domain [<RF-DOMAIN-NAME>|all|containing <WORD>|filter location <WORD>] [ap621|ap622|ap650|ap6511|ap6522|ap6521|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45XX|nx65XX|nx9000|vx9000] {upgrade-time <TIME> {no-reboot|reboot-time <TIME>}} {(staggered-reboot)}

**Parameters**

- **device-upgrade <MAC/HOSTNAME>**

  - 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

  - upgrade-time <TIME> {no-reboot|reboot-time <TIME>}: Optional. Schedules an automatic device firmware upgrade

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

- **device-upgrade all**

  - 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.

  - 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>: Specify the reboot time in the MM/DD/YYYY-HH:MM or HH:MM format.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>upgrade-time <code>&lt;TIME&gt;</code></td>
<td>Optional. Schedules an automatic device firmware upgrade on all devices</td>
</tr>
<tr>
<td>{no-reboot</td>
<td>reboot-time <code>&lt;TIME&gt;</code>}</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 <code>&lt;TIME&gt;</code> – 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 common to all of the above.</td>
</tr>
<tr>
<td></td>
<td>- Optional. Enables staggered reboot (one at a time), without network impact</td>
</tr>
</tbody>
</table>

- `device-upgrade [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000] all` {force|no-reboot / reboot-time `<TIME>` / upgrade-time `<TIME>`} {no-reboot / reboot-time `<TIME>`}

Upgrades firmware on all devices of a specific type. Select the device type.

- AP621 all – Upgrades firmware on all AP621s
- AP622 all – Upgrades firmware on all AP622s
- AP650 all – Upgrades firmware on all AP650s
- AP6511 all – Upgrades firmware on all AP6511s
- AP6521 all – Upgrades firmware on all AP6521s
- AP6522 all – Upgrades firmware on all AP6522s
- AP6532 all – Upgrades firmware on all AP6532s
- AP6562 all – Upgrades firmware on all AP6562s
- AP71XX all – Upgrades firmware on all AP71XXs
- AP81XX all – Upgrades firmware on all AP81XXs
- AP82XX all – Upgrades firmware on all AP82XXs
- RFS4000 all – Upgrades firmware on all RFS4000s
- RFS6000 all – Upgrades firmware on all RFS6000s
- RFS7000 all – Upgrades firmware on all RFS7000s
- NX45XX all – Upgrades firmware on all NX45XX series service platforms
- NX65XX all – Upgrades firmware on all NX65XX series service platforms
- NX9000 all – Upgrades firmware on all NX9000 series service platforms
- VX9000 all – Upgrades firmware on all VX9000 series service platforms

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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>force</td>
<td>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.</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 <code>&lt;TIME&gt;</code></td>
<td>Optional. Schedules an automatic reboot after a successful upgrade</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;TIME&gt;</code> – Optional. Specify the reboot time in the MM/DD/YYYY-HH:MM or HH:MM format.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>upgrade-time <code>&lt;TIME&gt;</code> {no-reboot</td>
<td>Optional. Schedules an automatic firmware upgrade on all devices of the specified type.</td>
</tr>
<tr>
<td></td>
<td>&lt;TIME&gt;}</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;TIME&gt;</code> – 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 <code>&lt;TIME&gt;</code> – 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 common to all of the above.</td>
</tr>
<tr>
<td></td>
<td>- Optional. Enables staggered reboot (one at a time), without network impact</td>
</tr>
<tr>
<td>cancel-upgrade</td>
<td>Cancels a scheduled firmware upgrade on a specified device or on all devices</td>
</tr>
<tr>
<td>[&lt;MAC/HOSTNAME]</td>
<td>all]</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;MAC/HOSTNAME&gt;</code> – Cancels a scheduled upgrade on the device identified by the <code>&lt;MAC/HOSTNAME&gt;</code> keyword. Specify the device's MAC address or hostname.</td>
</tr>
<tr>
<td></td>
<td>- all – Cancels scheduled upgrade on all devices</td>
</tr>
<tr>
<td>cancel-upgrade</td>
<td>Cancels scheduled firmware upgrade on all devices of a specific type. Select the device type.</td>
</tr>
<tr>
<td>[ap621</td>
<td>ap622</td>
</tr>
<tr>
<td></td>
<td>- AP621 all – Cancels scheduled upgrade on all AP621s</td>
</tr>
<tr>
<td></td>
<td>- AP622 all – Cancels scheduled upgrade on all AP622s</td>
</tr>
<tr>
<td></td>
<td>- AP650 all – Cancels scheduled upgrade on all AP650s</td>
</tr>
<tr>
<td></td>
<td>- AP6511 all – Cancels scheduled upgrade on all AP6511s</td>
</tr>
<tr>
<td></td>
<td>- AP6521 all – Cancels scheduled upgrade on all AP6521s</td>
</tr>
<tr>
<td></td>
<td>- AP6522 all – Cancels scheduled upgrade on all AP6522s</td>
</tr>
<tr>
<td></td>
<td>- AP6532 all – Cancels scheduled upgrade on all AP6532s</td>
</tr>
<tr>
<td></td>
<td>- AP6562 all – Cancels scheduled upgrade on all AP6562s</td>
</tr>
<tr>
<td></td>
<td>- AP71XX all – Cancels scheduled upgrade on all AP71XXs</td>
</tr>
<tr>
<td></td>
<td>- AP81XX all – Cancels scheduled upgrade on all AP81XXs</td>
</tr>
<tr>
<td></td>
<td>- AP82XX all – Cancels scheduled upgrade on all AP82XXs</td>
</tr>
<tr>
<td></td>
<td>- RFS4000 all – Cancels scheduled upgrade on all RFS4000s</td>
</tr>
<tr>
<td></td>
<td>- RFS6000 all – Cancels scheduled upgrade on all RFS6000s</td>
</tr>
<tr>
<td></td>
<td>- RFS7000 all – Cancels scheduled upgrade on all RFS7000s</td>
</tr>
<tr>
<td></td>
<td>- NX45XX all – Cancels scheduled upgrade on all NX45XX series service platforms</td>
</tr>
<tr>
<td></td>
<td>- NX65XX all – Cancels scheduled upgrade on all NX65XX series service platforms</td>
</tr>
<tr>
<td></td>
<td>- NX9000 all – Cancels scheduled upgrade on all NX9000 series service platforms</td>
</tr>
<tr>
<td></td>
<td>- VX9000 all – Cancels scheduled upgrade on all VX9000 devices</td>
</tr>
<tr>
<td>cancel-upgrade</td>
<td>Cancels scheduled firmware upgrade in a specified RF Domain or all RF Domains</td>
</tr>
<tr>
<td>on rf-domain</td>
<td>[&lt;DOMAIN-NAME]</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;RF-DOMAIN-NAME&gt;</code> – Cancels scheduled device upgrade in a specified RF Domain. Specify the RF Domain name.</td>
</tr>
<tr>
<td></td>
<td>- all – Cancels scheduled device upgrades across all RF Domains</td>
</tr>
</tbody>
</table>
**load-image**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap621</td>
<td>Loads AP621 firmware image</td>
</tr>
<tr>
<td>ap622</td>
<td>Loads AP622 firmware image</td>
</tr>
<tr>
<td>ap650</td>
<td>Loads AP650 firmware image</td>
</tr>
<tr>
<td>ap6511</td>
<td>Loads AP6511 firmware image</td>
</tr>
<tr>
<td>ap6521</td>
<td>Loads AP6521 firmware image</td>
</tr>
<tr>
<td>ap6522</td>
<td>Loads AP6522 firmware image</td>
</tr>
<tr>
<td>ap6532</td>
<td>Loads AP6532 firmware image</td>
</tr>
<tr>
<td>ap6562</td>
<td>Loads AP6562 firmware image</td>
</tr>
<tr>
<td>ap71xx</td>
<td>Loads AP71XX firmware image</td>
</tr>
<tr>
<td>ap81xx</td>
<td>Loads AP81XX firmware image</td>
</tr>
<tr>
<td>ap82xx</td>
<td>Loads AP82XX firmware image</td>
</tr>
<tr>
<td>rfs4000</td>
<td>Loads RFS4000 firmware image</td>
</tr>
<tr>
<td>rfs6000</td>
<td>Loads RFS6000 firmware image</td>
</tr>
<tr>
<td>rfs7000</td>
<td>Loads RFS7000 firmware image</td>
</tr>
<tr>
<td>nx45xx</td>
<td>Loads NX45XX series service platform firmware image</td>
</tr>
<tr>
<td>nx65xx</td>
<td>Loads NX65XX series service platform firmware image</td>
</tr>
<tr>
<td>nx9000</td>
<td>Loads NX9000 series service platform firmware image</td>
</tr>
<tr>
<td>vx9000</td>
<td>Loads VX9000 device firmware image</td>
</tr>
<tr>
<td>vx9000</td>
<td>Loads VX9000 device firmware image</td>
</tr>
</tbody>
</table>

**<URL>**

Specify the device's firmware image location in one of the following formats:

**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
### device-upgrade rf-domain

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;RF-DOMAIN-NAME&gt;</code></td>
<td>Upgrades devices in a specified RF Domain. Specify the RF Domain name.</td>
</tr>
<tr>
<td><code>all</code></td>
<td>Upgrades devices across all RF Domains</td>
</tr>
<tr>
<td><code>containing &lt;WORD&gt;</code></td>
<td>Filters RF Domains containing the sub-string identified by the <code>&lt;WORD&gt;</code> keyword. Devices on the filtered RF Domains are upgraded.</td>
</tr>
<tr>
<td><code>filter location &lt;WORD&gt;</code></td>
<td>Filters devices by their location. All devices with location matching the <code>&lt;WORD&gt;</code> keyword are upgraded.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP621</td>
<td>Upgrades firmware on all AP621s</td>
</tr>
<tr>
<td>AP622</td>
<td>Upgrades firmware on all AP622s</td>
</tr>
<tr>
<td>AP650</td>
<td>Upgrades firmware on all AP650s</td>
</tr>
<tr>
<td>AP6511</td>
<td>Upgrades firmware on all AP6511s</td>
</tr>
<tr>
<td>AP6521</td>
<td>Upgrades firmware on all AP6521s</td>
</tr>
<tr>
<td>AP6522</td>
<td>Upgrades firmware on all AP6522s</td>
</tr>
<tr>
<td>AP6532</td>
<td>Upgrades firmware on all AP6532s</td>
</tr>
<tr>
<td>AP6562</td>
<td>Upgrades firmware on all AP6562s</td>
</tr>
<tr>
<td>AP71XX</td>
<td>Upgrades firmware on all AP71XXs</td>
</tr>
<tr>
<td>AP81XX</td>
<td>Upgrades firmware on all AP81XXs</td>
</tr>
<tr>
<td>AP82XX</td>
<td>Upgrades firmware on all AP82XXs</td>
</tr>
<tr>
<td>RFS4000</td>
<td>Upgrades firmware on all RFS4000s</td>
</tr>
<tr>
<td>RFS6000</td>
<td>Upgrades firmware on all RFS6000s</td>
</tr>
<tr>
<td>RFS7000</td>
<td>Upgrades firmware on all RFS7000s</td>
</tr>
<tr>
<td>NX45XX</td>
<td>Upgrades firmware on all NX45XX series service platforms</td>
</tr>
<tr>
<td>NX65XX</td>
<td>Upgrades firmware on all NX65XX series service platforms</td>
</tr>
<tr>
<td>NX9000</td>
<td>Upgrades firmware on all NX9000 series service platforms</td>
</tr>
<tr>
<td>VX9000</td>
<td>Upgrades firmware on all VX9000 devices</td>
</tr>
</tbody>
</table>

### Force Option

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>force</code></td>
<td>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.</td>
</tr>
</tbody>
</table>

### Reboot Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no-reboot</code></td>
<td>Optional. Disables automatic reboot after a successful upgrade (the device must be manually restarted)</td>
</tr>
<tr>
<td><code>reboot-time &lt;TIME&gt;</code></td>
<td>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 rf-domain**

```
device-upgrade rf-domain [RF-DOMAIN-NAME] [all|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000] {from-controller {no-reboot|reboot-time <TIME>|upgrade-time <TIME> {no-reboot|reboot-time <TIME>}}}
```

- **rf-domain**
  - `RF-DOMAIN-NAME` – Upgrades devices in a specified RF Domain. Specify the RF Domain name.
  - `all` – Upgrades devices across all RF Domains
  - `containing <WORD>` – Filters RF Domains containing the sub-string identified by the <WORD> keyword. 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.

- **from-controller**
  - Optional. Upgrades a device through the adopted device.
  - `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.
### device-upgrade rf-domain

```
  device-upgrade rf-domain [rf-domain <RF-DOMAIN-NAME>|all|containing <WORD>|filter location <WORD>]
  upgrade-time <TIME>
  no-reboot
  reboot-time <TIME>
  {staggered-reboot}
```

<table>
<thead>
<tr>
<th>upgrade-time &lt;TIME&gt;</th>
<th>Optional. Schedules an automatic firmware upgrade</th>
</tr>
</thead>
<tbody>
<tr>
<td>{no-reboot}</td>
<td>• &lt;TIME&gt; – Specify the upgrade time in the MM/DD/YYYY-HH:MM or HH:MM format. After a scheduled upgrade, the following actions can be performed:</td>
</tr>
<tr>
<td>reboot-time &lt;TIME&gt;</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>

<table>
<thead>
<tr>
<th>staggered-reboot</th>
<th>This keyword is common to all of the above.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Optional. Enables staggered reboot (one at a time), without network impact</td>
</tr>
</tbody>
</table>

| rf-domain [all|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000] | upgrades firmware on devices in a specified RF Domain or all RF Domains |
|-------------------|--------------------------------------------------|
|                   | • <RF-DOMAIN-NAME> – Upgrades devices in a specified RF Domain. Specify the RF Domain name. |
|                   | • all – Upgrades devices across all RF Domains |
|                   | • containing <WORD> – Filters RF Domains containing the sub-string identified by the <WORD> keyword. 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. |

| [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000] | After specifying the RF Domain, select the device type. |
|---------------------------|--------------------------------------------------|
|                           | • all – Upgrades firmware on all devices |
|                           | • AP621 – Upgrades firmware on all AP621s |
|                           | • AP622 – Upgrades firmware on all AP622s |
|                           | • AP650 – Upgrades firmware on all AP650s |
|                           | • AP6511 – Upgrades firmware on all AP6511s |
|                           | • AP6521 – Upgrades firmware on all AP6521s |
|                           | • AP6522 – Upgrades firmware on all AP6522s |
|                           | • AP6532 – Upgrades firmware on all AP6532s |
|                           | • AP6562 – Upgrades firmware on all AP6562s |
|                           | • AP71XX – Upgrades firmware on all AP71XXs |
|                           | • AP81XX – Upgrades firmware on all AP81XXs |
|                           | • AP82XX – Upgrades firmware on all AP82XXs |
|                           | • RFS4000 – Upgrades firmware on all RFS4000s |
|                           | • RFS6000 – Upgrades firmware on all RFS6000s |
|                           | • RFS7000 – Upgrades firmware on all RFS7000s |
|                           | • NX45XX – Upgrades firmware on all NX45XX series service platforms |
|                           | • NX65XX – Upgrades firmware on all NX65XX series service platforms |
|                           | • NX9000 – Upgrades firmware on all NX9000 series service platforms |
|                           | • VX9000 – Upgrades firmware on all VX9000 devices |
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>NOC Controllers</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFS4000</td>
<td>X</td>
</tr>
<tr>
<td>RFS6000</td>
<td>X</td>
</tr>
<tr>
<td>RFS9000</td>
<td>X</td>
</tr>
<tr>
<td>NX45XX</td>
<td>-</td>
</tr>
<tr>
<td>NX65XX</td>
<td>-</td>
</tr>
<tr>
<td>NX9000</td>
<td>-</td>
</tr>
<tr>
<td>NX95XX</td>
<td>-</td>
</tr>
</tbody>
</table>

Examples:

- `rfs4000-229D58#device-upgrade rfs4000-229D58 no-reboot`  
  `rfs4000-229D58#`

- `rfs4000-229D58#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`  

- `rfs4000-229D58#show device-upgrade`  
  `rfs4000-229D58#show device-upgrade history`

---

- `ap71xx-0F43D8` failed 2013-01-05 00:21:08 3 00-23-68-22-9D-58 Update error: Unable to get update file, failure in ftp.openssl.tar`  
- `ap6532-986C50` failed 2013-01-05 00:26:31 3 00-23-68-22-9D-58 Update error: Bad file, failure in tar. tar: invalid tar magic`  

- `rfs4000-229D58#show device-upgrade versions`  
  `rfs4000-229D58 ap621 5.6.0.0-026B`
<table>
<thead>
<tr>
<th>Device</th>
<th>AP Type</th>
<th>Firmware Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs4000-229D58</td>
<td>ap622</td>
<td>5.6.0.0-026B</td>
</tr>
<tr>
<td>rfs4000-229D58</td>
<td>ap650</td>
<td>5.6.0.0-026B</td>
</tr>
<tr>
<td>rfs4000-229D58</td>
<td>ap6511</td>
<td>none</td>
</tr>
<tr>
<td>rfs4000-229D58</td>
<td>ap6521</td>
<td>5.6.0.0-026B</td>
</tr>
<tr>
<td>rfs4000-229D58</td>
<td>ap6522</td>
<td>5.6.0.0-026B</td>
</tr>
<tr>
<td>rfs4000-229D58</td>
<td>ap6532</td>
<td>5.6.0.0-026B</td>
</tr>
<tr>
<td>rfs4000-229D58</td>
<td>ap6562</td>
<td>5.6.0.0-026B</td>
</tr>
<tr>
<td>rfs4000-229D58</td>
<td>ap71xx</td>
<td>none</td>
</tr>
<tr>
<td>rfs4000-229D58</td>
<td>ap81xx</td>
<td>none</td>
</tr>
<tr>
<td>rfs4000-229D58</td>
<td>ap82xx</td>
<td>none</td>
</tr>
<tr>
<td>rfs4000-229D58</td>
<td>rfs4000</td>
<td>none</td>
</tr>
</tbody>
</table>
3.1.18 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

diff [<FILE>|<URL>] [<FILE>|<URL>]

**Parameters**
- diff [<FILE>|<URL>] [<FILE>|<URL>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;FILE&gt;</td>
<td>The first &lt;FILE&gt; is the source file for the diff command. The second &lt;FILE&gt; is used for comparison.</td>
</tr>
<tr>
<td>&lt;URL&gt;</td>
<td>The first &lt;URL&gt; is the source file's URL. The second &lt;URL&gt; is the second file's URL.</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs4000-229D58#diff startup-config running-config
--- startup-config
+++ running-config
@@ -1,3 +1,4 @@
+!### show running-config
!
! Configuration of RFS4000 version 5.6.0.0-026B
!
@@ -859,14 +860,11 @@
 alias vlan $testVLANAlias 1
!
 rfs4000 00-23-68-22-9D-58
 - radio-count 0
 - use profile default-rfs4000
 - use rf-domain default
 hostname rfs4000-229D58
 license AP DEFAULT-6AP-LICENSE
 license ADSEC DEFAULT-ADV-SEC-LICENSE
 - model-number RFS-4010-00010-WR
 - adoption-site Moto-EcoSpace3B
 mint mlcp vlan
 mint mlcp ip
 wep-shared-key-auth

rfs4000-229D58#
```
3.1.19 dir

Lists files on a device’s file system

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

dir [/all|/recursive|<DIR>|all-filesystems]

Parameters

- dir [/all|/recursive|<DIR>|all-filesystems]

<table>
<thead>
<tr>
<th>/all</th>
<th>Optional. Lists all files</th>
</tr>
</thead>
<tbody>
<tr>
<td>/recursive</td>
<td>Optional. Lists files recursively</td>
</tr>
<tr>
<td>&lt;DIR&gt;</td>
<td>Optional. Lists files in the named file path</td>
</tr>
<tr>
<td>all-filesystems</td>
<td>Optional. Lists files on all file systems</td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58#dir
Directory of flash:/.

```
  drwx          Wed Jan 30 02:45:10 2013   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 2013   crashinfo
  drwx          Wed Jan 16 22:57:14 2013   archived_logs
  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 2013   out.tar
```

rfs4000-229D58#dir all-filesystems
Directory of flash: /

```
  drwx          Wed Jan 30 02:45:10 2013   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 2013   crashinfo
  drwx          Wed Jan 16 22:57:14 2013   archived_logs
  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 2013   out.tar
```

Directory of nvram: /

```
  -rw-   10669    Sat Jan 14 02:47:11 2012   startup-config.save
```

Directory of system: /
drwx       Wed Jan 16 22:35:18 2013   proc
rfs4000-229D58#
3.1.20 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
disable

Parameters
None

Examples
rfs7000-37FABE#disable
rfs7000-37FABE>
3.1.21 edit

Privileged Exec Mode Commands

Edits a text file on the device’s file system

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
edit <FILE>

Parameters
- edit <FILE>

Examples
rfs4000-229D58#edit startup-config
   GNU nano 1.2.4                File: startup-config
   ! Configuration of RFS4000 version 5.6.0.0-026B
   !
   !
   !
   version 2.3
   !
   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 1 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
   [ line 1/808 (0%), col 1/2 (50%), char 0/22694 (0%) ]
   ^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
3.1.22 enable

<table>
<thead>
<tr>
<th>Privileged Exec Mode Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turns on (enables) the privileged mode command set. This command does not do anything in the Privilege Executable mode.</td>
</tr>
</tbody>
</table>

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**
```
enable
```

**Parameters**
None

**Examples**
```
rfs7000-37FABE#enable
rfs7000-37FABE#
```
3.1.23 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```markdown
erase [cf:|flash:|nvram:|startup-config|usb1:]
```

**Parameters**

- `erase [cf:|flash:|nvram:|startup-config|usb1:]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>cf:</code></td>
<td>Erases everything in the device’s <code>cf:</code> file</td>
</tr>
<tr>
<td><code>flash:</code></td>
<td>Erases everything in the device’s <code>flash:</code> file</td>
</tr>
<tr>
<td><code>nvram:</code></td>
<td>Erases everything in the device’s <code>nvram:</code> file</td>
</tr>
<tr>
<td><code>startup-config</code></td>
<td>Erases the device’s startup configuration file. The startup configuration file is used to configure the device when it reboots.</td>
</tr>
<tr>
<td><code>usb1:</code></td>
<td>Erases everything in the device’s <code>usb1:</code> file</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE#erase startup-config
Erase startup-config? (y/n): n
rfs7000-37FABE#
```
3.1.24 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
halt {on <DEVICE-NAME>}
```

**Parameters**

- `halt {on <DEVICE-NAME>}`

| `halt {on <DEVICE-NAME>}` | Halts a specified device  
|-----------------------------|--------------------------|
|                             | • `on <DEVICE-NAME>` – Optional. Enter the name of the AP, wireless controller, or service platform.  
| **Note:** If the device name is not specified, the logged device is halted. |

**Examples**

```
rfs7000-37FABE#halt on rfs7000-37FABE
rfs7000-37FABE#
```
3.1.25 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, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

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

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP&gt;</td>
<td>Specify the cluster member’s IP address.</td>
</tr>
<tr>
<td>user &lt;USERNAME&gt;</td>
<td>Specify a user account with super user privileges on the new cluster member.</td>
</tr>
<tr>
<td>password &lt;WORD&gt;</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>mode [active</td>
<td>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

```
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#
rfs6000-6DB5D4#show context
!
! Configuration of RFS6000 version 5.6.0.0-026B
!
! version 2.3
!
```
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>
Establishes or brings down an L2TPv3 tunnel

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
l2tpv3 tunnel [<TUNNEL-NAME>|all]
l2tpv3 tunnel <TUNNEL-NAME> [down|session|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>}`
  - 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.
### 3.1.27 logging

> Privileged Exec Mode Commands

Modifies message logging settings

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

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

**Parameters**

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>monitor</code></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;0-7&gt;</code> – 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>

**Examples**

```
rfs7000-37FABE#logging monitor debugging
rfs7000-37FABE#show logging
```

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

Log Buffer (1970 bytes):

```
Dec 16 14:32:44 2013: %DATAPLANE-4-DOSATTACK: IPSPOOF ATTACK: Source IP is Spoofed: Src IP : 192.168.0.3, Dst IP: 224.0.0.251, Src Mac: B4-C7-99-5C-FA-2F, Dst Mac: 01-00-5E-00-00-FB, Proto = 17.
Nov 19 04:17:04 2013: %DATAPLANE-4-DOSATTACK: IPSPOOF ATTACK: Source IP is Spoofed: Src IP : 192.168.0.3, Dst IP: 224.0.0.251, Src Mac: B4-C7-99-5C-FA-2F, Dst Mac: 01-00-5E-00-00-FB, Proto = 17.
```
--More--
rfs7000-37FABE#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets terminal lines logging levels</td>
</tr>
</tbody>
</table>
### 3.1.28 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
mint ping [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 - 60. The default is 3.

- **size <1-64000>**
  - Optional. Sets the MiNT payload size in bytes
  - `<1-64000>` – Specify a value from 1 - 640000 bytes. The default is 64 bytes.

- **timeout <1-10>**
  - Optional. Sets a response time in seconds
  - `<1-10>` – Specify a value from 1 - 10 seconds. 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
  - `<1-255>` – Specify a value from 1 - 255 seconds. The default is 30 seconds.
Examples
rfs7000-37FABE#mint ping 68.22.9B.58 count 6 size 128
MiNT ping 68.22.9B.58 with 128 bytes of data.
Ping request 1 timed out. No response from 68.22.9B.58
Ping request 2 timed out. No response from 68.22.9B.58
Ping request 3 timed out. No response from 68.22.9B.58
Ping request 4 timed out. No response from 68.22.9B.58
Ping request 5 timed out. No response from 68.22.9B.58
Ping request 6 timed out. No response from 68.22.9B.58

--- 68.22.9B.58 ping statistics ---
6 packets transmitted, 0 packets received, 100% packet loss
rfs7000-37FABE#
3.1.29 mkdir

Privileged Exec Mode Commands

Creates a new directory in the file system

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

mkdir <DIR>

Parameters

- mkdir <DIR>

Examples

rfs4000-229D58#dir
Directory of flash:/.

```
drwx Wed Jan 30 02:45:10 2013 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 2013 crashinfo
drwx Wed Jan 16 22:57:14 2013 archived_logs
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 2013 out.tar
```

rfs4000-229D58#

rfs4000-229D58#mkdir testdir
rfs4000-229D58#

rfs4000-229D58#dir
Directory of flash:/.

```
drwx Wed Jan 30 02:45:10 2013 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 2013 crashinfo
drax Fri Feb 15 14:50:49 2013 testdir
drwx Wed Jan 16 22:57:14 2013 archived_logs
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 2013 out.tar
```

rfs4000-229D58#
3.1.30 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
more <FILE>
```

Parameters

- more <FILE>

Examples

```
rfs4000-229D58#more flash:/log/messages.log
Jan 01 00:04:12 2013: rfs4000-229D58 : %SYSTEM-3-LOGIN_FAIL: Log-in failed for user
 'admin' from 'ssh'
Jan 01 02:06:53 2013: rfs4000-229D58 : %SYSTEM-3-LOGIN_FAIL: Log-in failed for user
 'admin'superuser' from 'ssh'
Jan 01 02:07:01 2013: rfs4000-229D58 : %SYSTEM-3-LOGIN_FAIL: Log-in failed for user
 'admin'superuser' from 'ssh'
Jan 01 02:23:26 2013: rfs4000-229D58 : %NSM-4-IFDOWN: Interface ge1 is down
Jan 01 02:24:25 2013: rfs4000-229D58 : %NSM-4-IFUP: Interface ge1 is up
Jan 01 02:24:26 2013: rfs4000-229D58 : %NSM-4-IFUP: Interface ge1 is up
Jan 01 02:24:33 2013: rfs4000-229D58 : %NSM-4-IFDOWN: Interface ge1 is down
Jan 01 02:24:40 2013: rfs4000-229D58 : %NSM-4-IFUP: Interface ge1 is up
Jan 01 02:24:40 2013: rfs4000-229D58 : %NSM-4-IFUP: Interface ge1 is up
rfs4000-229D58#
```
3.1.31 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [adoption|captive-portal|cpe|crypto|debug|logging|mac-user-db|page|raid|service|terminal|upgrade|virtual-machine|wireless]
no adoption {on <DEVICE-OR-DOMAIN-NAME>}
no captive-portal client [captive-portal <CAPTIVE-PORTAL-NAME>|mac <MAC>] {on <DEVICE-OR-DOMAIN-NAME>}
no crypto pki [server|trustpoint]
no crypto pki [server|trustpoint] <TRUSTPOINT-NAME> {del-key {on <DEVICE-NAME>}|on <DEVICE-NAME>}
no logging monitor
no page
no service [ap300|block-adopter-config-update|locator|snmp|ssm|wireless]
no service ap300 locator <MAC>
no service block-adopter-config-update
no service locator {on <DEVICE-NAME>}
no service ssm trace pattern {<WORD>} {(on <DEVICE-NAME>)}
no service wireless [trace pattern {<WORD>} {(on <DEVICE-NAME>)|unsanctioned ap air-terminate <BSSID> {on <DOMAIN-NAME>}}]
no terminal [length|width]
no upgrade <PATCH-NAME> {on <DEVICE-NAME>}
no wireless client [all]<MAC>]
no wireless client all {filter|on}
no wireless client all {filter [wlan <WLAN-NAME>]}\nno wireless client all {on <DEVICE-OR-DOMAIN-NAME>} {filter [wlan <WLAN-NAME>]}
no wireless 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:
no cpe led cpe [<1-24>|all]

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 mac-user-db user [<USER-NAME>]|all]
no raid locate
no service analytics wifi
### Parameters

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

  **no adoption** `{on <DEVICE-OR-DOMAIN-NAME>}`
  - Resets adoption status of a specified device or all devices in a specified RF Domain
  - `<DEVICE-OR-DOMAIN-NAME>` – Optional. Enter the name of the AP, wireless controller, service platform, or RF Domain. This command resets the adoption status of the specified device and all devices adopted by it.

- **no captive-portal client** `{captive-portal <CAPTIVE-PORTAL-NAME>|<MAC>}`

  **no captive-portal client** `{captive-portal <CAPTIVE-PORTAL-NAME>|<MAC>}`
  - Disconnects captive portal clients from the network
  - `<CAPTIVE-PORTAL-NAME>` – Specify the captive portal name.
  - `<MAC>` – Specify the client’s MAC address.

  **on <DEVICE-OR-DOMAIN-NAME>**
  - Optional. Disconnects a specified captive portal client or all 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.

- **no crypto pki** `{server|trustpoint} <TRUSTPOINT-NAME>`

  **no crypto pki** `{server|trustpoint} <TRUSTPOINT-NAME>`
  - Deletes all PKI authentications
  - `<TRUSTPOINT-NAME>` – Deletes a trustpoint or its server certificate. Specify the trustpoint name.

  **del-key** `{on <DEVICE-NAME>}`
  - Optional. Deletes the private key associated with a server certificate or trustpoint. The operation fails if the private key is in use by other trustpoints.
  - `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

- **no logging monitor**

  **no logging monitor**
  - Resets terminal lines message logging levels

- **no page**

  **no page**
  - Resets controller paging function to its default. Disabling the “page” command displays the CLI command output at once, instead of page by page.
- **no service ap300 locator <MAC>**

  Disables LEDs on AP300s or a specified device in the WLAN. It also resets the CLI table and MiNT protocol configurations.

- **no service block-adopter-config-update**

  Enables configuration updates from the NOC controller. If the configuration update from the NOC controller feature is blocked, use the `no service block-adopter-config-update` command to enable it.

- **no service locator {on <DEVICE-NAME>**}

  Disables LEDs on a specified device in the WLAN. It also resets the CLI table expand and MiNT protocol configurations.

  `<DEVICE-NAME>` – Optional. Specify the name of the AP, wireless controller, or service platform.

- **no service snmp sysoid wing5**

  Disables the configuration of new `sysObjectID` (sysoid), in the MIB, for devices running WiNG 5.X devices

  **sysoid wing5**

  Reverts back to the original sysoid used for WiNG 4.X

  Use the `service snmp sysoid wing5` command to enable the SNMP manager return sysoid for WiNG 5.X OS.

  The WiNG 4.X sysoids are:

  - **RFS4000** – 1.3.6.1.4.1.388.18
  - **RFS6000** – 1.3.6.1.4.1.388.16
  - **RFS7000** – 1.3.6.1.4.1.388.15

  **Note:** for more information on enabling this feature, see `service`.

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

  Disables certain specified services or features

  ```
  ssm
  ```

  Disables `Security Services Module` (SSM) related services

  ```
  trace pattern {<WORD>} {on <DEVICE-NAME>}
  ```

  Disables SSM related service tracing

  ```
  pattern
  ```

  Configures the pattern to match

  ```
  <WORD>
  ```

  Optional. Specify the pattern to ignore. Reverses the match pattern specified.

  ```
  on <DEVICE-NAME>
  ```

  Optional. Matches the specified pattern on specified device. Specify the name of the AP, wireless controller, or service platform.
- **no service wireless** [trace pattern {<WORD>} {on <DEVICE-NAME>}]
  - Disables certain specified services or features

- **unsanctioned ap air-terminate** <BSSID> {on <DOMAIN-NAME>}
  - Disables wireless-related service tracing
    - pattern – Configures the pattern to match
      - <WORD> – Optional. Specify the pattern to ignore. Reverses the match pattern specified.
      - on <DEVICE-NAME> – Optional. Matches the specified pattern on specified device. Specify the name of the AP, wireless controller, or service platform.

- **unsanctioned ap air-terminate** <BSSID> {on <DOMAIN-NAME>}
  - Terminates a specified access point
    - <BSSID> – Specify the BSSID of the access point.
    - on <DOMAIN-NAME> – Optional. Provides the specified access point’s RF Domain name
    - <DOMAIN-NAME> – Specify the name of the RF Domain.

- **no upgrade** <PATCH-NAME> {on <DEVICE-NAME>}
  - Removes a patch installed on a specified device
    - <PATCH-NAME> – Specify the name of the patch.
    - on <DEVICE-NAME> – Optional. Removes a patch on a specified device
      - <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

- **no terminal** [length|width]
  - Resets the width of the terminal window, or the number of lines displayed within the terminal window
    - length – Resets the number of lines displayed on the terminal window to its default
    - width – Resets the width of the terminal window to its default.

- **no wireless client** all {filter [wlan <WLAN-NAME>]}
  - Disassociates all wireless clients on a specified device or domain
    - filter wlan <WLAN-NAME> – Optional. Specifies an additional client selection filter
      - wlan – Filters clients on a specified WLAN
      - <WLAN-NAME> – Specify the WLAN name.

- **no wireless client** all {on <DEVICE-OR-DOMAIN-NAME> {filter [wlan <WLAN-NAME>]}
  - Disassociates all clients on a specified device or domain
    - <DEVICE-OR-DOMAIN-NAME> – Optional. Specify the name of the AP, wireless controller, service platform, or RF Domain.
    - filter wlan <WLAN-NAME> – Optional. Specifies an additional client selection filter
      - wlan – Filters clients on a specified WLAN
      - <WLAN-NAME> – Specify the WLAN name.
### PRIVILEGED EXEC MODE COMMANDS

• **no wireless client mac** `<MAC>` {on `<DEVICE-OR-DOMAIN-NAME>`}

  no wireless client mac `<MAC>`
  Disassociates a single wireless client on a specified device or RF Domain
  • mac `<MAC>` – Specify the wireless client’s MAC address in the AA-BB-CC-DD-EE-FF format.

  on `<DEVICE-OR-DOMAIN-NAME>`
  Optional. Specifies the name of the AP, wireless controller, service platform, or RF Domain to which the specified client is associated

• **no cpe led cpe [1-24]|all` {on `<DEVICE-NAME>`}

  no cpe led
  Disables LED flashing on CPEs through the adopted T5 controller
  **Note:** This command is available only on the RFS4000, RFS7000, NX45XX, NX65XX, NX9500, and NX9510 series service platforms.

  cpe [1-24]|all
  Identifies the CPEs
  • `<1-24>` – Specifies the CPE ID from 1 - 24
  • all – Specifies all CPEs connected to the T5 controller via DSL interface

  on `<DEVICE-NAME>`
  Optional. Specifies the T5 device’s hostname

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

  no virtual-machine assign-usb-ports
  Reverts ports assigned for virtual-machines back to WiNG
  **Note:** This command is available only on the NX45XX, NX65XX, NX9500, and NX9510 series service platforms.

  on `<DEVICE-NAME>`
  Reverts virtual-machine assigned ports on a specified device
  • on `<DEVICE-NAME>` – Optional. Specify the name of the AP, wireless controller, or service platform.

• **no mac-user-db user [USER-NAME]|all`}

  no mac-user-db user
  Deletes a specified user or all users from the MAC registration user database
  **Note:** This command is available only on the NX9000 series service platforms.

  `<USER-NAME>`
  Deletes the user, identified by the `<USER-NAME>` keyword, from the MAC registration user database
  • `<USER-NAME>` – Specify the username.

  all
  Deletes all users from the MAC registration user database

• **no raid locate**

  no raid locate
  Disables flashing of LEDs on RAID drives.
  **Note:** This command is available only on the NX9000 series service platforms.

  **Note:** For more information on RAIDs and enabling LEDs on RAID drives, see **raid**.

• **no service analytics wifi**

  no service analytics wifi
  Disables WiFi data polling

**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#

rfs7000-37FABE# no service cli-tables-expand line
rfs7000-37FABE#

nx9500-6C8809# no service analytics wifi
Wifi data polling will be enabled. Please run status command to check Wifi data polling status.
nx9500-6C8809#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>auto-provisioning-policy</td>
<td>Resets the adoption state of a device and all devices adopted to it</td>
</tr>
<tr>
<td>captive portal</td>
<td>Manages captive portal clients</td>
</tr>
<tr>
<td>crypto</td>
<td>Enables digital certificate configuration and RSA Keypair management</td>
</tr>
<tr>
<td>logging</td>
<td>Modifies message logging settings</td>
</tr>
<tr>
<td>page</td>
<td>Resets controller paging function to its default</td>
</tr>
<tr>
<td>service</td>
<td>Performs different functions depending on the parameter passed</td>
</tr>
<tr>
<td>terminal</td>
<td>Sets the length or the number of lines displayed within the terminal window</td>
</tr>
<tr>
<td>upgrade</td>
<td>Upgrades software image on a device</td>
</tr>
<tr>
<td>wireless-client</td>
<td>Manages wireless clients</td>
</tr>
<tr>
<td>virtual-machine</td>
<td>Installs, configures, and monitors the status of third-party VMs</td>
</tr>
<tr>
<td>raid</td>
<td>Enables Redundant Array of Independent Disks (RAID) management</td>
</tr>
</tbody>
</table>
3.1.32 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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(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)#
3.1.33 page

Privileged Exec Mode Commands

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
page

Parameters
None

Examples
rfs7000-37FABE#page
rfs7000-37FABE#

Related Commands

<table>
<thead>
<tr>
<th></th>
<th>Disables controller paging</th>
</tr>
</thead>
</table>
3.1.34 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

ping <IP/HOSTNAME> {count <1-10000>|dont-fragment {count|size}|size <1-64000>}

Parameters
- ping <IP/HOSTNAME> {count <1-10000>|dont-fragment {count|size}|size <1-64000>}

<table>
<thead>
<tr>
<th>&lt;IP/HOSTNAME&gt;</th>
<th>Specify the destination IP address or hostname to ping. When entered without any parameters, this command prompts for an IP address or a hostname.</th>
</tr>
</thead>
<tbody>
<tr>
<td>count &lt;1-10000&gt;</td>
<td>Optional. Sets the pings to the specified destination • &lt;1-10000&gt; – Specify a value from 1 - 10000. The default is 5.</td>
</tr>
<tr>
<td>dont-fragment</td>
<td>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 &lt;1-10000&gt; – Sets the pings to the specified destination from 1 - 10000. The default is 5. • size &lt;1-64000&gt; – Sets the size of ping payload size from 1 - 64000 bytes. The default is 100 bytes.</td>
</tr>
<tr>
<td>size &lt;1-64000&gt;</td>
<td>Optional. Sets the ping packet's size in bytes • &lt;1-64000&gt; – Specify the ping payload size from 1 - 64000 bytes. The default is 100 bytes.</td>
</tr>
</tbody>
</table>

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#
### 3.1.35 `ping6`

**Privileged Exec Mode Commands**

Sends ICMPv6 echo messages to a user-specified IPv6 address

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```sh
ing6 <IPv6/HOSTNAME> {<INTF-NAME>|count <1-10000>|size <1-64000>}
```

**Parameters**

- `<IPv6/HOSTNAME>` Specify the destination IPv6 address or hostname.
- `<INTF-NAME>` Specify the interface name for link local/broadcast address
- `count <1-10000>` Optional. Sets the pings to the specified IPv6 destination
  - `<1-10000>` – Specify a value from 1 - 10000. The default is 5.
- `size <1-64000>` Optional. Sets the IPv6 ping payload size in bytes
  - `<1-64000>` – Specify the ping payload size from 1 - 64000. The default is 100 bytes.

**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,

**Examples**

```sh
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#
```
3.1.36 pwd

Displays the full path of the present working directory, similar to the UNIX pwd command.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

pwd

Parameters

None

Examples

rfs4000-229D58#pwd
flash:/
rfs4000-229D58#

rfs4000-229D58#dir
Directory of flash:/.

drwx Wed Jan 30 02:45:10 2013 log

drwx Sat Jan  1 00:00:09 2000 configs

drwx Sat Jan  1 00:00:08 2000 cache

drax Wed Jan 16 22:26:53 2013 crashinfo

drax Fri Feb 15 14:50:49 2013 testdir

drax Wed Jan 16 22:57:14 2013 archived_logs

drax Sat Jan  1 00:00:08 2000 upgrade

drax Sat Jan  1 00:00:09 2000 hotspot

drax Sat Jan  1 00:00:09 2000 floorplans

drax Sat Jan  1 00:00:09 2000 startuplog

-rw- 176128 Fri Feb 15 14:32:51 2013 out.tar

rfs4000-229D58#
3.1.37 **re-elect**

*Privileged Exec Mode Commands*

Re-elects the tunnel controller (wireless controller or service platform)

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

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>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>re-elect tunnel-controller</td>
<td>Re-elects the tunnel controller</td>
</tr>
<tr>
<td>&lt;WORD&gt; {on &lt;DEVICE-NAME&gt;}</td>
<td>Optional. Re-elects the tunnel controller on all devices whose preferred tunnel controller name matches &lt;WORD&gt;</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Re-elects the tunnel controller 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**

```bash
rfs7000-37FABE#re-elect tunnel-controller
OK
rfs7000-37FABE#```
3.1.38 reload

Privileged Exec Mode Commands

Halts the device and performs a warm reboot

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
reload {cancel|force|in|on}
reload {on <DEVICE-OR-DOMAIN-NAME>}
reload {cancel|force} {on <DEVICE-OR-DOMAIN-NAME>}
reload {in <1-999>} {list|on}
reload {in <1-999>} {list {<LINE>|all}|on <DEVICE-OR-DOMAIN-NAME>}
reload {in <1-999>} {on <DEVICE-OR-DOMAIN-NAME>}
```

Parameters

- `reload {on <DEVICE-OR-DOMAIN-NAME>}`
  - Optional. Performs reload on a specified device or RF Domain. Halts the system and performs a warm reboot
    - `<DEVICE-OR-DOMAIN-NAME>` – Specify the name of the AP, wireless controller, service platform, or RF Domain.

- `reload {cancel|force} {on <DEVICE-OR-DOMAIN-NAME>}
  - Optional. Cancels or forces a reload on a specified device or RF Domain
    - `<DEVICE-OR-DOMAIN-NAME>` – Specify the name of the AP, wireless controller, service platform, or RF Domain.

- `cancel` Optional. Cancels pending reloads

- `force` Optional. Forces reboot, while ignoring conditions like upgrade in progress, unsaved changes etc.

- `on <DEVICE-OR-DOMAIN-NAME>` Optional. Performs a reload after a specified time period
  - `<1-999>` – Specify the time from 1 - 999 minutes.

- `list {<LINE>|all}` Optional. Reloads all adopted devices or specified devices
  - `<LINE>` – Optional. Reloads listed devices. List all devices (to be reloaded) separated by a space.
  - `all` – Optional. Reloads all devices adopted by this controller

- `on <DEVICE-OR-DOMAIN-NAME>` Optional. Reloads 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

```
rfs7000-37FABE#reload force on rfs7000-37FABE
rfs7000-37FABE#
```
### 3.1.39 rename

**Privileged Exec Mode Commands**

Renames a file in the devices' file system

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**
```
rename <OLD-FILE-NAME> <NEW-FILE-NAME>
```

**Parameters**
- `rename <OLD-FILE-NAME> <NEW-FILE-NAME>`

<table>
<thead>
<tr>
<th><strong>&lt;OLD-FILE-NAME&gt;</strong></th>
<th>Specify the file to rename.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&lt;NEW-FILE-NAME&gt;</strong></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 2013   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 2013   crashinfo
  drwx       Fri Feb 15 14:50:49 2013  testdir
  drwx       Wed Jan 16 22:57:14 2013   archived_logs
  drwx       Sat Jan 1 00:00:08 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 2013   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 2013   log
  drwx       Sat Jan 1 00:00:09 2000   configs
  drwx       Fri Feb 15 14:50:49 2013  Final
  drwx       Sat Jan 1 00:00:08 2000   cache
  drwx       Fri Feb 15 14:50:49 2013  testdir
  drwx       Wed Jan 16 22:26:53 2013   crashinfo
  drwx       Wed Jan 16 22:57:14 2013   archived_logs
  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 2013   out.tar

rfs4000-229D58#
```
3.1.40 rmdir

Deletes an existing directory from the file system (only empty directories can be removed)

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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      Wed Jan 30 02:45:10 2013   log
  drwx      Sat Jan  1 00:00:09 2000   configs
  drwx      Fri Feb 15 14:50:49 2013  Final
  drwx      Sat Jan  1 00:00:08 2000   cache
  drwx      Wed Jan 16 22:26:53 2013   crashinfo
  drwx      Sat Jan  1 00:00:08 2000   archived_logs
  drwx      Sat Jan  1 00:00:09 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 2013   out.tar

rfs4000-229D58#
```

```
rfs4000-229D58#rmdir Final
rfs4000-229D58#
```

```
rfs4000-229D58#dir
Directory of flash:/.

  drwx      Wed Jan 30 02:45:10 2013   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 2013   crashinfo
  drwx      Sat Jan  1 00:00:08 2000   archived_logs
  drwx      Sat Jan  1 00:00:09 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 2013   out.tar

rfs4000-229D58#
```
3.1.41 self

Privileged Exec Mode Commands

Enters the logged device's configuration context

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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)#
3.1.42 **ssh**

Privileged Exec Mode Commands

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

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```bash
ssh <IP/HOSTNAME> <USERNAME>
```

**Parameters**

- `ssh <IP/HOSTNAME> <USERNAME>`
  
  **<IP/HOSTNAME>**
  
  Specify the remote systems's IP address or hostname.

  **<USERNAME>**
  
  Specify the name of the user requesting the SSH connection.

**Usage Guidelines**

To exit the other device’s context, use the command that is relevant to that device.

**Examples**

```bash
nx9500-6C8809#ssh 192.168.13.16 admin
admin@192.168.13.16's password:
rfs6000-6DB5D4>
```
3.1.43 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.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

t5 [copy|delete|rename|write]

Parameters

- t5 [copy|delete|rename|write]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>copy</td>
<td>Copies file to an external server</td>
</tr>
<tr>
<td></td>
<td>• &lt;FILE&gt; – Specify the source file name.</td>
</tr>
<tr>
<td></td>
<td>• &lt;FILE&gt; – Specify the destination file name.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The content from the source file is copied to the destination file.</td>
</tr>
<tr>
<td></td>
<td>The source and/or destination files can be a local file, a remote FTP or TFTP file. 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.</td>
</tr>
<tr>
<td>delete</td>
<td>Deletes files on the T5 device’s file system</td>
</tr>
<tr>
<td></td>
<td>• &lt;FILE&gt; – Specify the file name. The specified file is deleted.</td>
</tr>
<tr>
<td>rename</td>
<td>Renames a file on the T5 device’s file system</td>
</tr>
<tr>
<td></td>
<td>• &lt;FILE&gt; – Specify the source file name</td>
</tr>
<tr>
<td></td>
<td>• &lt;FILE&gt; – Specify the new file name. The source file is renamed to the input provided here.</td>
</tr>
<tr>
<td>write</td>
<td>Writes running configuration to an adopted T5 device’s memory</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Executes these operation on a specified wireless controller or service platform</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE#t5 write memory on t5-ED5C2C
Success
rfs7000-37FABE#
3.1.44 telnet

Privileged Exec Mode Commands

Opens a Telnet session between two network devices

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

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

Parameters
- telnet <IP/HOSTNAME> {<TCP-PORT>}

<table>
<thead>
<tr>
<th>&lt;IP/HOSTNAME&gt;</th>
<th>Configures the remote system’s IP address or hostname. The Telnet session will be established between the connecting system and the remote system.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;TCP-PORT&gt;</td>
<td>Optional. Specify the Transmission Control Protocol (TCP) port.</td>
</tr>
</tbody>
</table>

Usage Guidelines
To exit the other device’s context, use the command relevant to that device.

Examples

nx9500-6C8809#telnet 192.168.13.23

Entering character mode
Escape character is ‘^[’.

AP7131 release 5.6.0-0.0-026B
ap7131-11E6C4 login: admin
Password:
ap7131-11E6C4>
3.1.45 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>length &lt;0-512&gt;</td>
<td>Sets the number of lines displayed on a terminal window</td>
</tr>
<tr>
<td>width &lt;0-512&gt;</td>
<td>Sets the width or number of characters displayed on the terminal window</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE#terminal length 150
rfs7000-37FABE#
```

```
rfs7000-37FABE#terminal width 215
rfs7000-37FABE#
```

Related Commands

```
no
```

Resets the width of the terminal window or the number of lines displayed on a terminal window
3.1.46 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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; — Specify the command name.</td>
<td></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)#
3.1.47 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

traceroute <LINE>

Parameters

- traceroute <LINE>

<table>
<thead>
<tr>
<th>&lt;LINE&gt;</th>
<th>Traces the route to a destination IP address or hostname</th>
</tr>
</thead>
</table>
| <LINE> | Specify a traceroute argument. For example, “service traceroute-h”.

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#
```
3.1.48 traceroute6

Privileged Exec Mode Commands

Traces the route to a specified IPv6 destination

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

traceroute6 <LINE>

Parameters

- traceroute6 <LINE>

<table>
<thead>
<tr>
<th>traceroute &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>Specify the destination IPv6 address or hostname.</td>
</tr>
</tbody>
</table>

Examples

rfs4000-1B3596#traceroute6 2001:10:10:10:10:10:10:2
  1 2001:10:10:10:10:10:10:2 (2001:10:10:10:10:10:10:2) 0.622 ms 0.497 ms 0.531 ms
rfs4000-1B3596#
3.1.49 upgrade

Privileged Exec Mode Commands

Upgrades a device's software image

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
upgrade [<FILE>|<URL>] {background|on <DEVICE-NAME>}

Parameters
- upgrade [<FILE>|<URL>] {background|on <DEVICE-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: cf:/path/file, usb1:/path/file, usb2:/path/file</td>
</tr>
<tr>
<td>&lt;URL&gt;</td>
<td>Specify the target firmware image location in the following format: tftp://&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>
</tbody>
</table>

Examples
rfs7000-37FABE#upgrade tftp://157.235.208.105:/img
var2 is 10 percent full
/tmp is 2 percent full
Free Memory 161896 kB
FWU invoked via Linux shell
Running from partition /dev/hda5, partition to
rfs7000-37FABE#upgrade tftp://157.125.208.235/img
Running from partition /dev/mtdblock7, partition to update is /dev/mtdblock6

Related Commands
no

Removes a patch installed on a specified device
3.1.50 upgrade-abort

- Privileged Exec Mode Commands

Aborts an ongoing software image upgrade

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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></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

rfs4000-229D58#upgrade ftp://anonymous:anonymous@192.168.13.10/LatestBuilds/W56/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/W56/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#
3.1.51  **watch**

- **Privileged Exec Mode Commands**

Repeats a specified CLI command at periodic intervals

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
watch <1-3600> <LINE>
```

**Parameters**

- `watch <1-3600> <LINE>`

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

**Examples**

```
rfs7000-37FABE#watch 1 show clock
rfs7000-37FABE#
```
3.1.52 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

exit

Parameters

None

Examples

rfs7000-37FABE#exit
3.1.53 **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, NX6500, NX6524

**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 <code>url-list</code>.</td>
</tr>
</tbody>
</table>

**Examples**

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

nx4500-5CFA2B#
```
3.1.54 virtual-machine

Privileged Exec Mode Commands

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

In addition to the shipped 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, NX6500, NX6524, NX9500, NX9510

Syntax NX45XX, NX65XX

```bash
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}

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

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 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>}

<table>
<thead>
<tr>
<th>assign-usb-ports</th>
<th>Assigns USB ports to TEAM-VoWLAN on a specified device</th>
</tr>
</thead>
<tbody>
<tr>
<td>team-vowlan</td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Specify the device name.</td>
</tr>
<tr>
<td>Note:</td>
<td>Use the no &gt; virtual-machine &gt; assign-usb-ports to reassign the port to WiNG.</td>
</tr>
<tr>
<td>Note:</td>
<td>TEAM-RLS VM cannot be installed when USB ports are assigned to TEAM-VoWLAN.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>virtual-machine console</th>
<th>Connects to the VM’s console, based on the parameters passed. Select one of the following console options:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;VM-NAME&gt; – Connects to the console of the VM identified by the &lt;VM-NAME&gt; keyword. Specify the VM name.</td>
</tr>
<tr>
<td></td>
<td>• team-urc – Connects to the VM TEAM-URC’s (IP-PBX) console</td>
</tr>
<tr>
<td></td>
<td>• team-rls – Connects to the VM TEAM Radio Link Server’s (RLS) console</td>
</tr>
<tr>
<td></td>
<td>• team-vowlan – Connects to the VM TEAM-VoWLAN’s (Voice over WLAN) console</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>virtual-machine export</th>
<th>Exports an existing VM image and settings. Use this command to export the VM to another NX45XX or NX65XX device in the same domain.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;VM-NAME&gt; – Specify the VM name.</td>
</tr>
<tr>
<td></td>
<td>• &lt;FILE&gt; – Specify the location and name of the source file (VM image). The VM image is retrieved and exported from the specified location.</td>
</tr>
<tr>
<td></td>
<td>• &lt;URL&gt; – 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:</td>
</tr>
<tr>
<td></td>
<td>tftp://&lt;hostname&gt;:&lt;port&gt;/path/file</td>
</tr>
<tr>
<td></td>
<td>ftp://&lt;user&gt;:&lt;password&gt;@&lt;hostname&gt;:&lt;port&gt;/path/file</td>
</tr>
<tr>
<td></td>
<td>sftp://&lt;user&gt;:&lt;password&gt;@&lt;hostname&gt;:&lt;port&gt;/path/file</td>
</tr>
<tr>
<td></td>
<td>http://&lt;hostname&gt;:&lt;port&gt;/path/file</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Executes the command on a specified device or devices</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the service platform name. In case of multiple devices, list the device names separated by commas.</td>
</tr>
<tr>
<td>Note:</td>
<td>The VM should be in a stop state during the export process.</td>
</tr>
<tr>
<td>Note:</td>
<td>If the destination is a device, the image is copied to a predefined location (VM archive)</td>
</tr>
</tbody>
</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}

<table>
<thead>
<tr>
<th>virtual-machine install</th>
<th>Installs the VM. The install command internally creates a VM template, consisting of the specified parameters, and starts the installation process.</th>
</tr>
</thead>
</table>
|                         | • <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>] | 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. |
| Contd...                           |--------------------------------------------------------------------------------|

| Install-media [Install-Media] | 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. |
| Contd... |--------------------------------------------------------------------------------|
- `virtual-machine install` [team-urc|team-rls|team-vowlan] `{on <DEVICE-NAME>}`

`virtual-machine install` 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>}`

`virtual-machine restart` 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.

**Note:** The option 'hard' forces the specified VM to restart.

- `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 or disables VNC on the virtual interfaces 1 & 2

- `vnc` – Optional. Enables/disables VNC port. When enabled, provides remote access to VGA through the noVNC client.
- `disable` – Disables VNC
- `enable` – Enables VNC (default setting)

- **virtual-machine set** 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 VIF number from 0 - 2.
  - **vif-mac** – Configures the MAC address of the selected virtual network interface
    - **<1-2>** – Select the VIF
      - **<1-8>** – Specify the MAC index for the selected VIF
      - **<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. WiNG 5.6 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.

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 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, 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

Contd...
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

**virtual-machine start**

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**

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.

**Note:** The option ‘hard’ forces the selected VM to shutdown

**virtual-machine uninstall**

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
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`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>virtual-machine console</code></td>
<td>Connects to the Air-Defense Services Platform (ADSP) VM’s console</td>
</tr>
</tbody>
</table>

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>]**

  **virtual-machine install**
  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.

  **Note:** 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:

  ```bash
  nx9500-6C874D#upgrade tftp://20.1.1.60/adsp-9.1.1Aug 20
  15:12:41 2013: %DAEMON-6-INFO: lighttpd[2405]: 127.0.0.1
  127.0.0.1:443 - "POST /mapi.fcgi HTTP/1.1" 200 192 "-" "-"
  -03-5.6.0.0-029B.img
  Aug 20 15:12:51 2013: 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).......Aug 20
  15:12:53 2013: %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>]**

  **virtual-machine restart**
  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>]**

  **virtual-machine set disk-size**
  Sets the ADSP VM's disk size (in GB). Specify a value from 100 - 500 GB.
  - 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:** Stop the ADSP VM before executing this command.

• **virtual-machine set memory <512-8192> adsp {on <DEVICE-NAME>]**

  **virtual-machine set memory**
  Modifies the ADSP VM's memory. Specify a value from 512 - 8192 MB.
  - 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>

virtual-machine set wing-memory <12288-32739>  
Specifies the WiNG memory size in MB  
**Note:** 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.  
**Note:** The new memory setting takes effect only after the next boot.

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

virtual-machine [start|stop]  
Starts/stops the ADSP VM  
• 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>}

virtual-machine uninstall  
Uninstalls 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.

**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.
3.1.55 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.

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 — NX9500

NOTE: 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
- **raid [check|silence]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>check</strong></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>
<tr>
<td><strong>silence</strong></td>
<td>Deactivates an alarm. <strong>Note:</strong> When enabled, an audible alarm is triggered when a drive in the array fails. The <code>silence</code> command deactivates the alarm (sound). <strong>Note:</strong> To enable RAID alarm, in the device configuration mode, use the <code>raid &gt; alarm &gt; enable</code> command. A NX9500 profile can also have the RAID alarm feature activated. For more information on the enabling RAID alarm, see <code>raid</code>.</td>
</tr>
</tbody>
</table>

- **raid [install|locate|remove|spare] drive <0-4>**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>install &lt;0-4&gt;</strong></td>
<td>Includes a new drive, inserted in one of the available slots, in the array. Specify the drive number. <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><strong>locate &lt;0-4&gt;</strong></td>
<td>Enables LEDs to blink on a specified drive. Specify the drive number. <strong>Note:</strong> Blinking LEDs enable you correctly locate a drive.</td>
</tr>
<tr>
<td><strong>remove &lt;0-4&gt;</strong></td>
<td>Removes (shuts down) a disk from the array, before it is physically removed from its slot. Specify the drive number containing the disk. <strong>Note:</strong> Use this command to also remove a hot spare.</td>
</tr>
<tr>
<td><strong>spare &lt;0-4&gt;</strong></td>
<td>Converts an unused drive into a hot spare. Specify the drive number.</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#
```
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 privileged 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
  ap81xx AP81XX access point
  ap82xx AP82XX access point
  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
```
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>captive-portal</td>
<td>Configure a captive portal</td>
</tr>
<tr>
<td>clear</td>
<td>Clear</td>
</tr>
<tr>
<td>client-identity</td>
<td>Client identity (DHCP Device Fingerprinting)</td>
</tr>
<tr>
<td>client-identity-group</td>
<td>Client identity group (DHCP Fingerprint Database)</td>
</tr>
<tr>
<td>clone</td>
<td>Clone configuration object</td>
</tr>
<tr>
<td>crypto-cmp-policy</td>
<td>CMP policy</td>
</tr>
<tr>
<td>customize</td>
<td>Customize the output of summary cli commands</td>
</tr>
<tr>
<td>device</td>
<td>Configuration on multiple devices</td>
</tr>
<tr>
<td>device-categorization</td>
<td>Configure a device categorization object</td>
</tr>
<tr>
<td>dhcp-server-policy</td>
<td>DHCP server policy</td>
</tr>
<tr>
<td>dhcpv6-server-policy</td>
<td>DHCPV6 server related configuration</td>
</tr>
<tr>
<td>dns-whitelist</td>
<td>Configure a whitelist</td>
</tr>
<tr>
<td>event-system-policy</td>
<td>Configure a event system policy</td>
</tr>
<tr>
<td>firewall-policy</td>
<td>Configure firewall policy</td>
</tr>
<tr>
<td>global-association-list</td>
<td>Configure a global association list</td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
</tr>
<tr>
<td>host</td>
<td>Enter the configuration context of a device by specifying its hostname</td>
</tr>
<tr>
<td>igmp-snoop-policy</td>
<td>Create igmp snoop policy</td>
</tr>
<tr>
<td>inline-password-encryption</td>
<td>Store encryption key in the startup configuration file</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>ipv6-router-advertisement-policy</td>
<td>IPv6 Router Advertisement related configuration</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>L2tpv3 tunnel protocol</td>
</tr>
<tr>
<td>mac</td>
<td>MAC configuration</td>
</tr>
<tr>
<td>management-policy</td>
<td>Configure a management policy</td>
</tr>
<tr>
<td>meshpoint</td>
<td>Create a new MESHPOINT or enter MESHPOINT configuration context for one or more MESHPOINTs</td>
</tr>
<tr>
<td>meshpoint-qos-policy</td>
<td>Configure a meshpoint quality-of-service policy</td>
</tr>
<tr>
<td>mint-policy</td>
<td>Configure the global mint policy</td>
</tr>
<tr>
<td>nac-list</td>
<td>Configure a network access control list</td>
</tr>
<tr>
<td>no</td>
<td>.</td>
</tr>
<tr>
<td>nx45xx</td>
<td>NX45XX integrated services platform</td>
</tr>
<tr>
<td>nx65xx</td>
<td>NX65XX integrated services platform</td>
</tr>
<tr>
<td>nx9000</td>
<td>NX9000 wireless controller</td>
</tr>
<tr>
<td>passpoint-policy</td>
<td>Configure a passpoint policy</td>
</tr>
<tr>
<td>password-encryption</td>
<td>Encrypt passwords in configuration</td>
</tr>
<tr>
<td>profile</td>
<td>Profile related commands - if no parameters are given, all profiles are selected</td>
</tr>
<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>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>self</td>
<td>Config context of the device currently logged into</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-list</td>
<td>Configure a URL list</td>
</tr>
<tr>
<td>vx9000</td>
<td>VX9000 wireless controller</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</td>
</tr>
</tbody>
</table>
configuration context for one or more WLANs

wlan-qos-policy Configure a wlan quality-of-service policy
write Write running configuration to memory or terminal

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
revert Revert changes
service Service Commands
show Show running system information

<DEVICE>(config)#
### 4.1 Global Configuration Commands

Table 4.1 summarizes the Global Configuration commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>aaa-policy</td>
<td>Configures a AAA policy</td>
<td>page 4-8</td>
</tr>
<tr>
<td>aaa-tacacs-policy</td>
<td>Configures AAA-TACACS policy</td>
<td>page 4-9</td>
</tr>
<tr>
<td>alias</td>
<td>Configures network, VLAN, and service aliases</td>
<td>page 4-10</td>
</tr>
<tr>
<td>ap300</td>
<td>Adds an AP300 to the network, and creates a general profile for the access point</td>
<td>page 4-17</td>
</tr>
<tr>
<td>ap621</td>
<td>Adds an AP621 to the network</td>
<td>page 4-18</td>
</tr>
<tr>
<td>ap622</td>
<td>Adds an AP622 to the network</td>
<td>page 4-19</td>
</tr>
<tr>
<td>ap650</td>
<td>Adds an AP650 to the network</td>
<td>page 4-20</td>
</tr>
<tr>
<td>ap6511</td>
<td>Adds an AP6511 to the network</td>
<td>page 4-21</td>
</tr>
<tr>
<td>ap6521</td>
<td>Adds an AP6521 to the network</td>
<td>page 4-22</td>
</tr>
<tr>
<td>ap6522</td>
<td>Adds an AP6522 to the network</td>
<td>page 4-23</td>
</tr>
<tr>
<td>ap6532</td>
<td>Adds an AP6532 to the network</td>
<td>page 4-24</td>
</tr>
<tr>
<td>ap6562</td>
<td>Adds an AP6562 to the network</td>
<td>page 4-25</td>
</tr>
<tr>
<td>ap71xx</td>
<td>Adds an AP71XX to the network</td>
<td>page 4-26</td>
</tr>
<tr>
<td>ap81xx</td>
<td>Adds an AP81XX to the network</td>
<td>page 4-27</td>
</tr>
<tr>
<td>ap82xx</td>
<td>Adds an AP82XX to the network</td>
<td>page 4-28</td>
</tr>
<tr>
<td>association-acl-policy</td>
<td>Configures an association ACL policy</td>
<td>page 4-29</td>
</tr>
<tr>
<td>auto-provisioning-policy</td>
<td>Configures an auto provisioning policy, which defines the process by which an access point discovers controllers and associates with it.</td>
<td>page 4-30</td>
</tr>
<tr>
<td>bgp</td>
<td>Configures Border Gateway Protocol (BGP) settings</td>
<td>page 4-31</td>
</tr>
<tr>
<td>bonjour-gw-discovery-policy</td>
<td>Configures a Bonjour GW Discovery policy (RFS7000 and AP7131)</td>
<td>page 4-33</td>
</tr>
<tr>
<td>bonjour-gw-forwarding-policy</td>
<td>Configures a Bonjour GW Forwarding policy (RFS7000 and AP7131)</td>
<td>page 4-35</td>
</tr>
<tr>
<td>captive portal</td>
<td>Configures a captive portal</td>
<td>page 4-36</td>
</tr>
<tr>
<td>clear</td>
<td>Clears the event history</td>
<td>page 4-73</td>
</tr>
<tr>
<td>client-identity</td>
<td>Enables client identification through DHCP device fingerprinting</td>
<td>page 4-74</td>
</tr>
<tr>
<td>client-identity-group</td>
<td>Creates a new client identity group and enters its configuration mode</td>
<td>page 4-82</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>clone</td>
<td>Clones a specified configuration object</td>
<td>page 4-89</td>
</tr>
<tr>
<td>crypto-cmp-policy</td>
<td>Creates a crypto Certificate Management Protocol (CMP) policy and enters its configuration mode</td>
<td>page 4-90</td>
</tr>
<tr>
<td>customize</td>
<td>Customizes the CLI command summary output</td>
<td>page 4-91</td>
</tr>
<tr>
<td>device</td>
<td>Specifies configuration on multiple devices</td>
<td>page 4-100</td>
</tr>
<tr>
<td>device-categorization</td>
<td>Configures a device categorization object</td>
<td>page 4-103</td>
</tr>
<tr>
<td>dhcp-server-policy</td>
<td>Configures a DHCP server policy</td>
<td>page 4-109</td>
</tr>
<tr>
<td>dhcpv6-server-policy</td>
<td>Configures DHCPv6 server policy parameters, such as class, address range, and options</td>
<td>page 4-110</td>
</tr>
<tr>
<td>dns-whitelist</td>
<td>Configures a DNS whitelist</td>
<td>page 4-112</td>
</tr>
<tr>
<td>event-system-policy</td>
<td>Configures an event system policy</td>
<td>page 4-118</td>
</tr>
<tr>
<td>firewall-policy</td>
<td>Configures a firewall policy</td>
<td>page 4-132</td>
</tr>
<tr>
<td>global-association-list</td>
<td>Configures a global list of client MAC addresses</td>
<td>page 4-134</td>
</tr>
<tr>
<td>host</td>
<td>Sets the system’s network name</td>
<td>page 4-136</td>
</tr>
<tr>
<td>inline-password-encryption</td>
<td>Stores the encryption key in the startup configuration file</td>
<td>page 4-137</td>
</tr>
<tr>
<td>ip</td>
<td>Creates a IP access control list (ACL) and/or a SNMP IP ACL, and enters its configuration mode</td>
<td>page 4-138</td>
</tr>
<tr>
<td>ipv6</td>
<td>Creates a IPv6 ACL and enters its configuration mode</td>
<td>page 4-140</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 4-141</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>Configures Layer 2 Tunneling Protocol Version 3 (L2TPV3) tunnel policy</td>
<td>page 4-160</td>
</tr>
<tr>
<td>mac</td>
<td>Configures MAC access lists (goes to the MAC Access Control List (ACL) mode)</td>
<td>page 4-162</td>
</tr>
<tr>
<td>management-policy</td>
<td>Configures a management policy</td>
<td>page 4-163</td>
</tr>
<tr>
<td>meshpoint</td>
<td>Configures meshpoint related configuration commands</td>
<td>page 4-164</td>
</tr>
<tr>
<td>meshpoint-qos-policy</td>
<td>Configures a set of parameters that defines the quality of service (QoS)</td>
<td>page 4-165</td>
</tr>
<tr>
<td>mint-policy</td>
<td>Configures a MiNT security policy</td>
<td>page 4-166</td>
</tr>
<tr>
<td>nac-list</td>
<td>Configures a network ACL</td>
<td>page 4-167</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 4-173</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>passpoint-policy</td>
<td>Creates a new passpoint policy and enters its configuration mode</td>
<td>page 4-182</td>
</tr>
<tr>
<td>password-encryption</td>
<td>Enables password encryption</td>
<td>page 4-184</td>
</tr>
<tr>
<td>profile</td>
<td>Configures profile related commands</td>
<td>page 4-185</td>
</tr>
<tr>
<td>radio-qos-policy</td>
<td>Configures a radio qos policy</td>
<td>page 4-190</td>
</tr>
<tr>
<td>radius-group</td>
<td>Configures a RADIUS group</td>
<td>page 4-191</td>
</tr>
<tr>
<td>radius-server-policy</td>
<td>Configures a RADIUS server policy</td>
<td>page 4-192</td>
</tr>
<tr>
<td>radius-user-pool-policy</td>
<td>Configures a RADIUS user pool policy</td>
<td>page 4-193</td>
</tr>
<tr>
<td>rename</td>
<td>Renames and existing top-level object (TLO)</td>
<td>page 4-194</td>
</tr>
<tr>
<td>rf-domain</td>
<td>Creates an RF Domain</td>
<td>page 4-198</td>
</tr>
<tr>
<td>rfs4000</td>
<td>Adds an RFS4000 to the network</td>
<td>page 4-228</td>
</tr>
<tr>
<td>rfs6000</td>
<td>Adds an RFS6000 to the network</td>
<td>page 4-229</td>
</tr>
<tr>
<td>rfs7000</td>
<td>Adds an RFS7000 to the network</td>
<td>page 4-230</td>
</tr>
<tr>
<td>nx45xx</td>
<td>Adds an NX45XX to the network</td>
<td>page 4-231</td>
</tr>
<tr>
<td>nx65xx</td>
<td>Adds an NX65XX to the network</td>
<td>page 4-232</td>
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<td>smart-cache-policy</td>
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<td>Writes information to memory or terminal</td>
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</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

\[ \text{aaa-policy } <\text{AAA-POLICY-NAME}> \]

**Parameters**

- `aaa-policy <AAA-POLICY-NAME>`

| <AAA-POLICY-NAME> | Specify the AAA policy name. If the policy does not exist, it is created. |

**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
- `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-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 aaa-tacacs-policy

**Global Configuration Commands**

Configures AAA Terminal Access Controller Access-Control System (TACACS) policy. This policy configures multiple servers for authentication and authorization. A TACACS Authentication server should be configured when the server preference is authenticated server.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**
```
aaa-tacacs-policy <AAA-TACACS-POLICY-NAME>
```

**Parameters**
- `aaa-tacacs-policy <AAA-TACACS-POLICY-NAME>`

| <AAA-TACACS-POLICY-NAME> | Specify the AAA-TACACS policy name. If the policy does not exist, it is created. |

**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
service         Service Commands
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.*
4.1.3 alias

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 172.16.13.20 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.

- **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 192.168.10-192.168.10.20.

  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.

1. *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.

2. *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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
alias [address-range|host|network|network-group|network-service|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> <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|host|network] <ENDING-IP> {<STARTING-IP> to <ENDING-IP>}|host <HOST-IP> {<HOST-IP>} |<NETWORK-ADDRESS/MASK>}{<NETWORK-ADDRESS/MASK>}

alias network-service <NETWORK-SERVICE-ALIAS-NAME> proto [<0-254>|<WORD>|eigrp|gre|igmp|igp|osfp|vrrp} {{<1-65535>|<WORD>|bgp|dns|ftp|ftp-data|gopher|https|ldap|nntp|ntp|pop3|proto|sip|smtp|sourceport|ssh|telnet|tftp|www}}

alias network-service <NETWORK-SERVICE-ALIAS-NAME> proto [<0-254>|<WORD>|eigrp|gre|igmp|igp|osfp|vrrp} {{<1-65535>|<WORD>|bgp|dns|ftp|ftp-data|gopher|https|ldap|nntp|ntp|pop3|proto|sip|smtp|sourceport} <1-65535>|<WORD>|ssh|telnet|tftp|www}}

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 `$`.*

- **address-range** `<ADDRESS-RANGE-ALIAS-NAME>`

  Associates a range of IP addresses with this address range alias
  *`<STARTING-IP> to <ENDING-IP>` – Specify the first IP address in the range.*
  *to `<ENDING-IP>` – Specify the last IP address in the range.*

- **alias host** `<HOST-ALIAS-NAME> <HOST-IP>`

  *Creates a host alias, defining a single network host*
  *`<HOST-ALIAS-NAME>` – Specify the host alias name.*
  *Note: Alias name should begin with `$`.*

  *`<HOST-IP>` – Specify the network host's IP address.

- **host** `<HOST-ALIAS-NAME>`

  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: $HOST and the host IP address it is mapped to is: 1.1.1.100.
  *`<HOST-IP>` – Specify the network host's IP address.*

- **alias network** `<NETWORK-ALIAS-NAME> <NETWORK-ADDRESS/MASK>`

  *Creates a network alias, defining a single network address*
  *`<NETWORK-ALIAS-NAME>` – Specify the network alias name.*
  *Note: Alias name should begin with `$`.*

  *`<NETWORK-ADDRESS/MASK>` – Specify the network's address and mask.*

- **network** `<NETWORK-ALIAS-NAME>`

  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: $NET and the network it is mapped to is: 1.1.1.0/24.
  *`<NETWORK-ADDRESS/MASK>` – Specify the network's address and mask.*

- **alias network-group** `<NETWORK-GROUP-ALIAS-NAME> [address-range `<STARTING-IP> to `<ENDING-IP>`]host `<HOST-IP>``

  *Creates a network-group alias*
  *`<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.

- **network** `<NETWORK-GROUP-ALIAS-NAME>`

  Associates a range of IP addresses with this network-group alias
  *`<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.

- **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.*
### GLOBAL CONFIGURATION COMMANDS

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>host &lt;HOST-IP&gt;</strong></td>
<td>Associates a single or multiple hosts with this network-group alias  [&lt;HOST-IP&gt;]   [&lt;HOST-IP&gt;]   [&lt;HOST-IP&gt;]  [&lt;HOST-IP&gt;]  [&lt;HOST-IP&gt;]  [&lt;HOST-IP&gt;]  [&lt;HOST-IP&gt;]  [&lt;HOST-IP&gt;]</td>
</tr>
<tr>
<td><strong>network &lt;NETWORK-ADDRESS/MASK&gt;</strong></td>
<td>Associates a single or multiple networks with this network-group alias  [&lt;NETWORK-ADDRESS/MASK&gt;]  [&lt;NETWORK-ADDRESS/MASK&gt;]  [&lt;NETWORK-ADDRESS/MASK&gt;]</td>
</tr>
<tr>
<td>**alias network-service &lt;NETWORK-SERVICE-ALIAS-NAME&gt; proto [&lt;0-254&gt;</td>
<td>&lt;WORD&gt;</td>
</tr>
<tr>
<td>**proto [&lt;0-254&gt;</td>
<td>&lt;WORD&gt;</td>
</tr>
<tr>
<td><strong>eigrp</strong></td>
<td>Selects Enhanced Interior Gateway Routing Protocol (EIGRP). The protocol number is 88.  [&lt;WORD&gt;</td>
</tr>
<tr>
<td><strong>gre</strong></td>
<td>Selects Generic Routing Encapsulation (GRE). The protocol number is 47.  [&lt;WORD&gt;</td>
</tr>
<tr>
<td><strong>igmp</strong></td>
<td>Selects Internet Group Management Protocol (IGMP). The protocol number is 2.  [&lt;WORD&gt;</td>
</tr>
<tr>
<td><strong>igp</strong></td>
<td>Selects Interior Gateway Protocol (IGP). The protocol number is 9.  [&lt;WORD&gt;</td>
</tr>
<tr>
<td><strong>ospf</strong></td>
<td>Selects Open Shortest Path First (OSPF). The protocol number is 89.  [&lt;WORD&gt;</td>
</tr>
<tr>
<td><strong>vrrp</strong></td>
<td>Selects Virtual Router Redundancy Protocol (VRRP). The protocol number is 112.  [&lt;WORD&gt;</td>
</tr>
</tbody>
</table>
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).
- POP3 – Optional. Configures the default Post Office Protocol (POP3) services port (110).
- proto – Optional. Use this option to select another Internet protocol in addition to the one selected in the previous step.
- sip – Optional. Configures the default Session Initiation Protocol (SIP) services port (5060).
- smtp – Optional. Configures the default Simple Mail Transfer Protocol (SMTP) services port (25).
- sourceport `<1-65535>`<WORD> – 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.
- 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).

### alias string `<STRING-ALIAS-NAME>` `<LINE>`

<table>
<thead>
<tr>
<th>alias string <code>&lt;STRING-ALIAS-NAME&gt;</code></th>
<th>Creates a string alias identified by the <code>&lt;STRING-ALIAS-NAME&gt;</code> keyword</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;STRING-ALIAS-NAME&gt;</code></td>
<td>Specify the string alias name.</td>
</tr>
<tr>
<td><code>&lt;LINE&gt;</code></td>
<td>Specify the string value.</td>
</tr>
</tbody>
</table>

**Note:** String aliases map a name to an arbitrary string value. For example, ‘alias string `$DOMAIN` test.motorola.com’. In this example, the string alias name is: `$DOMAIN` and the string value it is mapped to is: `test.motorola.com`. In this example, the string alias refers to a domain name.

**Note:** Alias name should begin with `$`.

### alias vlan `<VLAN-ALIAS-NAME>` `<1-4094>`

<table>
<thead>
<tr>
<th>alias vlan <code>&lt;VLAN-ALIAS-NAME&gt;</code></th>
<th>Creates a VLAN alias identified by the <code>&lt;VLAN-ALIAS-NAME&gt;</code> keyword</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;VLAN-ALIAS-NAME&gt;</code></td>
<td>Specify the VLAN alias name.</td>
</tr>
</tbody>
</table>

**Note:** Alias name should begin with `$`.
GLOBAL CONFIGURATION COMMANDS

Examples

```
rfs4000-229D58(config)# alias address-range $TestAddRanAlias 192.168.13.10 to 192.168.13.13
rfs4000-229D58(config)#
```

```
rfs4000-229D58(config)# alias network $TestNetworkAlias 192.168.13.0/24
rfs4000-229D58(config)#
```

```
rfs4000-229D58(config)# alias host $TestHostAlias 192.168.13.10
rfs4000-229D58(config)#
```

```
rfs4000-229D58(config)# alias vlan $TestVLANAlias 1
rfs4000-229D58(config)#
```

```
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 5.6.0.0-031B
!
! version 2.3
!
! 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:
```
example1-229D58(config)#alias network-service $kerberos proto tcp 749 750 80 proto tcp sourceport 20 proto udp 68 sourceport 67
example1-229D58(config)#commit
```
In the preceding example, the network-service alias `$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
```
example1-229D58(config)#alias string $DOMAIN test.motorola.com
example1-229D58(config)#show context
``` 

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes an existing network, VLAN, service, or string alias</td>
</tr>
</tbody>
</table>
4.1.4 ap300

Global Configuration Commands

Adds an AP300 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

Syntax

ap300 {<MAC>}

Parameters

- ap300 {<MAC>}

Example

rfs7000-37FABE(config)#ap300 00-A0-F8-CF-1E-DA
rfs7000-37FABE(config-ap300-00-A0-F8-CF-1E-DA)#

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>ap7131-889EC4</td>
<td>00-15-70-88-9E-C4</td>
<td>default-ap7131</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>2</td>
<td>ap300-CF1EDA</td>
<td>00-A0-F8-CF-1E-DA</td>
<td>default-ap300</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>

rfs7000-37FABE(config)#

Related Commands

no

Removes an AP300 from the network
4.1.5 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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ap621 <MAC>
```

**Parameters**

- **ap621** <MAC>

  | <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)#
```

```
rfs7000-37FABE(config)#show wireless ap configured
+---------------------------------+-----------------+-----------------+-----------------+-----------------+------------------+
| IDX | NAME             | MAC             | PROFILE         | RF-DOMAIN       | ADOPTED-BY       |
+---------------------------------+-----------------+-----------------+-----------------+-----------------+------------------+
| 1   | ap7131-889EC4    | 00-15-70-88-9E-C4 | default-ap7131 | default         | un-adopted       |
| 2   | ap300-CF1EDA     | 00-A0-F8-CF-1E-DA | default-ap300  | default         | un-adopted       |
| 3   | ap621-E3C356     | 5C-0E-8B-E3-C3-56 | default-ap621 | default         | un-adopted       |
+---------------------------------+-----------------+-----------------+-----------------+-----------------+------------------+
```

```
rfs7000-37FABE(config)#
```

**Related Commands**

- **no** Removes an AP621 from the network
4.1.6 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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ap622 <MAC>
```

**Parameters**

- `ap622 <MAC>`

**Examples**

```
rfs7000-37FABE(config)#ap622 B4-C7-99-43-C3-DC
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    ap7131-889EC4      00-15-70-88-9E-C4   default-ap7131    default     un-adopted
 2    ap300-CF1EDA       00-A0-F8-CF-1E-DA   default-ap300     default     un-adopted
 3    ap621-E3C356       5C-0E-8B-E3-C3-56   default-ap621     default     un-adopted
 4    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
4.1.7 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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`ap650 <MAC>`

**Parameters**

- `ap650 <MAC>`

<table>
<thead>
<tr>
<th>&lt;MAC&gt;</th>
<th>Specify the AP650's MAC address.</th>
</tr>
</thead>
</table>

**Examples**

```
rfs7000-37FABE(config)#ap650 5C-0E-8B-34-81-BC
rfs7000-37FABE(config-device-5C-0E-8B-34-81-BC)#
```

```
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>
<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></td>
<td>ap7131-889EC4</td>
<td>00-15-70-88-9E-C4</td>
<td>default-ap7131</td>
<td>default</td>
<td>un-adopted</td>
<td></td>
<td>ap300-CF1EDA</td>
<td>00-A0-F8-CF-1E-DA</td>
<td>default-ap300</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td></td>
<td>ap621-E3C356</td>
<td>5C-0E-8B-E3-C3-56</td>
<td>default-ap621</td>
<td>default</td>
<td>un-adopted</td>
<td></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></td>
<td>ap650-3481BC</td>
<td>5C-0E-8B-34-81-BC</td>
<td>default-ap650</td>
<td>default</td>
<td>un-adopted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+------------|----------------|-----------------|-----------------|-----------------|-----------------|
```

```
rfs7000-37FABE(config)#
```

**Related Commands**

- `no` Removes an AP650 from the network
4.1.8 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, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

ap6511 <MAC>

Parameters

- ap6511 <MAC>

  <MAC> Specify the AP6511’s MAC address.

Examples

rfs7000-37FABE(config)#ap6511 5C-0E-8B-08-45-6A
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>ap7131-889EC4</td>
<td>00-15-70-88-9E-C4</td>
<td>default-ap7131</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>2</td>
<td>ap300-CF1EDA</td>
<td>00-A0-F8-CF-1E-DA</td>
<td>default-ap300</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>3</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>4</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>5</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>6</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
4.1.9 **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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ap6521 <MAC>
```

**Parameters**

- `ap6521 <MAC>`

**Example**

```
rfs7000-37FABE(config)#ap6521 5C-0E-8B-08-73-68
rfs7000-37FABE(config-device-5C-0E-8B-08-73-68)#
```

```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>ap7131-889EC4</td>
<td>00-15-70-88-9E-C4</td>
<td>default-ap7131</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>2</td>
<td>ap300-CF1EDA</td>
<td>00-A0-F8-CF-1E-DA</td>
<td>default-ap300</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>3</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>4</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>5</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>6</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>
<tr>
<td>7</td>
<td>ap6521-087368</td>
<td>5C-0E-8B-08-73-68</td>
<td>default-ap6521</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>

```
rfs7000-37FABE(config)#
```

**Related Commands**

- `no` Removes an AP6521 from the network
4.1.10 **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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ap6522 <MAC>
```

**Parameters**

- `ap6522 <MAC>`

<table>
<thead>
<tr>
<th>&lt;MAC&gt;</th>
<th>Specify the AP6522's MAC address.</th>
</tr>
</thead>
</table>

**Examples**

```
rfs7000-37FABE(config)#ap6522 5C-0E-8B-7B-F2-24
rfs7000-37FABE(config-device-5C-0E-8B-7B-F2-24)#
```

```
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>ap7131-889EC4</td>
<td>00-15-70-88-9E-C4</td>
<td>default-ap7131</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>2</td>
<td>ap300-CF1EDA</td>
<td>00-A0-F8-CF-1E-DA</td>
<td>default-ap300</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>3</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>4</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>5</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>6</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>
<tr>
<td>7</td>
<td>ap6521-087368</td>
<td>5C-0E-8B-08-73-68</td>
<td>default-ap6521</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>8</td>
<td>ap6522-7BF224</td>
<td>5C-0E-8B-7B-F2-24</td>
<td>default-ap6522</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>

```
rfs7000-37FABE(config)#
```

**Related Commands**

```
no
```

Removes an AP6522 from the network
4.1.11 ap6532

**Global Configuration Commands**

Adds 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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ap6532 <MAC>
```

**Parameters**

- `ap6532 <MAC>`

**Examples**

```bash
rfs7000-37FABE(config)#ap6532 00-23-68-31-16-59
rfs7000-37FABE(config-device-00-23-68-31-16-59)#
```

```bash
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>ap7131-889EC4</td>
<td>00-15-70-88-9E-C4</td>
<td>default-ap7131</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>2</td>
<td>ap300-CF1EDA</td>
<td>00-A0-F8-CF-1E-DA</td>
<td>default-ap300</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>3</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>4</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>5</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>6</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>
<tr>
<td>7</td>
<td>ap6521-087368</td>
<td>5C-0E-8B-08-73-68</td>
<td>default-ap6521</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>8</td>
<td>ap6522-7BF224</td>
<td>5C-0E-8B-7B-F2-24</td>
<td>default-ap6522</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>9</td>
<td>ap6532-311659</td>
<td>00-23-68-31-16-59</td>
<td>default-ap6532</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>

```bash
rfs7000-37FABE(config)#
```

**Related Commands**

```bash
no
```

`no` Removes an AP6532 from the network
4.1.12 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, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

ap6532 <MAC>

Parameters

- ap6562 <MAC>

Examples

rfs7000-37FABE(config)#ap6532 00-23-09-0E-12-60
rfs7000-37FABE(config-device-00-23-09-0E-12-60)#

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>ap7131-889EC4</td>
<td>00-15-70-88-9E-C4</td>
<td>default-ap7131</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>2</td>
<td>ap300-CF1EDA</td>
<td>00-A0-F8-CF-1E-DA</td>
<td>default-ap300</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>3</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>4</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>5</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>6</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>
<tr>
<td>7</td>
<td>ap6521-087368</td>
<td>5C-0E-8B-08-73-68</td>
<td>default-ap6521</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>8</td>
<td>ap6522-7BF224</td>
<td>5C-0E-8B-7B-F2-24</td>
<td>default-ap6522</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>9</td>
<td>ap6532-311659</td>
<td>00-23-68-31-16-59</td>
<td>default-ap6532</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>10</td>
<td>ap6562-0E1260</td>
<td>00-23-09-0E-12-60</td>
<td>default-ap6562</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>

rfs7000-37FABE(config)#

Related Commands

no

Removes an AP6562 from the network
4.1.13 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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```text
ap71xx <MAC>
```

**Parameters**
- `ap71xx <MAC>`

**Examples**

```text
rfs7000-37FABE(config)#ap71xx 00-23-68-99-BF-A8
rfs7000-37FABE(config-device-00-23-68-99-BF-A8)#
```

```text
rfs7000-37FABE(config)#show wireless ap configured
---------------------------------------------------------------------------------------
IDX         NAME                MAC              PROFILE       RF-DOMAIN    ADOPTED-BY
---------------------------------------------------------------------------------------
 1    ap7131-889EC4      00-15-70-88-9E-C4   default-ap7131    default     un-adopted
 2    ap300-CF1EDA       00-A0-F8-CF-1E-DA   default-ap300     default     un-adopted
 3    ap621-E3C356       SC-0E-8B-E3-C3-56   default-ap621     default     un-adopted
 4    ap622-43C3DC       B4-C7-99-43-C3-DC   default-ap622     default     un-adopted
 5    ap650-3481BC       SC-0E-8B-34-81-BC   default-ap650     default     un-adopted
 6    ap6511-08456A      SC-0E-8B-08-45-6A   default-ap6511    default     un-adopted
 7    ap6521-087368      SC-0E-8B-08-73-68   default-ap6521    default     un-adopted
 8    ap6522-7BF224      SC-0E-8B-7B-F2-24   default-ap6522    default     un-adopted
 9    ap6532-311659      00-23-68-31-16-59   default-ap6532    default     un-adopted
10   ap6562-0E1260      00-23-09-0E-12-60   default-ap6562    default     un-adopted
11   ap7131-99BFA8      00-23-68-99-BF-A8   default-ap71xx     default     un-adopted
---------------------------------------------------------------------------------------
rfs7000-37FABE(config)#
```

**Related Commands**

- `no` Removes an AP71XX from the network
4.1.14 ap81xx

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, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
ap81xx <MAC>

Parameters
- ap81xx <MAC>

Examples
rfs7000-37FABE(config)#ap81xx C4-01-FA-BE-F1-16
rfs7000-37FABE(config-device-C4-01-FA-BE-F1-16)#

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>ap7131-889EC4</td>
<td>00-15-70-88-9E-C4</td>
<td>default-ap7131</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>2</td>
<td>ap300-CF1EDA</td>
<td>00-A0-F8-CF-1E-DA</td>
<td>default-ap300</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>3</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>4</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>5</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>6</td>
<td>ap6511-08456A</td>
<td>5C-0E-8B-08-45-6A</td>
<td>default-ap651</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>7</td>
<td>ap6521-087368</td>
<td>5C-0E-8B-08-73-68</td>
<td>default-ap6521</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>8</td>
<td>ap6522-7BF224</td>
<td>5C-0E-8B-7F-2-24</td>
<td>default-ap6522</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>9</td>
<td>ap6532-311659</td>
<td>00-23-67-16-59</td>
<td>default-ap6532</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>10</td>
<td>ap6562-OF1260</td>
<td>00-23-09-0E-12-60</td>
<td>default-ap6562</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>11</td>
<td>ap7131-99F8A</td>
<td>00-23-68-99-BF-A8</td>
<td>default-ap71xx</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>12</td>
<td>ap8132-BEF116</td>
<td>C4-01-FA-BE-F1-16</td>
<td>default-ap81xx</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>

Related Commands

no  Removes an AP81XX from the network
4.1.15 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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**
ap82xx <MAC>

**Parameters**
- ap82xx <MAC>

**Examples**
rfs7000-37FABE(config)#ap82xx 6C-90-CD-02-54-21
rfs7000-37FABE(config-device-6C-90-CD-02-54-21)#

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>ap7131-889EC4</td>
<td>00-15-70-88-9E-C4</td>
<td>default-ap7131</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>2</td>
<td>ap300-CF1EDA</td>
<td>00-A0-F8-CF-1E-DA</td>
<td>default-ap300</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>3</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>4</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>5</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>6</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>
<tr>
<td>7</td>
<td>ap6521-087368</td>
<td>5C-0E-8B-08-73-68</td>
<td>default-ap6521</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>8</td>
<td>ap6522-7BF224</td>
<td>5C-0E-8B-7B-F2-24</td>
<td>default-ap6522</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>9</td>
<td>ap6532-311659</td>
<td>00-23-68-31-16-59</td>
<td>default-ap6532</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>10</td>
<td>ap6562-0E1260</td>
<td>00-23-09-0E-12-60</td>
<td>default-ap6562</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>11</td>
<td>ap7131-99BFA8</td>
<td>00-23-68-99-BF-A8</td>
<td>default-ap71xx</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>12</td>
<td>ap8132-BEF116</td>
<td>C4-01-FA- BE-F1-16</td>
<td>default-ap81xx</td>
<td>default</td>
<td>un-adopted</td>
</tr>
<tr>
<td>13</td>
<td>ap8232-147748</td>
<td>00-23-68-14-77-48</td>
<td>default-ap82xx</td>
<td>default</td>
<td>un-adopted</td>
</tr>
</tbody>
</table>

rfs7000-37FABE(config)#

**Related Commands**

no

Removes an AP82XX from the network
4.1.16 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

association-acl-policy <ASSOCIATION-ACL-POLICY-NAME>

**Parameters**

- association-acl-policy <ASSOCIATION-ACL-POLICY-NAME>

| <ASSOCIATION-ACL-POLICY-NAME> | Specify the association ACL policy name. If the policy does not exist, it is created. |

**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.
4.1.17 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

\[ \text{auto-provisioning-policy } <\text{AUTO-PROVISIONING-POLICY-NAME}> \]

**Parameters**

- **auto-provisioning-policy** <AUTO-PROVISIONING-POLICY-NAME>

**Examples**

```
config#auto-provisioning-policy test
config#auto-provisioning-policy-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

```
clearscr
commit
do
end
exit
help
revert
service
show
write
```

```
config#auto-provisioning-policy-policy-test)
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes an existing Auto Provisioning policy</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on the association-acl-policy, see Chapter 9, AUTO-PROVISIONING-POLICY.
4.1.18 bgp

`Global Configuration Commands`

Configures Border Gateway Protocol (BGP) settings

*Border Gateway Protocol* (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 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, 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).

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>Parameter</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>community-list &lt;LIST-NAME&gt;</td>
<td>Creates a community list and enters its configuration mode</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>ip-access-list &lt;LIST-NAME&gt;</td>
<td>Creates a BGP IP access list and enters its configuration mode</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>
</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

| no | Modifies BGP settings, based on the parameters passed |

**NOTE:** For more information on configuring BGP Top-Level Objects (TLOs), see Chapter 28, BORDER GATEWAY PROTOCOL.
4.1.19 bonjour-gw-discovery-policy

Global Configuration Commands

Configures a Bonjour GW Discovery policy. The policy defines a list of services clients want to discover across subnets. A maximum of 8 (eight) policies can be created on access point, wireless controller, or service platform.

When configured and applied, this feature enables Bonjour services on local and tunneled VLANs.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an existing Bonjour GW Discovery policy</td>
</tr>
</tbody>
</table>
4.1.20 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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><strong>Note:</strong></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><strong>Note:</strong></td>
<td>Execute the <code>bonjour-gw-discovery-policy</code> command to define the Bonjour services allowed on local and tunneled VLANs.</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>To associate a Bonjour GW Forwarding policy with a device or profile, in the profile/device configuration mode, execute the <code>use &gt; bonjour-gw-forwarding-policy &gt; &lt;POLICY-NAME&gt;</code> command. For more information see, <code>use</code>.</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>
</tbody>
</table>

- `clrscr` clears the display screen
- `commit` commits all changes made in this session
- `do` runs commands from Exec mode
- `end` ends current mode and change to EXEC mode
- `exit` ends current mode and down to previous mode
- `help` describes the interactive help system
- `revert` reverts changes
- `service` displays Service Commands
- `show` shows running system information
- `write` writes running configuration to memory or terminal

```
rfs7000-37FABE(config-bonjour-gw-forwarding-policy-TestPolicy)#
```

**Related Commands**

| `no` | Removes an existing Bonjour GW Forwarding policy |
4.1.21 captive portal

- Global Configuration Commands

A captive portal provides secure guest access and authentication services within the network. Table 4.2 lists the command to enter the captive portal configuration mode.

**Table 4.2 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 4-37</td>
</tr>
<tr>
<td>captive-portal-mode commands</td>
<td>Summarizes captive portal configuration commands</td>
<td>page 4-39</td>
</tr>
</tbody>
</table>
4.1.21.1 captive-portal

Configures a 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 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 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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:

- **OAuth**
  - OAuth 2.0 authentication configuration
- **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)
- **logout-fqdn**
  - Configure the FQDN address to logout the session from client
- **no**
  - Negate a command or set its defaults
- **post-authentication-vlan**
  - Configure post authentication vlan for captive portal users
- **radius-vlan-assignment**
  - Enable radius vlan assignment for captive portal
users
Configure connection redirection parameters

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 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.

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><strong>no</strong></td>
<td>Removes an existing captive portal</td>
</tr>
</tbody>
</table>
### 4.1.21.2 captive-portal-mode commands

Table 4.3 summarizes captive portal configuration mode commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAuth</td>
<td>Configures the client ID used by OAuth 2.0 to authenticate a client and provide access to protected resources on the captive portal</td>
<td>page 4-41</td>
</tr>
<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 4-42</td>
</tr>
<tr>
<td>access-type</td>
<td>Configures a captive portal’s access type</td>
<td>page 4-43</td>
</tr>
<tr>
<td>accounting</td>
<td>Enables a captive portal’s accounting records</td>
<td>page 4-44</td>
</tr>
<tr>
<td>bypass</td>
<td>Enables bypassing of captive portal detection requests from wireless clients</td>
<td>page 4-46</td>
</tr>
<tr>
<td>connection-mode</td>
<td>Configures a captive portal’s connection mode</td>
<td>page 4-47</td>
</tr>
<tr>
<td>custom-auth</td>
<td>Configures custom user information</td>
<td>page 4-48</td>
</tr>
<tr>
<td>data-limit</td>
<td>Enforces data limit on captive portal clients</td>
<td>page 4-49</td>
</tr>
<tr>
<td>inactivity-timeout</td>
<td>Defines an inactivity timeout in seconds</td>
<td>page 4-50</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures the IPv6 address of the internal captive portal server</td>
<td>page 4-51</td>
</tr>
<tr>
<td>logout-fqdn</td>
<td>Clears the logout FQDN address</td>
<td>page 4-52</td>
</tr>
<tr>
<td>no</td>
<td>Reverts the selected captive portal’s settings to default</td>
<td>page 4-53</td>
</tr>
<tr>
<td>post-authentication-vlan</td>
<td>Assigns a post authentication RADIUS VLAN for this captive portal’s users</td>
<td>page 4-58</td>
</tr>
<tr>
<td>radius-vlan-assignment</td>
<td>Assigns a RADIUS VLAN for this captive portal</td>
<td>page 4-59</td>
</tr>
<tr>
<td>redirection</td>
<td>Enables redirection of client connections to specified destination ports</td>
<td>page 4-60</td>
</tr>
<tr>
<td>server</td>
<td>Configures the captive portal server settings</td>
<td>page 4-61</td>
</tr>
<tr>
<td>simultaneous-users</td>
<td>Specifies a username used by a MAC address pool</td>
<td>page 4-63</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 4-64</td>
</tr>
<tr>
<td>use</td>
<td>Associates a AAA policy and a DNS whitelist with a captive portal</td>
<td>page 4-65</td>
</tr>
<tr>
<td>webpage</td>
<td>Configures captive portal Web page settings</td>
<td>page 4-66</td>
</tr>
<tr>
<td>webpage-auto-upload</td>
<td>Enables automatic upload of advanced Web pages on a captive portal</td>
<td>page 4-71</td>
</tr>
<tr>
<td>webpage-location</td>
<td>Specifies the location of Web pages used for captive portal authentication</td>
<td>page 4-72</td>
</tr>
</tbody>
</table>
Table 4.3 Captive-Portal-Mode Commands

<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous mode</td>
<td>page 5-4</td>
</tr>
<tr>
<td>help</td>
<td>Displays the interactive help system</td>
<td>page 5-6</td>
</tr>
<tr>
<td>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
4.1.21.2.1 OAuth

**captive-portal-mode commands**

Configures the client ID used by OAuth 2.0 to authenticate a client and provide access to protected resources on the captive portal.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
OAuth client-id [facebook|google] <WORD>
```

**Parameters**
- OAuth client-id [facebook|google] <WORD>

<table>
<thead>
<tr>
<th>OAuth</th>
<th>Configures OAuth 2.0 settings required to provide OAuth access to clients</th>
</tr>
</thead>
<tbody>
<tr>
<td>client-id [facebook</td>
<td>google] &lt;WORD&gt;</td>
</tr>
<tr>
<td>facebook</td>
<td>Configures the client's Facebook ID</td>
</tr>
<tr>
<td>google</td>
<td>Configures the client's Google ID</td>
</tr>
<tr>
<td>&lt;WORD&gt;</td>
<td>Provide the client's Facebook/Google ID (should be registered with the OAuth provider)</td>
</tr>
</tbody>
</table>

**Examples**

```
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
OAuth client-id Google TechPubs.printer.google.com
```

**Related Commands**

```
no
```

Removes all OAuth client identities configured for this captive portal.
4.1.21.2.2 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

access-time <10-10080>

Parameters

- access-time <10-10080>

| <10-10080> | Defines the access time allowed for a wireless client from 10 - 10080 minutes. The default is 1440 minutes. |

Examples

rfs7000-37FABE(config-captive-portal-test)#access-time 35
rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
access-time 35
rfs7000-37FABE(config-captive-portal-test)#

Related Commands

| no | Reverts to the default permitted access time (1440 minutes) |
4.1.21.2.3 access-type

**captive-portal-mode commands**

Defines the captive portal's access type

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`access-type [OAuth|custom-auth-radius|email|logging|no-auth|radius]`

**Parameters**
- `access-type [OAuth|custom-auth-radius|email|logging|no-auth|radius]`

<table>
<thead>
<tr>
<th>OAuth</th>
<th>Uses OAuth 2.0 authorization framework to authenticate a client requesting captive portal access</th>
</tr>
</thead>
<tbody>
<tr>
<td>custom-auth-radius</td>
<td>Specifies the custom user information used for authentication (RADIUS lookup of given information, such as name, e-mail address, telephone etc.). When configured, accessing clients are required to provide a 1-32 character lookup data string used to authenticate their credentials. <strong>Note:</strong> When selecting this option, use the custom-auth command to configure the required user information.</td>
</tr>
<tr>
<td>email</td>
<td>Uses user's e-mail address for authentication</td>
</tr>
<tr>
<td>logging</td>
<td>Provides users access without authentication. The system logs access details of users allowed access.</td>
</tr>
<tr>
<td>no-auth</td>
<td>Defines no authentication required for a guest (guest is redirected to welcome message). Provides users access to the captive portal without authentication.</td>
</tr>
<tr>
<td>radius</td>
<td>Enables RADIUS authentication for wireless clients. Provides captive portal access to successfully authenticated users only. This is the default setting.</td>
</tr>
</tbody>
</table>

**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)#

rfs7000-6DCD4B(config-captive-portal-test2)#access-type OAuth
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 | Removes the captive portal access type or reverts to default (radius) |
4.1.2.4 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 host <IP/HOSTNAME> | Enables support for syslog accounting messages. This option is disabled by default.
  | port <1-65535> | Optional. Specifies the syslog server’s listener port
  | proxy-mode [none|through-controller|through-rf-domain-manager] | Optional. Specifies the mode of proxying the syslog server

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>
4.1.21.2.5 bypass

* captive-portal-mode commands

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`bypass captive-portal-detection`

**Parameters**

- `bypass captive-portal-detection`

**Examples**

```plaintext
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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables bypassing of captive portal detection requests</td>
</tr>
</tbody>
</table>
4.1.21.2.6 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, it is recommended that you use HTTPS as it affords controller and client transmissions some measure of data protection HTTP cannot provide.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
connection-mode [http|https]

Parameters
- **connection-mode [http|https]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>http</td>
<td>Sets HTTP as the default connection mode. This is the default setting.</td>
</tr>
<tr>
<td>https</td>
<td>Sets HTTPS as the default connection mode</td>
</tr>
</tbody>
</table>

Note: HTTPS is a more secure version of HTTP, and uses encryption while sending and receiving requests.

Examples
rfs7000-37FABE(config-captive-portal-test)#connection-mode https
rfs7000-37FABE(config-captive-portal-test)#show context
rfs7000-37FABE(config-captive-portal-test)#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
4.1.21.2.7 custom-auth

**captive-portal-mode commands**

Configures custom user information

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

custom-auth info <LINE>

**Parameters**

- custom-auth info <LINE>

<table>
<thead>
<tr>
<th>info &lt;LINE&gt;</th>
<th>Configures information used for RADIUS lookup when custom-auth RADIUS access type is configured</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;LINE&gt; — Guest data needs to be provided. Specify the name, e-mail address, and telephone number of the user.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-captive-portal-test)#custom-auth info bob, bob@zebra.com

rfs7000-37FABE(config-captive-portal-test)#show context
captive-portal test
  access-type logging
  access-time 35
  custom-auth info bob, bob@zebra.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
4.1.21.2.8 data-limit

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

data-limit <1-102400> {action [log-and-disconnect|log-only]}

Parameters

- data-limit <1-102400> {action [log-and-disconnect|log-only]}

| data-limit <1-102400> | Sets a captive portal client's data transfer limit in megabytes. This limit is applicable for both upstream and downstream data transfer.
| | • <1-102400> – Specify a value from 1 - 102400 MB.
| 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)#

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
4.1.21.2.9 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**
inactivity-timeout <60-86400>

**Parameters**
- inactivity-timeout <60-86400>

<60-86400> Defines the timeout interval after which a captive portal session is automatically terminated
- <60-86400> – Specify a value from 60 - 86400 seconds. The default is 10 minutes or 600 seconds.

**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@zebra.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
4.1.21.2.10 ipv6

* captive-portal-mode commands

Configures the internal captive portal server's (running on the centralized mode) IPv6 address

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>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
  ipv6 server host 2001:10:10:6d:33:fa:8b
  OAuth client-id Google TechPubs.printer.google.com
rfs7000-6DCD4B(config-captive-portal-test2)#

**Related Commands**

* no

  Removes the captive portal server's IPv6 address
4.1.21.2.11 logout-fqdn

* captive-portal-mode commands

Configures the *Fully Qualified Domain Name* (FQDN) address to logout of the session from the client.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
logout-fqdn <WORD>
```

**Parameters**

- `logout-fqdn <WORD>`

<table>
<thead>
<tr>
<th>logout-fqdn &lt;WORD&gt;</th>
<th>Configures the FQDN address used to logout</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WORD&gt;</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)#
```

```
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 |
### 4.21.2.12 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
no [OAuth|access-time|access-type|accounting|bypass|connection-mode|custom-auth|
data-limit|inactivity-timeout|ipv6|logout-fqdn|post-authentication-vlan|
radius-vlan-assignment|redirection|server|simultaneous-users|terms-agreement|use|
webpage|webpage-auto-upload|webpage-location]
no [access-time|access-type|connection-mode|data-limit|inactivity-timeout|logout-fqdn|
post-authentication-vlan|radius-vlan-assignment|simultaneous-users|terms-agreement|
webpage-auto-upload|webpage-location]

no OAuth <CLIENT-ID>
no accounting [radius|syslog]
no bypass captive-portal-detection
no custom-auth info
no ipv6 server host
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|welcome]
no webpage internal [org-name|org-signature]
no webpage internal [acknowledgment|agreement|fail|login|no-service|welcome]
[description|footer|header|main-logo|small-logo|title]
```

**Parameters**

- `no OAuth <CLIENT-ID>`
  - Removes all OAuth client identities configured for this captive portal

- `no [access-time|access-type|connection-mode|data-limit|inactivity-timeout|logout-fqdn|post-authentication-vlan|radius-vlan-assignment|simultaneous-users|terms-agreement|use|webpage|webpage-auto-upload|webpage-location]`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no access-time</td>
<td>Resets client access time</td>
</tr>
<tr>
<td>no access-type</td>
<td>Resets client access type</td>
</tr>
<tr>
<td>no connection-mode</td>
<td>Resets connection mode to HTTP</td>
</tr>
<tr>
<td>no data-limit</td>
<td>Removes data limit enforcement for captive portal clients</td>
</tr>
<tr>
<td>no inactivity-timeout</td>
<td>Resets inactivity timeout interval</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>no logout-fqdn</td>
<td>Clears the logout FQDN address</td>
</tr>
<tr>
<td>no post-authentication-vlan</td>
<td>Removes the post authentication RADIUS VLAN assigned to this captive portal’s users</td>
</tr>
<tr>
<td>no radius-vlan-assignment</td>
<td>Disables RADIUS VLAN assignment for captive portal users</td>
</tr>
<tr>
<td>no simultaneous-users</td>
<td>Resets the number of MAC addresses that can use a single user name to its default of 1</td>
</tr>
<tr>
<td>no terms-agreement</td>
<td>Resets the terms of agreement required for logging in. The user no longer has to agree to terms &amp; conditions before connecting to a captive portal.</td>
</tr>
<tr>
<td>no webpage-auto-upload</td>
<td>Disables automatic upload of advanced Web pages on a captive portal</td>
</tr>
<tr>
<td>no webpage-location</td>
<td>Resets the use of custom Web pages for login, welcome, terms, and failure page. The default is automatically created Web pages.</td>
</tr>
</tbody>
</table>

- **no accounting [radius|syslog]**
  - no accounting | Disables accounting configurations |
  - radius | Disables support for sending RADIUS accounting messages |
  - syslog | Disables support for sending syslog messages to remote syslog servers |

- **no bypass captive-portal-detection**
  - no bypass captive-portal-detection | Disables bypassing of captive-portal detection requests |

- **no custom-auth info**
  - no custom-auth | Resets custom authentication information |
  - info | Resets the configuration of custom user information sent to the RADIUS server (for custom-auth-radius access type) |

- **no ipv6 server host**
  - no ipv6 server host | Removes the device hosting the internal IPv6 captive portal server |

- **no redirection ports**
  - no redirection ports | Disables redirection of client connections to specified destination ports |

- **no server host**
  - no server host | Clears captive portal server address |

- **no server mode {centralized-controller [hosting-vlan-interface]}**
  - no server mode | Clears the captive portal server mode |
  - centralized-controller hosting-vlan-interface | Optional. Resets the hosting VLAN interface for centralized captive portal server to its default of zero (0) |
### GLOBAL CONFIGURATION COMMANDS

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no use</strong> [aaa-policy</td>
<td>dns-whitelist]</td>
</tr>
<tr>
<td>no use</td>
<td>Removes the AAA policy used with a captive portal policy.</td>
</tr>
<tr>
<td>aaa-policy</td>
<td>Removes the DNS whitelist used with a captive portal policy.</td>
</tr>
<tr>
<td><strong>no webpage external</strong> [acknowledgment</td>
<td>agreement</td>
</tr>
<tr>
<td>no webpage external</td>
<td>Resets the acknowledgment page location.</td>
</tr>
<tr>
<td>acknowledgment</td>
<td>Resets the agreement page settings.</td>
</tr>
<tr>
<td>agreement</td>
<td>Resets the fail page settings.</td>
</tr>
<tr>
<td>fail</td>
<td>Resets the login page settings.</td>
</tr>
<tr>
<td>login {post}</td>
<td>Sets the post - Optional. Users are redirected to post internally when they try to authenticate.</td>
</tr>
<tr>
<td>no-service</td>
<td>Resets the no-service page settings. The no-service Web page is displayed when critical services (such as, AAA server, captive portal server, DHCP server, and AP to controller connectivity) are not reachable and the user cannot access the captive portal.</td>
</tr>
<tr>
<td>welcome</td>
<td>Resets the welcome page settings.</td>
</tr>
<tr>
<td><strong>no webpage internal</strong> [org-name</td>
<td>org-signature]</td>
</tr>
<tr>
<td>no webpage internal</td>
<td>Resets the organization name that is included at the top of Web pages.</td>
</tr>
<tr>
<td>org-name</td>
<td>Resets the organization signature (email, addresses, phone numbers) included at the bottom of Web pages.</td>
</tr>
<tr>
<td>org-signature</td>
<td>Resets the welcome page settings.</td>
</tr>
<tr>
<td><strong>no webpage internal</strong> [acknowledgment</td>
<td>agreement</td>
</tr>
<tr>
<td>no webpage internal</td>
<td>Resets the acknowledgment page settings.</td>
</tr>
<tr>
<td>acknowledgment</td>
<td>Resets the agreement page settings.</td>
</tr>
<tr>
<td>agreement</td>
<td>Resets the fail page settings.</td>
</tr>
<tr>
<td>fail</td>
<td>Resets the login page settings.</td>
</tr>
<tr>
<td>login</td>
<td>Resets the no-service page settings. The no-service Web page is displayed when critical services (such as, AAA server, captive portal server, DHCP server) are not reachable and the user cannot access the captive portal.</td>
</tr>
<tr>
<td>welcome</td>
<td>Resets the welcome page settings.</td>
</tr>
</tbody>
</table>
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@zebra.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@zebra.com
  connection-mode https
  inactivity-timeout 750
rfs7000-37FABE(config-captive-portal-test)#
```

```
rfs7000-6DCD4B(config-captive-portal-test2)#show context
captive-portal test2
  access-type OAuth
rfs7000-6DCD4B(config-captive-portal-test2)#
```

```
rfs7000-6DCD4B(config-captive-portal-test2)#no ipv6 server host
rfs7000-6DCD4B(config-captive-portal-test2)#show context
captive-portal test2
  access-type OAuth
rfs7000-6DCD4B(config-captive-portal-test2)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OAuth</strong></td>
<td>Configures the client ID used by OAuth 2.0 to authenticate a client and provide access to protected resources on the captive portal</td>
</tr>
<tr>
<td><strong>access-time</strong></td>
<td>Configures the allowed access time for each captive portal client</td>
</tr>
<tr>
<td><strong>access-type</strong></td>
<td>Configures captive portal authentication and logging information</td>
</tr>
<tr>
<td><strong>accounting</strong></td>
<td>Configures captive portal accounting information</td>
</tr>
<tr>
<td><strong>bypass</strong></td>
<td>Enables bypassing of captive portal detection requests</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>connection-mode</td>
<td>Configures how clients connect to a captive portal</td>
</tr>
<tr>
<td>custom-auth</td>
<td>Configures the captive portal parameters required for client access</td>
</tr>
<tr>
<td>inactivity-timeout</td>
<td>Configures the client inactivity timeout interval</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures the internal captive portal server’s (running on the centralized mode) IPv6 address</td>
</tr>
<tr>
<td>logout-fqdn</td>
<td>Configures the FQDN address to logout of the session from the client</td>
</tr>
<tr>
<td>post-authentication-vlan</td>
<td>Assigns a post authentication RADIUS VLAN for this captive portal’s users</td>
</tr>
<tr>
<td>radius-vlan-assignment</td>
<td>Enables assignment of a RADIUS VLAN for this captive portal</td>
</tr>
<tr>
<td>redirection</td>
<td>Enables redirection of client connections to specified destination ports</td>
</tr>
<tr>
<td>server</td>
<td>Configures captive portal server parameters</td>
</tr>
<tr>
<td>simultaneous-users</td>
<td>Configures the maximum number of clients that can use a single captive portal user name</td>
</tr>
<tr>
<td>terms-agreement</td>
<td>Configures if a client has to accept terms and conditions before logging to the captive portal</td>
</tr>
<tr>
<td>use</td>
<td>Associates a AAA policy and DNS whitelist with this captive portal policy</td>
</tr>
<tr>
<td>webpage-location</td>
<td>Configures the location of Web pages displayed when the user interacts with the captive portal</td>
</tr>
<tr>
<td>webpage</td>
<td>Configures Web pages used by the captive portal to interact with users</td>
</tr>
<tr>
<td>webpage-auto-upload</td>
<td>Enables automatic upload of advanced Web pages on a captive portal</td>
</tr>
<tr>
<td>aaa-policy</td>
<td>Configures a AAA policy</td>
</tr>
<tr>
<td>dns-whitelist</td>
<td>Configures a DNS whitelist</td>
</tr>
</tbody>
</table>
4.1.21.2.13 post-authentication-vlan

Assigns a post authentication RADIUS VLAN for this captive portal’s users

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
post-authentication-vlan <1-4096>

Parameters
- post-authentication-vlan <1-4096>

<table>
<thead>
<tr>
<th>post-authentication-vlan &lt;1-4096&gt;</th>
<th>Assigns a VLAN for this captive portal’s users after they have authenticated and logged on to the network</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;1-4096&gt; – Specify the VLAN’s number from 1 - 4096.</td>
</tr>
</tbody>
</table>

Examples
rfs4000-229D58 (config-captive-portal-test)#post-authentication-vlan 1
rfs4000-229D58 (config-captive-portal-test)#

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
4.1.21.2.14 radius-vlan-assignment

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, then 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

radius-vlan-assignment

Parameters

None

Examples

rfs4000-229D58(config-captive-portal-test)#radius-vlan-assignment
rfs4000-229D58(config-captive-portal-test)#

rfs4000-229D58(config-captive-portal-test)#show context captive-portal test
post-authentication-vlan 1
radius-vlan-assignment
rfs4000-229D58(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>Disables assignment of a RADIUS VLAN for this captive portal</td>
</tr>
<tr>
<td><code>post-authentication-vlan</code></td>
<td>Assigns a post authentication RADIUS VLAN for this captive portal’s users</td>
</tr>
</tbody>
</table>
4.1.21.2.15 redirection

- captive-portal-mode commands

Enables redirection of client connections to specified destination ports

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

rfs4000-229D58(config-captive-portal-test)#redirection ports 1,2,3
rfs4000-229D58(config-captive-portal-test)#

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
4.21.2.16 server

- **captive-portal-mode commands**

Configures captive portal server parameters, such as the hostname, IP, and mode of operation. This is the server validating guest user permissions.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
server [host|mode]
server host <IP/HOSTNAME>
server mode [centralized|centralized-controller {hosting-vlan-interface <0-4096>}|self]
```

**Parameters**

- **host <IP/HOSTNAME>**
  - Configures the internal captive portal authentication server (wireless controller, access point, service platform)
  - `<IP/HOSTNAME>` – Specify the IPv4 address or hostname of the captive portal server.
  - **Note:** For centralized wireless controller mode, this should be a virtual hostname and not IP address.
  - **Note:** This option is available only when hosting the captive portal on an external (fixed) server resource.

- **server mode [centralized|centralized-controller {hosting-vlan-interface <0-4096>}|self]**

  - **mode**
    - **centralized**
      - Considers the configured server’s hostname or IP address as the centralized captive portal server. Select this option if the captive portal is supported on an external server.

  - **centralized-controller {hosting-vlan-interface <0-4096>}**
    - Configures the numeric IP address (or DNS hostname) for the server validating guest user permissions for the captive portal policy. This option is available only for the centralized (external) AND centralized-controller captive portal server resources.
    - `<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).

- **self**
  - Selects the captive portal server as the same device supporting the WLAN (the captive portal and the WLAN are configured on the same device). Select this option to maintain the captive portal configuration (Web pages) internally. This is the default setting.
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@zebra.com
  connection-mode https
  inactivity-timeout 750
  server host 172.16.10.9
rfs7000-37FABE(config-captive-portal-test)#

Related Commands

| no          | Resets or disables captive portal host and mode settings |
4.1.21.2.17 simultaneous-users

**captive-portal-mode commands**

Specifies the number of MAC addresses that can simultaneously use a particular username. This option is disabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
simultaneous-users <1-8192>
```

**Parameters**
- `simultaneous-users <1-8192>`

| `<1-8192>` | Specifies the number of MAC addresses that can simultaneously use a particular username. Select a number from 1 - 8192. |

**Examples**

```
rfs7000-37FABE(config-captive-portal-test)#simultaneous-users 5
```

```
rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
  custom-auth info bob,\ bob@zebra.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
4.1.21.2.18 terms-agreement

```plaintext
Enforces the user to agree to terms and conditions (included in the login page) for captive portal access. This feature is disabled by default.
```

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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@zebra.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><code>no</code></td>
<td>Resets or disables captive portal commands</td>
</tr>
</tbody>
</table>
4.1.21.2.19 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 Chapter 8, AAA-POLICY.
For more information on DNS whitelists, see Chapter 4, dns-whitelist.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

use [aaa-policy <AAA-POLICY-NAME>|dns-whitelist <DNS-WHITELIST-NAME>]

Parameters
- use [aaa-policy <AAA-POLICY-NAME>|dns-whitelist <DNS-WHITELIST-NAME>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>aaa-policy &lt;AAA-POLICY-NAME&gt;</td>
<td>Configures a AAA policy with this captive portal. AAA policies validate user credentials and provide captive portal access to the network.</td>
</tr>
<tr>
<td></td>
<td>• &lt;AAA-POLICY-NAME&gt; – Specify the AAA policy name.</td>
</tr>
<tr>
<td>dns-whitelist &lt;DNS-WHITELIST-NAME&gt;</td>
<td>Configures a DNS whitelist to use with this captive portal. DNS whitelists restrict captive portal access.</td>
</tr>
<tr>
<td></td>
<td>• &lt;DNS-WHITELIST-NAME&gt; – 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

```
rf8000-37FABE(config-captive-portal-test)#use aaa-policy test
rf8000-37FABE(config-captive-portal-test)#use dns-whitelist test
rf8000-37FABE(config-captive-portal-test)#show context captive-portal test
    access-time 35
    custom-auth info bob, \bob@zebra.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
rf8000-37FABE(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>
4.1.21.2.20 webpage

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. There are six (6) different pages.

- 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 unavailability of critical services.
- 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

webpage [external|internal]

```bash
webpage external [acknowledgment|agreement|fail|login {post}|no-service|welcome] <URL>

webpage internal [acknowledgment|agreement|fail|login|no-service|org-name|org-signature|welcome]

webpage internal [acknowledgment|agreement|fail|login|no-service|welcome] [description|footer|header|title] <CONTENT>

webpage internal [acknowledgment|agreement|fail|login|no-service|welcome] [main-logo|small-logo] <URL>

webpage internal [org-name|org-signature] <LINE>
```

Parameters

- webpage external [acknowledgment|agreement|fail|login {post}|no-service|welcome] <URL>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>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>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</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>
<tr>
<td>login {post}</td>
<td>Indicates the page is displayed for getting user credentials. This page is displayed by default. - post – Optional. Redirects users to post externally when they 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.</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 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  <strong>Note:</strong> For more information on enabling these critical resource monitoring, see service.</td>
</tr>
<tr>
<td>welcome</td>
<td>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.</td>
</tr>
<tr>
<td>&lt;URL&gt;</td>
<td>Indicates the URL to the Web page displayed. Query String: URL can include query tags. Supported Query Tags are: - <code>WING_TAG_CLIENT_IP</code> - Captive portal client IPv4 address - <code>WING_TAG_CLIENT_MAC</code> - Captive portal client MAC address - <code>WING_TAG_WLAN_SSID</code> - Captive portal client WLAN ssid - <code>WING_TAG_AP_MAC</code> - Captive portal client AP MAC address - <code>WING_TAG_AP_NAME</code> - Captive portal client AP Name - <code>WING_TAG_RF_DOMAIN</code> - Captive portal client RF Domain - <code>WING_TAG_CP_SERVER</code> - Captive portal server address - <code>WING_TAG_USERNAME</code> - Captive portal authentication username Example:  <a href="http://cportal.com/policy/login.html?client_ip=WING_TAG_CLIENT_IP&amp;ap_mac=WING_TAG_AP_MAC">http://cportal.com/policy/login.html?client_ip=WING_TAG_CLIENT_IP&amp;ap_mac=WING_TAG_AP_MAC</a>. Use ‘&amp;’ or ‘?’ character to separate field-value pair.  <strong>Note:</strong> Enter ‘ctrl-v’ followed by ‘?’ to configure query string.</td>
</tr>
</tbody>
</table>
- webpage internal [acknowledgment|agreement|fail|login|no-service|welcome] [description|footer|header|title] <CONTENT>

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>internal</td>
<td>Indicates the Web pages are internal. 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 user credentials.</td>
</tr>
</tbody>
</table>
| no-service | Indicates the page is displayed when certain critical services are unavailable and the user fails to access 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  
  - AP to controller connectivity monitoring  
**Note:** For more information on enabling these critical resource monitoring, see service. |
| welcome | Indicates the page is displayed after a user has been successfully authenticated. |
| description | Indicates the content is the description portion of each of the following internal Web pages: acknowledgment, agreement, fail, login, no-service, and welcome. |
| footer | 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. |
| header | 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. |
| title | 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. |
| <CONTENT> | The following keyword is common to all of the above internal Web page options:  
  - <CONTENT> – 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. |
- **webpage internal [acknowledgment|agreement|fail|login|no-service|welcome] [main-logo|small-logo] <URL>

<table>
<thead>
<tr>
<th>internal</th>
<th>Indicates the Web pages are internal</th>
</tr>
</thead>
<tbody>
<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>
</tbody>
</table>
| no-service         | Indicates the page is displayed when certain critical services are unavailable and the user fails to access 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  
  - AP to controller connectivity monitoring  
  **Note:** For more information on enabling these critical resource monitoring, see wlan. |
| welcome            | Indicates the page is displayed after a user has been successfully authenticated |
| main-logo          | The following keyword is common to all of the above internal Web page options:  
  - main-logo – Indicates the main logo displayed in the header portion of each Web page |
| 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 portion of each Web page, and constitutes the organization’s signature |
| <URL>              | Provides the complete URL of the main-logo and small-logo files  
  - <URL> – Specify the location of the main-logo and the small-logo files. The files are loaded from the specified location. |

- **webpage internal [org-name|org-signature] <LINE>

<table>
<thead>
<tr>
<th>internal</th>
<th>Indicates the Web pages are internal</th>
</tr>
</thead>
<tbody>
<tr>
<td>org-name</td>
<td>Specifies the company’s name, included on Web pages along with the main image</td>
</tr>
<tr>
<td>org-signature</td>
<td>Specifies the company’s signature information, included in the bottom of Web pages along with a small image</td>
</tr>
<tr>
<td>&lt;LINE&gt;</td>
<td>Specify the company’s name or signature depending on the option selected.</td>
</tr>
</tbody>
</table>
Examples
rfs7000-37FABE(config-captive-portal-test)#webpage external fail http://www.zebra.com

rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
  access-time 35
custom-auth info bob, bob@zebra.com
connection-mode https
inactivity-timeout 750
server host 172.16.10.9
simultaneous-users 5
terms-agreement
webpage-location external
  webpage external fail http://www.zebra.com
use aaa-policy test
rfs7000-37FABE(config-captive-portal-test)#

Related Commands

+-------------------+--------------------------------------------------+
| **no**             | resets or disables captive portal configurations |
+-------------------+--------------------------------------------------+
4.1.21.2.21 webpage-auto-upload

*captive-portal-mode commands*

Enables automatic upload of advanced Web pages on a captive portal. 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

webpage-auto-upload

**Parameters**

None

**Examples**

rfs7000-37FABE(config-captive-portal-test)#webpage-auto-upload
rfs7000-37FABE(config-captive-portal-test)#

rfs7000-37FABE(config-captive-portal-test)#show context
captive-portal test
webpage-auto-upload
logout-fqdn logout.testuser.com
rfs7000-37FABE(config-captive-portal-test)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>no</em></td>
<td>Disables automatic upload of advanced Web pages on a captive portal</td>
</tr>
<tr>
<td><em>webpage</em></td>
<td>Configures Web pages displayed when interacting with a captive portal</td>
</tr>
<tr>
<td><em>webpage-location</em></td>
<td>Specifies the location of the Web pages used for authentication</td>
</tr>
</tbody>
</table>
### 4.1.21.22 webpage-location

**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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
webpage-location [advanced|external|internal]
```

**Parameters**

- `webpage-location [advanced|external|internal]`

<table>
<thead>
<tr>
<th>Option</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 <code>advanced</code> 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**

```
rfs7000-37FABE(config-captive-portal-test)#webpage-location external
rfs7000-37FABE(config-captive-portal-test)#show context captive-portal test
```

**Related Commands**

- `no` Resets or disables captive portal Web page settings
- `webpage` Configures a captive portal’s Web page (acknowledgment, agreement, login, welcome, fail, no-service, and terms) settings
- `webpage-auto-upload` Enables an automatic upload of advanced Web pages on a captive portal
4.1.22 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

clear event-history

Parameters
- clear event-history

| event-history | Clears the event history file |

Examples

rfs4000-229D58#show event-history
EVENT HISTORY REPORT
Generated on '2013-01-31 00:15:57 UTC' by 'admin'

2013-01-31 00:15:36     rfs4000-229D58  SYSTEM     LOGIN                Successfully
logged in user 'admin' with privilege 'superuser' from 'ssh'
2013-01-30 23:43:10     rfs4000-229D58  SYSTEM     UI_USER_AUTH_SUCCESS UI user
'admin' from: '192.168.100.224' authentication successful
2013-01-30 03:47:47     rfs4000-229D58  SYSTEM     LOGOUT               Logged out user
'admin' with privilege 'superuser' from '192.168.100.231(web)'
2013-01-30 02:45:08     rfs4000-229D58  SYSTEM     UI_USER_AUTH_SUCCESS UI user
'admin' from: '192.168.100.231' authentication successful
2013-01-28 20:28:29     rfs4000-229D58  SYSTEM     LOGOUT               Logged out user
'admin' with privilege 'superuser' from '192.168.100.173(web)'
2013-01-28 19:56:31     rfs4000-229D58  SYSTEM     UI_USER_AUTH_SUCCESS UI user
'admin' from: '192.168.100.173' authentication successful
2013-01-27 20:15:20     rfs4000-229D58  SYSTEM     LOGOUT               Logged out user
'admin' with privilege 'superuser' from '192.168.100.204'
2013-01-27 20:14:45     rfs4000-229D58  SYSTEM     LOGIN
logged in user 'admin' with privilege 'superuser' from 'ssh'
2013-01-27 19:53:25     rfs4000-229D58  SYSTEM     LOGOUT               Logged out user
'admin' with privilege 'superuser' from '192.168.100.204'
2013-01-27 19:43:22     rfs4000-229D58  SYSTEM     LOGIN
Successfully
logged in user 'admin' with privilege 'superuser' from 'ssh'
--More--
rfs4000-229D58#

rfs4000-229D58#clear event-history
rfs4000-229D58#
rfs4000-229D58#show event-history
EVENT HISTORY REPORT
Generated on '2013-02-15 14:59:21 UTC' by 'admin'

2013-02-15 14:44:19     rfs4000-229D58  SYSTEM     CLOCK_RESET         System clock
reset, Time: 2013-02-15 14:45:30
rfs4000-229D58#
4.1.23 **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.

**Table 4.4** summarizes the commands available for creating and configuring a set of new client identity parameters.

**Table 4.4 Client-Identity-Config Commands**

<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 4-75</td>
</tr>
<tr>
<td>client-identity-mode commands</td>
<td>Invokes the client identity policy configuration mode commands</td>
<td>page 4-77</td>
</tr>
<tr>
<td>client-identity-group</td>
<td>Creates a new client identity group and enters its configuration mode</td>
<td>page 4-82</td>
</tr>
</tbody>
</table>
4.1.23.1 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

client-identity <CLIENT-IDENTITY-NAME>

Parameters

- client-identity <CLIENT-IDENTITY-NAME>

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)#?

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)#
### 4.1.23.2 client-identity-mode commands

```markdown
> **client-identity**

Table 4.5 summarizes a new client’s identity configuration mode commands.

**Table 4.5** Client-Identity-Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>dhcp</code></td>
<td>Configures the DHCP option match criteria for device fingerprinting</td>
<td>page 4-78</td>
</tr>
<tr>
<td><code>dhcp-match-message-type</code></td>
<td>Configures the DHCP message type for device fingerprinting</td>
<td>page 4-80</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Removes the DHCP option (used for client identification) configurations</td>
<td>page 4-81</td>
</tr>
</tbody>
</table>
### 4.1.23.2.1 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
dhcp <1-16> [message-type|option|option-modes]

dhcp <1-16> message-type [discover|request] [option|option-codes]

dhcp <1-16> message-type [discover|request] [option <1-254>|option-codes]

type [contains|exact|starts-with] [ascii|hexstring] <WORD>
```

**Parameters**

- `dhcp <1-16> message-type [discover|request] [option <1-254>|option-codes] [contains|exact|starts-with] [ascii|hexstring] <WORD>`

<table>
<thead>
<tr>
<th>dhcp &lt;1-16&gt;</th>
<th>Adds a DHCP option match criteria signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-16&gt;</td>
<td>Specify an index for this DHCP match criteria from 1 - 16.</td>
</tr>
</tbody>
</table>

**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)
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, it is recommended that you use a combination of one or more of the preceding options to define a device.

Examples

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
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
rfs4000-229D58(config-client-identity-test)#

Related Commands

no

Removes a DHCP option signature (match criteria)
4.1.23.2.2 dhcp-match-message-type

Configure the DHCP message type to match

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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)#

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

rfs4000-229D58(config-client-identity-test)#

Related Commands

no

Removes the DHCP message type to match
4.1.23.2.3 no

- **client-identity-mode commands**

Removes the DHCP options match criteria configurations

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
no [dhcp|dhcp-match-message-type]
```

**Parameters**

- **no [dhcp <1-16>|dhcp-match-message-type]**

<table>
<thead>
<tr>
<th>dhcplee</th>
<th>Removes the DHCP option match criteria rule identified by the &lt;1-16&gt; keyword</th>
</tr>
</thead>
<tbody>
<tr>
<td>dhcplee</td>
<td>&lt;1-16&gt; — Specify the DHCP option match criteria rule index</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>dhcplee</th>
<th>Removes the DHCP message type to match</th>
</tr>
</thead>
</table>

**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
```

**Related Commands**

<table>
<thead>
<tr>
<th>dhcp</th>
<th>Configures the DHCP option match criteria for device fingerprinting</th>
</tr>
</thead>
<tbody>
<tr>
<td>dhcp-match-message-type</td>
<td>Configures the DHCP message type for device fingerprinting</td>
</tr>
</tbody>
</table>
### 4.1.24 client-identity-group

Table 4.6 summarizes the commands for creating and configuring a new client identity group.

**Table 4.6 Client-Identity-Group Config Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>client-identity-group</code></td>
<td>Creates a new client identity group and enters its configuration mode</td>
<td>page 4-83</td>
</tr>
<tr>
<td><code>client-identity-group-mode</code></td>
<td>Invokes the client identity group configuration mode commands</td>
<td>page 4-84</td>
</tr>
<tr>
<td><code>client-identity</code></td>
<td>Creates new client identity policy and enters its configuration mode</td>
<td>page 4-74</td>
</tr>
</tbody>
</table>
4.1.24.1 client-identity-group

Configure 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

client-identity-group <CLIENT-IDENTITY-GROUP-NAME> precedence <1-10000>

Parameters

- client-identity-group <CLIENT-IDENTITY-GROUP-NAME> <1-10000>

Examples

rfs4000-229D58(config)#client-identity-group test
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)#
4.1.24.2 client-identity-group-mode commands

Table 4.5 summarizes a new 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 fingerprinting) with this client identity group</td>
<td>page 4-85</td>
</tr>
<tr>
<td>no</td>
<td>Removes the client identity associated with this client identity group</td>
<td>page 4-81</td>
</tr>
</tbody>
</table>
4.1.24.2.1 client-identity

Associates an existing and configured client identity (device fingerprinting) with this client identity group

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>&lt;1-10000&gt; — Specify this client identity precedence from &lt;1-10000&gt;.</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 5.6.0.0-029B
!
! version 2.1
!
! 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
!
```

The following example associates client identity ‘test’ with the client identity group ‘test’:

```
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:

```plaintext
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 TestClientIdentity precedence 2
rfs4000-229D58(config-client-identity-group-test)#
```

The following example shows the possible client identities:

```plaintext
rfs4000-229D58(config)#show context

! Configuration of RFS4000 version 5.6.0.0-029B
!
version 2.3
!
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 353d32333a3b
dhcp 2 message-type request option-codes exact hexstring 353d32333c37
dhcp 10 message-type request option-codes exact hexstring 353d32333c37
!
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 353d32393c0c37
dhcp 7 message-type request option-codes exact hexstring 353d32393c0c37
dhcp 8 message-type request option-codes exact hexstring 353d32393c0c37
!
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
dhcp 10 message-type request option 60 starts-with ascii dhcpcd-5.2.10:Linux-3
!
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-N7000DDL-P8-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 353d32333c0c37
dhcp 11 message-type request option-codes exact hexstring 353d32333c0c37
!
client-identity Mac-OS-X
dhcp 3 message-type request option 55 exact hexstring 0103060f775ff2c2e2f
client-identity Motorola-XOOM
  dhcp 9 message-type request option 55 exact hexstring 012103061c333a3b
  dhcp 10 message-type request option 60 exact ascii dhcpcd-5.2.10:Linux-2.6.36.3-00042-g3c1a41e:armv7l:stingray
  dhcp 11 message-type request option-codes exact hexstring 3532393c0c37
  dhcp 12 message-type request option-codes exact hexstring 3539330c37
  dhcp 13 message-type request option-codes exact hexstring 353236393c0c37

client-identity Ubuntu-11
  dhcp 2 message-type request option 55 exact hexstring 011c02030f06770c2c2f1a792a79f9fc2a
  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 010f03062c2e2f1f2179f9f2b
  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 010f03062c2e2f1f2179f9f2b
  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 0103060f2c2e2f
  dhcp 12 message-type request option-codes exact hexstring 3536323d37

client-identity Windows-XP
  dhcp 4 message-type request option 55 exact hexstring 010f03062c2e2f1f21f92b
  dhcp 5 message-type request option 60 exact ascii "MSFT 5.0"

client-identity iPhone-iPad
  dhcp 10 message-type request option 55 exact hexstring 0103060f77fc
  dhcp 1 message-type request option-codes exact hexstring 3537393d32330c
  dhcp 2 message-type request option-codes exact hexstring 3537393d32360c
  dhcp 3 message-type request option-codes exact hexstring 3537393d3233

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 Motorola-XOOM precedence 700
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

Related Commands

no

Removes the client identity associated with the client identity group
### 4.1.24.2.2 no

#### client-identity-group-mode commands

Removes the client identity associated with the client identity group

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
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></td>
<td>&lt;CLIENT-IDENTITY-NAME&gt; – Specify the client identity name.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs4000-229D58(config-client-identity-group-test)#show context
client-identity test precedence 1
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><strong>client-identity</strong></th>
<th>Associates an existing and configured client identity (device fingerprinting) with this client identity group</th>
</tr>
</thead>
</table>
## 4.1.25 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

### Syntax

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`clone [TLO</td>
<td>device]`</td>
</tr>
<tr>
<td><code>clone TLO &lt;EXISTING-OBJECT-NAME&gt; &lt;NEW-OBJECT-NAME&gt;</code></td>
<td>Configures a new device based on an existing device configuration</td>
</tr>
<tr>
<td><code>clone device &lt;EXISTING-DEVICE-MAC/NAME&gt; &lt;NEW-DEVICE-MAC&gt;</code></td>
<td></td>
</tr>
</tbody>
</table>

### Parameters
- **clone TLO <EXISTING-OBJECT-NAME> <NEW-OBJECT-NAME>**
  - `<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/NAME>**
  - `<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
!
! Configuration of NX9500 version 5.6.0.0-042B
!
! version 2.3
!
rf-domain TechPubs
location SanJose
timezone America/Los_Angeles
country-code us
!
rf-domain Cloned_TechPubs2
location SanJose
!
--More--
nx9500-6C8809(config)#
```
4.1.26 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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-renewal-timeout: Trigger a cert renewal request on timeout
- cert-update: Enable cert renewal of certificate when about to expire
- 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

nx9500-6C8809(config-cmp-policy-CMP)#

Related Commands

no

Resets values or disables commands

NOTE: For more information on the crypto CMP policy, see Chapter 29, CRYPTO-CMP-POLICY.
### 4.1.27 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>customize hostname-column-width &lt;1-64&gt;</td>
<td><strong>hostname-column-width &lt;1-64&gt;</strong> Configures default width of the hostname column in all show commands</td>
</tr>
<tr>
<td>customize show-wireless-client (ap-name &lt;1-64&gt;, auth, client-identity &lt;1-32&gt;, bss, enc, hostname &lt;1-64&gt;, ip, last-active, location &lt;1-64&gt;, mac, radio-alias &lt;3-67&gt;, radio-id, radio-type, role &lt;1-32&gt;, state, username &lt;1-64&gt;, vendor, vlan, wlan)</td>
<td><strong>show-wireless-client</strong> (ap-name &lt;1-64&gt;, auth, client-identity &lt;1-32&gt;, bss, enc, hostname &lt;1-64&gt;, ip, last-active, location &lt;1-64&gt;, mac, radio-alias &lt;3-67&gt;, radio-id, radio-type, role &lt;1-32&gt;, state, username &lt;1-64&gt;, vendor, vlan, wlan)</td>
</tr>
<tr>
<td>customize show-wireless-client-stats (hostname &lt;1-64&gt;, mac, rx-bytes, rx-errors, rx-packets, rx-throughput, tx-bytes, tx-dropped, tx-packets, tx-throughput)</td>
<td><strong>show-wireless-client-stats</strong> (hostname &lt;1-64&gt;, mac, rx-bytes, rx-errors, rx-packets, rx-throughput, tx-bytes, tx-dropped, tx-packets, tx-throughput)</td>
</tr>
<tr>
<td>customize show-wireless-client-stats-rf (average-retry-number, error-rate, hostname &lt;1-64&gt;, mac, noise, q-index, rx-rate, signal, snr, t-index, tx-rate)</td>
<td><strong>show-wireless-client-stats-rf</strong> (average-retry-number, error-rate, hostname &lt;1-64&gt;, mac, noise, q-index, rx-rate, signal, snr, t-index, tx-rate)</td>
</tr>
<tr>
<td>customize show-wireless-meshpoint (ap-mac, cfg-as-root, hops, hostname &lt;1-64&gt;, interface-ids, is-root, mesh-name &lt;1-64&gt;, mpid, next-hop-hostname &lt;1-64&gt;, next-hop-ifid, next-hop-use-time, path-metric, root-bound-time, root-hostname &lt;1-64&gt;, root-mpid)</td>
<td><strong>show-wireless-meshpoint</strong> (ap-mac, cfg-as-root, hops, hostname &lt;1-64&gt;, interface-ids, is-root, mesh-name &lt;1-64&gt;, mpid, next-hop-hostname &lt;1-64&gt;, next-hop-ifid, next-hop-use-time, path-metric, root-bound-time, root-hostname &lt;1-64&gt;, root-mpid)</td>
</tr>
<tr>
<td>customize show-wireless-meshpoint-neighbor-stats (ap-hostname &lt;1-64&gt;, neighbor-hostname &lt;1-64&gt;, neighbor-ifid, rx-bytes, rx-errors, rx-packets, rx-throughput, tx-bytes, tx-dropped, tx-packets, tx-throughput)</td>
<td><strong>show-wireless-meshpoint-neighbor-stats</strong> (ap-hostname &lt;1-64&gt;, neighbor-hostname &lt;1-64&gt;, neighbor-ifid, rx-bytes, rx-errors, rx-packets, rx-throughput, tx-bytes, tx-dropped, tx-packets, tx-throughput)</td>
</tr>
<tr>
<td>customize show-wireless-meshpoint-neighbor-stats-rf (ap-hostname &lt;1-64&gt;, average-retry-number, error-rate, neighbor-hostname &lt;1-64&gt;, neighbor-ifid, noise, q-index, rx-rate, signal, snr, t-index, tx-rate)</td>
<td><strong>show-wireless-meshpoint-neighbor-stats-rf</strong> (ap-hostname &lt;1-64&gt;, average-retry-number, error-rate, neighbor-hostname &lt;1-64&gt;, neighbor-ifid, noise, q-index, rx-rate, signal, snr, t-index, tx-rate)</td>
</tr>
<tr>
<td>customize show-wireless-radio (adopt-to, ap-name &lt;1-64&gt;, channel, location &lt;1-64&gt;, num-clients, power, radio-alias &lt;3-67&gt;, radio-id, radio-mac, rf-mode, state)</td>
<td><strong>show-wireless-radio</strong> (adopt-to, ap-name &lt;1-64&gt;, channel, location &lt;1-64&gt;, num-clients, power, radio-alias &lt;3-67&gt;, radio-id, radio-mac, rf-mode, state)</td>
</tr>
<tr>
<td>customize show-wireless-radio-stats-rf (average-retry-number, error-rate, noise, q-index, radio-alias &lt;3-67&gt;, radio-id, radio-mac, rx-rate, signal, snr, t-index, tx-rate)</td>
<td><strong>show-wireless-radio-stats-rf</strong> (average-retry-number, error-rate, noise, q-index, radio-alias &lt;3-67&gt;, radio-id, radio-mac, rx-rate, signal, snr, t-index, tx-rate)</td>
</tr>
</tbody>
</table>

**Parameters**

- **hostname-column-width <1-64>** — Sets the hostname column width from 1 - 64 characters
- 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)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show-wireless-client</td>
<td>Customizes the show wireless client command output</td>
</tr>
<tr>
<td>ap-name &lt;1-64&gt;</td>
<td>Includes the ap-name column, which displays the name of the AP with which this client associates</td>
</tr>
<tr>
<td>auth</td>
<td>Includes the auth column, which displays the authorization protocol used by the wireless client</td>
</tr>
<tr>
<td>client-identity &lt;1-32&gt;</td>
<td>Includes the client-identity (device type) column, which displays details gathered from DHCP device fingerprinting feature (when enabled). For more information, see client-identity.</td>
</tr>
<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>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>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>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>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>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, 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 wireless client stats command output</td>
</tr>
</tbody>
</table>
| 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                                                                      |
| rx-bytes                 | Includes the rx-bytes column, which displays the total number of bytes received by the wireless client                                         |
| rx-errors                | Includes the rx-error column, which displays the total number of errors received by the wireless client                                        |
| rx-packets               | Includes the rx-packets column, which displays the total number of packets received by the wireless client                                     |
| rx-throughput            | Includes the rx-throughput column, which displays the receive throughput at the wireless client                                               |
| tx-bytes                 | Includes the tx-bytes column, which displays the total number of bytes transmitted by the wireless client                                       |
| tx-dropped               | Includes the tx-dropped column, which displays the total number of dropped packets by the wireless client                                      |
| tx-packets               | Includes the tx-packets column, which displays the total number of packets transmitted by the wireless client                                   |
| tx-throughput            | Includes the tx-throughput column, which displays the transmission throughput at the wireless client                                           |

- **customize show-wireless-client-stats-rf** (average-retry-number, error-rate, noise, q-index, rx-rate, signal, snr, t-index, tx-rate)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show-wireless-client-stats-rf</td>
<td>Customizes the show wireless client 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 made per packet</td>
</tr>
<tr>
<td>error-rate</td>
<td>Includes the error-rate column, which displays the rate of error for the wireless client</td>
</tr>
</tbody>
</table>
| 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 |
| T-index | Includes the t-index column, which displays the traffic utilization index 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 (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)

| Show-wireless-meshpoint | Customizes the show wireless meshpoint command output |
| Ap-mac | 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 |
| Cfg-as-root | Includes the cfg-as-root column, which displays the configured root state of the meshpoint |
| Hops | Includes the hops column, which displays the number of hops to the root for this meshpoint |
| Hostname <1-64> | Includes the hostname column, which displays the AP's hostname. Applicable only in case of non-wireless controller meshpoints  
  • <1-64> – Sets the hostname column width from 1 - 64 characters |
| Interface-ids | Includes the interface-ids column, which displays the interface identifiers (interfaces used by this meshpoint) |
| Is-root | Includes the is-root column, which displays the current root state of the meshpoint |
| Mesh-name <1-64> | Includes the mesh-name column, which displays the meshpoint’s name  
  • <1-64> – Sets the mesh-name column width from 1 - 64 characters |
| Mpid | Includes the mpid column, which displays the meshpoint identifier in the AA-BB-CC-DD-EE-FF format |
| Next-hop-hostname <1-64> | Includes the next-hop-hostname column, which displays the next-hop AP's name (the AP next in the path to the bound root)  
  • <1-64> – Sets the next-hop-hostname column width from 1 - 64 characters |
<p>| Next-hop-ifid | Includes the next-hop-ifid column, which displays the next-hop interface identifier in the AA-BB-CC-DD-EE-FF format |
| Next-hop-use-time | Includes the next-hop-use-time column, which displays the time since this meshpoint started using this next hop |
| Root-bound-time | Includes the root-bound-time column, which displays the time since this meshpoint has been bound to the current root |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>root-hostname &lt;1-64&gt;</td>
<td>Includes the root-hostname column, which displays the root AP’s hostname to which this meshpoint is bound. &lt;1-64&gt; – Sets the root-hostname column width from 1 - 64 characters.</td>
</tr>
<tr>
<td>root-mpid</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><code>customize show-wireless-meshpoint-neighbor-stats</code></td>
<td>Customizes the show wireless meshpoint neighbor stats command output.</td>
</tr>
<tr>
<td><code>show-wireless-meshpoint-neighbor-stats</code></td>
<td>Includes the ap-name column, which displays name of the AP reporting a neighbor. &lt;1-64&gt; – Sets the ap-name column width from 1 - 64 characters.</td>
</tr>
<tr>
<td><code>show-wireless-meshpoint-neighbor-stats-rf</code></td>
<td>Customizes the show wireless meshpoint neighbor statistics RF command output.</td>
</tr>
<tr>
<td><code>ap-name &lt;1-64&gt;</code></td>
<td>Includes the neighborhostname column, which displays the reported neighbor’s hostname. &lt;1-64&gt; – Sets the neighbor-hostname column width from 1 - 64 characters.</td>
</tr>
<tr>
<td><code>neighbor-hostname &lt;1-64&gt;</code></td>
<td>Includes the neighbor-hostname column, which displays the reported neighbor’s hostname. &lt;1-64&gt; – Sets the neighbor-hostname column width from 1 - 64 characters.</td>
</tr>
<tr>
<td><code>neighbor-ifid</code></td>
<td>Includes the neighbor-ifid column, which displays the neighbor’s interface ID.</td>
</tr>
<tr>
<td><code>rx-bytes</code></td>
<td>Includes the rx-bytes column, which displays the total bytes received.</td>
</tr>
<tr>
<td><code>rx-errors</code></td>
<td>Includes the rx-error column, which displays the total bytes of error received.</td>
</tr>
<tr>
<td><code>rx-packets</code></td>
<td>Includes the rx-packets column, which displays the number of packets received.</td>
</tr>
<tr>
<td><code>rx-throughput</code></td>
<td>Includes the rx-throughput column, which displays neighbor’s received throughput.</td>
</tr>
<tr>
<td><code>tx-bytes</code></td>
<td>Includes the tx-bytes column, which displays the total bytes transmitted.</td>
</tr>
<tr>
<td><code>tx-dropped</code></td>
<td>Includes the tx-dropped column, which displays the total bytes dropped.</td>
</tr>
<tr>
<td><code>tx-packets</code></td>
<td>Includes the tx-packets column, which displays the number of packets transmitted.</td>
</tr>
<tr>
<td><code>tx-throughput</code></td>
<td>Includes the tx-throughput column, which displays neighbor’s transmitted throughput.</td>
</tr>
<tr>
<td><code>average-retry-number</code></td>
<td>Includes the average-retry-number column, which displays the average number of retransmissions made per packet.</td>
</tr>
<tr>
<td><code>error-rate</code></td>
<td>Includes the error-rate column.</td>
</tr>
<tr>
<td><code>neighbor-hostname &lt;1-64&gt;</code></td>
<td>Includes the neighbor-hostname, which displays reported neighbor’s hostname. &lt;1-64&gt; – Sets the neighbor-hostname column width from 1 - 64 characters.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>show-wireless-radio</td>
<td>Customizes the show wireless radio command output</td>
</tr>
<tr>
<td>adopt-to</td>
<td>Includes the adopt-to column, which displays information about the wireless controller adopting this AP</td>
</tr>
<tr>
<td>ap-name &lt;1-64&gt;</td>
<td>Includes the ap-name column, which displays information about the AP this radio belongs</td>
</tr>
<tr>
<td>channel</td>
<td>Includes the channel column, which displays information about the configured and current channel for this radio</td>
</tr>
<tr>
<td>location &lt;1-64&gt;</td>
<td>Includes the location column, which displays the location of the AP this radio belongs</td>
</tr>
<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>
<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 “HOSTNAME:RX” 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>rf-mode</td>
<td>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.</td>
</tr>
<tr>
<td>state</td>
<td>Includes the state column, which displays the radio’s current operational state</td>
</tr>
</tbody>
</table>

- 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)

- noise
- q-index
- rx-rate
- signal
- snr
- t-index
- tx-rate

- Includes the noise column, which displays the noise level in dBm
- Includes the q-index column, which displays the q-index
- Includes the rx-rate column, which displays rate of receiving
- Includes the signal column, which displays the signal strength in dBm
- Includes the snr column, which displays the signal-to-noise ratio
- Includes the t-index column, which displays t-index
- Includes the tx-rate column, which displays rate of transmission
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</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 |
| show-wireless-radio-stats-rf | Customizes the show wireless radio stats RF command output                  |
| average-retry-number     | Includes the average-retry-number column, which displays the average number of retransmissions per packet |
| error-rate               | Includes the error-rate column, which displays the rate of error for the radio |
| noise                    | Includes the noise column, which displays the noise detected by the radio    |
| q-index                  | Includes the q-index column, which displays the RF quality index            |
  **Note:** Higher values indicate better RF quality. |
| 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-rate                  | Includes the rx-rate column, which displays the receive rate at the particular radio |
| signal                   | Includes the signal column, which displays the signal strength at the particular radio |
| snr                      | Includes the snr column, which displays the signal-to-noise ratio at the particular radio |
Examples

rfs7000-37FABE(config)#customize show-wireless-client ap-name auth

rfs7000-37FABE(config)#commit

rfs7000-37FABE(config)#show wireless client

```
-----------------------
<p>| AP-NAME | AUTH |</p>
<table>
<thead>
<tr>
<th>-----------------------</th>
</tr>
</thead>
</table>

Total number of wireless clients displayed: 0
rfs7000-37FABE(config)#
```

The following examples demonstrate how to customize the `show > wireless > meshpoint` command output.

The following example shows the `show > wireless > meshpoint` command output format before customization:

```
rfs4000-1B3596#show wireless meshpoint

```

```
---------------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>MESH</th>
<th>HOSTNAME</th>
<th>HOPS</th>
<th>IS-ROOT</th>
<th>CONFIG-AS-ROOT</th>
<th>ROOT-BOUND-TIME</th>
<th>NEXT-HOP-HOSTNAME</th>
<th>NEXT-HOP-USE-TIME</th>
<th>INTERFACE-IDENTIFIERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>c00466</td>
<td>ap7131-96F998</td>
<td>1</td>
<td>NO</td>
<td>NO</td>
<td>ap7131-96FAAC</td>
<td>1 days 02:10:04</td>
<td>ap7131-96FAAC</td>
<td>1 days 02:10:04</td>
</tr>
<tr>
<td>c00466</td>
<td>ap7131-96FAAC</td>
<td>0</td>
<td>YES</td>
<td>YES</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>c00466</td>
<td>ap7131-96F6B4</td>
<td>2</td>
<td>NO</td>
<td>NO</td>
<td>ap7131-96FAAC</td>
<td>1 days 02:10:08</td>
<td>ap7131-96F998</td>
<td>1 days 02:10:08</td>
</tr>
</tbody>
</table>
```

Total number of meshpoint displayed: 3
rfs4000-1B3596#
```

The `show > wireless > meshpoint` command output is customized as follows:

```
rfs4000-1B3596(config)#customize show-wireless-meshpoint hops hostname 13 is-root config-as-root root-bound-time next-hop-hostname next-hop-use-time interface-ids

rfs4000-1B3596(config)#commit
```

The following example shows the `show > wireless > meshpoint` command output format after customization:

```
rfs4000-1B3596(config)#show wireless meshpoint

```

```
---------------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>HOPS</th>
<th>HOSTNAME</th>
<th>IS-ROOT</th>
<th>CONFIG-AS-ROOT</th>
<th>ROOT-BOUND-TIME</th>
<th>NEXT-HOP-HOSTNAME</th>
<th>NEXT-HOP-USE-TIME</th>
<th>INTERFACE-IDENTIFIERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap7131-96F998</td>
<td>00-23-68-95-16-60(00-23-68-96-F9-98:R1), 00-23-68-93-48-E1(00-23-68-96-F9-98:R2)</td>
<td>1 days 02:10:04</td>
<td>NO</td>
<td>ap7131-96FAAC</td>
<td>1 days 02:10:04</td>
<td>00-23-68-95-33-31(00-23-68-96-F6-B4:R2)</td>
<td></td>
</tr>
<tr>
<td>ap7131-96F6B4</td>
<td>2</td>
<td>NO</td>
<td>NO</td>
<td>ap7131-96F998</td>
<td>1 days 02:10:08</td>
<td>00-23-68-93-16-60(00-23-68-96-F9-98:R1), 00-23-68-93-48-E1(00-23-68-96-F9-98:R2)</td>
<td></td>
</tr>
</tbody>
</table>
```

Total number of meshpoint displayed: 3
rfs4000-1B3596(config)#
```

To revert to the default format use the `no > customize` command.

```
rfs4000-1B3596(config)#no customize show-wireless-meshpoint
rfs4000-1B3596(config)#commit
```

<table>
<thead>
<tr>
<th>t-index</th>
<th>Includes the t-index column, which displays the traffic utilization index at the particular radio</th>
</tr>
</thead>
<tbody>
<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>
The `show > wireless > meshpoint` command output format has been reverted to default.

```
rfs4000-1B3596(config)#show wireless meshpoint
---------------------------------------------------------------------------------------
------------------------------------------------
MESH           HOSTNAME          HOPS IS-ROOT CONFIG-AS-ROOT ROOT-HOSTNAME       ROOT-
BOUND-TIME NEXT-HOP-HOSTNAME NEXT-HOP-USE-TIME
---------------------------------------------------------------------------------------
------------------------------------------------
c00466          ap7131-96F998        1 NO      NO             ap7131-96FAAC       1
days 02:10:40 ap7131-96FAAC       1 days 02:10:40
---------------------------------------------------------------------------------------
c00466          ap7131-96FAAC        0 YES     YES            N/A                             N/
c00466          ap7131-96F6B4        2 NO      NO             ap7131-96FAAC       1
days 02:10:38 ap7131-96F998       1 days 02:10:38
---------------------------------------------------------------------------------------
```

Total number of meshpoint displayed: 3

rfs4000-1B3596(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>
### 4.1.28 device

*Global Configuration Commands*

Enables simultaneous configuration of multiple devices

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
device {containing|filter}
```

```
device containing <STRING> {filter type [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|t5|VX9000]}
```

```
device filter type [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|t5|VX9000]
```

**Parameters**

- **device containing <STRING>** {filter type [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|t5|VX9000]}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>device</td>
<td>Configures a basic device profile</td>
</tr>
<tr>
<td>containing &lt;STRING&gt;</td>
<td>Configures the string to search for in the device’s hostname. Only those devices that have the specified string in their hostname can be configured.</td>
</tr>
<tr>
<td>filter type</td>
<td>Optional. Filters out a specific device type</td>
</tr>
<tr>
<td>ap621</td>
<td>Optional. Filters out devices other than AP621s</td>
</tr>
<tr>
<td>ap622</td>
<td>Optional. Filters out devices other than AP622s</td>
</tr>
<tr>
<td>ap650</td>
<td>Optional. Filters out devices other than AP650s</td>
</tr>
<tr>
<td>ap6511</td>
<td>Optional. Filters out devices other than AP6511s</td>
</tr>
<tr>
<td>ap6521</td>
<td>Optional. Filters out devices other than AP6521s</td>
</tr>
<tr>
<td>ap6522</td>
<td>Optional. Filters out devices other than AP6522s</td>
</tr>
<tr>
<td>ap6532</td>
<td>Optional. Filters out devices other than AP6532s</td>
</tr>
<tr>
<td>ap6562</td>
<td>Optional. Filters out devices other than AP6562s</td>
</tr>
<tr>
<td>ap71xx</td>
<td>Optional. Filters out devices other than AP71XXs</td>
</tr>
<tr>
<td>ap81xx</td>
<td>Optional. Filters out devices other than AP81XXs</td>
</tr>
<tr>
<td>ap82xx</td>
<td>Optional. Filters out devices other than AP82XXs</td>
</tr>
<tr>
<td>rfs4000</td>
<td>Optional. Filters out devices other than RFS4000s</td>
</tr>
<tr>
<td>rfs6000</td>
<td>Optional. Filters out devices other than RFS6000s</td>
</tr>
<tr>
<td>device</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ap621</td>
<td>Filters out all devices other than AP621s</td>
</tr>
<tr>
<td>ap622</td>
<td>Filters out all devices other than AP622s</td>
</tr>
<tr>
<td>ap650</td>
<td>Filters out devices other than AP650s</td>
</tr>
<tr>
<td>ap6511</td>
<td>Filters out devices other than AP6511s</td>
</tr>
<tr>
<td>ap6521</td>
<td>Filters out devices other than AP6521s</td>
</tr>
<tr>
<td>ap6522</td>
<td>Filters out devices other than AP6522s</td>
</tr>
<tr>
<td>ap6532</td>
<td>Filters out devices other than AP6532s</td>
</tr>
<tr>
<td>ap6562</td>
<td>Filters out devices other than AP6562s</td>
</tr>
<tr>
<td>ap71xx</td>
<td>Filters out devices other than AP71XXs</td>
</tr>
<tr>
<td>ap81xx</td>
<td>Filters out devices other than AP81XXs</td>
</tr>
<tr>
<td>ap82xx</td>
<td>Filters out devices other than AP82XXs</td>
</tr>
<tr>
<td>rfs4000</td>
<td>Filters out devices other than RFS4000s</td>
</tr>
<tr>
<td>rfs6000</td>
<td>Filters out devices other than RFS6000s</td>
</tr>
<tr>
<td>rfs7000</td>
<td>Filters out devices other than RFS7000s</td>
</tr>
<tr>
<td>nx45xx</td>
<td>Filters out devices other than NX45XX series</td>
</tr>
<tr>
<td>nx65xx</td>
<td>Filters out devices other than NX65XX series</td>
</tr>
<tr>
<td>nx9000</td>
<td>Filters out devices other than NX9000 series</td>
</tr>
</tbody>
</table>

**device** | Configures a basic device profile

**filter-type** | Filters out a specific device type

**Note:** Applicable only on the RFS7000, NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, and NX9510 platforms.

**Note:** Applicable only to the NX9000, NX9500, and NX9510 platforms.
### Examples

```
rfs7000-37FABE(config)#device containing ap filter type ap71xx
% Error: Parsing cmd line (1)
rfs7000-37FABE(config)#
```

```
rfs7000-37FABE(config)#device containing ap filter type ap650
rfs7000-37FABE(config-device-{'type': 'ap650', 'con)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes multiple devices from the network</td>
</tr>
</tbody>
</table>
4.1.29 device-categorization

Categorizes devices as sanctioned or neighboring. Categorization of devices enables quick identification and blocking of unsanctioned devices in the network.

Table 4.8 lists the command to enter the device categorization configuration mode.

<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</td>
<td>page 4-104</td>
</tr>
<tr>
<td>device-categorization-mode</td>
<td>Summarizes device categorization list configuration mode commands</td>
<td>page 4-105</td>
</tr>
</tbody>
</table>
4.1.29.1 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.

If a device categorization list does not exist, it is created.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
4.1.29.2 device-categorization-mode commands

Table 4.9 summarizes device categorization configuration 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 4-106</td>
</tr>
<tr>
<td>no</td>
<td>Removes a device from the device categorization list</td>
<td>page 4-107</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
### 4.1.29.2.1 mark-device

**device-categorization-mode commands**

 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>}}
  - <1-1000> | Configures the device categorization entry index number
  - sanctioned | Marks a device as sanctioned. A sanctioned device is authorized to use network resources.
  - neighboring | Marks a device as neighboring. A neighboring device is a neighbor in the same network as this device.
  - ap {mac <MAC>|ssid <SSID>} | Marks a specified AP as sanctioned or neighboring based on its MAC address or SSID
    - mac <MAC> – Optional. Specify the AP’s MAC address
    - ssid <SSID> – Optional. Specify the AP’s SSID. After specifying the SSID, you can optionally specify its MAC SSID.
  - Note: All APs are marked if no specific MAC address or SSID is provided.

- mark-device [sanctioned|neighboring] client {mac <MAC>}
  - <1-1000> | Configures the device categorization entry index number
  - sanctioned | Marks the wireless client as sanctioned. A sanctioned device is authorized to use network resources.
  - neighboring | Marks the wireless client as neighboring. A neighboring device is a neighbor in the same network as this device.
  - client {mac <MAC>} | Marks a specified wireless client as sanctioned or neighboring based on its MAC address
    - mac <MAC> – Optional. Specify the wireless client’s MAC address.

**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
4.1.29.2.2 no

**device-categorization-mode commands**

Removes a device from the device categorization list

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
no mark-device <1-1000> [sanctioned|neighboring] ap {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 mark-device <1-1000> [sanctioned|neighboring] ap {mac <MAC>|ssid <SSID> {mac <MAC>}}`

  - **No mark-device** Removes a device from the marked devices list
  - `<1-1000>` Specify the mark device entry index.
  - **sanctioned** Removes a device marked as sanctioned
  - **neighboring** Removes a device marked as neighboring
  - **ap** Removes a AP marked as sanctioned or neighboring based on its MAC address or SSID
    - mac `<MAC>` – Optional. Specify the AP’s MAC address.
    - ssid `<SSID>` – Optional. Specify the AP’s SSID. After specifying the SSID, you can optionally specify its MAC SSID.
  - **client** Removes a wireless client marked as sanctioned or neighboring based on its MAC address
    - mac `<MAC>` – Optional. Specify the wireless client’s MAC address.

**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)#
```

```
rfs7000-37FABE(config-device-categorization-rfs7000)#no mark-device 1 sanctioned ap mac 11-22-33-44-55-66
```
The following example shows the device categorization list ‘rfs7000’ settings after the ‘no’ command is executed:

```
  rfs7000-37FABE(config-device-categorization-rfs7000)#show context
device-categorization rfs7000
  rfs7000-37FABE(config-device-categorization-rfs7000)#
```

**Related Commands**

| mark-device | Adds a device to a list of sanctioned or neighboring devices |
4.1.30 dhcp-server-policy

Configures DHCP 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

dhcp-server-policy <DHCP-POLICY-NAME>

Parameters
- dhcp-server-policy <DHCP-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
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)#

Related Commands

no           Removes an existing DHCP server policy

NOTE: For more information on DHCP policy, see Chapter 12, DHCP-SERVER-POLICY.
### dhcpv6-server-policy

**Global Configuration Commands**

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

dhcpv6-server-policy <DHCPv6-POLICY-NAME>

**Parameters**

- dhcpv6-server-policy <DHCPv6-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

rfs7000-6DCD4B(config-dhcpv6-server-policy-test)#

**Related Commands**

- no Removes an existing DHCPv6 server policy
NOTE: For more information on DHCP policy, see Chapter 12, DHCP-SERVER-POLICY.
4.1.32  

**globaL Configuration Commands**

Configures a DNS whitelist. A DNS whitelist is a list of domains allowed access to the network.

Table 4.10 lists DNS Whitelist configuration mode commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>dns-whitelist</strong></td>
<td>Creates a DNS whitelist and enters its configuration mode</td>
<td>page 4-113</td>
</tr>
<tr>
<td><strong>dns-whitelist-mode</strong></td>
<td>Summarizes DNS whitelist configuration mode commands</td>
<td>page 4-114</td>
</tr>
</tbody>
</table>
4.1.32.1 dns-whitelist

`dns-whitelist` Configures a DNS whitelist. A DNS whitelist is a list of domains allowed access to the network.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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
4.1.32.2 dns-whitelist-mode commands

Table 4.11 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 4-115</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts to default</td>
<td>page 4-116</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
**4.132.2.1 permit**

A whitelist is a list of host names and IP addresses permitted access to the network or captive portal. This command adds a device by its hostname or IP address to the DNS whitelist.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
permit <IPv4/IPv6/HOSTNAME> {suffix}
```

Parameters

- `permit <IPv4/ipv6/HOSTNAME> {suffix}`

| `<IPv4/IPv6/HOSTNAME>` | Adds a device to the DNS whitelist  
|------------------------|-------------------------------------------------------------|
|                        | • `<IPv4/IPv6/HOSTNAME>` — Specify the devices’ IPv4/IPv6 address or hostname.  
| `suffix`               | Optional. Matches any hostname including the specified name as suffix  

Note: A maximum of 256 entries can be made.

Examples

```
rfs7000-37FABE(config-dns-whitelist-test)#permit zebra.com suffix
rfs7000-37FABE(config-dns-whitelist-test)#show context
dns-whitelist test
rfs7000-37FABE(config-dns-whitelist-test)#
```

Related Commands

```
no
```

Removes a DNS whitelist entry
4.1.32.2 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 zebra.com suffix
rfs7000-37FABE(config-dns-whitelist-test)#

rfs7000-37FABE(config-dns-whitelist-test)#no permit zebra.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 |
4.1.33  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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
end

Parameters
None

Examples
rfs7000-37FABE(config)#end
rfs7000-37FABE#
4.1.34 event-system-policy

**Global Configuration Commands**

Configures how events are supported. Each event can be configured individually to perform an action such as sending an e-mail or forwarding a notification.

Table 4.12 lists event system configuration mode commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>event-system-policy</td>
<td>Creates an event system policy and enters its configuration mode</td>
<td>page 4-119</td>
</tr>
<tr>
<td>event-system-policy-mode</td>
<td>Summarizes event system policy configuration mode commands</td>
<td>page 4-120</td>
</tr>
<tr>
<td>mode commands</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.1.34.1 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 administered 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6510, NX6524, NX9000, NX9500, NX9510

Syntax

```
event-system-policy <EVENT-SYSTEM-POLICY-NAME>
```

Parameters

- event-system-policy <EVENT-SYSTEM-POLICY-NAME>

| <EVENT-SYSTEM-POLICY-NAME> | Specify the event system policy name. If the policy does not exist, it is created. |

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
### 4.1.34.2 event-system-policy-mode commands

Table 4.13 summarizes event system policy configuration mode commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>event</code></td>
<td>Configures an event</td>
<td>page 4-121</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Negates a command or reverts to default</td>
<td>page 4-131</td>
</tr>
<tr>
<td><code>clrscr</code></td>
<td>Clears the display screen</td>
<td>page 5-3</td>
</tr>
<tr>
<td><code>commit</code></td>
<td>Commits (saves) changes made in the current session</td>
<td>page 5-4</td>
</tr>
<tr>
<td><code>end</code></td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td><code>exit</code></td>
<td>Ends the current mode and moves to the previous mode</td>
<td>page 5-5</td>
</tr>
<tr>
<td><code>help</code></td>
<td>Displays the interactive help system</td>
<td>page 5-6</td>
</tr>
<tr>
<td><code>revert</code></td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td><code>service</code></td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td><code>show</code></td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td><code>write</code></td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
4.1.34.2.1 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
event <EVENT-TYPE> <EVENT-NAME> (email,forward-to-switch,snmp,syslog) [default|on|off]
```

The event types are:

```
event ?

aaa          AAA/Radius module
adopt-service Adoption Service
adv-wips     Adv-wips module
ap           Access Point module
captive-portal Captive Portal
certmgr      Certificate Manager (Not valid for NCAP/MCN)
certmgr-lite Lite version of certificate manager (NCAP & MCN) only
cfgd         Cfgd module
cluster      Cluster module
crm          Critical Resource Monitoring
dhcpsvr      DHCP Configuration Daemon
diag         Diag module
dot11        802.11 management module
dot1x        802.1X Authentication/fwu         Firmware update module
isdn         Isdn module
l2tpv3       Layer 2 Tunneling Protocol Version 3
licmgr       License module
mesh         Mesh module
mgmt         Management Services
nsnm         Network Services Module
pm           Process-monitor module
radconf      Radius Configuration Daemon
radio        Radio module
smrt         Smart-rf module
smtpnot      Smtpnot module
system       System module
test         Test module
vrrp         Virtual Router Redundancy Protocol
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>&lt;event-type&gt;</th>
<th>&lt;event-name&gt;</th>
</tr>
</thead>
</table>
| aaa          | Configures 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 |
| 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           | Configures AP 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 |
<table>
<thead>
<tr>
<th><code>&lt;event-type&gt;</code></th>
<th><code>&lt;event-name&gt;</code></th>
</tr>
</thead>
<tbody>
<tr>
<td>captive-portal</td>
<td>Configures captive portal (hotspot) related event messages</td>
</tr>
<tr>
<td></td>
<td>• allow-access – Event client allowed access message</td>
</tr>
<tr>
<td></td>
<td>• auth-failed – Event authentication failed message</td>
</tr>
<tr>
<td></td>
<td>• auth-success – Event authentication success message</td>
</tr>
<tr>
<td></td>
<td>• client-disconnect – Event client disconnected message</td>
</tr>
<tr>
<td></td>
<td>• client-removed – Event client removed message</td>
</tr>
<tr>
<td></td>
<td>• data-limit-exceed – Event client data limit exceed message</td>
</tr>
<tr>
<td></td>
<td>• flex-log-access – Event flexible log access granted to client message</td>
</tr>
<tr>
<td></td>
<td>• inactivity-timeout – Event client time-out due to inactivity message</td>
</tr>
<tr>
<td></td>
<td>• page-cre-failed – Event page creation failure message</td>
</tr>
<tr>
<td></td>
<td>• purge-client – Event client purged message</td>
</tr>
<tr>
<td></td>
<td>• session-timeout – Event session timeout message</td>
</tr>
<tr>
<td></td>
<td>• vlan-switch – Event client switched VLAN</td>
</tr>
<tr>
<td>certmgr</td>
<td>Configures certificate manager related event messages (Not applicable to AP6511 and AP6521)</td>
</tr>
<tr>
<td></td>
<td>• ca-cert-actions-failure – Event CA certificate actions failure message</td>
</tr>
<tr>
<td></td>
<td>• ca-cert-actions-success – Event CA certificate actions success message</td>
</tr>
<tr>
<td></td>
<td>• ca-key-actions-failure – Event CA key actions failure message</td>
</tr>
<tr>
<td></td>
<td>• ca-key-actions-success – Event CA key actions success message</td>
</tr>
<tr>
<td></td>
<td>• cert-expiry – Event certificate expiry message</td>
</tr>
<tr>
<td></td>
<td>• crl-actions-failure – Event Certificate Revocation List (CRL) actions failure message</td>
</tr>
<tr>
<td></td>
<td>• crl-actions-success – Event CRL actions success message</td>
</tr>
<tr>
<td></td>
<td>• csr-export-failure – Event CSR export failure message</td>
</tr>
<tr>
<td></td>
<td>• csr-export-success – Event CSR export success message</td>
</tr>
<tr>
<td></td>
<td>• delete-trustpoint-action – Event delete trustpoint action message</td>
</tr>
<tr>
<td></td>
<td>• export-trustpoint – Event export trustpoint message</td>
</tr>
<tr>
<td></td>
<td>• import-trustpoint – Event import trustpoint message</td>
</tr>
<tr>
<td></td>
<td>• rsa-key-actions-failure – Event RSA key actions failure message</td>
</tr>
<tr>
<td></td>
<td>• rsa-key-actions-success – Event RSA key actions success message</td>
</tr>
<tr>
<td></td>
<td>• svr-cert-actions-success – Event server certificate actions success message</td>
</tr>
<tr>
<td></td>
<td>• svr-cert-actions-failure – Event server certificate actions failure message</td>
</tr>
<tr>
<td>certmgr-lite</td>
<td>Enables and configures logging of certificate manager (lite version) related event messages (applicable only to AP621, AP6521 and AP6511)</td>
</tr>
<tr>
<td>cfgd</td>
<td>Configures configuration daemon module related event messages</td>
</tr>
<tr>
<td></td>
<td>• acl-attached-altered – Event Access List (ACL) attached altered message</td>
</tr>
<tr>
<td></td>
<td>• acl-rule-altered – Event ACL rule altered message</td>
</tr>
<tr>
<td>cluster</td>
<td>Configures cluster module related messages</td>
</tr>
<tr>
<td></td>
<td>• cmaster-cfg-update-fail – Event cluster master config update failed message</td>
</tr>
<tr>
<td></td>
<td>• max-exceeded – Event maximum cluster count exceeded 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>
</tbody>
</table>
| crm           | Configures Critical Resource Monitoring (CRM) related event messages  
|               |  
|               | • critical-resource-down – Event Critical Resource Down message  
|               | • critical-resource-up – Event Critical Resource Up message  
| dhcpsvr       | Configures DHCP server related event messages  
|               |  
|               | • 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          | Configures 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  
|               | • cpu-usage-too-high-recovery – Event recovery from high CPU usage message  
|               | • disk-usage – Event disk usage message  
|               | • elapsed-time – Event elapsed time message  
|               | • fan-underspeed – Event fan underspeed message  
|               | • fd-count – Event forward count message  
|               | • free-flash-disk – Event free flash disk message  
|               | • free-flash-inodes – Event free flash inodes message  
|               | • free-nvram-disk – Event free nvram disk message  
|               | • free-nvram-inodes – Event free nvram inodes message  
|               | • free-ram – Event free ram message  
|               | • free-ram-disk – Event free ram disk message  
|               | • free-ram-inodes – Event free ram inodes message  
|               | • head-cache-usage – Event head cache usage message  
|               | • high-temp – Event high temp message  
|               | • ip-dest-usage – Event ip destination usage message  
|               | • led-identify – Event led identify message  
|               | • low-temp – Event low temp message  
|               | • mem-usage-too-high – Event memory usage high message  
|               | • mem-usage-too-high-recovery – Event recovery from high memory usage message  
|               | • new-led-state – Event new led state message  
|               | • over-temp – Event over temp message  
|               | • over-voltage – Event over voltage message  
|               | • poe-init-fail – Event PoE init fail message  
|               | Contd..
<table>
<thead>
<tr>
<th>&lt;event-type&gt;</th>
<th>&lt;event-name&gt;</th>
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<tbody>
<tr>
<td>dot11</td>
<td>Configures 802.11 management module related event messages</td>
</tr>
<tr>
<td></td>
<td>• client-associated – Wireless client associated event message</td>
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<tr>
<td></td>
<td>• client-denied-assoc – Event client denied association message</td>
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<tr>
<td></td>
<td>• client-disassociated – Wireless client disassociated message</td>
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<td></td>
<td>• country-code – Event country code message</td>
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<tr>
<td></td>
<td>• country-code-error – Event country code error message</td>
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<td></td>
<td>• eap-cached-keys – Event Extensible Authentication Protocol (EAP) cached keys message</td>
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<td>• eap-client-timeout – Event EAP client timeout message</td>
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<tr>
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<td>• eap-failed – Event EAP failed message</td>
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<td>• eap-opp-cached-keys – Event EAP opp cached keys message</td>
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<tr>
<td></td>
<td>• eap-preauth-client-timeout – Event EAP pre authentication client timeout message</td>
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<td></td>
<td>• eap-preauth-failed – Event EAP pre authentication failed message</td>
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<tr>
<td></td>
<td>• eap-preauth-server-timeout – Event EAP pre authentication server timeout message</td>
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<tr>
<td></td>
<td>• eap-preauth-success – Event EAP pre authentication success message</td>
</tr>
<tr>
<td></td>
<td>• eap-server-timeout – Event EAP server timeout message</td>
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<tr>
<td></td>
<td>• eap-success – Event EAP success message</td>
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<tr>
<td></td>
<td>• ft-roam-success – Event client fast BSS transition message</td>
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<tr>
<td></td>
<td>• move-operation-success – Event move operation success message</td>
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<td></td>
<td>• neighbor-denied-assoc – Event neighbor denied association message</td>
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<tr>
<td></td>
<td>• unsanctioned-ap-active – Event unsanctioned AP active message</td>
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<tr>
<td></td>
<td>• unsanctioned-ap-inactive – Event unsanctioned AP inactive message</td>
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<tr>
<td></td>
<td>• unsanctioned-ap-status-change – Event unsanctioned AP status change</td>
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<tr>
<td></td>
<td>• voice-call-completed – Event voice call completed message</td>
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<tr>
<td></td>
<td>• voice-call-established – Event voice call established message</td>
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<td></td>
<td>• voice-call-failed – Event voice call failed message</td>
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<tr>
<td></td>
<td>• wlan-time-access-disable – Event WLAN disabled by time-based-access message</td>
</tr>
<tr>
<td></td>
<td>• wlan-time-access-enable – Event WLAN re-enabled by time-based-access message</td>
</tr>
<tr>
<td></td>
<td>• wlan-time-access-disable – Event WLAN disabled by time-based-access message</td>
</tr>
</tbody>
</table>

Contd...
<table>
<thead>
<tr>
<th>&lt;event-type&gt;</th>
<th>&lt;event-name&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>wlan-time-access-enable</td>
<td>Event WLAN re-enabled by time-based-access message</td>
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<tr>
<td>wpa-wpa2-failed</td>
<td>Event WPA-WPA2 failed message</td>
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<td>wpa-wpa2-key-rotn</td>
<td>Event WPA-WPA2 key rotn message</td>
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<tr>
<td>wpa-wpa2-success</td>
<td>Event WPA-WPA2 success message</td>
</tr>
<tr>
<td>dot1x</td>
<td>Configures 802.1X authentication related event messages</td>
</tr>
<tr>
<td>dot1x-failed</td>
<td>Event EAP authentication failure message</td>
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<tr>
<td>dot1x-success</td>
<td>Event dot1x-success message</td>
</tr>
<tr>
<td>fwu</td>
<td>Configures firmware update (fwu) related event messages</td>
</tr>
<tr>
<td>fwuaborted</td>
<td>Event fwu aborted message</td>
</tr>
<tr>
<td>fwubadconfig</td>
<td>Event fwu aborted due to bad config message</td>
</tr>
<tr>
<td>fwucorruptedefile</td>
<td>Event fwu aborted due to corrupted file message</td>
</tr>
<tr>
<td>fwucouldntgetfile</td>
<td>Event fwu aborted because the system could not get file message</td>
</tr>
<tr>
<td>fwudone</td>
<td>Event fwu done message</td>
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<tr>
<td>fwufileundefined</td>
<td>Event fwu aborted due to file undefined message</td>
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<tr>
<td>fwunoneed</td>
<td>Event fwu no need message</td>
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<tr>
<td>fwuprodmismatch</td>
<td>Event fwu aborted due to product mismatch message</td>
</tr>
<tr>
<td>fwuserverundefined</td>
<td>Event fwu aborted due to server undefined message</td>
</tr>
<tr>
<td>fwuserverunreachable</td>
<td>Event fwu aborted due to server unreachable message</td>
</tr>
<tr>
<td>fwusignmismatch</td>
<td>Event fwu aborted due to signature mismatch message</td>
</tr>
<tr>
<td>fwusyserr</td>
<td>Event fwu aborted due to system error message</td>
</tr>
<tr>
<td>fwuunsupportedhw</td>
<td>Event fwu aborted due to unsupported hardware message</td>
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<tr>
<td>fwuunsupportedmodelnum</td>
<td>Event fwu aborted due to unsupported FIPS model number message</td>
</tr>
<tr>
<td>fwuvtermismatch</td>
<td>Event fwu aborted due to version mismatch message</td>
</tr>
<tr>
<td>isdn</td>
<td>Configures file Integrated Service Digital Network (ISDN) module related event messages</td>
</tr>
<tr>
<td>isdn-alert</td>
<td>Event ISDN alert message</td>
</tr>
<tr>
<td>isdn-crit</td>
<td>Event ISDN critical message</td>
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<tr>
<td>isdn-debug</td>
<td>Event ISDN debug message</td>
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<tr>
<td>isdn-emerg</td>
<td>Event ISDN emergency message</td>
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<tr>
<td>isdn-err</td>
<td>Event ISDN error message</td>
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<tr>
<td>isdn-info</td>
<td>Event ISDN info message</td>
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<tr>
<td>isdn-notice</td>
<td>Event ISDN notice message</td>
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<tr>
<td>isdn-warning</td>
<td>Event ISDN warning message</td>
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<tr>
<td>l2tpv3</td>
<td>Configures L2TPv3 related event messages</td>
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<tr>
<td>l2tpv3-tunnel-down</td>
<td>Event L2TPv3 tunnel down message</td>
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<tr>
<td>l2tpv3-tunnel-up</td>
<td>Event L2TPv3 tunnel up message</td>
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<tr>
<td><strong>&lt;event-type&gt;</strong></td>
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</tbody>
</table>
| licmgr | Configures license manager module related event messages  
- lic-installed-count – Event total number of license installed count message  
- lic-installed-default – Event default license installation message  
- lic-installed – Event license installed message  
- lic-invalid – Event license installation failed message  
- lic-removed – Event license removed message |
| mgmt | Configures management services module related event messages  
- log-http-init – Event Web server started  
- log-http-local-start – Event Web server started in local mode  
- log-http-start – Event Web server started in external mode  
- log-https-start – Event secure Web server started  
- log-https-wait – Event waiting for Web server to start  
- log-key-deleted – Event RSA key associated with SSH is deleted  
- log-key-restored – Event RSA key associated with SSH is added  
- log-trustpoint-deleted – Event trustpoint associated with HTTPS is deleted |
| mesh | Configures mesh module related event messages  
- mesh-link-down – Event mesh link down message  
- mesh-link-up – Event mesh link up message  
- meshpoint-down – Event meshpoint down message  
- meshpoint-loop-prevent-off – Event meshpoint loop prevent off message  
- meshpoint-loop-prevent-on – Event meshpoint loop prevent on message  
- meshpoint-path-change – Event meshpoint-path-change message  
- meshpoint-root-change – Event meshpoint-root-change message  
- meshpoint-up – Event meshpoint up message |
| nsm | Configures *Network Service Module* (NSM) related event message  
- dhcpc-err – Event DHCP certification error message  
- dhcpdefrt – Event DHCP defrt message  
- dhcpip – Event DHCP IP message  
- dhcpipchg – Event DHCP IP change message  
- dhcpipnoadd – Event DHCP IP overlaps static IP address message  
- dhcplsexp – Event DHCP lease expiry message  
- dhcpnak – Event DHCP server returned DHCP NAK response  
- dhcpnodefrt – Event interface no default route message  
- if-failback – Event interface failback message  
- if-failover – EVENT interface failover message  
- ifdown – Event interface down message  
- ifipcfg – Event interface IP config message  
- ifup – Event interface up message  
- nsm-ntp – Event translate host name message |
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<th><code>&lt;event-type&gt;</code></th>
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<td>pm</td>
<td>Configures process monitor module related event messages</td>
</tr>
<tr>
<td></td>
<td>• procid – Event proc ID message</td>
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<td></td>
<td>• procmrxrstrt – Event proc max restart message</td>
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<td></td>
<td>• procnoresp – Event proc no response message</td>
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<td></td>
<td>• procrstt – Event proc restart message</td>
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<td></td>
<td>• procsstart – Event proc start message</td>
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<td>• procstop – Event proc stop message</td>
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<td></td>
<td>• procsyrsrstrt – Event proc system restart message</td>
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<tr>
<td></td>
<td>• startupcomplete – Event startup complete message</td>
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<tr>
<td>radconf</td>
<td>Configures RADIUS configuration daemon related event messages</td>
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<tr>
<td></td>
<td>• could-not-stop-radius – Event could not stop RADIUS server message</td>
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<td></td>
<td>• radiusdstart – Event RADIUS server started message</td>
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<td></td>
<td>• radiusdstop – Event RADIUS server stopped message</td>
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<td>radio</td>
<td>Configures radio module related event messages</td>
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<td>• acs-scan-complete – Event ACS scan completed</td>
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<td>• acs-scan-started – Event ACS scan started</td>
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<td></td>
<td>• channel-country-mismatch – Event channel and country of operation mismatch message</td>
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<td></td>
<td>• radar-det-info – Detected radar info message</td>
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<td></td>
<td>• radar-detected – Event radar detected message</td>
</tr>
<tr>
<td></td>
<td>• radar-scan-completed – Event radar scan completed message</td>
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<tr>
<td></td>
<td>• radar-scan-started – Event radar scan started message</td>
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<tr>
<td></td>
<td>• radio-antenna-error – Event invalid antenna type on this radio message</td>
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<td></td>
<td>• radio-antenna-setting – Event antenna type setting on this radio message</td>
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<td></td>
<td>• radio-state-change – Event radio state change message</td>
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<tr>
<td></td>
<td>• resume-home-channel – Event resume home channel message</td>
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<td>smrt</td>
<td>Configures SMART RF module related event messages</td>
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<td></td>
<td>• calibration-done – Event calibration done message</td>
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<td>• calibration-started – Event calibration started message</td>
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<td></td>
<td>• channel-change – Event channel change message</td>
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<td>• config-cleared – Configuration cleared event message</td>
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<td></td>
<td>• cov-hole-recovery – Event coverage hole recovery message</td>
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<td></td>
<td>• cov-hole-recovery-done – Event coverage hole recovery done message</td>
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<td></td>
<td>• interference-recovery – Event interference recovery message</td>
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<td></td>
<td>• neighbor-recovery – Event neighbor recovery message</td>
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<td>• power-adjustment – Event power adjustment message</td>
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<td>• root-recovery – Event meshpoint root recovery message</td>
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<td>&lt;event-type&gt;</td>
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<td>smtpnot</td>
<td>Configures SMTP module related event messages</td>
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<td></td>
<td>• cfg – Event cfg message</td>
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<td></td>
<td>• cfginc – Event cfg inc message</td>
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<td></td>
<td>• net – Event net message</td>
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<td></td>
<td>• proto – Event proto message</td>
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<td></td>
<td>• smtpauth – Event SMTP authentication message</td>
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<td>• smtperr – Event SMTP error message</td>
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<td></td>
<td>• smtpinfo – Event SMTP information message</td>
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<tr>
<td>system</td>
<td>Configures 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>• guest-user-exp – Event guest user purging message</td>
</tr>
<tr>
<td></td>
<td>• http-err – Event Web server did not start message</td>
</tr>
<tr>
<td></td>
<td>• login – Event successful login message</td>
</tr>
<tr>
<td></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>
<tr>
<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 heart beat message</td>
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<tr>
<td></td>
<td>• procstop – Event proc stop message</td>
</tr>
<tr>
<td></td>
<td>• server-unreachable – Event server-unreachable message</td>
</tr>
<tr>
<td></td>
<td>• system-autoup-disable – Event system autoup disable message</td>
</tr>
<tr>
<td></td>
<td>• system-autoup-enable – Event system autoup enable 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></td>
<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>
</tr>
<tr>
<td><code>&lt;event-type&gt;</code></td>
<td><code>&lt;event-name&gt;</code></td>
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<tr>
<td>test</td>
<td>Configures 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>
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<td></td>
<td>• testcrit – Event test critical message</td>
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<td></td>
<td>• testdebug – Event test debug message</td>
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<td></td>
<td>• testemerg – Event test emergency message</td>
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<td>• testerr – Event test error message</td>
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<td></td>
<td>• testinfo – Event test information message</td>
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<td></td>
<td>• testnotice – Event test notice message</td>
</tr>
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<td></td>
<td>• testwarn – Event test warning message</td>
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<tr>
<td>vrrp</td>
<td>Configures 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>
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<td></td>
<td>• vrrp-state-change – Event VRRP state transition message</td>
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<tr>
<td></td>
<td>• vrrp-vip-subnet-mismatch – Event VRRP IP not overlapping with an interface addresses message</td>
</tr>
<tr>
<td>wips</td>
<td>Configures the Wireless IPS module related event messages</td>
</tr>
<tr>
<td></td>
<td>• wips-client-blacklisted – Event WIPS client blacklisted message</td>
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<td></td>
<td>• wips-client-rem-blacklist – Event WIPS client rem blacklist message</td>
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<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**

```
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)#
```

**Related Commands**

| `<no>` | Resets or disables event monitoring |
4.1.34.2.2 no

- **event-system-policy-mode commands**

Negates an event monitoring configuration

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

no event <EVENT-TYPE> <EVENT-NAME> [email|forward-to-switch|snmp|syslog] [default|on|off]

**Parameters**

- no event <EVENT-TYPE> <EVENT-NAME> [email|forward-to-switch|snmp|syslog] [default|on|off]

<table>
<thead>
<tr>
<th>no event &lt;EVENT-TYPE&gt; &lt;EVENT-NAME&gt;</th>
<th>Removes the specified event monitoring activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;EVENT-TYPE&gt; – Select the event type.</td>
<td></td>
</tr>
<tr>
<td>&lt;EVENT-NAME&gt; – After selecting the event type, specify the event name.</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The system stops network monitoring for the occurrence of the specified event and no notification is sent if the event occurs.

**Examples**

```bash
rfs7000-37FABE(config-event-system-policy-TestPolicy)#event ap adopted syslog default
rfs7000-37FABE(config-event-system-policy-TestPolicy)#
```

```bash
rfs7000-37FABE(config-event-system-policy-TestPolicy)#no event ap adopted syslog
rfs7000-37FABE(config-event-system-policy-TestPolicy)#
```

**Related Commands**

- **event** Configures the action taken for each event
4.1.35 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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><code>no</code></td>
<td>Removes an existing firewall policy</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on Firewall policy, see *Chapter 13, FIREWALL-POLICY.*
4.1.36 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

global-association-list <GLOBAL-ASSOC-LIST-NAME>

Parameters
- global-association-list <GLOBAL-ASSOC-LIST-NAME>

Examples

rfs4000-229D58 (config)#global-association-list my-clients
rfs4000-229D58 (config-global-assoc-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-global-assoc-list-my-clients)##
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 5.6.0.0-029B
!
!
version 2.3
!
! 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
    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 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)#
4.1.37 **host**

- **Global Configuration Commands**

Enters the configuration context of a remote device using its hostname

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
host <DEVICE-NAME>
```

**Parameters**

- `host <DEVICE-NAME>`

| `<DEVICE-NAME>` | Specify the device’s hostname. All discovered devices are displayed when ‘Tab’ is pressed to auto complete this command. |

**Examples**

```
rfs4000-229D58(config)#host rfs4000-229D58
rfs4000-229D58(config-device-00-23-68-22-9D-58)#
```
4.1.38 inline-password-encryption

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
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
rfs7000-37FABE(config)#password-encryption secret 2 12345678
rfs7000-37FABE(config)#

rfs7000-37FABE(config)#commit wr mem
rfs7000-37FABE(config)#

This command uses the specified password for encryption key and stores it outside of startup-config

rfs7000-37FABE(config)#inline-password-encryption
rfs7000-37FABE(config)#

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>
</tbody>
</table>
4.1.39 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>`

<table>
<thead>
<tr>
<th>access-list &lt;IP-ACL-NAME&gt;</th>
<th>Creates an IP ACL and enters its configuration mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;IP-ACL-NAME&gt;</code> – Specify the ACL name. If the access list does not exist, it is created.</td>
</tr>
</tbody>
</table>

- `ip snmp-access-list <IP-SNMP-ACL-NAME>`

<table>
<thead>
<tr>
<th>snmp-access-list &lt;IP-SNMP-ACL-NAME&gt;</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SNMP performs network management functions using a data structure called a <em>Management Information Base (MIB)</em>. SNMP is widely implemented but not very secure, since it uses only text community strings for accessing controller or service platform configuration files.</td>
</tr>
<tr>
<td></td>
<td>Use SNMP ACLs (firewalls) to help reduce SNMP's vulnerabilities, as SNMP traffic can be easily exploited to produce a <em>denial of service</em> (DoS).</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;IP-SNMP-ACL-NAME&gt;</code> – 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.</td>
</tr>
</tbody>
</table>

**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

```bash
rfs7000-37FABE(config)#ip access-list test
```

```bash
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

```bash
rfs7000-37FABE(config-ip-acl-test)#
```

```bash
rfs7000-37FABE(config)#ip snmp-access-list SNMPAcl
```

```bash
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

```bash
rfs7000-37FABE(config-ip-snmp-acl-SNMPAcl)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an IP access control list</td>
</tr>
</tbody>
</table>

**NOTE:** For more information on access control lists, see Chapter 11, ACCESS-LIST.
4.1.40 ipv6

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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.
4.1.41 ipv6-router-advertisement-policy

Table 4.14 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 4-142</td>
</tr>
<tr>
<td>ipv6-router-advertisement-policy-mode commands</td>
<td>Summarizes the IPv6 RA policy configuration mode commands</td>
<td>page 4-144</td>
</tr>
</tbody>
</table>
4.1.41.1 ipv6-router-advertisement-policy

Creates an IPv6 router advertisement (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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
ipv6-router-advertisement-policy <POLICY-NAME>
```

Parameters

- `ipv6-router-advertisement-policy <POLICY-NAME>`

Examples

```
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
router-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
do      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)#

Related Commands

no  Removes the specified IPv6 RA policy
### 4.1.41.2 ipv6-router-advertisement-policy-mode commands

- **ipv6-router-advertisement-policy**

Table 4.15 summarises 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/disables advertisement of IPv6 maximum transmission unit (MTU) and hop-count value in RAs</td>
<td>page 4-145</td>
</tr>
<tr>
<td>assist-neighbor-discovery</td>
<td>Enables/disables advertisement of the source link layer address in RAs</td>
<td>page 4-146</td>
</tr>
<tr>
<td>check-ra-consistency</td>
<td>Enables/disables 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 4-147</td>
</tr>
<tr>
<td>dns-server</td>
<td>Configures the DNS server’s IPv6 address and lifetime advertised in RAs</td>
<td>page 4-148</td>
</tr>
<tr>
<td>domain-name</td>
<td>Configures the Domain name search label advertised in RAs</td>
<td>page 4-149</td>
</tr>
<tr>
<td>managed-config-flag</td>
<td>Sets the managed address configuration flag in RAs</td>
<td>page 4-150</td>
</tr>
<tr>
<td>nd-reachable-time</td>
<td>Enables/disables advertisement of neighbor reachable time in RAs</td>
<td>page 4-151</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts router advertisement policy settings</td>
<td>page 4-152</td>
</tr>
<tr>
<td>ns-interval</td>
<td>Configures the interval between two successive retransmitted neighbor solicitation (NS) messages</td>
<td>page 4-154</td>
</tr>
<tr>
<td>other-config-flag</td>
<td>Sets the other-configuration flag in RAs</td>
<td>page 4-155</td>
</tr>
<tr>
<td>ra</td>
<td>Configures RA related parameters, such as the interval between two unsolicited successive RAs</td>
<td>page 4-156</td>
</tr>
<tr>
<td>router-lifetime</td>
<td>Configures the default router’s lifetime, in seconds, advertised in RAs</td>
<td>page 4-157</td>
</tr>
<tr>
<td>router-preference</td>
<td>Configures the router preference field value advertised in RAs</td>
<td>page 4-158</td>
</tr>
<tr>
<td>unicast-solicited-advertisement</td>
<td>Enables/disables unicasting of solicited RAs</td>
<td>page 4-159</td>
</tr>
</tbody>
</table>
4.1.41.2.1 advertise

IPv6-router-advertisement-policy-mode commands

Enables/disables advertisement of IPv6 maximum transmission unit (MTU) and hop-count value in RAs

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
advertise [hop-limit|mtu]

Parameters
- advertise [hop-limit|mtu]

| advertise [hop-limit|mtu] | Enables/disables 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
advertise mtu
advertise hop-limit
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#

Related Commands

| no | Disables advertisement of IPv6 MTU and hop-count value in RAs |
4.1.41.2.2 assist-neighbor-discovery

- ipv6-router-advertisement-policy-mode commands

Enables/disables 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>no</td>
<td>Disables the advertisement of the source link layer address in RAs</td>
</tr>
</tbody>
</table>
4.1.41.2.3 check-ra-consistency

- ipv6-router-advertisement-policy-mode commands

Enables/disables 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables comparison of interface-specific parameters advertised by other routers, within the link, with those advertised with this router</td>
</tr>
</tbody>
</table>
4.1.41.2.4 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

dns-server <IPv6> {lifetime [<4-3600>|expired|infinite]}

Parameters
- dns-server <IPv6> {lifetime [<4-3600>|expired|infinite]}

<table>
<thead>
<tr>
<th>dns-server &lt;IPv6&gt;</th>
<th>Configures the DNS server’s IPv6 address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>- &lt;IPv6&gt; — Specify the DNS server’s address. This address is advertised in RAs. A maximum of four (4) entries can be made per policy.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>lifetime</th>
<th>Optional. Configures the DNS server’s (identified by the &lt;IPv6&gt; parameter) lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;4-3600&gt;</td>
<td>- Configures a lifetime in seconds. Specify a value form 4 - 3600 seconds. The default is 600 seconds.</td>
</tr>
<tr>
<td>expired</td>
<td>- Advertises that this DNS server’s lifetime has expired and should not be used</td>
</tr>
<tr>
<td>infinite</td>
<td>- Advertises that this DNS server’s lifetime is infinite</td>
</tr>
</tbody>
</table>

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. |
4.1.41.2.5 domain-name

- ipv6-router-advertisement-policy-mode commands

Configures the Domain name search label advertised in RAs

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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.
4.1.41.2.6 managed-config-flag

Sets/removes 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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><code>no</code></td>
<td>Removes the managed address configuration flag advertised in RAs</td>
</tr>
</tbody>
</table>
4.1.41.2.7 nd-reachable-time

**ipv6-router-advertisement-policy-mode commands**

Enables/disables advertisement of neighbor discovery reachable time in RAs. This feature is disabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
nd-reachable-time [<5000-3600000>|global]
```

**Parameters**

- `nd-reachable-time [<5000-3600000]|global]`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| 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**

```plaintext
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 |
4.1.41.2.8 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [advertise|assist-neighbor-discovery|check-ra-consistency|dns-server|domain-name|
managed-config-flag|nd-reachable-time|ns-interval|other-config-flag|ra|
routing-lifetime|unicast-solicited-advertisement]

Parameters
- no [advertise|assist-neighbor-discovery|check-ra-consistency|dns-server|domain-name|
managed-config-flag|nd-reachable-flag|ns-interval|other-config-flag|ra|
routing-lifetime|unicast-solicited-advertisement]

Examples

rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context
ipv6-router-advertisement-policy test
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)#

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

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>advertise</td>
<td>Enables/disables advertisement of IPv6 MTU and hop-count value in RAs</td>
</tr>
<tr>
<td>assist-neighbor-discovery</td>
<td>Enables/disables advertisement of the source link layer address in RAs</td>
</tr>
<tr>
<td>check-ra-consistency</td>
<td>Enables/disables checking of consistency in RA values advertised by this router with those advertised by other routers, if any, on the same link</td>
</tr>
<tr>
<td>dns-server</td>
<td>Configures the DNS server’s IPv6 address and lifetime advertised in RAs</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>domain-name</td>
<td>Configures the Domain name search label advertised in RAs</td>
</tr>
<tr>
<td>managed-config-flag</td>
<td>Sets/removes the managed address configuration flag in RAs</td>
</tr>
<tr>
<td>nd-reachable-time</td>
<td>Enables/disables advertisement of neighbor reachable time in RAs</td>
</tr>
<tr>
<td>ns-interval</td>
<td>Configures the <em>neighbor solicitation</em> (NS) retransmit timer value advertised in RAs</td>
</tr>
<tr>
<td>other-config-flag</td>
<td>Sets/removes the other-configuration flag in RAs</td>
</tr>
<tr>
<td>ra</td>
<td>Configures RA related parameters, such as the interval between two unsolicited successive RAs. It also allows suppression of RAs.</td>
</tr>
<tr>
<td>router-lifetime</td>
<td>Configures the default router's lifetime, in seconds, advertised in RAs</td>
</tr>
<tr>
<td>router-preference</td>
<td>Configures the router preference field value advertised in RAs</td>
</tr>
<tr>
<td>unicast-solicited-advertisement</td>
<td>Enables/disables uncasting of solicited RAs</td>
</tr>
</tbody>
</table>
4.1.41.2.9 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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:
| | • <1000-3600000> – Specify a value from 1000 - 3600000 milliseconds. The default is 1000 milliseconds.
| | • 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.

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
4.1.41.2.10 *other-config-flag*

- `ipv6-router-advertisement-policy-mode commands`

Sets/removes 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
other-config-flag
```

**Parameters**

None

**Examples**

```
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#other-config-flag
```

**Related Commands**

| **no** | Removes the other-config-flag advertised on RAs |
4.1.41.2.11 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ra [interval <3-1800>|suppress]
```

**Parameters**

- `ra [interval <3-1800>|suppress]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>interval <code>&lt;3-1800&gt;</code></td>
<td>Configures the interval, in seconds, between two unsolicited successive RAs. <code>&lt;3-1800&gt;</code> — Specify a value from 3 - 1800 seconds. The default is 300 seconds. <strong>Note:</strong> The router-lifetime should be at least three times the specified router interval.</td>
</tr>
<tr>
<td>suppress</td>
<td>Enables/disables the suppression of RAs. By default, RAs are suppressed. The <code>no ra suppress</code> command enables the sending of RAs.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#ra interval 200
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#no ra suppress
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context ipv6-router-advertisement-policy test
no 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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the RA interval, and enables the sending of RAs</td>
</tr>
</tbody>
</table>
4.1.41.2.12 router-lifetime

Configures the default router’s lifetime, in seconds, advertised in RAs

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
router-lifetime <0-9000>

Parameters
- router-lifetime <0-9000>

Example
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#router-lifetime 2000
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#show context
ipv6-router-advertisement-policy test
  no ra suppress
  ra interval 200
  managed-config-flag
  nd-reaching-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
4.1.41.2.13 router-preference

- ipv6-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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
router-preference [high|medium|low]

Parameters
- router-preference [high|medium|low]

| router-preference [high|medium|low] | Sets this router’s preference over other routers, in the link, to be the default router. The options are high, low, and medium. The default value is medium. |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      | • To a router to be selected as a default router, the advertised router lifetime should not be equal to “0”. |
|                                      | • To enable default router selection using router information contained in RAs, you need to configure default router selection on that interface. |

Examples
rfs7000-6DCD4B(config-ipv6-radv-policy-test)#router-preference high

fs7000-6DCD4B(config-ipv6-radv-policy-test)#show context
ipv6-router-advertisement-policy test
no 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)#
4.1.41.2.14 unicast-solicited-advertisement

- ipv6-router-advertisement-policy-mode commands

Enables/disables unicasting of solicited RAs. This feature is disabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
no 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 |
4.1.42 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

l2tpv3 policy <L2TPV3-POLICY-NAME>

Parameters

- l2tpv3 policy <L2TPV3-POLICY-NAME>

Examples

rfs7000-37FABE(config)#l2tpv3 policy L2TPV3Policy1
rfs7000-37FABE(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>no</td>
<td>Removes an existing L2TPv3 tunnel policy</td>
</tr>
<tr>
<td>mint-policy</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.
4.1.43 mac

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

`mac access-list <MAC-ACCESS-LIST-NAME>`

Parameters
- `mac access-list <MAC-ACCESS-LIST-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.
4.1.44 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
management-policy <MANAGEMENT-POLICY-NAME>

Parameters
- management-policy <MANAGEMENT-POLICY-NAME>

Examples
<DEVICE>(config)#management-policy test
<DEVICE>(config-management-policy-test)#?

Management Mode commands:
- aaa-login Set authentication for logins
- banner Define a login banner
- ftp Enable FTP server
- http Hyper Text Terminal Protocol (HTTP)
- https Secure HTTP
- idle-session-timeout Configure idle timeout for a configuration session (GUI or CLI)
- ipv6 IPv6 Protocol
- no Negate a command or set its defaults
- privilege-mode-password Set the password for entering CLI privilege mode
- restrict-access Restrict management access to the device
- snmp-server SNMP
- ssh Enable ssh
- telnet Enable telnet
- user Add a user account
- 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-management-policy-test)#

Related Commands

no Removes an existing management policy

NOTE: For more information on Management policy configuration, see Chapter 15, MANAGEMENT-POLICY.
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

meshpoint [<MESHPOINT-NAME>|containing <WORD>]

Parameters

- meshpoint [<MESHPOINT-NAME>|containing <WORD>]

| <MESHPOINT-NAME> | Specify the meshpoint name. If the meshpoint does not exist, it is created. |
| containting <WORD> | Selects existing meshpoints containing the sub-string <WORD> in their names |

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
- 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

rfs7000-37FABE(config-meshpoint-TestMeshpoint)#

Related Commands

- no Removes an existing meshpoint

NOTE: For more information on Meshpoint configuration, see Chapter 26, MESHPOINT
4.1.46 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

meshpoint-qos-policy <MESHPOINT-QOS-POLICY-NAME>

Parameters

- meshpoint-qos-policy <MESHPOINT-QOS-POLICY-NAME>

| <MESHPOINT-QOS-POLICY-NAME> | Specify the meshpoint QoS policy name. If the policy does not exist, it is created. |

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
4.1.47 mint-policy

Global Configuration Commands

Configures the global MiNT policy

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

mint-policy global-default

Parameters

- mint-policy global-default

| global-default | Uses 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.
4.1.48 \textit{nac-list}

\textbf{Global Configuration Commands}

A \textit{Network Access Control} (NAC) policy configures a list of devices that can access a network based on their MAC addresses. Table 4.16 lists NAC list configuration mode commands.

\begin{table}[h]
\centering
\begin{tabular}{|l|l|l|}
\hline
\textbf{Command} & \textbf{Description} & \textbf{Reference} \\
\hline
\textit{nac-list} & Creates a NAC list and enters its configuration mode & page 4-168 \\
\hline
\textit{nac-list-mode commands} & Summarizes NAC list configuration mode commands & page 4-169 \\
\hline
\end{tabular}
\caption{NAC-List Config Command}
\end{table}
4.1.48.1 nac-list

`nac-list`

Configures a NAC list that manages access to the network.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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
4.1.48.2 nac-list-mode commands

Table 4.17 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 4-170</td>
</tr>
<tr>
<td>include</td>
<td>Specifies the MAC addresses included in the NAC enforcement list</td>
<td>page 4-171</td>
</tr>
<tr>
<td>no</td>
<td>Cancels an exclude or include NAC list rule</td>
<td>page 4-172</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
4.1.48.2.1 exclude

Specifies the MAC addresses excluded from the NAC enforcement list.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
exclude <START-MAC> [/<END-MAC> precedence <1-1000>|precedence <1-1000>]

Parameters
- exclude <START-MAC> [/<END-MAC> precedence <1-1000>|precedence <1-1000>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| <START-MAC>    | Specifies a range of MAC addresses or a single MAC address to exclude from the NAC enforcement list.  
|                | Use this parameter to specify a single MAC address.                         |
| <END-MAC>      | Specifies the last MAC address in the range (optional if a single MAC is added to the list). |
| precedence <1-1000> | Sets the rule precedence. Exclude entries are checked in the order of their rule precedence. |

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)#
4.148.2.2 **include**

> **nac-list-mode commands**

Specifies the MAC addresses included in the NAC enforcement list.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

include <START-MAC> [<END-MAC> precedence <1-1000>|precedence <1-1000>]

**Parameters**

- include <START-MAC> [<END-MAC> precedence <1-1000>|precedence <1-1000>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;START-MAC&gt;</td>
<td>Specifies a range of MAC addresses or a single MAC address to include in the NAC enforcement list.</td>
</tr>
<tr>
<td>Note:</td>
<td>Use this parameter to specify a single MAC address.</td>
</tr>
<tr>
<td>&lt;END-MAC&gt;</td>
<td>Specifies the last MAC address in the range (optional if a single MAC is added to the list).</td>
</tr>
<tr>
<td>precedence &lt;1-1000&gt;</td>
<td>Sets the rule precedence. Include entries are checked in the order of their rule precedence.</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)#
```
4.1.48.2.3 no

nac-list-mode commands

Cancels an exclude or include NAC list rule

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [exclude|include]

no [exclude|include] <START-MAC> [<END-MAC> precedence <1-1000>|precedence <1-1000>]

Parameters

- no [exclude|include] <START-MAC> [<END-MAC> precedence <1-1000>|precedence <1-1000>]

| no exclude | Removes an exclude rule |
| no include | Removes an include rule |

<START-MAC> Specifies a range of MACs included in/removed from the NAC enforcement list

Specify the first MAC address in the range.

**Note:** Use this parameter to specify a single MAC address.

<END-MAC> Specify the last MAC address in the range (optional if a single MAC is added to the list).

precedence <1-1000> Sets the rule precedence for this rule. Exclude or include entries are checked in the order of their rule precedence.

- <1-1000> — Specify a value from 1 - 1000.

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)#
```

The following example shows the NAC list ‘test’ settings after the ‘no’ command is executed:

```
rfs7000-37FABE(config-nac-list-test)#no exclude 00-40-96-B0-BA-2A precedence 1
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 |
4.1.49 no

**Global Configuration Commands**

Negates a command, or reverts configured settings to their default

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```


no [ap300|ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000]

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|ap71xx|ap81xx|ap82xx|nx45xx|nx65xx|nx9000]}


no password-encryption secret 2 <OLD-PASSPHRASE>

no profile {ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap71xx|ap81xx|ap82xx} {filter|nx45xx|nx65xx|nx9000|t5|vx9000}

no wlan [<WLAN-NAME>]|all|containing <WLAN-NAME-SUBSTRING>]

no service set [command-history|reboot-history|upgrade-history] {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’ command is specific to the NX45XX and NX65XX series service platforms:

no url-list <URL-LIST-NAME>

The following ‘no’ command is specific to the NX9000 series service platforms:

no vx9000 <VX-MAC>

**Parameters**


<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no aaa-policy &lt;POLICY-NAME&gt;</td>
<td>Deletes the specified AAA policy</td>
</tr>
<tr>
<td>no aaa-tacacs-policy &lt;POLICY-NAME&gt;</td>
<td>Deletes the specified AAA TACACS policy</td>
</tr>
<tr>
<td>no crypto-cmp-policy &lt;POLICY-NAME&gt;</td>
<td>Deletes the specified crypto CMP policy</td>
</tr>
<tr>
<td>no auto-provisioning-policy &lt;POLICY-NAME&gt;</td>
<td>Deletes the specified auto provisioning policy</td>
</tr>
<tr>
<td>no bonjour-gw-discovery-policy &lt;POLICY-NAME&gt;</td>
<td>Deletes the specified Bonjour GW discovery policy</td>
</tr>
<tr>
<td>no bonjour-gw-forwarding-policy &lt;POLICY-NAME&gt;</td>
<td>Deletes the specified Bonjour GW forwarding policy</td>
</tr>
<tr>
<td>no captive-portal &lt;CAPTIVE-PORTAL-NAME&gt;</td>
<td>Deletes the specified captive portal</td>
</tr>
<tr>
<td>no device-categorization &lt;DEVICE-CATEGORIZATION-LIST-NAME&gt;</td>
<td>Deletes the specified device categorization list</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td><code>no dhcp-server-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified DHCP server policy</td>
</tr>
<tr>
<td><code>no dhcpv6-server-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified DHCPv6 server policy</td>
</tr>
<tr>
<td><code>no dns-whitelist &lt;DNS-WHITELIST-NAME&gt;</code></td>
<td>Deletes the specified DNS Whitelist</td>
</tr>
<tr>
<td><code>no event-system-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified event system policy</td>
</tr>
<tr>
<td><code>no firewall-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified firewall policy</td>
</tr>
<tr>
<td><code>no global-association-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified global association policy</td>
</tr>
<tr>
<td><code>no inline-password-encryption</code></td>
<td>Disables storing of the encryption key in the startup configuration file</td>
</tr>
<tr>
<td><code>no ip access-list &lt;IP-ACCESS-LIST-NAME&gt;</code></td>
<td>Deletes the specified IP access list</td>
</tr>
<tr>
<td><code>no ipv6 access-list &lt;IPv6-ACCESS-LIST-NAME&gt;</code></td>
<td>Deletes the specified IPv6 access list</td>
</tr>
<tr>
<td><code>ipv6-router-advertisement-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specifies IPv6 router advertisement policy</td>
</tr>
<tr>
<td><code>no l2tpv3 policy &lt;L2TPV3-POLICY-NAME&gt;</code></td>
<td>Deletes the specified L2TPv3 policy</td>
</tr>
<tr>
<td><strong>Note:</strong> The default L2TPv3 policy cannot be deleted.</td>
<td></td>
</tr>
<tr>
<td><code>no mac access-list &lt;MAC-ACCESS-LIST-NAME&gt;</code></td>
<td>Deletes the specified MAC access list</td>
</tr>
<tr>
<td><code>no management-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified management policy</td>
</tr>
<tr>
<td><code>no meshpoint &lt;MESHPOINT-NAME&gt;</code></td>
<td>Deletes the specified meshpoint</td>
</tr>
<tr>
<td><code>no meshpoint-qos-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified meshpoint QoS policy</td>
</tr>
<tr>
<td><code>no nac-list &lt;NAC-LIST-NAME&gt;</code></td>
<td>Deletes the specified NAC list</td>
</tr>
<tr>
<td><code>no passpoint-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified passpoint policy</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><code>no radio-qos-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified radio QoS policy</td>
</tr>
<tr>
<td><code>no radius-group &lt;RADIUS-GROUP-NAME&gt;</code></td>
<td>Deletes the specified RADIUS group</td>
</tr>
<tr>
<td><code>no radius-server-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified RADIUS server policy</td>
</tr>
<tr>
<td><code>no radius-user-pool-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified RADIUS user pool policy</td>
</tr>
<tr>
<td><code>no rf-domain &lt;RF-DOMAIN-NAME&gt;</code></td>
<td>Deletes the specified RF Domain</td>
</tr>
<tr>
<td><code>no role-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified role policy</td>
</tr>
<tr>
<td><code>no routing-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified routing policy</td>
</tr>
<tr>
<td><code>no smart-rf-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified smart RF policy</td>
</tr>
<tr>
<td><code>no wips-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified WIPS policy</td>
</tr>
<tr>
<td><code>no wlan-qos-policy &lt;POLICY-NAME&gt;</code></td>
<td>Deletes the specified WLAN QoS policy</td>
</tr>
</tbody>
</table>

- `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>`| vlan `<VLAN-ALIAS-NAME>`]

- `no alias` Removes an existing network, VLAN, or service alias. Select the alias type. The options are: network, vlan, and service.
- `address-range` `<ADDRESS-RANGE-ALIAS-NAME>` Deletes the specified address range alias
- `host` `<HOST-ALIAS-NAME>` Deletes the specified host alias
- `network` `<NETWORK-ALIAS-NAME>` Deletes the specified network alias
- `network-group` `<NETWORK-GROUP-ALIAS-NAME>` Removes the specified component (IP address(es), hosts, or network address(es)) of the specified network-group alias
- `network-service` `<NETWORK-SERVICE-ALIAS-NAME>` Deletes the specified network-service alias
### GLOBAL CONFIGURATION COMMANDS

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no bgp</strong>&lt;br&gt;**[as-path-list</td>
<td>community-list</td>
</tr>
<tr>
<td><strong>community-list</strong>&lt;br&gt;<strong>&lt;LIST-NAME&gt;</strong></td>
<td>Removes the specified community list &lt;br&gt;- <code>&lt;LIST-NAME&gt;</code> – Specify the community list name.</td>
</tr>
<tr>
<td><strong>extcommunity-list</strong>&lt;br&gt;<strong>&lt;LIST-NAME&gt;</strong></td>
<td>Removes the extended community list &lt;br&gt;- <code>&lt;LIST-NAME&gt;</code> – Specify the extended community list name.</td>
</tr>
<tr>
<td><strong>ip-access-list</strong>&lt;br&gt;<strong>&lt;LIST-NAME&gt;</strong></td>
<td>Removes the specified BGP IP access list &lt;br&gt;- <code>&lt;LIST-NAME&gt;</code> – Specify the BGP IP access list name.</td>
</tr>
<tr>
<td><strong>ip-prefix-list</strong>&lt;br&gt;<strong>&lt;LIST-NAME&gt;</strong></td>
<td>Removes the specified BGP IP prefix list &lt;br&gt;- <code>&lt;LIST-NAME&gt;</code> – Specify the BGP IP prefix list name.</td>
</tr>
<tr>
<td><strong>no ap300</strong></td>
<td>Removes an AP300 from the network</td>
</tr>
<tr>
<td><strong>no ap621</strong></td>
<td>Removes an AP621 from the network</td>
</tr>
<tr>
<td><strong>no ap622</strong></td>
<td>Removes an AP622 from the network</td>
</tr>
<tr>
<td><strong>no ap650</strong></td>
<td>Removes an AP650 from the network</td>
</tr>
<tr>
<td><strong>no ap6511</strong></td>
<td>Removes an AP6511 from the network</td>
</tr>
<tr>
<td><strong>no ap6521</strong></td>
<td>Removes an AP6521 from the network</td>
</tr>
<tr>
<td><strong>no ap6522</strong></td>
<td>Removes an AP6522 from the network</td>
</tr>
<tr>
<td><strong>no ap6532</strong></td>
<td>Removes an AP6532 from the network</td>
</tr>
<tr>
<td><strong>no ap6562</strong></td>
<td>Removes an AP6562 from the network</td>
</tr>
<tr>
<td><strong>no ap71xx</strong></td>
<td>Removes an AP71XX from the network</td>
</tr>
<tr>
<td><strong>no ap81xx</strong></td>
<td>Removes an AP81XX from the network</td>
</tr>
<tr>
<td><strong>no ap82xx</strong></td>
<td>Removes an AP82XX from the network</td>
</tr>
<tr>
<td><strong>no rfs4000</strong></td>
<td>Removes a RFS4000 from the network</td>
</tr>
<tr>
<td><strong>no rfs6000</strong></td>
<td>Removes a RFS6000 from the network</td>
</tr>
<tr>
<td><strong>no rfs7000</strong></td>
<td>Removes a RFS7000 from the network</td>
</tr>
<tr>
<td><strong>no nx45xx</strong></td>
<td>Removes a NX45XX series device from the network</td>
</tr>
<tr>
<td><strong>no nx65xx</strong></td>
<td>Removes a NX65XX series device from the network</td>
</tr>
</tbody>
</table>

**Note:**<br>This table lists various commands used for global configuration in a network environment.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no nx9000</td>
<td>Removes a NX9000 series device from the network.</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>Identifies the device to remove by its MAC address.</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;MAC&gt;</code> – Specify the device’s MAC address in the AA-BB-CC-DD-EE-FF format.</td>
</tr>
<tr>
<td>no client-identity <code>&lt;CLIENT-IDENTITY-NAME&gt;</code></td>
<td>Removes the set of client identity fingerprints identified by the <code>&lt;CLIENT-NAME&gt;</code> keyword</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;CLIENT-IDENTITY-NAME&gt;</code> – Specify the client identity name.</td>
</tr>
<tr>
<td>no client-identity-group <code>&lt;CLIENT-IDENTITY-GROUP-NAME&gt;</code></td>
<td>Removes the client identity group identified by the <code>&lt;CLIENT-IDENTITY-GROUP-NAME&gt;</code> keyword</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;CLIENT-IDENTITY-GROUP-NAME&gt;</code> – Specify the client identity group name.</td>
</tr>
<tr>
<td>no device <code>{containing &lt;WORD&gt;}</code></td>
<td>Removes single or multiple devices based on the filter options provided.</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;WORD&gt;</code> – Specify the device’s MAC address in the AA-BB-CC-DD-EE-FF format.</td>
</tr>
<tr>
<td>filter type <code>&lt;DEVICE-TYPE&gt;</code></td>
<td>Optional. Filters devices based on the device type selected.</td>
</tr>
<tr>
<td></td>
<td>- type <code>&lt;DEVICE-TYPE&gt;</code> – Select the access point, wireless controller, or service platform type.</td>
</tr>
<tr>
<td>no customize</td>
<td>Restores the output of the show wireless client parameters to default.</td>
</tr>
<tr>
<td>no password-encryption secret 2</td>
<td>Disables password encryption.</td>
</tr>
<tr>
<td>no profile `{ap621</td>
<td>ap622</td>
</tr>
<tr>
<td>ap621</td>
<td>Optional. Removes a AP621 profile</td>
</tr>
<tr>
<td>ap622</td>
<td>Optional. Removes a AP622 profile</td>
</tr>
<tr>
<td>ap650</td>
<td>Optional. Removes a AP650 profile</td>
</tr>
<tr>
<td>ap6511</td>
<td>Optional. Removes a AP6511 profile</td>
</tr>
<tr>
<td>ap6521</td>
<td>Optional. Removes a AP6521 profile</td>
</tr>
<tr>
<td>ap6522</td>
<td>Optional. Removes a AP6522 profile</td>
</tr>
<tr>
<td>ap6532</td>
<td>Optional. Removes a AP6532 profile</td>
</tr>
</tbody>
</table>
GLOBAL CONFIGURATION COMMANDS 4 - 179

- no wlan [<WLAN-NAME>|all|containing <WLAN-NAME-SUBSTRING>]
  - Removes a WLAN
  - Identifies the WLAN name
  - Removes all WLANs
  - Removes WLANs whose names contain the string specified by the <WLAN-NAME-SUBSTRING> parameter

- no service set [command-history|reboot-history|upgrade-history] {on <DEVICE-NAME>}
  - Resets service command parameters
  - Resets command history file size to default (200)
  - Resets reboot history file size to default (50)
  - Resets upgrade history file size to default (50)
  - Optional. Resets service command parameters on a specified device
    - <DEVICE-NAME> – Specify name of the AP, wireless controller, or service platform.

- no smart-cache-policy <POLICY-NAME>
  - Deletes the specified smart content cache policy
  - Note: This command is specific to the NX45XX, NX65XX, and NX9000 series service platforms.
• no t5 <T5-DEVICE-MAC>

Removes the t5 wireless controller identified by the device's MAC address

**Note:** This command is applicable only on the RFS4000, RFS6000, RFS7000, NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, and NX9510 platforms.

---

• no url-list <URL-LIST-NAME>

**Note:** This command is specific to the NX45XX and NX65XX series service platforms.

---

• no route-map <ROUTE-MAP-NAME>

**Note:** This command is specific to the NX45XX, NX65XX, and NX9000 series service platforms.

---

• no vx9000 <VX-MAC>

**Note:** This command is specific to the NX9000 series service platforms.

---

### Examples

```bash
<DEVICE>(config)#no ?
  aaa-policy                        Delete a aaa policy
  aaa-tacacs-policy                 Delete a aaa tacacs policy
  alias                             Alias
  ap300                             Delete an AP300
  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
  ap81xx                            Delete an AP81XX access point
  ap82xx                            Delete an AP82XX access point
  association-acl-policy            Delete an association-acl policy
  auto-provisioning-policy          Delete an auto-provisioning policy
  bgp                               BGP Configuration
  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 a event system policy
  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
nx45xx                            Delete an NX45XX integrated services platform
nx65xx                            Delete an NX65XX integrated services platform
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
role-policy                       Role based firewall policy
route-map                         Dynamic routing route map Configuration
routing-policy                    Policy Based Routing Configuratino
smart-cache-policy                Delete a content caching
smart-rf-policy                   Delete a smart-rf-policy
t5                                 Delete an T5 wireless controller
url-list                          Delete a URL list
vx9000                            Delete an VX9000 wireless controller
wips-policy                       Delete a wips policy
wlan                              Delete a wlan object
wlan-qos-policy                   Delete a wireless lan QoS configuration policy

<DEVICE>(config)#

GLOBAL CONFIGURATION COMMANDS 4 - 181
4.1.50 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
- access-network-type
- connection-capability
- domain-name
- hessid
- internet
- ip-address-type
- nai-realm
- net-auth-type
- no
- operator
- osu
- roam-consortium
- venue
- wan-metrics
- clrscr
- commit
- do
- end
- exit
--More--

Related Commands

no | Removes an existing passpoint policy
NOTE: For more information on passpoint policy, see Chapter 27, PASSPOINT POLICY.
4.1.51 password-encryption

Enables password encryption

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
password-encryption secret 2 <LINE>

Parameters
- password-encryption secret 2 <LINE>

<table>
<thead>
<tr>
<th>secret 2 &lt;LINE&gt;</th>
<th>Encrypts passwords with a secret phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 – Specifies the encryption type as either SHA256 or AES256</td>
<td></td>
</tr>
<tr>
<td>&lt;LINE&gt; – Specify the encryption passphrase.</td>
<td></td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config)#password-encryption secret 2 motorola
rfs7000-37FABE(config)#
x6500-31FABE(config)#password-encryption secret 2 symbol
x6500-31FABE(config)#

Related Commands

| no | Disables password encryption |
### 4.1.52 profile

Global Configuration Commands

Configures profile related commands. If no parameters are given, all profiles are selected.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```plaintext
profile {ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6562|ap71xx|ap81xx|ap82xx|
  containing | filter | rfs4000 | rfs6000 | rfs7000 | nx45xx | nx65xx | nx9000}

profile {ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6562|ap71xx|ap81xx|ap82xx|
  rfs4000 | rfs6000 | rfs7000 | nx45xx | nx65xx | nx9000} <DEVICE-PROFILE-NAME>

profile {containing <DEVICE-PROFILE-NAME>} {filter type [ap621|ap622|ap650|ap6511|
  ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|
  nx65xx|nx9000]}

profile {filter type [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|
  ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000]} <DEVICE-PROFILE-NAME>
```

#### Parameters

- **profile** `{ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6562|ap71xx|ap81xx|ap82xx|
  containing | filter | rfs4000 | rfs6000 | rfs7000 | nx45xx | nx65xx | nx9000}

- **ap621** Optional. Configures AP621 profile commands
- **ap622** Optional. Configures AP622 profile commands
- **ap650** Optional. Configures AP650 profile commands
- **ap6511** Optional. Configures AP6511 profile commands
- **ap6521** Optional. Configures AP6521 profile commands
- **ap6522** Optional. Configures AP6522 profile commands
- **ap6532** Optional. Configures AP6532 profile commands
- **ap6562** Optional. Configures AP6562 profile commands
- **ap71xx** Optional. Configures AP71XX profile commands
- **ap81xx** Optional. Configures AP81XX profile commands
- **ap82xx** Optional. Configures AP82XX profile commands
- **rfs4000** Optional. Configures RFS4000 profile commands
- **rfs6000** Optional. Configures RFS6000 profile commands
- **rfs7000** Optional. Configures RFS7000 profile commands
- **nx45xx** Optional. Configures NX45XX profile commands
<table>
<thead>
<tr>
<th>Device Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nx65xx</td>
<td>Optional. Configures NX65XX profile commands</td>
</tr>
<tr>
<td>nx9000</td>
<td>Optional. Configures NX9000 series profile commands</td>
</tr>
<tr>
<td>&lt;DEVICE-PROFILE-NAME&gt;</td>
<td>After specifying the profile type, specify a substring in the profile name to filter profiles</td>
</tr>
</tbody>
</table>

profile {containing <DEVICE-PROFILE-NAME>} {filter type [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000]}

- profile Configures device profile commands
- containing <DEVICE-PROFILE-NAME> Optional. Configures profiles that contain a specified sub-string in the hostname
- filter type 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.
  - type – Filters profiles by the device type. Select a device type from the following options:
```plaintext
- **profile** `{filter type [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000]}

<table>
<thead>
<tr>
<th>filter type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<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>
<td></td>
</tr>
<tr>
<td>type – Filters profiles by the device type. Select a device type from the following options:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap621</td>
<td>Optional. Selects an AP621 profile</td>
</tr>
<tr>
<td>ap622</td>
<td>Optional. Selects an AP622 profile</td>
</tr>
<tr>
<td>ap650</td>
<td>Optional. Selects an AP650 profile</td>
</tr>
<tr>
<td>ap6511</td>
<td>Optional. Selects an AP6511 profile</td>
</tr>
<tr>
<td>ap6521</td>
<td>Optional. Selects an AP6521 profile</td>
</tr>
<tr>
<td>ap6522</td>
<td>Optional. Selects an AP6522 profile</td>
</tr>
<tr>
<td>ap6532</td>
<td>Optional. Selects an AP6532 profile</td>
</tr>
<tr>
<td>ap6562</td>
<td>Optional. Selects an AP6562 profile</td>
</tr>
<tr>
<td>ap71xx</td>
<td>Optional. Selects an AP71XX profile</td>
</tr>
<tr>
<td>ap81xx</td>
<td>Optional. Selects an AP81XX profile</td>
</tr>
<tr>
<td>ap82xx</td>
<td>Optional. Selects an AP82XX profile</td>
</tr>
<tr>
<td>rfs4000</td>
<td>Optional. Selects a RFS4000 profile</td>
</tr>
<tr>
<td>rfs6000</td>
<td>Optional. Selects a RFS6000 profile</td>
</tr>
<tr>
<td>rfs7000</td>
<td>Optional. Selects a RFS7000 profile</td>
</tr>
<tr>
<td>nx45xx</td>
<td>Optional. Selects a NX45XX series profile</td>
</tr>
<tr>
<td>nx65xx</td>
<td>Optional. Selects a NX65XX series profile</td>
</tr>
<tr>
<td>nx9000</td>
<td>Optional. Selects a NX9000 series profile</td>
</tr>
</tbody>
</table>

**Examples**

```
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>captive-portal</td>
<td>Captive portal</td>
</tr>
<tr>
<td>cdp</td>
<td>Cisco Discovery Protocol</td>
</tr>
<tr>
<td>cluster</td>
<td>Cluster configuration</td>
</tr>
<tr>
<td>configuration-persistence</td>
<td>Enable persistence of configuration across reloads (startup config file)</td>
</tr>
<tr>
<td>controller</td>
<td>WLAN controller configuration</td>
</tr>
<tr>
<td>critical-resource</td>
<td>Critical Resource</td>
</tr>
<tr>
<td>crypto</td>
<td>Encryption related commands</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>Device firmware upgrade</td>
</tr>
<tr>
<td>dot1x</td>
<td>802.1X</td>
</tr>
<tr>
<td>dscp-mapping</td>
<td>Configure IP DSCP to 802.1p priority mapping for untagged frames</td>
</tr>
<tr>
<td>email-notification</td>
<td>Email notification configuration</td>
</tr>
<tr>
<td>enforce-version</td>
<td>Check the firmware versions of devices before interoperateing</td>
</tr>
<tr>
<td>environmental-sensor</td>
<td>Environmental Sensors Configuration</td>
</tr>
<tr>
<td>events</td>
<td>System event messages</td>
</tr>
<tr>
<td>export</td>
<td>Export a file</td>
</tr>
<tr>
<td>floor</td>
<td>Set the floor within a area where the system is located</td>
</tr>
<tr>
<td>gre</td>
<td>GRE protocol</td>
</tr>
<tr>
<td>http-analyze</td>
<td>Specify HTTP-Analysis configuration</td>
</tr>
<tr>
<td>interface</td>
<td>Select an interface to configure</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>l2tpv3</td>
<td>L2tpv3 protocol</td>
</tr>
<tr>
<td>l3e-lite-table</td>
<td>L3e lite Table</td>
</tr>
<tr>
<td>led</td>
<td>Turn LEDs on/off on the device</td>
</tr>
<tr>
<td>led-timeout</td>
<td>Configure the time for the led to turn off after the last radio state change</td>
</tr>
<tr>
<td>legacy-auto-downgrade</td>
<td>Enable device firmware to auto downgrade when other legacy devices are detected</td>
</tr>
<tr>
<td>legacy-auto-update</td>
<td>Auto upgrade of legacy devices</td>
</tr>
<tr>
<td>lldp</td>
<td>Link Layer Discovery Protocol</td>
</tr>
<tr>
<td>load-balancing</td>
<td>Configure load balancing parameter</td>
</tr>
<tr>
<td>logging</td>
<td>Modify message logging facilities</td>
</tr>
<tr>
<td>mac-address-table</td>
<td>MAC Address Table</td>
</tr>
<tr>
<td>mac-auth</td>
<td>802.1X</td>
</tr>
<tr>
<td>memory-profile</td>
<td>Memory profile to be used on the device</td>
</tr>
<tr>
<td>meshpoint-device</td>
<td>Configure meshpoint device parameters</td>
</tr>
<tr>
<td>meshpoint-monitor-interval</td>
<td>Configure meshpoint monitoring interval</td>
</tr>
<tr>
<td>min-misconfiguration-recovery-time</td>
<td>Check controller connectivity after configuration is received</td>
</tr>
<tr>
<td>mint</td>
<td>MiNT protocol</td>
</tr>
<tr>
<td>misconfiguration-recovery-time</td>
<td>Check controller connectivity after configuration is received</td>
</tr>
<tr>
<td>neighbor-inactivity-timeout</td>
<td>Configure neighbor inactivity timeout</td>
</tr>
<tr>
<td>neighbor-info-interval</td>
<td>Configure neighbor information exchange interval</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
</tr>
<tr>
<td>noc</td>
<td>Configure the noc related setting</td>
</tr>
<tr>
<td>ntp</td>
<td>Ntp server WORD</td>
</tr>
<tr>
<td>offline-duration</td>
<td>Set duration for which a device remains unadopted before it generates offline event</td>
</tr>
<tr>
<td>power-config</td>
<td>Configure power mode</td>
</tr>
<tr>
<td>preferred-controller-group</td>
<td>Controller group this system will prefer for adoption</td>
</tr>
<tr>
<td>preferred-tunnel-controller</td>
<td>Tunnel Controller Name this system will prefer for tunneling extended vlan traffic</td>
</tr>
</tbody>
</table>
radius  Configure device-level radius authentication parameters
raid       RAID
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
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
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>)#

NOTE: For more information on profiles and how to configure profiles, see Chapter 7, PROFILES.

Related Commands

| no                  | Removes a profile and its associated configurations |
4.1.53  radio-qos-policy

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)#

NOTE: For more information on radio qos policy, see Chapter 17, RADIO-QOS-POLICY.

Related Commands
- no Removes an existing Radio QoS policy
4.1.54 **radius-group**

*Global Configuration Commands*

Configures RADIUS user group parameters.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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)#
```

**NOTE:** For more information on RADIUS user group commands, see Chapter 16, RADIUS-POLICY.

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an existing RADIUS group</td>
</tr>
</tbody>
</table>
4.1.55 radius-server-policy

> **Global Configuration Commands**

Creates an onboard device RADIUS policy

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
radius-server-policy <RADIUS-SERVER-POLICY-NAME>
```

**Parameters**
- `radius-server-policy <RADIUS-SERVER-POLICY-NAME>`

**Examples**

```
rfs7000-37FABE(config)#radius-server-policy testpolicy
rfs7000-37FABE(config-radius-server-policy-testpolicy)#?
```

Radius Configuration commands:
- `authentication` Radius authentication
- `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
- `nas` 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
- `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-radius-server-policy-testpolicy)#
```

---

**NOTE:** For more information on RADIUS server policy commands, see Chapter 16, RADIUS-POLICY.

**Related Commands**

- `no` Removes an existing RADIUS server policy
4.1.56 radius-user-pool-policy

Global Configuration Commands

Configures a RADIUS user pool

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
der End current mode and change to EXEC mode
del End current mode and down to previous mode
describe 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)#

NOTE: For more information on RADIUS user group commands, see Chapter 16, RADIUS-POLICY.

Related Commands
- no Removes an existing RADIUS user pool
4.1.57 **rename**

- **Global Configuration Commands**

Renames and existing TLO

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

rename tlo <TLO-NAME>

**Parameters**

- rename tlo <TLO-NAME> <NEW-TLO-NAME>

**Examples**

The following example shows the top level objects available for renaming:

```
rfs4000-229D58(config)#rename
aaa_policy                   aaa_tacacs_policy
address_range_alias         aif_policy
ap300                        assoc_acl
auto_provisioning_policy    bgp_as_path_list
bgp_community_list          bgp_extcommunity_list
bgp_ip_access_list          bgp_ip_prefix_list
bridging_policy             captive_portal
centro_policy               client_identity
client_identity_group      crypto_cmp_policy
device_categorization       dhcp_server_policy
dhcpv6_server_policy        dns_whitelist
dr_route_map                event_system_policy
dr_router_policy            global_assoc_list
host_alias                   ip_acl
ip_ssnmp_acl                 ipv6_acl
ipv6_prefix_policy          ipv6_radv_policy
l2tpv3_policy               mac_acl
management_policy           meshpoint
meshpoint_qos               mint_policy
mint_security_policy        nac_list
network_alias               network_group_alias
network_service_alias       network_group_alias
profile                      profile
radius_group                 profile
radius_user_pool            profile
rls_policy                  profile
routing_policy              profile
smart_rf_policy             profile
subscriber_policy           profile
wips_policy                 profile
wlan_qos                    profile
device
rfs4000-229D58(config)#
```

**Note:** Enter rename and press Tab to list top level objects available for renaming.
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 5.6.0.0-029B
!
! version 2.1
!
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 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 5.6.0.0-029B
!
! version 2.1
!
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 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 5.6.0.0-029B
!
!
version 2.1
!
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 host 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 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 |
4.1.58 rf-domain

Global Configuration Commands

An RF Domain groups devices that can logically belong to one network.

Table 4.18 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 4-198</td>
</tr>
<tr>
<td>rf-domain-mode commands</td>
<td>Invokes RF Domain configuration mode commands</td>
<td>page 4-200</td>
</tr>
</tbody>
</table>
4.1.58.1 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 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 in 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510
Syntax
rf-domain {<RF-DOMAIN-NAME>|containing <DOMAIN-NAME>}

Parameters
- rf-domain {<RF-DOMAIN-NAME>|containing <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</td>
<td>Optional. Identifies an existing RF Domain that contains a specified sub-string in the domain name</td>
</tr>
<tr>
<td>&lt;DOMAIN-NAME&gt;</td>
<td>• &lt;DOMAIN-NAME&gt; – Specify a sub-string of the RF Domain name.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config)#rf-domain rfs7000
rfs7000-37FABE(config-rf-domain-rfs7000)#?

RF Domain Mode commands:
- 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 Motorola 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)#
4.1.58.2 rf-domain-mode commands

This section describes the default commands under RF Domain.
Table 4.19 summarises RF Domain configuration commands.

Table 4.19 RF-Domain-Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>alias</td>
<td>Configures network, VLAN, and service aliases at the RF Domain level</td>
<td>page 4-202</td>
</tr>
<tr>
<td>channel-list</td>
<td>Configures the channel list advertised by radios</td>
<td>page 4-207</td>
</tr>
<tr>
<td>contact</td>
<td>Configures network administrator's contact information (needed in case of any</td>
<td>page 4-208</td>
</tr>
<tr>
<td></td>
<td>problems impacting the RF Domain)</td>
<td></td>
</tr>
<tr>
<td>control-vlan</td>
<td>Configures VLAN for traffic control on a RF Domain</td>
<td>page 4-209</td>
</tr>
<tr>
<td>controller-managed</td>
<td>Configures the adopting controller or service platform as this RF Domain's</td>
<td>page 4-210</td>
</tr>
<tr>
<td></td>
<td>manager</td>
<td></td>
</tr>
<tr>
<td>country-code</td>
<td>Configures the country of operation</td>
<td>page 4-211</td>
</tr>
<tr>
<td>layout</td>
<td>Configures layout information</td>
<td>page 4-212</td>
</tr>
<tr>
<td>location</td>
<td>Configures the physical location of a RF Domain</td>
<td>page 4-214</td>
</tr>
<tr>
<td>mac-name</td>
<td>Maps MAC addresses to names</td>
<td>page 4-215</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts configured settings to their default</td>
<td>page 4-216</td>
</tr>
<tr>
<td>override-smart-rf</td>
<td>Configures RF Domain level overrides for Smart RF</td>
<td>page 4-218</td>
</tr>
<tr>
<td>override-wlan</td>
<td>Configures RF Domain level overrides for a WLAN</td>
<td>page 4-219</td>
</tr>
<tr>
<td>sensor-server</td>
<td>Configures an AirDefense sensor server on this RF Domain</td>
<td>page 4-220</td>
</tr>
<tr>
<td>stats</td>
<td>Configures stats related settings on this RF Domain. These settings define</td>
<td>page 4-222</td>
</tr>
<tr>
<td></td>
<td>how RF Domain statistics are updated</td>
<td></td>
</tr>
<tr>
<td>timezone</td>
<td>Configures a RF Domain’s geographic time zone</td>
<td>page 4-223</td>
</tr>
<tr>
<td>tree-node</td>
<td>Configures the hierarchial (tree-node) structure under which this RF Domain</td>
<td>page 4-224</td>
</tr>
<tr>
<td></td>
<td>appears</td>
<td></td>
</tr>
<tr>
<td>use</td>
<td>Enables the use of a specified Smart RF and/or WIPS policy</td>
<td>page 4-226</td>
</tr>
<tr>
<td>clrsr</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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug</td>
<td>page 5-15</td>
</tr>
<tr>
<td></td>
<td>(config-if) instance configurations</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.19 RF-Domain-Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
4.1.58.2.1 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```plaintext
alias [address-range|host|network|network-group|network-service|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>]
    network <NETWORK-ADDRESS/MASK> {<NETWORK-ADDRESS/MASK>}
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|nntp|ntp|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|nntp|ntp|pop3|proto|sip|smtp|sourceport|<1-65535>|<WORD>|ssh|telnet|tftp|www}
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>**

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
<th>note</th>
</tr>
</thead>
<tbody>
<tr>
<td>address-range</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>
<td></td>
</tr>
<tr>
<td>&lt;ADDRESS-RANGE-ALIAS-NAME&gt;</td>
<td>- Specify the address range alias name.</td>
<td></td>
</tr>
<tr>
<td>&lt;STARTING-IP&gt;</td>
<td>Associates a range of IP addresses with this address range alias</td>
<td></td>
</tr>
<tr>
<td>to &lt;ENDING-IP&gt;</td>
<td>- Specify the first IP address in the range.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Specify the last IP address in the range.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> If using an existing address-range alias, you can apply overrides to the alias at the RF Domain level.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Note: Alias name should begin with $.</em></td>
<td></td>
</tr>
</tbody>
</table>
## GLOBAL CONFIGURATION COMMANDS

1. `alias host <HOST-ALIAS-NAME> <HOST-IP>`

   **host**
   `<HOST-ALIAS-NAME>`  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.
   - `<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 RF Domain level.

2. `alias network <NETWORK-ALIAS-NAME> <NETWORK-ADDRESS/MASK>`

   **network**
   `<NETWORK-ALIAS-NAME>`  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.
   - `<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 RF Domain level.

3. `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>}`

   **network**
   `<NETWORK-GROUP-ALIAS-NAME>`  Creates a network-group alias for this RF Domain. Or associates an existing network-group alias with this RF Domain.
   - `<NETWORK-GROUP-ALIAS-NAME>` – Specify the network-group alias name.
   **Note:** Alias name should begin with `$`.

   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 RF Domain level.

   **address-range**
   `<STARTING-IP>` to `<ENDING-IP>` {<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>` {<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>` {<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.

Creates 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.
| `eigrp`         | Selects Enhanced Interior Gateway Routing Protocol (EIGRP). The protocol number is 88.
| `gre`           | Selects Generic Routing Encapsulation (GRE). The protocol number is 47.
| `igmp`          | Selects Internet Group Management Protocol (IGMP). The protocol number is 2.
| `igp`           | Selects Interior Gateway Protocol (IGP). The protocol number is 9.
| `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|pop3|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)
| `ldap`          | Optional. Configures the default Lightweight Directory Access Protocol (LDAP) services port (389)
| `ntp`           | Optional. Configures the default Newsgroup (NNTP) services port (119)
| `ntp`           | Optional. Configures the default Network Time Protocol (NTP) services port (123)
| `POP3`          | Optional. Configures the default Post Office Protocol (POP3) services port (110)
| `proto`         | Optional. Use this option to select another Internet protocol in addition to the one selected in the previous step.

Contd..
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>alias string <code>&lt;STRING-ALIAS-NAME&gt;</code> <code>&lt;LINE&gt;</code></td>
<td>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 <code>$DOMAIN</code> test.motorola.com’. In this example, the string alias name is: <code>$DOMAIN</code> and the string value it is mapped to is: test.motorola.com. In this example, the string alias refers to a domain name.</td>
</tr>
<tr>
<td></td>
<td>Note: Alias name should begin with <code>'$'</code>.</td>
</tr>
<tr>
<td></td>
<td>Note: If using an existing string alias, you can apply overrides to the alias at the RF Domain level.</td>
</tr>
<tr>
<td>alias vlan <code>&lt;VLAN-ALIAS-NAME&gt;</code> <code>&lt;1-4094&gt;</code></td>
<td>Creates a VLAN alias for this RF Domain. Or associates an existing VLAN alias with this RF Domain. A VLAN alias maps a name to a VLAN ID.</td>
</tr>
<tr>
<td></td>
<td>Note: Alias name should begin with <code>'$'</code>.</td>
</tr>
<tr>
<td></td>
<td>Note: If using an existing VLAN alias, you can apply overrides to the alias at the RF Domain level.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config)#show context
!
! Configuration of RFS4000 version 5.6.0.0-029B
!
! version 2.3
!
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 $TestAddrRanAlias 192.168.13.10 to 192.168.13.13
!
alias network-service $NetworkServAlias proto udp
```
In the following examples, the global aliases '$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

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 $test network 192.168.2.0/24 192.168.3.0/24
associate this network-group alias '$test' to the RF Domain 'test' and override the 'host' element of the alias.

rfs4000-229D58(config-rf-domain-test)#alias network-group $test host 192.168.10.10

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>
4.1.58.2.2 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

channel-list [2.4GHz|5GHz|dynamic]

channel-list dynamic

channel-list [2.4GHz|5GHz] <CHANNEL-LIST>

Parameters

- channel-list dynamic

<table>
<thead>
<tr>
<th>dynamic</th>
<th>Enables a dynamic update of a channel list</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-list [2.4GHz</td>
<td>5GHz] &lt;CHANNEL-LIST&gt;</td>
</tr>
</tbody>
</table>

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.
4.1.58.2.3 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
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 a network administrator’s contact details
4.1.58.2.4 control-vlan

- **rf-domain-mode commands**

Configures the VLAN designated for traffic control in this RF Domain

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

current-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
contact Bob+14082778691
no country-code
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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables the VLAN designated for controlling RF Domain traffic</td>
</tr>
</tbody>
</table>
4.1.58.2.5 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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)#

Related Commands

no
Removes the adopting controller or service platform as this RF Domain’s manager
4.1.58.2.6 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
country-code <WORD>
```

Parameters

- **country-code <WORD>**

<table>
<thead>
<tr>
<th>country-code</th>
<th>Configures the RF Domain’s country of operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WORD&gt;</td>
<td>Specify the two (2) letter ISO-3166 country code.</td>
</tr>
</tbody>
</table>

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
4.1.58.2.7 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

- layout [area|floor|map-location]
- layout area <AREA-NAME> {(floor|map-location)}
- layout floor <FLOOR-NAME> {(<1-4094>|area|map-location)}
- layout map-location <URL> units [feet|meters] {(area <AREA-NAME>|floor <FLOOR-NAME>)}

Parameters

- layout area <AREA-NAME> {(floor|map-location)}
  
  Configures the RF Domain's layout in terms of area, floor, and location on a map.

- layout floor <FLOOR-NAME> {(<1-4094>|area|map-location)}
  
  Configures the RF Domain's layout in terms of area, floor, and location on a map.

- layout map-location <URL> units [feet|meters] {(area <AREA-NAME>|floor <FLOOR-NAME>)}
  
  Configures the location of the RF Domain on the map.

Note: After configuring the RF Domain’s area of functioning, optionally specify the floor name (and number), and/or the map location.

Note: After configuring the RF Domain’s floor name (and number), optionally specify the area name and/or the map location.

Note: After configuring the floor name (and number) for this RF Domain, optionally specify the area name.
Examples

```plaintext
rfs7000-37FABE(config-rf-domain-default)#layout map-location www.firstfloor.com units meters area Ecospace floor Floor5
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 Floor5 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><code>no</code></td>
<td>Removes the RF Domain layout details</td>
</tr>
</tbody>
</table>
4.1.58.2.8 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 common set of device configurations are deployed and managed by a RF Domain policy.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 Floor5 map-location www.firstfloor.com units meters
  control-vlan 1

rfs7000-37FABE(config-rf-domain-default)#

Related Commands

no

Removes the RF Domain location
### 4.58.2.9 mac-name

- **rf-domain-mode commands**

Configures a relevant name for each MAC address

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
mac-name <MAC> <NAME>
```

**Parameters**

- mac-name <MAC> <NAME>

<table>
<thead>
<tr>
<th>mac-name</th>
<th>Configures a relevant name for each MAC address</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;MAC&gt; &lt;NAME&gt;</td>
<td>Specifies the MAC address</td>
</tr>
<tr>
<td></td>
<td>- &lt;NAME&gt; — Specify a friendly name for this MAC address to use in events and statistics.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
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 Floor5 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
4.1.58.2.10 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no \[alias|channel-list|contact|control-vlan|controller-managed|country-code|layout|location|mac-name|override-smartrf|override-wlan|sensor-server|stats|timezone|tree-node|use\]

Parameters

- no \[alias|channel-list|contact|control-vlan|controller-managed|country-code|layout|location|mac-name|override-smartrf|override-wlan|sensor-server|stats|timezone|tree-node|use\]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no alias</td>
<td>Removes aliases associated with this RF Domain</td>
</tr>
<tr>
<td>no channel-list</td>
<td>Removes the channel list for the 2.4 GHz and 5.0 GHz bands. Also disables dynamic update of a channel list.</td>
</tr>
<tr>
<td>no contact</td>
<td>Removes configured contact details</td>
</tr>
<tr>
<td>no control-vlan</td>
<td>Removes the VLAN configured for controlling traffic</td>
</tr>
<tr>
<td>no controller-managed</td>
<td>Removes the adopting controller (access point, wireless controller, or service platform) as this RF Domain's manager</td>
</tr>
<tr>
<td>no country-code</td>
<td>Removes the country of operation configured</td>
</tr>
<tr>
<td>no layout</td>
<td>Removes RF Domain layout details</td>
</tr>
<tr>
<td>no location</td>
<td>Removes RF Domain location details</td>
</tr>
<tr>
<td>no mac-name</td>
<td>Removes the MAC address to name mapping</td>
</tr>
<tr>
<td>no override-smartrf</td>
<td>Resets override Smart RF settings to default</td>
</tr>
<tr>
<td>no override-wlan</td>
<td>Resets override WLAN settings to default</td>
</tr>
<tr>
<td>no sensor-server</td>
<td>Disables AirDefense sensor server details</td>
</tr>
<tr>
<td>no stats</td>
<td>Resets RF Domain stats settings</td>
</tr>
<tr>
<td>no timezone</td>
<td>Removes RF Domain’s time zone</td>
</tr>
<tr>
<td>no tree-node</td>
<td>Removes the configured hierarchial (tree-node) structure under which this RF Domain appears</td>
</tr>
<tr>
<td>no use</td>
<td>Resets RF Domain profile settings</td>
</tr>
</tbody>
</table>
Examples
The following example shows the default RF Domain settings before the 'no' commands are executed:

```bash
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 Floor5 map-location www.firstfloor.com units meters
  control-vlan 1
rfs7000-37FABE(config-rf-domain-default)#
```

```bash
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:

```bash
rfs7000-37FABE(config-rf-domain-default)#show context
rf-domain default
  contact Bob+14082778691
  country-code us
  layout area Ecospace floor Floor5 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>alias</td>
<td>Configures network, VLAN, and service aliases at the RF Domain level</td>
</tr>
<tr>
<td>channel-list</td>
<td>Configures the channel list advertised by radios, and enables dynamic update of channel lists</td>
</tr>
<tr>
<td>contact</td>
<td>Configures details of the person to contact (or the administrator) in case of any problems or issues impacting the RF Domain</td>
</tr>
<tr>
<td>control-vlan</td>
<td>Configures a VLAN for traffic control</td>
</tr>
<tr>
<td>controller-managed</td>
<td>Configures the adopting controller or service platform as this RF Domain’s manager</td>
</tr>
<tr>
<td>country-code</td>
<td>Configures a RF Domain’s country of operation</td>
</tr>
<tr>
<td>layout</td>
<td>Configures a RF Domain’s layout maps</td>
</tr>
<tr>
<td>location</td>
<td>Configures a RF Domain’s deployment location</td>
</tr>
<tr>
<td>mac-name</td>
<td>Configures a relevant name for each MAC address</td>
</tr>
<tr>
<td>override-smart-rf</td>
<td>Configures RF Domain level overrides for Smart RF</td>
</tr>
<tr>
<td>override-wlan</td>
<td>Configures RF Domain level overrides for WLAN</td>
</tr>
<tr>
<td>sensor-server</td>
<td>Configures an AirDefense sensor server</td>
</tr>
<tr>
<td>stats</td>
<td>Configures RF Domain stats settings</td>
</tr>
<tr>
<td>timezone</td>
<td>Configures a RF Domain’s geographic time zone</td>
</tr>
<tr>
<td>tree-node</td>
<td>Configures the hierarchial (tree-node) structure under which this RF Domain appears</td>
</tr>
<tr>
<td>use</td>
<td>Enables the use of a Smart RF and/or WIIPS policy</td>
</tr>
</tbody>
</table>
4.1.58.2.11 override-smart-rf

rf-domain-mode commands

Enables dynamic channel switching for Smart RF radios

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>
</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 Floor5 map-location www.firstfloor.com units meters
rfs7000-37FABE(config-rf-domain-default)#

Related Commands

no
Resets the override Smart RF settings its default
4.1.58.2.12 override-wlan

rf-domain-mode commands

Configures RF Domain level overrides for a WLAN

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

overrides-wlan <WLAN> [ssid|vlan-pool|wpa-wpa2-psk]

overrides-wlan <WLAN> [ssid <SSID>|vlan-pool <1-4094> {limit <0-8192>} | wpa-wpa2-psk <PASSPHRASE>]

Parameters

- overrides-wlan <WLAN> [ssid <SSID>|vlan-pool <1-4094> {limit <0-8192>} | wpa-wpa2-psk <PASSPHRASE>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| <WLAN> | Configures the WLAN name
The name should not exceed 32 characters and should represent the WLAN coverage area. After creating the WLAN, configure its override parameters. |
| ssid <SSID> | Configures a override SSID associated with this WLAN
The SSID should not exceed 32 characters. |
| 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. |
| wpa-wpa2-psk <PASSPHRASE> | Configures the WPA-WPA2 pre-shared key or passphrase for this WLAN
- <PASSPHRASE> – Specify a WPA-WPA2 key or passphrase. |

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 Floor5 map-location www.firstfloor.com units meters
rfs7000-37FABE(config-rf-domain-default)#

Related Commands

no | Resets the override WLAN settings its default
4.1.58.2.13 sensor-server

**rf-domain-mode commands**

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 WiNG 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
sensor-server <1-3> ip <IP> {port [443|<1-65535>]}  
```

**Parameters**

- **sensor-server <1-3> ip <IP> {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&gt;</th>
<th>Configures the (non DNS) IP address of the sensor server</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP&gt;</td>
<td>- Specify the IP address of the sensor server.</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 |
| <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 Floor5 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>
4.1.58.2.14 stats

rf-domain-mode commands

Configures stats settings that define how RF Domain statistics are updated

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
stats [open-window|update-interval]
stats open-window <1-2> {sample-interval <5-86640>} {size <3-100>}
stats update-interval [<5-300]|auto]

Parameters
- stats open-window <1-2> {sample-interval <5-86640>} {size <3-100>}
- stats update-interval [<5-300]|auto]

Related Commands
no

Resets stats related settings
4.1.58.2.15 timezone

rf-domain-mode commands

Configures the RF Domain's geographic time zone. Configuring the time zone is essential for RF Domains deployed across different geographical locations.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 Floor5 map-location www.firstfloor.com units meters
rfs7000-37FABE(config-rf-domain-default)#

Related Commands
- no — Removes a RF Domain's time zone
4.1.58.2.16 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

tree-node [campus|city|country|region] {(campus|city|country|region)}

Parameters

- tree-node [campus|city|country|region] {(campus|city|country|region)}

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><code>no</code></td>
<td>Removes the RF Domain’s tree-node configuration</td>
</tr>
</tbody>
</table>
4.158.2.17 use

rf-domain-mode commands

Enables the use of Smart RF and WIPS with this RF Domain

Assigns an existing Wireless IPS (WIPS) policy to the RF Domain

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.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

use [smart-rf-policy|wips-policy]

use [smart-rf-policy <SMART-RF-POLICY-NAME>|wips-policy <WIPS-POLICY-NAME>]

Parameters

- use [smart-rf-policy <SMART-RF-POLICY-NAME>|wips-policy <WIPS-POLICY-NAME>]

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 Floor5 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><strong>no</strong></td>
<td>Resets profiles used with this RF Domain</td>
</tr>
<tr>
<td><strong>sensor-server</strong></td>
<td>Configures an AirDefense sensor server on this RF Domain</td>
</tr>
<tr>
<td><strong>wips-policy</strong></td>
<td>Configures a WIPS policy</td>
</tr>
<tr>
<td><strong>smart-rf-policy</strong></td>
<td>Configures a Smart RF policy</td>
</tr>
</tbody>
</table>
### 4.1.59 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, NX6500, NX6524, NX9000, NX9500, NX9510

**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
4.1.60  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, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

rfs6000 <DEVICE-RFS6000-MAC>

Parameters

- rfs6000 <DEVICE-RFS6000-MAC>

<table>
<thead>
<tr>
<th>&lt;DEVICE-RFS6000-MAC&gt;</th>
<th>Specify the RFS6000's MAC address.</th>
</tr>
</thead>
</table>

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
4.1.61 **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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
rfs7000 <DEVICE-RFS7000-MAC>
```

**Parameters**

- `rfs7000 <DEVICE-RFS7000-MAC>`

<table>
<thead>
<tr>
<th>&lt;DEVICE-RFS7000-MAC&gt;</th>
<th>Specify the RFS7000's MAC address.</th>
</tr>
</thead>
</table>

**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
```

4.1.62 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, NX6500, NX6524, NX9000, NX9500, NX9510

---

**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
4.1.63 **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, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

nx65xx <DEVICE-NX65XX-MAC>

**Parameters**

- nx65xx <DEVICE-NX65XX-MAC>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;DEVICE-NX65XX-MAC&gt;</td>
<td>Specifies the MAC address of a NX65XX series service platform.</td>
</tr>
</tbody>
</table>

**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

---

**NOTE:** In this guide, NX6500 and NX6524 are collectively represented as a NX65XX series service platform.
### 4.1.64 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, NX6500, NX6524, NX9000, NX9500, NX9510

---

**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
4.1.65 role-policy

**Global Configuration Commands**

Configures a role-based firewall policy

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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-server: Add a ldap server
- ldap-service: Enable ldap attributes in role definition
- 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)#
```  

**NOTE:** For more information on role policy commands, see Chapter 18, ROLE-POLICY.

**Related Commands**

- no
  - Removes an existing role policy
### 4.1.66 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, NX6500, NX6524, NX9000

**Syntax**

```plaintext
route-map <ROUTE-MAP-NAME>
```

**Parameters**
- `route-map <ROUTE-MAP-NAME>`

**Examples**

```plaintext
nx9500-6C8809(config)#route-map test
nx9500-6C8809(config-dr-route-map-test)#
```

```plaintext
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

```plaintext
nx9500-6C8809(config-dr-route-map-test)#
```

**Related Commands**

- `no` Removes an existing dynamic BGP route map

---

**NOTE:** For more information on BGP route maps, see *Chapter 28, BORDER GATEWAY PROTOCOL.*
4.1.67 routing-policy

**Global Configuration Commands**

Configures a routing policy

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

role-policy \(<\text{ROUTING-POLICY-NAME}>\)

**Parameters**
- role-policy \(<\text{ROUTING-POLICY-NAME}>\)

| \(<\text{ROUTING-POLICY-NAME}>\) | Specify the role policy name. If the policy does not exist, it is created. |

**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)#

**NOTE:** For more information on routing policy commands, see Chapter 24, ROUTING-POLICY.

**Related Commands**

- **no** Removes an existing routing policy
4.1.68 self

Displays the device’s configuration context

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
self

Parameters
None

Examples
rfs7000-37FABE(config)#self
rfs7000-37FABE(config-device-00-15-70-37-FA-BE)#
4.1.69 **smart-rf-policy**

- **Global Configuration Commands**

Configures a Smart RF policy

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
smart-rf-policy <SMART-RF-POLICY-NAME>
```

**Parameters**

- `smart-rf-policy <SMART-RF-POLICY-NAME>`

**Examples**

```plaintext
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
- `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

```plaintext
clrscr Cuts 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
```

```plaintext
rfs7000-37FABE(config-smart-rf-policy-test)#
```

**NOTE:** For more information on Smart RF policy commands, see Chapter 19, SMART-RF-POLICY.

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an existing Smart RF policy</td>
</tr>
</tbody>
</table>
4.1.70 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 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, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

`t5 <T5-DEVICE-MAC>`

Parameters

- `t5 <T5-DEVICE-MAC>`

| t5 <T5-DEVICE-MAC> | Specify the t5 device’s MAC address. The system enters the identified device’s configuration mode. 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 Digital Subscriber Line (DSL) as their high speed Internet access mechanism using the CPE’s physical wallplate connection and phone jack. **Note:** After logging on to the T5 device, use the ‘cpe’ keyword and configure the following mandatory settings:
- `vlan` — Set a VLAN from 1 - 4,094 used as a virtual interface for connections between the T5 controller and its managed CPE devices.
- `start ip` — Set a starting IP address used in a range of addresses available to T5 controller connecting CPE devices.
- `end ip` — Set an end IP address used in a range of addresses available to T5 controller connecting CPE devices.

Examples

```
rfs7000-37FABE(config)#t5 B4:C7:99:ED:5C:2C
rfs7000-1AD09D(config-device-B4:C7:99:ED:5C:2C)#?
```

T5 Device Mode commands:

- `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
- `password` — T5 password configuration
- `qos` — QOS settings
- `radius-server` — Radius server settings
- `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
end
exit
help
revert
service
show
write

no

Removes the t5 wireless controller identified by the device's MAC address
4.1.71 **wips-policy**

- **Global Configuration Commands**

Configures a WIPS policy

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
wips-policy <WIPS-POLICY-NAME>
```

**Parameters**

- `wips-policy <WIPS-POLICY-NAME>`

**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
interference-event         Specify events which will contribute to smart-rf
                          are not stored in history
                          wifi interference calculations
no                         Negate a command or set its defaults
signature                  Signature to configure
use                        Set setting to use
clearscreen                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:** For more information on WIPS policy commands, see Chapter 20, *WIPS-POLICY*.

**Related Commands**

```
no                      Removes an existing WIPS policy
```
4.1.72 wlan

Global Configuration Commands

Configures a Wireless Local Area Network (WLAN)

Table 4.20 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 4-243</td>
</tr>
<tr>
<td>wlan-mode commands</td>
<td>Summarizes WLAN configuration mode commands</td>
<td>page 4-246</td>
</tr>
</tbody>
</table>
4.1.72.1 wlan

`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 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 WiNG 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```plaintext
wlan {<WLAN-NAME>|containing <WLAN-NAME>}
```

Parameters

- `wlan {<WLAN-NAME>|containing <WLAN-NAME>}`

  | wlan `<WLAN-NAME>` | Configures a new WLAN |
  | `containing <WLAN-NAME>` | Optional. Specify the WLAN name. The WLAN name could be a logical representation of its coverage area (for example, engineering, marketing etc.). The name cannot exceed 32 characters. |

  | containing `<WLAN-NAME>` | Optional. Configures an existing WLAN’s settings |
  | `<WLAN-NAME>` | 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. |

Examples

```
rfs7000-37FABE(config)#wlan 1
rfs7000-37FABE(config-wlan-1)#
```
rfs7000-37FABE(config)# wlan containing wlan1
rfs7000-37FABE(config-wlan-{'containing': 'wlan1'})#

rfs7000-37FABE(config-wlan-1)#?
Wireless LAN Mode commands:
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
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
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)
kberos Configure kerberos authentication parameters
mac-authentication Configure mac-authentication related parameters
mac-registration Enable dynamic MAC registration of user
motorola-extensions Enable support for Motorola-Specific extensions to 802.11
no Negate a command or set its defaults
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
radio-resource-measurement
radius
relay-agent
remove-override
shutdown
ssid
t5-client-isolation
t5-security
time-based-access
use
vlan
vlan-pool-member
wep128
wep64
wireless-client
wpa-wpa2
clrscr
commit
do
end
exit
help
revert
service
show
write

rfs7000-37FABE(config-wlan-1)#
4.1.72.2 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>
```

Table 4.21 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 4-249</td>
</tr>
<tr>
<td>acl</td>
<td>Defines the actions based on an ACL rule configuration</td>
<td>page 4-251</td>
</tr>
<tr>
<td>answer-broadcast-probes</td>
<td>Allows a WLAN to respond to probes for broadcast ESS</td>
<td>page 4-253</td>
</tr>
<tr>
<td>association-list</td>
<td>Attaches an existing global association list to a WLAN</td>
<td>page 4-254</td>
</tr>
<tr>
<td>authentication-type</td>
<td>Sets a WLAN’s authentication type</td>
<td>page 4-255</td>
</tr>
<tr>
<td>bridging-mode</td>
<td>Configures how packets to/from this WLAN are bridged</td>
<td>page 4-257</td>
</tr>
<tr>
<td>broadcast-dhcp</td>
<td>Configures broadcast DHCP packet handling</td>
<td>page 4-258</td>
</tr>
<tr>
<td>broadcast-ssid</td>
<td>Advertises a WLAN’s SSID in beacons</td>
<td>page 4-259</td>
</tr>
<tr>
<td>captive-portal-enforcement</td>
<td>Configures a WLAN’s captive portal enforcement</td>
<td>page 4-260</td>
</tr>
<tr>
<td>client-access</td>
<td>Enables WLAN client access (normal data operations)</td>
<td>page 4-261</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 4-262</td>
</tr>
<tr>
<td>client-load-balancing</td>
<td>Enables load balancing of WLAN clients</td>
<td>page 4-263</td>
</tr>
<tr>
<td>controller-assisted-mobility</td>
<td>Enables controller assisted mobility to determine wireless clients’ VLAN assignment</td>
<td>page 4-265</td>
</tr>
<tr>
<td>data-rates</td>
<td>Specifies the 802.11 rates supported on the WLAN</td>
<td>page 4-266</td>
</tr>
<tr>
<td>description</td>
<td>Sets a WLAN’s description</td>
<td>page 4-269</td>
</tr>
<tr>
<td>downstream-group-addressed-forwarding</td>
<td>Enables forwarding of downstream packets addressed to a group</td>
<td>page 4-270</td>
</tr>
<tr>
<td>dynamic-vlan-assignment</td>
<td>Configures dynamic VLAN assignment on this WLAN</td>
<td>page 4-271</td>
</tr>
<tr>
<td>eap-types</td>
<td>Configures client access based on eap-type used for authentication</td>
<td>page 4-272</td>
</tr>
<tr>
<td>encryption-type</td>
<td>Sets a WLAN’s encryption type</td>
<td>page 4-273</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>enforce-dhcp</td>
<td>Drops packets from clients with a static IP address</td>
<td>page 4-274</td>
</tr>
<tr>
<td>fast-bss-transition</td>
<td>Configures support for 802.11r fast BSS transition on a WLAN</td>
<td>page 4-275</td>
</tr>
<tr>
<td>http-analyze</td>
<td>Enables HTTP URL analysis on the WLAN</td>
<td>page 4-276</td>
</tr>
<tr>
<td>ip</td>
<td>Configures IPv4 settings on this WLAN</td>
<td>page 4-277</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures IPv6 settings on this WLAN</td>
<td>page 4-278</td>
</tr>
<tr>
<td>kerberos</td>
<td>Configures Kerberos authentication parameters</td>
<td>page 4-279</td>
</tr>
<tr>
<td>mac-authentication</td>
<td>Configures MAC authentication parameters</td>
<td>page 4-281</td>
</tr>
<tr>
<td>mac-registration</td>
<td>Enables dynamic MAC registration of user</td>
<td>page 4-282</td>
</tr>
<tr>
<td>motorola-extensions</td>
<td>Enables support for Vendor specific extensions to 802.11</td>
<td>page 4-284</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 4-285</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</td>
<td>page 4-288</td>
</tr>
<tr>
<td>protected-mgmt-frames</td>
<td>Enables and configures the WLAN’s frame protection mode and security association</td>
<td>page 4-290</td>
</tr>
<tr>
<td>proxy-arp-mode</td>
<td>Enables the proxy ARP mode for ARP requests</td>
<td>page 4-291</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>
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</tr>
<tr>
<td>qos-map</td>
<td>Enables support for 802.11u QoS map element and frames</td>
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</tr>
<tr>
<td>radio-resource-measurement</td>
<td>Enables support for 802.11k radio resource measurement</td>
<td>page 4-294</td>
</tr>
<tr>
<td>radius</td>
<td>Configures RADIUS parameters</td>
<td>page 4-295</td>
</tr>
<tr>
<td>relay-agent</td>
<td>Enables support for DHCP relay agent information (option 82) feature on this WLAN</td>
<td>page 4-296</td>
</tr>
<tr>
<td>shutdown</td>
<td>Closes a WLAN</td>
<td>page 4-297</td>
</tr>
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<td>Configures a WLAN’s SSID</td>
<td>page 4-298</td>
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<tr>
<td>t5-client-isolation</td>
<td>Disallows clients connecting to the WLAN to communicate with one another</td>
<td>page 4-299</td>
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<tr>
<td>t5-security</td>
<td>Configures T5 PowerBroadband security settings</td>
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<tr>
<td>time-based-access</td>
<td>Configures time-based client access</td>
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</tr>
<tr>
<td>use</td>
<td>Defines WLAN mode configuration settings</td>
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<tr>
<td>vlan</td>
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<td>vlan-pool-member</td>
<td>Adds a member VLAN to the pool of VLANs for a WLAN</td>
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</tr>
</tbody>
</table>
## Table 4.21 WLAN-Mode Commands

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<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
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<td>wep128</td>
<td>Configures WEP128 parameters</td>
<td>page 4-308</td>
</tr>
<tr>
<td>wep64</td>
<td>Configures WEP64 parameters</td>
<td>page 4-310</td>
</tr>
<tr>
<td>wireless-client</td>
<td>Configures the transmit power for wireless clients transmission</td>
<td>page 4-312</td>
</tr>
<tr>
<td>wpa-wpa2</td>
<td>Modifies TKIP and CCMP (WPA/WPA2) related parameters</td>
<td>page 4-314</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands applicable in the WLAN configuration mode</td>
<td>page 4-317</td>
</tr>
</tbody>
</table>
### 4.1.72.2.1 accounting

<table>
<thead>
<tr>
<th>wlan-mode commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defines the WLAN's accounting configuration</td>
</tr>
</tbody>
</table>

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

### Syntax

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>accounting [radius</td>
<td>syslog</td>
</tr>
<tr>
<td>accounting [radius</td>
<td>wait-client-ip]</td>
</tr>
<tr>
<td>accounting syslog [host</td>
<td>mac-address-format]</td>
</tr>
<tr>
<td>accounting syslog host &lt;IP/HOSTNAME&gt; {port &lt;1-65535&gt;} {proxy-mode [none</td>
<td>through-controller</td>
</tr>
<tr>
<td>accounting syslog mac-address-format [middle-hyphen</td>
<td>no-delim</td>
</tr>
</tbody>
</table>

### Parameters

- **accounting [radius|wait-client-ip]** Enables waiting for client’s IP before commencing the accounting procedure

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>accounting radius</td>
<td>Enables support for WLAN RADIUS accounting messages. This option is disabled by default. When enabled, the WLAN uses an external RADIUS resource for accounting. <strong>Note:</strong> Use the use &gt; aaa-policy &gt; &lt;AAA-POLICY-NAME&gt; 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.</td>
</tr>
<tr>
<td>accounting wait-client-ip</td>
<td>Enables waiting for client’s IP before commencing the accounting procedure</td>
</tr>
</tbody>
</table>

- **accounting syslog host <IP/HOSTNAME> {port <1-65535>} {proxy-mode [none|through-controller|through-rf-domain-manager]}** Enables support for WLAN syslog accounting messages in standard syslog format (RFC 3164). This option is disabled by default.
### accounting syslog

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>host (&lt;\text{IP/HOSTNAME}&gt;)</td>
<td>Configures a syslog destination hostname or IP address for accounting records. (&lt;\text{IP/HOSTNAME}&gt;) – Specify the IP address or name of the destination host.</td>
</tr>
<tr>
<td>port (&lt;1-65535&gt;)</td>
<td>Optional. Configures the syslog server's UDP port (this port is used to connect to the server). (&lt;1-65535&gt;) – Specify the port from 1 - 65535. Default port is 514.</td>
</tr>
</tbody>
</table>
| proxy-mode \([\text{none} | \text{through-controller} | \text{through-rf-domain-manager}]\) | Optional. Configures the request proxying mode.  
- \text{none} – Requests are directly sent to the server from the device.
- \text{through-controller} – Proxies requests through the controller (access point, wireless controller, or service platform) configuring the device.
- \text{through-rf-domain-manager} – Proxies requests through the local RF Domain manager. |

* accounting syslog mac-address-format {middle-hyphen|no-delim|pair-colon|pair-hyphen|quad-dot} case {lower|upper}*

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>accounting syslog</td>
<td>Enables support for WLAN syslog accounting messages.</td>
</tr>
<tr>
<td>mac-address-format</td>
<td>Configures the MAC address format used in syslog messages.</td>
</tr>
<tr>
<td>middle-hyphen</td>
<td>Configures the MAC address format with middle hyphen (AABBCC-DDDEEFF)</td>
</tr>
<tr>
<td>no-delim</td>
<td>Configures the MAC address format without delimiters (AABBCCDDEEFF)</td>
</tr>
<tr>
<td>pair-colon</td>
<td>Configures the MAC address format with pair-colon delimiters (AA:BB:CC:DD:EE:FF)</td>
</tr>
<tr>
<td>pair-hyphen</td>
<td>Configures the MAC address format with pair-hyphen delimiters (AA-BB-CC-DD-EE-FF). This is the default setting.</td>
</tr>
<tr>
<td>quad-dot</td>
<td>Configures the MAC address format with quad-dot delimiters (AABB.CC:DD:EE:FF)</td>
</tr>
</tbody>
</table>
| case {lower|upper} | The following keywords are common to all:  
- \text{case} – Specifies MAC address case (upper or lower).  
- \text{lower} – Specifies MAC address is filled in lower case (for example, aa-bb-cc-dd-ee-ff)  
- \text{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
rfs7000-37FABE(config-wlan-test)#
```
4.1.72.2 acl

* wlan-mode commands

Defines the actions taken based on an ACL rule configuration.

Use the `use > ip-access-list <IP-ACCESS-LIST-NAME>` 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 wireless firewall.

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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
set acl exceed-rate wireless-client-denied-traffic <0-1000000> {blacklist|disassociate}
```

**Parameters**

- `acl exceed-rate wireless-client-denied-traffic <0-1000000> {blacklist|disassociate}`

- `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.

- `blacklist <0-86400>` Optional. When enabled, sets the time interval to blacklist a wireless client

- `disassociate` Optional. When enabled, disassociates a wireless client
Examples

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)#
4.1.72.2.3 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
answer-broadcast-probes

Parameters
None

Examples
rfs7000-37FABE(config-wlan-1)#answer-broadcast-probes
rfs7000-37FABE(config-wlan-1)#
4.1.72.2.4 association-list

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

association-list global <GLOBAL-ASSO-LIST-NAME>

Parameters
None

Examples

rfs4000-229D58(config-wlan-test)#association-list global my-clients
rfs4000-229D58(config-wlan-test)#

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)#
4.1.72.2.5 authentication-type

Sets the WLAN's authentication type

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
authentication-type [eap|eap-mac|eap-psk|kerberos|mac|none]
```

Parameters

- **authentication-type [eap|eap-mac|eap-psk|kerberos|mac|none]**
  - **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.
  - **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 passcode during authentication. EAP-PSK is useful when transitioning from a PSK network to one that supports EAP.
  - **kerberos** 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).
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `mac` | 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.  

| `none` | No authentication is used or the client uses pre-shared keys |

**Examples**

```bash
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
rfs7000-37FABE(config-wlan-test)#
```
**4.1.72.2.6 bridging-mode**

* wlan-mode commands

Configures how packets are bridged to and from a WLAN

Use this command to define which VLANs are bridged, and how local VLANs are bridged between the wired and wireless sides of the network.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
bridging-mode [local|tunnel]
```

**Parameters**

- bridging-mode [local|tunnel]

<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</td>
</tr>
<tr>
<td>tunnel</td>
<td>Tunnels packets to other devices (typically a wireless controller or service platform). This is the default mode.</td>
</tr>
</tbody>
</table>

**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)#
```
4.1.72.2.7 broadcast-dhcp

* wlan-mode commands

Configures broadcast DHCP packet parameters

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
broadcast-dhcp validate-offer
```

**Parameters**

- `broadcast-dhcp validate-offer`

| validate-offer | Validates the broadcast DHCP packet destination (a wireless client associated to the radio) before forwarding over the air |

**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)#
```
4.1.72.2.8 broadcast-ssid

wlan-mode commands

Advertises the WLAN SSID in beacons. This feature is enabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
broadcast-ssid

Parameters
None

Examples
rfs7000-37FABE(config-wlan-1)#broadcast-ssid
rfs7000-37FABE(config-wlan-1)#
4.1.72.2.9 captive-portal-enforcement

wlan-mode commands

Configures the WLAN's captive portal enforcement

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

captive-portal-enforcement {fall-back}

Parameters
- captive-portal-enforcement {fall-back}

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>captive-portal-enforcement</td>
<td>Enables captive portal enforcement on a WLAN</td>
</tr>
<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)#
4.1.72.2.10 client-access

- wlan-mode commands

Enables WLAN client access (for normal data operations)

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
client-access

Parameters
None

Examples
rfs7000-37FABE(config-wlan-1)#client-access
rfs7000-37FABE(config-wlan-1)#
4.1.72.2.11 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`client-client-communication`

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-wlan-1)#client-client-communication
rfs7000-37FABE(config-wlan-1)#
```
4.1.72.2.12 client-load-balancing

**wlan-mode commands**

Configures client load balancing on a WLAN. This feature is disabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
client-load-balancing {allow-single-band-clients|band-discovery-intvl|
capability-ageout-time|max-probe-req|probe-req-intvl}
```

```
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|probe-req-intvl} [2.4Ghz|5Ghz] <0-10000>
```

**Parameters**

- **client-load-balancing {allow-single-band-clients [2.4Ghz|5Ghz]}**
  - Optional. Allows single band clients to associate even during load balancing
  - **2.4GHz** – Enables load balancing across 2.4 GHz channels
  - **5GHz** – Enables load balancing across 5.0 GHz channels

- **band-discovery-intvl <0-10000>**
  - Optional. Configures the interval to discover a client’s band capability before connection
  - **<0-10000>** – Specify a value from 0 - 10000 seconds.

- **capability-ageout-time <0-10000>**
  - Optional. Configures a client’s capability ageout interval
  - **<0-10000>** – Specify a value from 0 - 10000 seconds.

- **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

- **probe-req-intvl 2.4GHz|5GHz <0-10000>**
  - Optional. Configures client probe request interval limits for device association
  - **2.4GHz** – Configures the client probe request interval on 2.4 GHz radios
  - **5GHz** – Configures the client probe request interval on 5.0 GHz radios

  - **<0-10000>** – Specify a value from 0 - 10000.
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)#
4.1.72.2.13 controller-assisted-mobility

Enables controller or service platform assisted mobility to determine a wireless client’s VLAN assignment

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
controller-assisted-mobility

Parameters
None

Examples
rfs4000-229D58(config-wlan-test)#controller-assisted-mobility
rfs4000-229D58(config-wlan-test)#

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)#
4.1.72.2.14 data-rates

- wlan-mode commands

Specifies the 802.11 rates supported on a WLAN

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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|basis-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|mcs2s|mcs3s]

Parameters
- data-rates 2.4GHz [b-only|bg|bgn|default|g-only|gn]

<table>
<thead>
<tr>
<th>data-rates</th>
<th>Specifies the 802.11 rates supported when mapped to a 2.4 GHz radio</th>
</tr>
</thead>
<tbody>
<tr>
<td>b-only</td>
<td>Uses rates that support only 11b clients</td>
</tr>
<tr>
<td>bg</td>
<td>Uses rates that support both 11b and 11g clients</td>
</tr>
<tr>
<td>bgn</td>
<td>Uses rates that support 11b, 11g and 11n clients</td>
</tr>
<tr>
<td>default</td>
<td>Uses the default rates configured for a 2.4 GHz radio</td>
</tr>
<tr>
<td>g-only</td>
<td>Uses rates that support operation in 11g only</td>
</tr>
<tr>
<td>gn</td>
<td>Uses rates that support 11g and 11n clients</td>
</tr>
</tbody>
</table>

- data-rates 5GHz [a-only|an|default]

<table>
<thead>
<tr>
<th>data-rates</th>
<th>Specifies the 802.11 rates supported when mapped to a 5.0 GHz radio</th>
</tr>
</thead>
<tbody>
<tr>
<td>a-only</td>
<td>Uses rates that support operation in 11a only</td>
</tr>
<tr>
<td>an</td>
<td>Uses rates that support 11a and 11n clients</td>
</tr>
<tr>
<td>default</td>
<td>Uses default rates configured for a 5.0 GHz</td>
</tr>
</tbody>
</table>
- **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. |
| 1,11,2,5.5                | 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  |
| [12,18,24,36,48,54,6,9,   | The following data rates are common to both the 2.4 GHz and 5.0 GHz channels:  |
|   basic-1,basic-11,       | • 12 – 12 Mbps  |
|   basic-12,basic-18,      | • 18 – 18-Mbps  |
|   basic-2,               | • 24 – 24 Mbps  |
|   basic-36,basic-48,      | • 36 – 36-Mbps  |
|   basic-5.5,             | • 48 – 48-Mbps  |
|   basic-54,basic-6,       | • 54 – 54-Mbps  |
|   basic-9,basic-mcs-1s,   | • 6 – 6-Mbps  |
|   mcs-1s,mcs2s,mcs-3s]    | • 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)#
4.1.72.2.15 description

Defines the WLAN description

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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></td>
<td>The WLAN’s description should help differentiate it from others with similar configurations. The description should not exceed 64 characters.</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)#
4.1.72.2.16 downstream-group-addressed-forwarding

* wlan-mode commands

Enables/disables forwarding of downstream BCMC packets to a group on this WLAN. This feature is enabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

downstream-group-addressed-forwarding

**Parameters**

None

**Examples**

rfs4000-229D58 (config-wlan-test)#downstream-group-addressed-forwarding
rfs4000-229D58 (config-wlan-test)#
4.1.72.2.17 dynamic-vlan-assignment

- **wlan-mode commands**

Configures dynamic VLAN assignment on this WLAN

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**
dynamic-vlan-assignment allowed-vlans <VLAN-ID>

**Parameters**
- dynamic-vlan-assignment allowed-vlans <VLAN-ID>

<table>
<thead>
<tr>
<th>dynamic-vlan-assignment allowed-vlans</th>
<th>Configures a list of VLAN IDs or VLAN alias allowed access to the WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;VLAN-ID&gt;</td>
<td>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)#

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)#
4.1.72.2.18 eap-types

Configures client access based on the EAP type used

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 |

[a|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
- 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 (GSM) 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)#
4.172.2.19 encryption-type

Sets a WLAN’s encryption type

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

cryptographic-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>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
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
bottleneck-modal-portal-enforcement fall-back
acl exceed-rate wireless-client-denied-traffic 20 disassociate
broadcast-dhcp validate-offer
rfs7000-37FABE(config-wlan-test)
4.1.72.2.20 enforce-dhcp

- wlan-mode commands

Drops packets from clients with a static IP address

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

enforce-dhcp

Parameters

None

Examples

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
acl exceed-rate wireless-client-denied-traffic 20 disassociate
  enforce-dhcp
broadcast-dhcp validate-offer
rfs7000-37FABE(config-wlan-test)#
4.1.72.2.21 fast-bss-transition

> wlan-mode commands

Enables or disables 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
fast-bss-transition {over-ds}

Parameters
- fast-bss-transition {over-ds}

---

<table>
<thead>
<tr>
<th>fast-bss-transition over-ds</th>
<th>Enables 802.11r FT support on this WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<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>
<td></td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-wlan-test)#fast-bss-transition
rfs7000-37FABE(config-wlan-test)#

rfs7000-37FABE(config-wlan-test)#show context wlan test
ssid test
bridging-mode tunnel
encryption-type none
authentication-type none

**fast-bss-transition**

rfs7000-37FABE(config-wlan-test)#
4.1.72.2.22  http-analyze

Enables HTTP URL analysis on the WLAN

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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]
  - filter Filters URLs, based on the parameters set, before forwarding them
  - images Filters out URLs referring to images (does not forward URL requesting images)
  - post Filters out URLs requesting POST (does not forward POST requests). This option is disabled by default.
  - query-string Removes query strings from URLs before forwarding them (forwards requests and no data). This option is disabled by default.
- http-analyze syslog host <IP/HOSTNAME> {port <1-65535>} {proxy-mode [none|through-controller|through-rf-domain-manager]}
  - syslog host <IP/HOSTNAME> Forwards client and URL information to a syslog server
    - host <IP/HOSTNAME> – Specify the syslog server's IP address or hostname
  - port <1-65535> Optional. Specifies the UDP port to connect to the syslog server from 1 - 65535
  - proxy-mode [none|through-controller|through-rf-domain-manager] Optional. Specifies if the request is to be proxied through another device
    - none – Requests are sent directly to syslog server from device
    - through-controller – Proxies requests, to the syslog server, through the controller configuring the device
    - through-rf-domain-manager – Proxies requests, to the syslog server, through the local RF Domain manager

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)#
4.1.72.2.23 ip

- **wlan-mode commands**

Configures Internet Protocol (IP) settings

Supported in the following platforms:
- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
ip [arp|dhcp]

ip arp [header-mismatch-validation|trust]

ip dhcp trust
```

**Parameters**

- **ip arp [header-mismatch-validation|trust]**
  - ip arp Configures the IP settings for ARP packets
  - header-mismatch-validation Verifies mismatch of source MAC address in the ARP and Ethernet headers
  - trust Sets ARP responses as trusted for a WLAN/range

- **ip dhcp trust**
  - ip dhcp Configures the IP settings for DHCP packets
  - trust Sets DHCP responses as trusted for a WLAN/range

**Examples**

```
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 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)#
```
4.1.72.2.24 ipv6

Sets the DHCPv6 and ICMPv6 neighbor discovery (ND) components for this WLAN.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- 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>ipv6 dhcpv6 trust</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipv6 nd [header-mismatch-validation</td>
<td>raguard</td>
</tr>
<tr>
<td>header-mismatch-validation</td>
<td>Checks for mismatch of source MAC address in the ICMPv6 neighbor discovery (ND) message and Ethernet header (link layer option). This option is enabled by default.</td>
</tr>
<tr>
<td>raguard</td>
<td>Allows redirection of router advertisements (RAs) and ICMPv6 packets originating on this WLAN. This option is disabled by default.</td>
</tr>
<tr>
<td>trust</td>
<td>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.</td>
</tr>
</tbody>
</table>

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)#
4.1.72.2.25 kerberos

wlan-mode commands

Configures 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 Vendor specific 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
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>]
- kerberos realm <REALM>
- kerberos server [primary|secondary] host <IP/HOSTNAME> {port <1-65535>}

| kerberos | Configures a WLAN's Kerberos authentication parameters The parameters are: password, realm, and server. |
| password | Configures a Kerberos Key Distribution Center (KDC) server password. The password should not exceed 127 characters. The password options are: |
| kerberos realm <REALM> | The parameters are: password, realm, and server. |
| 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 WLAN's Kerberos authentication parameters The parameters are: password, realm, and server. |
server [primary|secondary]  Configures the primary and secondary KDC server parameters
  • primary – Configures the primary KDC server parameters
  • secondary – Configures the secondary KDC server parameters

host <IP/HOSTNAME>  Sets the primary or secondary KDC server address
  • <IP/HOSTNAME> – Specify the IP address or name of the KDC server.

port <1-65535>  Optional. Configures the UDP port used to connect to the KDC server
  • <1-65535> – Specify the port from 1 - 65535. The default is 88.

  • kerberos server timeout <1-60>

kerberos  Configures a WLAN's Kerberos authentication parameters
The parameters are: password, realm, and server.

timeout <1-60>  Modifies the Kerberos KDC server’s timeout parameters
  • <1-60> – Specifies the wait time for a response from the Kerberos KDC server before retrying.
  Specify a value from 1 - 60 seconds.

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)#
4.1.72.2.26 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>cached-credentials</td>
<td>Uses cached credentials to skip RADIUS lookups</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.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config-wlan-test)#mac-authentication cached-credentials
rfs4000-229D58(config-wlan-test)#
```
4.1.7.2.27 **mac-registration**

* wlan-mode commands

Enables dynamic MAC registration of a user

---

**NOTE:** This feature is supported only if MAC authentication is enabled. To enable MAC authentication use the `authentication-type > mac` command in the config WLAN mode.

---

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
mac-registration [external|group-name]

mac-registration external host <IP/HOSTNAME> {proxy-mode [none|through-controller|through-rf-domain-manager]}

mac-registration group-name <GROUP-NAME> {agreement-refresh <0-100>|expiry-time <1-1500>}
```

**Parameters**

- **mac-registration external host <IP/HOSTNAME> {proxy-mode [none|through-controller|through-rf-domain-manager]}**

  - `external` Forwards MAC registration user information to the external controller
  - `host <IP/HOSTNAME>` Specifies the external controller’s IP address or hostname
  - `proxy-mode` Optional. Specifies the forwarding mode
    - `none` – Requests are sent directly to the controller from the requesting device
    - `through-controller` – Requests are proxied through the controller configuring the device
    - `through-rf-domain` – Requests are proxied through the local RF Domain manager

- **mac-registration group-name <GROUP-NAME> {agreement-refresh <0-100>|expiry-time <1-1500>}**

  - `group-name <GROUP-NAME>` Specifies the group to which the MAC registered user should be added
    - `<GROUP-NAME>` – Specify the group name.
  - `expiry-time <1-1500>` Optional. Specifies the user expiry time in days from 1 - 1500
  - `agreement-refresh <0-100>` Optional. Sets the time (in days), after which an inactive user has to refresh the WLAN’s terms of agreement. For example, if the agreement refresh period is set to 10, a user logging in after 10 days of inactivity will be displayed the agreement page. and will be allowed WLAN access only after refreshing the terms of agreement.
    - `<0-100>` – Specify the number of days from 0 - 100.
Examples

rfs7000-37FABE(config-wlan-1)#mac-registration group-name test expiry-time 100

rfs7000-37FABE(config-wlan-1)#mac-registration external host 172.16.10.8 proxy-mode through-controller

rfs7000-37FABE(config-wlan-1)#show context

wlan 1
ssid 1
bridging-mode tunnel
encryption-type none
authentication-type mac
mac-registration group-name test expiry-time 100
mac-registration external host 172.16.10.8 proxy-mode through-controller

rfs4000-229D58(config-wlan-wlan-testing)#mac-registration group-name Group3

agreement-refresh Specify when the agreement page should be displayed to the user (in days)
expiry-time Specify the user expiry time in days

rfs4000-229D58(config-wlan-wlan-testing)#mac-registration group-name Group3 agreement-refresh

<0-100> Agreement page will be displayed to the user if the user has not visited in the past (number of days)

rfs4000-229D58(config-wlan-wlan-testing)#

rfs4000-229D58(config-wlan-wlan-testing)#mac-registration group-name Group3 agreement-refresh 19
4.1.72.28 motorola-extensions

- wlan-mode commands

Enables support for Vendor specific extensions to 802.11

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
motorola-extensions [move-command|smart-scan|symbol-load-information|wmm-load-information]
```

Parameters

- `motorola-extensions [move-command|smart-scan|symbol-load-information|wmm-load-information]`

<table>
<thead>
<tr>
<th>motorola-extensions</th>
<th>Enables support for Vendor specific extensions to 802.11</th>
</tr>
</thead>
<tbody>
<tr>
<td>move-command</td>
<td>Enables support for Vendor specific move (fast roaming) feature</td>
</tr>
<tr>
<td>smart-scan</td>
<td>Enables support for smart scanning feature</td>
</tr>
<tr>
<td>symbol-load-information</td>
<td>Enables support for the Symbol Technologies load information element (Element ID 173)</td>
</tr>
<tr>
<td>wmm-load-information</td>
<td>Enables support for the Vendor specific WMM load information element</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-wlan-test)#motorola-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
motorola-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
```

rfs7000-37FABE(config-wlan-test)#
4.1.72.2.29 no

> wlan-mode commands

Negates WLAN mode commands and reverts values to their default

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no <PARAMETER>

Parameters

None

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
  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
  dynamic-vlan-assignment  Dynamic VLAN assignment configuration
  eap-types  Allow all EAP types on this wlan
  encryption-type  Reset the encryption to use on this wlan to default (none)
  enforce-dhcp  Drop packets from Wireless Clients with static IP address
  fast-bss-transition  Disable support for 802.11r Fast BSS Transition
  http-analyze  Enable HTTP URL analysis on the wlan
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
  encryption-type tkip-ccmp
  authentication-type eap
  kerberos server primary host 172.16.10.2
  accounting syslog host 172.16.10.4 port 2
  data-rates 2.4GHz gn
  motorola-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
rfs7000-37FABE(config-wlan-test)##
```
rfs7000-37FABE(config-wlan-test)#no accounting syslog
rfs7000-37FABE(config-wlan-test)#no description
rfs7000-37FABE(config-wlan-test)#no authentication-type
rfs7000-37FABE(config-wlan-test)#no encryption-type
rfs7000-37FABE(config-wlan-test)#no enforce-dhcp
rfs7000-37FABE(config-wlan-test)#no kerberos server primary host
rfs7000-37FABE(config-wlan-test)#no kerberos server timeout
rfs7000-37FABE(config-wlan-test)#no data-rates 2.4GHz
rfs7000-37FABE(config-wlan-test)#no ip dhcp trust
rfs7000-37FABE(config-wlan-test)#no captive-portal-enforcement

The test settings after the execution of the no command:

rfs7000-37FABE(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode local
  encryption-type none
  authentication-type none
  motorola-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
rfs7000-37FABE(config-wlan-test)#
4.1.72.2.30 opendns

wlan-mode commands

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.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

opendns device-id <DEVICE-ID>

Parameters

- opendns device-id <DEVICE-ID>

<table>
<thead>
<tr>
<th>opendns device-id &lt;DEVICE-ID&gt;</th>
<th>Configures the device ID sent to OpenDNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;DEVICE-ID&gt; — Specify the device ID. This value is embedded in each DNS query packet going out from an access point, wireless controller, or service platform to the OpenDNS. The device ID is a sixteen (16) character hex string representing a 64 bit unsigned integer. Use the no &gt; opendns &gt; device-id command to removes the device ID.</td>
<td></td>
</tr>
</tbody>
</table>

Therefore, when a wireless client associates with a OpenDNS configured WLAN, all DNS queries originating from the client are appended with an additional 31 bytes of data at the end of the DNS packet representing the device ID.

Note: 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 dns-server.

For example:

```
rfs7000-37FABE(config-dhcp-policy-dhcppolicy-pool-dhcppool)#show context
dhcp-pool dhcppool
    network 192.168.13.0/24
    address range 192.168.13.160 192.168.13.200
    default-router 192.168.13.105
dns-server 208.67.220.220 208.67.222.222
rfs7000-37FABE(config-dhcp-policy-dhcppolicy-pool-dhcppool)#
```

Note: To prevent the 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:

```
rfs7000-37FABE(config-ip-acl-dns-list)#show context
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"
rfs7000-37FABE(config-ip-acl-dns-list)#
```
Examples
rfs7000-37FABE(config-wlan-test)#opendns device-id 44-55-66

rfs7000-37FABE(config-wlan-test)#show context
wlan test
ssid test
bridging-mode tunnel
encryption-type none
authentication-type none
  opendns device-id 44-55-66
rfs7000-37FABE(config-wlan-test)#
4.1.72.2.31 protected-mgmt-frames

**wlan-mode commands**

Configures the WLAN’s frame protection mode and security association.

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>]]`
  - `protected-mgmt-frames` Enables and configures WLAN’s frame protection mode and security association. Use this command to specify whether management frames are continually or optionally protected.
  - `mandatory` Enforces **protected management frames** (PMF) on this WLAN (management frames are continually optionally protected)
  - `optional` Provides PMF only for those clients that support PMF (management frames are optionally protected)
  - `sa-query [attempts <1-10>|timeout <100-1000>]
    - `sa-query` Configures the following **security association** (SA) parameters:
      - `attempts <1-10>` — Configures the number of SA query attempts from 1-10. The default is 5.
      - `timeout <100-1000>` — 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.

**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)#
```
4.1.72.2.32 proxy-arp-mode

- wlan-mode commands

Enables proxy ARP mode for handling ARP requests

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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)</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
motorola-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
http-analyze controller
rfs7000-37FABE(config-wlan-test)#
4.1.72.2.33 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
proxy-nd-mode [dynamic|strict]
```

**Parameters**

- `proxy-nd-mode [dynamic|strict]`

**Examples**

```plaintext
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)#
```
4.1.72.2.34 qos-map

- wlan-mode commands

Enables support for 802.11u QoS map element and frames

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

gos-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)#
4.1.72.2.35 radio-resource-measurement

**wlan-mode commands**

Enables support for 802.11k radio resource measurement

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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</td>
</tr>
<tr>
<td>{channel-report}</td>
<td>• channel-report – 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>• hybrid – Optional. Uses the hybrid model of smart-rf neighbors and roaming frequency to neighbors</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config-wlan-test)#radio-resource-measurement
rfs4000-229D58(config-wlan-test)#

rfs4000-229D58(config-wlan-test)#show context
wlan test
  ssid test
  bridging-mode tunnel
  vlan 1
  encryption-type none
  authentication-type none
radio-resource-measurement
  controller-assisted-mobility
rfs4000-229D58(config-wlan-test)#
```
### 4.1.72.2.36 radius

**wlan-mode commands**

Configures RADIUS related parameters

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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)</td>
</tr>
<tr>
<td>nas-identifier &lt;NAS-ID&gt;</td>
<td>Configures the WLAN NAS identifier sent to the RADIUS server. The NAS identifier should not exceed 256 characters.</td>
</tr>
<tr>
<td>nas-port-id &lt;NAS-PORT-ID&gt;</td>
<td>Configures the WLAN NAS port ID sent to the RADIUS server. The NAS port identifier should not exceed 256 characters.</td>
</tr>
<tr>
<td>vlan-assignment</td>
<td>Configures the VLAN assignment of a WLAN</td>
</tr>
</tbody>
</table>

**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
  motorola-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
  http-analyze controller

rfs7000-37FABE(config-wlan-test)#
```
4.1.72.2.37 relay-agent

> wlan-mode commands

Enables support for DHCP relay agent information (option 82) feature on this WLAN

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

relay-agent dhcp-option82

Parameters

- relay-agent dhcp-option82

| relay-agent | dhcp-option82 | Supports DHCP option 82. When enabled, this feature allows the DHCP relay agent to insert the relay agent information option (option 82) in client requests forwarded to the DHCP server. This information provides the following:
- circuit ID suboption – Provides the SNMP port interface index
- remote ID – Provides the controller’s MAC address |

Examples

rfs4000-229D58(config-wlan-test)#relay-agent dhcp-option82
rfs4000-229D58(config-wlan-test)#

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)#
4.1.72.2.38 shutdown

wlan-mode commands

Shuts down a WLAN

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
shutdown {on-critical-resource|on-meshpoint-loss|on-primary-port-link-loss|on-unadoption}
```

Parameters

- shutdown {on-critical-resource|on-meshpoint-loss|on-primary-port-link-loss|on-unadoption}

<table>
<thead>
<tr>
<th>shutdown</th>
<th>Shuts down the WLAN when specified events occur. Disabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>on-critical-resource</td>
<td>Optional. Shuts down the WLAN when critical resource failure occurs. Disabled by default.</td>
</tr>
<tr>
<td>on-meshpoint-loss</td>
<td>Optional. Shuts down the WLAN when the root meshpoint link fails (is unreachable). Disabled by default.</td>
</tr>
<tr>
<td>on-primary-port-link-loss</td>
<td>Optional. Shuts down the WLAN when a device losses its primary Ethernet port (ge1/up1) link. Disabled by default.</td>
</tr>
<tr>
<td>on-unadoption</td>
<td>Optional. Shuts down the WLAN when an adopted device becomes unadopted. Disabled by default.</td>
</tr>
</tbody>
</table>

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
  motorola-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)#
```
4.1.72.2.39 ssid

Configure a WLAN's SSID
Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
```plaintext
ssid <SSID>
```

Parameters
- `ssid <SSID>`

Examples
```plaintext
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
  motorola-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)#
```
### 4.1.72.2.40 t5-client-isolation

**wlan-mode commands**

Disallow 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 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.

**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, NX6500, NX6524, NX9000, NX9500, NX9510

**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 bridging-mode local encryption-type none authentication-type none t5-client-isolation

nx9500-6C8809(config-wlan-test)#
4.1.72.2.41 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 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, NX6500, NX6524, NX9000, NX9500, NX9510

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>]`
  - **encryption-type**
    - [wep128|wep64] Applies one of the following encryption algorithms to the T5 support WLAN configuration: WEP64 or WEP128
  - **hex <STRING>** Configures the hex password (used to derive the security key)
    - <STRING> – Specify the hex password (should not exceed the 10 - 26 characters).
  - **passphrase <STRING>** Configures the passphrase shared by both transmitting and receiving authenticators
    - <STRING> – Specify the passphrase. It could either be an alphanumeric string of 8 to 63 ASCII characters or 64 HEX characters. The alphanumeric string allows character spaces. This string is converted to a numeric value. Configuring a passphrase saves you the need to create a 256-bit key each time keys are generated.

- `t5-security wpa-enterprise [wpa-personal] encryption-type [ccmp|tkip|tkip-ccmp] version [mixed|wpa|wpa2]`
  - **wpa-enterprise** Configures the T5 WLAN security type as: wpa-enterprise OR wpa-personal
<table>
<thead>
<tr>
<th><strong>encryption-type</strong></th>
<th>The following parameters are common to the <strong>wpa-enterprise</strong> and <strong>wpa-personal</strong> keywords: Applies one of the following encryption algorithms to the T5 support WLAN configuration: CCMP, TKIP, or TKIP-CCMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>`[ccmp</td>
<td>tkip</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>version</strong></th>
<th>The following parameters are common to the <strong>wpa-enterprise</strong> and <strong>wpa-personal</strong> keywords:</th>
</tr>
</thead>
<tbody>
<tr>
<td>`[mixed</td>
<td>wpa</td>
</tr>
</tbody>
</table>

**Examples**

```bash
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**

nx9500-6C8809(config-wlan-test)#t5-client-isolation
```

```bash
nx9500-6C8809(config-wlan-test)#
```
4.1.72.2.42 time-based-access

wlan-mode commands

Configures time-based client 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
 motorola-extensions wmm-load-information
 client-load-balancing probe-req-intvl 5ghz 5
 --More--
rfs7000-37FABE(config-wlan-test)#
4.1.72.2.43 use

- wlan-mode commands

This command associates an existing captive portal with a WLAN.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

use [aaa-policy|association-acl-policy|bonjour-gw-discovery-policy|captive-portal|ip-access-list|ipv6-access-list|mac-access-list|passpoint-policy|wlan-qos-policy]


Parameters


<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| aaa-policy <AAA-POLICY-NAME> | Uses an existing AAA policy with a WLAN  
  • <AAA-POLICY-NAME> – Specify the AAA 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 is applied for the Bonjour requests coming over WLAN.  
  • <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. |
| captive-portal <CAPTIVE-PORTAL-NAME> | Enables a WLAN's captive portal authentication  
  • <CAPTIVE-PORTAL-NAME> – Specify the captive portal name.                                    |
| passpoint-policy <PASSPOINT-POLICY-NAME> | Associates a passpoint policy (Hotspot2 configuration) with this WLAN.  
  • <PASSPOINT-POLICY-NAME> – Specify the Hotspot 2.0 policy name.  
  Note: For more information on passpoint policy, see PASSPOINT POLICY.  
  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. |
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 ACL.

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
motorola-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)#
4.1.72.2.44 vlan

Sets the VLAN where traffic from a WLAN is mapped

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
```
vlan [<1-4094>|<VLAN-ALIAS-NAME>]
```

Parameters

- `<1-4094>` 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.

- `<VLAN-ALIAS-NAME>` Assigns a VLAN alias to the WLAN. The VLAN alias should be existing and 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`.

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
  motorola-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)#
```
### 4.1.72.2.45 vlan-pool-member

**wlan-mode commands**

Adds a member VLAN to a WLAN's VLAN pool

---

**NOTE:** Configuration of a VLAN pool overrides the 'vlan' configuration.

---

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
vlan-pool-member <WORD> {limit <0-8192>}
```

**Parameters**

- `vlan-pool-member <WORD> {limit <0-8192>`

<table>
<thead>
<tr>
<th><strong>Parameter</strong></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>vlan-pool-member</code></td>
<td>Adds a member VLAN to a WLAN's VLAN pool</td>
</tr>
<tr>
<td><code>&lt;WORD&gt;</code></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><code>limit &lt;0-8192&gt;</code></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>• <code>&lt;0-8192&gt;</code> – 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 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
    radius vlan-assignment
    time-based-access days weekdays start 10:00 end 16:30
    motorola-extensions wmm-load-information
    --More--
rfs7000-37FABE(config-wlan-test)#
```
4.1.72.2.46 wep128

wlan-mode commands

Configures WEP128 parameters

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>]

  Configures pre-shared hex keys
  - <1-4> – Configures a maximum of four key indexes. Select the 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 keys as 13 ASCII characters converted to hex, or 26 hexadecimal characters

  hex
  - [0 <WORD>|2 <WORD>|<WORD>]
    Sets keys as hexadecimal characters (10 characters for WEP64, 26 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 motorolasolutions@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 025f6e7ed9718918a87a75acc75
    wep128 key 2 hex 02b3fb36924b222dffe98c86c315
    wep128 key 3 hex 01ebe394431700194762ebd5b2
    wep128 key 4 hex 0e3de75be311bd787aeac5e4e8b
    radius vlan-assignment
    time-based-access days weekdays start 10:00 end 16:30
--More--
rfs7000-37FABE(config-wlan-test)#
4.1.72.2.47 wep64

- **wlan-mode commands**

  Configures WEP64 parameters

  Supported in the following platforms:
  - Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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 key (10 hex or 5 ASCII characters for WEP64, 26 hex or 13 ASCII characters for WEP128).
  - **hex** [0 <WORD>|2 <WORD>|<WORD>] — Sets keys as hexadecimal characters (10 characters for WEP64, 26 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
rfs7000-37FABE(config-wlan-test)#wep64 key 1 ascii motor
rfs7000-37FABE(config-wlan-test)#wep64 transmit-key 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
 wep64 key 1 hex 0 6d6f746f72
 radius vlan-assignment
 time-based-access days weekdays start 10:00 end 16:30
 motorola-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)#
### 4.1.72.48 wireless-client

**wlan-mode commands**

Configures the transmit power indicated to clients

**Supported in the following platforms:**
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
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]
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>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>

- `<0-256>` – Specify a value from 0 - 256.
- `<60-86400>` – Specify a value from 60 - 86400 seconds.
- `<1-86400>` – Specify a value from 1 - 86400 seconds.
- `<30-86400>` – Specify the client reauthentication interval from 30 - 86400 seconds.
- `<60-86400>` – Specify a value from 60 - 86400 seconds. The default is 60 seconds.
### 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.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wireless-client roam-notification</td>
<td>Configures when a roam notification is transmitted</td>
</tr>
<tr>
<td>after-association</td>
<td>Transmits a roam notification after a client has associated</td>
</tr>
<tr>
<td>after-data-ready</td>
<td>Transmits a roam notification after a client is data-ready (after completion of authentication, handshakes etc.)</td>
</tr>
<tr>
<td>auto</td>
<td>Transmits a roam notification upon client association (if the client is known to have authenticated to the network)</td>
</tr>
</tbody>
</table>

**Examples**

```bash
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 6d6f746f72
 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
 motorola-extensions wmm-load-information
 wireless-client tx-power 12
 client-load-balancing probe-req-intvl 5ghz 5
```

---

### Notes
- The `show context` command displays the configuration settings for the test WLAN.
- The `wep` and `wep64` keys are displayed along with their hexadecimal values.
- The `radius vlan-assignment` command configures VLAN assignment for the radius clients.
- The `time-based-access` command configures time-based access for specific days and time intervals.
- The `motorola-extensions` command enables extensions for Wi-Fi network load information.
4.1.72.2.49 wpa-wpa2

- wlan-mode commands

Modifies TKIP-CCMP (WPA/WPA2) related parameters

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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** [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>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wpa-wpa2</td>
<td>Modifies TKIP-CCMP (WPA/WPA2) related parameters</td>
</tr>
<tr>
<td>exclude-wpa2-tkip</td>
<td>Excludes the Wi-Fi Protected Access II (WPA2) version of TKIP. It supports the WPA version of TKIP only</td>
</tr>
<tr>
<td>opp-pmk-caching</td>
<td>Uses opportunistic key caching (same Pairwise Master Key (PMK) across APs for fast roaming with EAP802.1x</td>
</tr>
<tr>
<td>pmk-caching</td>
<td>Uses cached pair-wise master keys (fast roaming with eap/802.1x)</td>
</tr>
<tr>
<td>preauthentication</td>
<td>Uses pre-authentication mode (WPA2 fast roaming)</td>
</tr>
<tr>
<td>server-only-authentication</td>
<td>Uses online signup server-only-authenticated encryption network</td>
</tr>
<tr>
<td>use-sha256-akm</td>
<td>Uses sha256 authentication key management suite</td>
</tr>
<tr>
<td>wpa-wpa2 handshake</td>
<td>Configures WPA/WPA2 handshake parameters</td>
</tr>
<tr>
<td>attempts &lt;1-5&gt;</td>
<td>Configures the total number of times a message is transmitted towards a non-responsive client</td>
</tr>
<tr>
<td>&lt;1-5&gt; – Specify a value from 1 - 5.</td>
<td></td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>init-wait &lt;5-1000000&gt;</td>
<td>Configures a minimum wait-time period, in microseconds, before the first handshake message is transmitted from the AP</td>
</tr>
</tbody>
</table>
| 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  
  - 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.  
  - `<10-5000>` – Optional. Configures a different timeout between the second and third attempts |

* wpa-wpa2 key-rotation [broadcast|unicast] <30-86400>  

* wpa-wpa2 psk [0 <LINE>|2 <LINE>|<LINE>]  
  wpa-wpa2 | Modifies TKIP-CCMP (WPA/WPA2) related parameters  
  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>  
  wpa-wpa2 | Modifies TKIP-CCMP (WPA/WPA2) parameters  
  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 - 65536 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 6d6f746f72
wep128 key 1 hex 0 25f6e7ed9718918a87a75acc75
--More--
--More--
rfs7000-37FABE(config-wlan-test)#
4.1.72.2.50 service

> wlan-mode commands

Invokes service commands applicable in the WLAN configuration mode

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
service [allow-ht-only|allow-open-passpoint|cred-cache clear-on-disconnect|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-disconnect|eap-mac-multicopy|eap-mac-multikeys|enforce-pmkid-validation|radio-crypto|reauthentication seamless|session-timeout mac|tx-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 vlan <1-4094>|captive-portal external-server|dhcp crm <CRM-NAME> vlan <1-4094>]
```

```
service unresponsive-client [attempts <1-1000>|timeout <1-60>]
```

```
service wpa-wpa2 exclude-rsn-ie
```

Parameters

- service [allow-ht-only|allow-open-passpoint|cred-cache clear-on-disconnect|eap-mac-multicopy|eap-mac-multikeys|enforce-pmkid-validation|radio-crypto|reauthentication seamless|session-timeout mac|tx-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</td>
</tr>
<tr>
<td>allow-open-passpoint</td>
<td>Enables non-WPA2 security for passpoint WLANs.</td>
</tr>
<tr>
<td></td>
<td>For more information on passpoint policy and configuration, see PASSPOINT POLICY.</td>
</tr>
<tr>
<td>cred-cache clear-on-disconnect</td>
<td>Clears credential cache after a client has disconnected from the network</td>
</tr>
<tr>
<td>eap-mac-multicopy</td>
<td>Enables sending of multiple copies of broadcast and unicast messages</td>
</tr>
<tr>
<td>eap-mac-multikeys</td>
<td>Enables configuration of different key indices for MAC authentication</td>
</tr>
<tr>
<td>enforce-pmkid-validation</td>
<td>Validates the Predictive real-time pairwise master key identifier (PMKID) contained in a client’s association request against the one present in the wpa-wpa2 handshake</td>
</tr>
<tr>
<td></td>
<td>This functionality is based on the Proactive Key Caching (PKC) extension of the 802.11i EEEE standard. Whenever a wireless client successfully authenticates with a AP it receives a pairwise master key (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>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>radio-crypto</td>
<td>Uses radio hardware for encryption and decryption. This is applicable only for devices using Counter Cipher Mode with Block Chaining Message Authentication Code Protocol (CCMP) encryption mode.</td>
</tr>
<tr>
<td>reauthentication</td>
<td>Enables seamless EAP client reauthentication without disconnecting client after the session has timed out.</td>
</tr>
<tr>
<td>seamless</td>
<td></td>
</tr>
<tr>
<td>session-timeout mac</td>
<td>Enables reauthentication of MAC authenticated clients without disconnecting client after the session has timed out.</td>
</tr>
<tr>
<td>tx-deauth-on-roam-detection</td>
<td>Transmits a deauthentication on the air while disassociating a client because its roam is detected on the wired side.</td>
</tr>
<tr>
<td>show cli</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>eap-mac-mode</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>mac-always</td>
<td></td>
</tr>
<tr>
<td>normal</td>
<td>Grants client access if the client clears either EAP or MAC authentication.</td>
</tr>
<tr>
<td>service eap-throttle &lt;0-254&gt;</td>
<td>Enables EAP throttling on this WLAN.</td>
</tr>
<tr>
<td>eap-throttle &lt;0-254&gt;</td>
<td>&lt;0-254&gt; – Specify the maximum number of EAP sessions throttled simultaneously.</td>
</tr>
<tr>
<td>service key-index eap-wep-unicast &lt;1-4&gt;</td>
<td>Configures an index with each key during EAP authentication with WEP.</td>
</tr>
<tr>
<td>key-index eap-wep-unicast &lt;1-4&gt;</td>
<td>&lt;1-4&gt; – Select a index from 1 - 4.</td>
</tr>
<tr>
<td>service wpa-wap2 exclude-rsn-ie</td>
<td></td>
</tr>
<tr>
<td>key-index eap-wep-unicast &lt;1-4&gt;</td>
<td>Configures an index with each key during EAP authentication with WEP.</td>
</tr>
<tr>
<td>aaa-server</td>
<td>Enables AAA server failure monitoring. This feature is disabled by default.</td>
</tr>
</tbody>
</table>
**adoption vlan <1-4094>**

Enables adoption failure monitoring on an adopted AP. Also configures a adoption failover VLAN. This feature is disabled by default.

- **VLAN <1-4094>** – Specify the VLAN on which clients are placed when the connectivity between the AAP and the controller is lost.

**Note:** Configure a DHCP pool and gateway for the failover VLAN. Ensure the DHCP server is running on the AP. Also ensure that the DHCP pool is configured to have less lease time.

When this feature is enabled on a WLAN, it allows adopted APs to monitor their connectivity with the controller. If and when this connectivity is lost, all new clients are placed in the configured adoption failover VLAN. They are served an IP by the DHCP server running on the AP. In this situation if a client tries to access a Web URL, the AP redirects the client to a page stating that the service is down.

**Note:** When the AAP’s link to the switch is restored, clients are placed back in the WLAN’s configured VLAN, and are served an IP from the corresponding configured DHCP server (external or on the AP/controller).

---

**captive-portal external-server**

Enables external captive portal server failure monitoring. This feature is disabled by default.

**Note:** When enabled, this feature enables APs to display, to an externally located captive portal’s user, the no-service page when the captive portal’s server is not reachable.

---

**dhcp crm <CRM-NAMESPACE> vlan <1-4094>**

Enables external DHCP server failure monitoring. Also configures a DHCP failover VLAN. This feature is disabled by default.

- **crm <CRM-NAMESPACE>** – Specified the names of the CRMs being monitored (i.e. the servers configured under this CRM are monitored).
- **VLAN <1-4094>** – Specify the VLAN on which clients are placed when the connectivity between the AAP and the controller is lost.

**Note:** Configure a DHCP pool and gateway for the failover VLAN. Ensure the following:

- DHCP server is running on the AP,
- DHCP pool is configured to have less lease time,
- and the CRM for DHCP server to be monitored is configured on the AP.

When this feature is enabled on a WLAN, it allows the monitoring of DHCP servers. If the DHCP server is unavailable, the AP disconnects all clients. These disconnected clients are placed in the specified CRM failover VLAN, and are served a new IP by the DHCP server running on the AP. In this situation if a client tries to access a Web URL, the AP redirects the client to a page stating that the service is down.

**Note:** Whenever there is a change in DHCP server availability, all associated clients are shifted back to the appropriate DHCP server and are served new IP addresses.

---

- **service unresponsive-client [attempts <1-1000>|timeout <1-60>]**

**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.

**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.
Examples

rfs4000-229D58(config-wlan-test)#service allow-ht-only
rfs4000-229D58(config-wlan-test)#

rfs4000-229D58(config-wlan-test)#service monitor aaa-server
rfs4000-229D58(config-wlan-test)#

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)#
4.1.73 wlan-qos-policy

Global Configuration Commands

Configures a WLAN QoS policy

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 as nd 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

clscr: 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)#

NOTE: For more information on WLAN QoS policy commands, see Chapter 21, WLAN-QOS-POLICY.
**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an existing WLAN QoS Policy</td>
</tr>
</tbody>
</table>
4.1.74 **smart-cache-policy**

 GLOBAL Configuration Commands

Table 4.22 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 4-324</td>
</tr>
<tr>
<td><code>smart-cache-policy-mode commands</code></td>
<td>Summarizes the smart cache policy configuration mode commands</td>
<td>page 4-326</td>
</tr>
</tbody>
</table>
4.1.74.1  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, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```
smart-cache-policy <SMART-CACHE-POLICY-NAME>
```

#### Parameters

- `smart-cache-policy <SMART-CACHE-POLICY-NAME>`

<table>
<thead>
<tr>
<th>&lt;SMART-CACHE-POLICY-NAME&gt;</th>
<th>Creates a new smart content cache policy. Specify the policy name. If the policy does not exist, it is created.</th>
</tr>
</thead>
</table>

#### 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)#
### smart-cache-policy-mode commands

#### smart-cache-policy

Table 4.23 summarises 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 4-327</td>
</tr>
<tr>
<td>aging</td>
<td>Configures the refresh pattern (aging parameters) for specific content types</td>
<td>page 4-328</td>
</tr>
<tr>
<td>cache</td>
<td>Configures cache management settings</td>
<td>page 4-330</td>
</tr>
<tr>
<td>forward-proxy</td>
<td>Configures the address and port for forward caching proxy service</td>
<td>page 4-332</td>
</tr>
<tr>
<td>http-access</td>
<td>Configures HTTP filters – access control lists (ACLs)</td>
<td>page 4-334</td>
</tr>
<tr>
<td>no</td>
<td>Removes or resets content cache policy settings</td>
<td>page 4-336</td>
</tr>
<tr>
<td>pre-fetch</td>
<td>Enables pre fetching of URL lists</td>
<td>page 4-337</td>
</tr>
<tr>
<td>parent-proxy</td>
<td>Enables/disables parent proxy on this smart cache policy</td>
<td>page 4-338</td>
</tr>
<tr>
<td>smart-cache</td>
<td>Enables smart content caching</td>
<td>page 4-339</td>
</tr>
<tr>
<td>transparent-proxy</td>
<td>Configures transparent caching proxy settings</td>
<td>page 4-340</td>
</tr>
</tbody>
</table>
4.1.74.2.1 access-log

Enables or disables 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, NX6500, NX6524, NX9000, NX9500, NX9510

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>rotate-type [duration &lt;1-100&gt; day</td>
<td>size &lt;1-100&gt; MB]</td>
</tr>
<tr>
<td></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
```
x4500-5CFA2B(config-smart-cache-policy-test)#access-log rotate 10 rotate-type duration 10 day
```
```
x4500-5CFA2B(config-smart-cache-policy-test)#
```
```
x4500-5CFA2B(config-smart-cache-policy-test)#show context smart-cache-policy test
```
```
ex4500-5CFA2B(config-smart-cache-policy-test)#access-log rotate 10 rotate-type duration 10 day
```
```
x4500-5CFA2B(config-smart-cache-policy-test)#
```

Related Commands
```
no
```
Disables client request logging
4.1.74.2.2 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, NX6500, NX6524, NX9000, NX9500, NX9510

**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>**
  - `precedence <1-100>` — Specify a precedence for this aging rule.
  - `<WORD>` Specifies the regular expression to match. This option is case sensitive, and is the default setting.
  - `ignore-case <WORD>` Specifies the regular expression to match. This option is not case sensitive.

- **min-age <0-525600>**
  - 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.
  - `<0-525600>` — Specify a value from 0 - 525600 minutes. The default is 1 minute.

- **freshness-factor <0-100>**
  - 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.
  - `<0-100>` — Specify a value from 0 - 100%. The default is 100%.

- **max-age <0-525600>**
  - 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.
  - `<0-525600>` — Specify a value from 0 - 525600 minutes. The default is 525600.
### 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
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes an existing aging rule (refresh pattern)</td>
</tr>
</tbody>
</table>
### 4.1.74.2.3 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, NX6500, NX6524, NX9000, NX9500, NX9510

**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> | url-regex <URL> }
```

```
cache size <1-32>
```

**Parameters**

- **cache media**
  - **(all|aol|bing|break|cnn|daily-motion|metacafe|vimeo|youtube)**

  Enables content caching from the following video content sharing sites. The sites currently supported are:
  - aol.com
  - bing.com
  - break.com
  - dailymotion.com
  - metacafe.com
  - vimeo.com
  - cnn.com
  - youtube.com

  **Note:** Select All 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.

- **cache precedence <1-100> [deny|permit]**

  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.

  - **<1-100>** – Specify a precedence rule from 1 - 100.
  - **[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
The document provides configuration commands for cache management, including:

- **destination-domain <DOMAIN-NAME>**: Optional. Specifies the destination domain’s hostname to match. The domain name can be an FQDN. The specified value is matched against the hostname part of the HTTP request URL. A leading asterisk or period in the domain name is treated as a wild card. For example, `www.motorola-solutions.com`, `motorola-solutions.com`, `*.motorola-solutions.com` and `.com` are all valid values.

  **Note**: The destination domain parameter will NOT match against URLs that have an IP address instead of a hostname.

- **destination-domain-regex <WORD>**: Optional. Specifies a regular expression matching on originating server names. The destination domain regex is the same as the destination domain, but the destination domain regex allows your to use standard expression matching on originating server names.

- **destination-ip [<IP>/M|any]**: Optional. Specifies the originating server’s IP address, obtained from the HTTP request URL.

  **Note**: Provide the IP address in the A.B.C.D/M format.

  **Note**: Specify `any` to consider all originating servers.

- **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.

  **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 origin server hostname.

- **cache size <1-32>**: Configures the maximum caching storage size. This is upper limit on the disk space used for storing cached contents.

  **Note**: Specify a value from 1 - 32 GB. The default is 32 GB.

**Examples**

```bash
nx4500-5CFA2B(config-smart-cache-policy-test)#cache size 30
nx4500-5CFA2B(config-smart-cache-policy-test)#
nx4500-5CFA2B(config-smart-cache-policy-test)#show context smart-cache-policy test
  cache size 30
  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**: Resets or removes cache management settings.
4.1.74.2.4 forward-proxy

smart-cache-policy-mode commands

Enables or disables 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, NX6500, NX6524, NX9000, NX9500, NX9510

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>`
  Optional. Configures the IP address and TCP port for forward proxying. This is the IP address where the forward smart caching proxy server is listening. The default port is 1.

- **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

- **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.
  - `<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)#
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
  access-log rotate 10 rotate-type duration 10 day
nx4500-5CFA2B(config-smart-cache-policy-test)#
```
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Reverts address and port for forward caching proxy service</td>
</tr>
</tbody>
</table>
4.1.74.2.5 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, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```plaintext
http-access precedence <1-100> [deny|permit] {destination-domain <DOMAIN-NAME>|
destination-domain-regex <WORD>|destination-ip <IP>|mimetype-regex <WORD>|
source-ip <IP>|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

- **destination-domain-regex <WORD>**
  - Optional. Specifies a regular expression matching on originating server names
  - 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 originating server’s IP address, obtained from the HTTP request URL
  - **Note:** Provide the IP address in the A.B.C.D/M format.
  - **Note:** Specify *any* to consider all originating 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.
  - **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
Examples

nx4500-5CFA2B(config-smart-cache-policy-test)#http-access precedence 4 deny destination-domain .TechPubs
nx4500-5CFA2B(config-smart-cache-policy-test)#
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes an ACL</td>
</tr>
</tbody>
</table>
4.1.74.2.6 no

smart-cache-policy-mode commands

Removes or resets smart cache policy settings

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [access-log|aging|cache|forward-proxy|http-access|parent-proxy|pre-fetch|smart-cache|transparent-proxy]

Parameters

- no [access-log|aging|cache|forward-proxy|http-access|parent-proxy|pre-fetch|smart-cache|transparent-proxy]

| no access-log              | Disables logging of all client requests |
| no aging                   | Removes the refresh pattern configured with this smart cache policy |
| no cache                   | Removes cache management settings |
| no forward-proxy           | Removes the forward proxy settings |
| no http-access             | Removes the ACL associated with this smart cache policy |
| no parent-proxy            | Removes the parent proxy settings |
| no pre-fetch               | Disables pre-fetching of a URL |
| no smart-cache             | Disables smart content caching |
| no transparent-proxy       | Removes the transparent proxy settings |

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
    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)#

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)#
4.1.74.2.7 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, NX6500, NX6524, NX9000, NX9500, NX9510

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>&lt;URL-LIST-NAME&gt;</td>
<td>Pre-fetches a list of URLs identified by the &lt;URL-LIST-NAME&gt; 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 url-list.</td>
</tr>
<tr>
<td>schedule &lt;TIME&gt;</td>
<td>Pre-fetches the specified URL list at a specified time</td>
</tr>
<tr>
<td>&lt;TIME&gt; – Specify the time in the HH:MM format.</td>
<td></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)#

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-regex test
 access-log rotate 10 every 50 day
 pre-fetch test schedule 12:30
 nx4500-5CFA2B(config-content-cache-policy-test)#

Related Commands
- no
  Removes an ACL
4.1.74.2.8 parent-proxy

smart-cache-policy-mode commands

Enables or disables 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, NX6500, NX6524, NX9000, NX9500, NX9510

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>
<tbody>
<tr>
<td>host &lt;IP/HOST-NAME&gt; port &lt;1-32768&gt;</td>
<td>Configures the hostname or IP address of the parent proxy server</td>
</tr>
</tbody>
</table>

<IP/HOST-NAME> – Specify the parent proxy server’s IP address or hostname.

port <> – 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)#

nx4500-5CFA2B(config-smart-cache-policy-test)#show context
smart-cache-policy test
parent-proxy host 192.168.13.8 port 21
    cache size 30
    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 |
4.1.74.2.9 smart-cache

- smart-cache-policy-mode commands

Enables smart content caching

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
smart-cache enable

Parameters
- smart-cache enable

| smart-cache enable | Enables smart content caching. When enabled, devices using this smart-cache policy act as forward proxy. |

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
4.1.74.2.10 transparent-proxy

smart-cache-policy-mode commands

Enables or disables 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, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
transparent-proxy {protocol|vlan}
transparent-proxy {protocol {all|https}}
transparent-proxy {vlan <VLAN-ID>}

Parameters
- transparent-proxy {protocol {all|https}}
- transparent-proxy {vlan <VLAN-ID>}

Examples
nx4500-5CFA2B(config-smart-cache-policy-test)#transparent-proxy vlan 10-20
nx4500-5CFA2B(config-smart-cache-policy-test)#
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

no Resets or removes transparent caching proxy settings
4.1.75 url-list

Global Configuration Commands

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. 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:
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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:
   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.motorolsolutions.com depth 10
```
```
nx4500-5CFA2B(config-url-list-test)#show context
url-list test
   url http://www.motorolsolutions.com depth 10
```
```
nx4500-5CFA2B(config-url-list-URLlist1)#
```
4.1.76 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 WiNG 5.6 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

Syntax

```
vx9000 <MAC>
```

Parameters

- **vx <MAC>**

<table>
<thead>
<tr>
<th>vx &lt;MAC&gt;</th>
<th>Configures a V-WLC and enters its configuration mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: The V-WLC configuration is the same as that of a normal controller.</td>
<td></td>
</tr>
</tbody>
</table>

Examples

```
nx9500-5c8809(config)#vx 11-22-33-44-55-66
nx9500-5c8809(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-site` Set system's adoption site
- `alias` Alias
- `ap300` Adopt/unadopt AP300 device to this profile/device
- `area` Set name of area where the system is located
- `arp` Address Resolution Protocol (ARP)
- `auto-learn-staging-config` Enable learning network configuration of the devices that come for adoption
- `autogen-uniqueld` 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
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cluster</td>
<td>Cluster configuration</td>
</tr>
<tr>
<td>configuration-persistence</td>
<td>Enable persistence of configuration across reloads (startup config file)</td>
</tr>
<tr>
<td>contact</td>
<td>Configure the contact</td>
</tr>
<tr>
<td>controller</td>
<td>WLAN controller configuration</td>
</tr>
<tr>
<td>country-code</td>
<td>Configure the country of operation</td>
</tr>
<tr>
<td>critical-resource</td>
<td>Critical Resource</td>
</tr>
<tr>
<td>crypto</td>
<td>Encryption related commands</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>Device firmware upgrade</td>
</tr>
<tr>
<td>dot1x</td>
<td>802.1X</td>
</tr>
<tr>
<td>dscp-mapping</td>
<td>Configure IP DSCP to 802.1p priority mapping for untagged frames</td>
</tr>
<tr>
<td>email-notification</td>
<td>Email notification configuration</td>
</tr>
<tr>
<td>enforce-version</td>
<td>Check the firmware versions of devices before interoperating</td>
</tr>
<tr>
<td>environmental-sensor</td>
<td>Environmental Sensors Configuration</td>
</tr>
<tr>
<td>events</td>
<td>System event messages</td>
</tr>
<tr>
<td>export</td>
<td>Export a file</td>
</tr>
<tr>
<td>floor</td>
<td>Set the floor within an area where the system is located</td>
</tr>
<tr>
<td>geo-coordinates</td>
<td>Configure geo coordinates for this device</td>
</tr>
<tr>
<td>gre</td>
<td>GRE protocol</td>
</tr>
<tr>
<td>hostname</td>
<td>Set system's network name</td>
</tr>
<tr>
<td>http-analyze</td>
<td>Specify HTTP-Analysis configuration</td>
</tr>
<tr>
<td>interface</td>
<td>Select an interface to configure</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>l2tpv3</td>
<td>L2tpv3 protocol</td>
</tr>
<tr>
<td>l3e-lite-table</td>
<td>L3e lite Table</td>
</tr>
<tr>
<td>layout-coordinates</td>
<td>Configure layout coordinates for this device</td>
</tr>
<tr>
<td>led</td>
<td>Turn LEDs on/off on the device</td>
</tr>
<tr>
<td>led-timeout</td>
<td>Configure the time for the led to turn off after the last radio state</td>
</tr>
<tr>
<td>change</td>
<td>Change</td>
</tr>
<tr>
<td>legacy-auto-downgrade</td>
<td>Enable device firmware to auto downgrade when other legacy devices are</td>
</tr>
<tr>
<td></td>
<td>detected</td>
</tr>
<tr>
<td>legacy-auto-update</td>
<td>Auto upgrade of legacy devices</td>
</tr>
<tr>
<td>license</td>
<td>License management command</td>
</tr>
<tr>
<td>lldp</td>
<td>Link Layer Discovery Protocol</td>
</tr>
<tr>
<td>load-balancing</td>
<td>Configure load balancing parameter</td>
</tr>
<tr>
<td>location</td>
<td>Configure the location</td>
</tr>
<tr>
<td>logging</td>
<td>Modify message logging facilities</td>
</tr>
<tr>
<td>mac-address-table</td>
<td>MAC Address Table</td>
</tr>
<tr>
<td>mac-auth</td>
<td>802.1X</td>
</tr>
<tr>
<td>mac-name</td>
<td>Configure MAC address to name mappings</td>
</tr>
<tr>
<td>memory-profile</td>
<td>Memory profile to be used on the device</td>
</tr>
<tr>
<td>meshpoint-device</td>
<td>Configure meshpoint device parameters</td>
</tr>
<tr>
<td>meshpoint-monitor-interval</td>
<td>Configure meshpoint monitoring interval</td>
</tr>
<tr>
<td>min-misconfiguration-recovery-time</td>
<td>Check controller connectivity after configuration is received</td>
</tr>
<tr>
<td>mint</td>
<td>MiNT protocol</td>
</tr>
<tr>
<td>mirror</td>
<td>Mirroring</td>
</tr>
<tr>
<td>misconfiguration-recovery-time</td>
<td>Check controller connectivity after configuration is received</td>
</tr>
<tr>
<td>neighbor-inactivity-timeout</td>
<td>Configure neighbor inactivity timeout</td>
</tr>
<tr>
<td>neighbor-info-interval</td>
<td>Configure neighbor information exchange interval</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
</tr>
<tr>
<td>noc</td>
<td>Configure the noc related setting</td>
</tr>
</tbody>
</table>
ntp
offline-duration
override-wlan
power-config
preferred-controller-group
preferred-tunnel-controller
radius
raid
reevaluate-everytime
remove-override
rf-domain-manager
router
rsa-key
sensor-server
slot
spanning-tree
timezone
traffic-class-mapping
trustpoint
tunnel-controller
use
vrp
vrp-state-check
wep-shared-key-auth
clrscr
commit
do
don't
end
exit
help
revert
service
show
write

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 80ee9649edd948b5a35d7
eaf8e73b376a51649291714d04c84769b0fc4b3766816878d2739c24
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)~*#
vx-0099CC(config-device-00-0C-29-00-99-CC)~*#
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: 80ee9649eddc94b48b5a35d7eaf8e73b376a51649291714d04c84769b0fc4b3766816878d2739c24

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</td>
<td>000C290099CC0A80001</td>
<td>AP</td>
<td>10240</td>
<td>0</td>
<td>10240</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>00-0C-29-00-99-CC</td>
<td>000C290099CC0A80001</td>
<td>AAP</td>
<td>10240</td>
<td>0</td>
<td>10240</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

vx-0099CC(config-device-00-0C-29-00-99-CC)~*

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a VX9000 wireless controller</td>
</tr>
</tbody>
</table>
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

Table 5.1 summarizes commands common to the User Exec, Priv Exec, and Global Config 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 5-11</td>
</tr>
<tr>
<td>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 5-48</td>
</tr>
<tr>
<td>write</td>
<td>Writes the system’s running configuration to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
5.1.1 clrscr

Common Commands

Clears the screen and refreshes the prompt, irrespective of the mode.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
    ap81xx          Upgrade AP81XX Device
    ap82xx          Upgrade AP82XX 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

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
commit {write}{memory}

Parameters
- commit {write}{memory}

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>write</td>
<td>Optional. If a commit succeeds, the configuration is written to memory</td>
</tr>
<tr>
<td>memory</td>
<td>Optional. Writes to memory</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE#commit write memory
[OK]
rfs7000-37FABE#
5.1.3 exit

Common Commands

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 will prompt you to either do a commit or a revert before terminating the session.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

exit

Parameters

None

Examples

rfs7000-37FABE(config)#exit
rfs7000-37FABE#
5.1.4 help

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
  • Wireless Controllers — RFS4000, RFS6000, RFS7000
  • Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510
Syntax
help {search|show}
help {show configuration-tree}
help {search <WORD>} {detailed|only-show|skip-no|skip-show}

NOTE: The show configuration-tree option is not available in the Global Config mode.

Parameters
• help {show configuration-tree}

<table>
<thead>
<tr>
<th>show configuration-tree</th>
<th>Optional. Displays the running system information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• configuration-tree – Displays relationship amongst configuration objects</td>
</tr>
</tbody>
</table>

• 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></td>
<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>
</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 29 references for “crypto”
Found 113 references for “crypto”

Mode : User Exec
Command : show crypto key rsa (\[public-key-detail\]) (\[(\[on DEVICE-NAME\])\])
  \ Show running system information
  \ Encryption related commands
  \ Key management operations
  \ Show RSA public Keys
  \ Show the public key in PEM format
  \ On AP/Controller
  \ AP / Controller name

: show crypto pki trustpoints (\[WORD\]|all\]) (\[(\[on DEVICE-NAME\])\])
  \ Show running system information
  \ Encryption related commands
  \ Public Key Infrastructure related commands
  \ Display the configured trustpoints
  \ Display a particular trustpoint's details
  \ Display details for all trustpoints
  \ On AP/Controller
  \ AP / Controller name

: show crypto isakmp sa (\[(\[on DEVICE-NAME\])\])
  \ Show running system information
  \ Encryption Module
  \ Show ISAKMP related statistics
  \ Show all ISAKMP Security Associations
  \ On AP/Controller
  \ AP / Controller name

: show crypto ipsec sa (\[(\[on DEVICE-NAME\])\])
  \ Show running system information
  \ Encryption Module
  \ Show IPSec related statistics
  \ IPSec security association
  \ On AP/Controller
  \ AP / Controller name

: crypto key generate rsa WORD <1024-2048> (\[(\[on DEVICE-NAME\])\])
  \ Encryption related commands
  \ Key management operations
  \ Generate a keypair
  \ Generate a RSA keypair
  \ Keypair name

rfs7000-37FABE>
rfs7000-37FABE>help show configuration-tree

## ACCESS-POINT / SWITCH ## ---+
| -+> [[ RF-DOMAIN ]]  
| -+> [[ PROFILE ]]  
| -+> Device specific parameters (license, serial number, hostname)  
| -+> Configuration Overrides of rf-domain and profile

## RF-DOMAIN ## ---+
| -+> RF parameters, WIPS server parameters  
| -+> [[ SMART-RF-POLICY ]]  
| -+> [[ WIPS POLICY ]]  

## PROFILE ## ---+
| -+> Physical interface (interface GE,ME,UP etc)  
| | -+> [[ RATE-LIMIT-TRUST-POLICY ]]  
| -+> Vlan interface (interface VLAN1/VLAN36 etc)  
| -+> Radio interface (interface RADIO1, RADIO2 etc)  
| | -+> Radio specific Configuration  
| | -+> [[ RADIO-QOS-POLICY ]]  
| | -+> [[ ASSOC-ACL-POLICY ]]  
| | -+> [[ WLAN ]]  
| -+> [[ MANAGEMENT-POLICY ]]  
| -+> [[ DHCP-SERVER-POLICY ]]  
| -+> [[ FIREWALL-POLICY ]]  
| -+> [[ NAT-POLICY ]]  

rfs7000-37FABE>

rfs7000-37FABE>help search clrscr only-show
found no commands containing "clrscr"
rfs7000-37FABE>
rfs7000-37FABE>help search service skip-show
found more than 64 references, showing the first 64

Context : Command
Command : service block-adopter-config-update
: service clear adoption history (on DEVICE-NAME)
: service clear captive-portal-page-upload history (on DOMAIN-NAME)
: service clear command-history (on DEVICE-NAME)
: service clear device-upgrade history (on DOMAIN-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 wireless ap statistics (AA-BB-CC-DD-EE-FF) (on...
: service clear wireless client statistics (AA-BB-CC-DD-EE-FF) (on...
: 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) (on DEVICE-OR-DO...
: service clear xpath requests (1-100000)
: service force-send-config (on DEVICE-OR-DOMAIN-NAME)
: service request-full-config-from-adopter
: 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)
: service show configuration-revision
: service show crash-info (on DEVICE-NAME)
: service show dhcp-lease (WORD wwan1 pppoe1 vlan 1-4094) (on...
: service show diag led-status (on DEVICE-NAME)
: service show diag stats (on DEVICE-NAME)
: service show fib (table-id 0-255)
: service show fib6 (table-id 0-255)
: service show info (on DEVICE-NAME)
: service show mac-vendor WORD
: service show mem (on DEVICE-NAME)
: service show mint adopted-devices (on DEVICE-NAME)
: service show mint ports
: service show noc diag
: service show pm history (on DEVICE-NAME)
: service show pm (on DEVICE-NAME)
: service show process (on DEVICE-NAME)
: service show reboot-history (on DEVICE-NAME)
: service show rf-domain-manager diag (DEVICE-NAME) (on DEVICE-O...
: service show rf-domain-manager info (DEVICE-NAME) (on DEVICE-O...
: service show sites
: service show snmp session
: service show startup-log (on DEVICE-NAME)
: service show syslog (on DEVICE-NAME)
: service show top (on DEVICE-NAME)
: service show upgrade-history (on DEVICE-NAME)
: service show watchdog (on DEVICE-NAME)
: service show wireless aaa-stats (on DEVICE-NAME)
: service show wireless ap300 (MAC-ADDRESS)
: service show wireless client proc (info stats) (AA-BB-CC-DD-EE-...
: service show wireless config-internal
: service show wireless credential-cache (on DEVICE-NAME)
: service show wireless dns-cache (on DEVICE-NAME)
: service show wireless log-internal
: service show wireless meshpoint neighbor proc (info stats) (AA-...
: service show wireless neighbors
: service show wireless radar-status (on DEVICE-NAME)
: service show wireless reference (frame handshake mcs-rates reason...
: service show wireless stats-client diag (DEVICE-NAME) (on DEVI...
: service show wireless vlan-usage (on DEVICE-NAME)
: service show xpath-history
rfs7000-37FABE>help search mint only-show
Found 8 references for "mint"

Mode : User Exec
Command : show mint neighbors (|details)| (|on DEVICE-NAME))
           : show mint links (|details)| (|on DEVICE-NAME))
           : show mint id(| (on DEVICE-NAME))
           : show mint stats(| (on DEVICE-NAME))
           : show mint route(| (on DEVICE-NAME))
           : show mint lsp
           : show mint lsp-db (|details)| (|on DEVICE-NAME))
           : show mint mlcp(| (on DEVICE-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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

no <PARAMETER>

**Parameters**

None

**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 CNTL/Z.

```
rfs7000-37FABE(config)#no ?
aaa-policy                        Delete a aaa policy
aaa-tacacs-policy                 Delete a aaa tacacs policy
alias                             Alias
ap300                             Delete an AP300
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
ap81xx                            Delete an AP81XX access point
ap82xx                            Delete an AP82XX access point
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
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
dhcpsv6-server-policy            DHCPv6 server related configuration
dns-whitelist                    Delete a whitelist object
event-system-policy              Delete an event system policy
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
ipv6
ipv6-router-advertisement-policy
l2tpv3
management-policy
meshpoint
meshpoint-qos-policy
nac-list
passpoint-policy
password-encryption
profile
radio-qos-policy
radius-group
radius-server-policy
radius-user-pool-policy
rf-domain
rfs4000
rfs6000
rfs7000
role-policy
routing-policy
smart-rf-policy
t5
wips-policy
wlan
wlan-qos-policy
service

Priv Exec mode: No command options
rfs7000-37FABE#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
  upgrade  Remove a patch
  wireless  Wireless Configuration/Statistics commands

user Exec mode: No command options
rfs7000-37FABE>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
  wireless  Wireless Configuration/Statistics commands
## 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

Common Commands
Reverts changes made, in the current session, to their last saved configuration

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
revert

Parameters
None

Examples
rfs7000-37FABE>revert
rfs7000-37FABE>
5.1.7 service

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX81XX, NX9000, NX9500, NX9510

Syntax (User Exec Mode)

```

- service ap300 [dns-name|dot1x|locator|reload]
- service ap300 dns-name <DNS-NAME> on [all|ap-mac <MAC>]
- service ap300 dot1x username <USERNAME> password <PASSWORD> on [all|ap-mac <MAC>]
- service ap300 [locator|reload] <MAC>

- service [block-adopter-config-update|request-full-config-from-adopter]

- service clear [adoption|captive-portal-page-upload|command-history|device-upgrade|noc|reboot-history|unsanctioned|upgrade-history|virtual-machine-history|wireless|xpath]

- service clear adoption history {on <DEVICE-NAME>}
- service clear device-upgrade 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|wireless|xpath

- service clear noc statistics
- service clear unsanctioned apts {on <DEVICE-OR-DOMAIN-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 [radio statistics {<MAC/HOSTNAME>} {<1-3>}

- 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 load-balancing clear-client-capability [<MAC>|all] {on <DEVICE-NAME>}

service locator {<1-60>} {on <DEVICE-NAME>}

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 set [display-mode|validation-mode]

service set display-mode [global|rf-domain <DOMAIN-NAME>]

service set validation-mode [full|partial] {on <DEVICE-NAME>}

service show [block-adopter-config-update|captive-portal|cli|client-identity-defaults|
command-history|configuration-revision|crash-info|dhcp-lease|diag|fast-switching|
fib|fib6|hardware-switch|info|mac-vendor|mem|mint|noc|pm|process|reboot-history|
rf-domain-manager|sites|snmp|startup-log|sysinfo|top|upgrade-history|
virtual-machine-history|watchdog|wireless|xpath-history]

service show block-adopter-config-update

service show captive-portal [servers] {on <DEVICE-NAME>}

service show [cli|client-identity-defaults] configuration-revision|mac-vendor <OUI/MAC>|
noc diag|snmp session|xpath-history

service show [command-history|crash-info|info|mem|process|reboot-history]
startup-log|sysinfo|top|upgrade-history|watchdog {on <DEVICE-NAME>}

service show dhcp-lease [<INTERFACE-NAME>]<pppoe1|vlan <1-4094>|wwan1}{<DEVICE-NAME>}

service show diag [led-status|stats] {on <DEVICE-NAME>}

service show [fib|fib6] [table-id <0-255>]

service show hardware-switch mac-address-table

service show mint [adopted-devices {on <DEVICE-NAME>}|ports]

service show pm {history} {on <DEVICE-NAME>}

service show rf-domain-manager diag {MAC/<HOSTNAME>} {on <DEVICE-OR-DOMAIN-NAME>}

service show sites

service show virtual-machine-history {on <DEVICE-NAME>}

service show wireless [aaa-stats|ap300|client] [config-internal|credential-cache|
dns-cache|log-internal|meshpoint|neighbors|reference|stats-client] [vlan-usage]

service show wireless [aaa-stats|client-credential-cache|dns-cache|vlan-usage] {on <DEVICE-NAME>}

service show wireless [ap300 <MAC>|config-internal] [log-internal|neighbors]

service show wireless [client] [meshpoint neighbor] proc [info|stats] {<MAC>}

{on <DEVICE-OR-DOMAIN-NAME>}

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|interactive-calibration|
interactive-calibration-result|run-calibration|save-config] [stop-calibration]

service smart-rf clear-config {MAC}<DEVICE-NAME> [on <DOMAIN-NAME>]

service smart-rf [clear-history] [interactive-calibration|run-calibration|save-config|
stop-calibration] {on <DOMAIN-NAME>}

service smart-rf interactive-calibration-result [discard|replace-current-config|
write-to-configuration] {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-wmm]

**service wireless client beacon-request** <MAC> mode [active|passive|table]

**ssid** [SSID|any] channel-report [CHANNEL-LIST|none] {on <DEVICE-NAME>}

**service wireless client quiet-element** [start|stop]

**service wireless client trigger-bss-transition** mac <MAC> {timeout <0-65535>} {url <URL>}

**service wireless client mac** <MAC> type [deauth-imminent|subscrition-remediation]

**service wireless dump-core-snapshot**

**service wireless meshpoint** zl <MESHPOINT-NAME> {on <DEVICE-NAME>}

**service wireless qos** delete-tspec <MAC> tid <0-7>

**service wireless trace** pattern <WORD>

**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>]

**service wireless wips clear-event-history** {on <DEVICE-OR-DOMAIN-NAME>}

### Parameters (User Exec Mode)

**service ap300** dns-name <DNS-NAME> on [all|ap-mac <MAC>]

<table>
<thead>
<tr>
<th>ap300</th>
<th>Configures global AP300 settings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Note:</strong> This command is not applicable to the NX45XX, NX65XX, and NX9000 series service platforms.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>dns-name</th>
<th>&lt;DNS-NAME&gt;</th>
<th>Authenticates DNS server name for AP adoption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;DNS-NAME&gt;</td>
<td>• &lt;DNS-NAME&gt; – Specify the DNS server name.</td>
</tr>
</tbody>
</table>

| on [all|ap-mac <MAC>] | Adopts a specified AP300 or all AP300s |
|----------------------|---------------------------------------|
| all | Adopts all AP300s |
| ap-mac <MAC> | Adopts a specified AP300 |
| <MAC> | Specify the AP300’s MAC address. |

**service ap300 dot1x** username <USERNAME> password <PASSWORD> on [all|ap-mac <MAC>]

<table>
<thead>
<tr>
<th>ap300</th>
<th>Configures global AP300 settings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Note:</strong> This command is not applicable to the NX45XX, NX65XX, and NX9000 series service platforms.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>dot1x</th>
<th>Sets 802.1x authentication parameters</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>username</th>
<th>&lt;USERNAME&gt;</th>
<th>Authenticates user before providing access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;USERNAME&gt;</td>
<td>• &lt;USERNAME&gt; – Specify the username to authenticate.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>password</th>
<th>&lt;PASSWORD&gt;</th>
<th>Authenticates password before providing access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;PASSWORD&gt;</td>
<td>• &lt;PASSWORD&gt; – Specify the password.</td>
</tr>
</tbody>
</table>

| on [all|ap-mac <MAC>] | Configures global AP300 parameters on a specified AP300 or all AP300s |
|----------------------|------------------------------------------------------------------------|
| all | Sets global parameters on all AP300s |
| AP300 <MAC> | Configures global parameters on a specified AP300 |
| <MAC> | Specify the AP300’s MAC address. |
• service ap300 [locator|reload] <MAC>

<table>
<thead>
<tr>
<th>ap300</th>
<th>Configures global AP300 settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: This command is not applicable to the NX45XX, NX65XX, and NX9000 series service platforms.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>locator</th>
<th>Enables a specified AP300's LEDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>reload</td>
<td>Resets a specified AP300</td>
</tr>
</tbody>
</table>

| <MAC>               | The following keyword is common to ‘locator’ and ‘reload’ parameters: |
|---------------------| Specifies the AP300's MAC address to enable its locator or to reset the device |
|                     | • <MAC> – Specify the AP300's MAC address. |

• service [block-adopter-config-update|request-full-config-from-adopter]

<table>
<thead>
<tr>
<th>block-adopter-config-update</th>
<th>Blocks the configuration updates sent from the NOC server</th>
</tr>
</thead>
<tbody>
<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’.

• service clear adoption history {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>clear adoption history</th>
<th>Clears adoption history on this device and its adopted access points</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears adoption history 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>

• service clear device-upgrade history {on <DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>clear device-upgrade history</th>
<th>Clears device upgrade history</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DOMAIN-NAME&gt;</td>
<td>Optional. Clears all firmware upgrade history in a specified RF Domain</td>
</tr>
<tr>
<td>• &lt;DOMAIN-NAME&gt; – Specify the RF Domain name.</td>
<td></td>
</tr>
</tbody>
</table>

• service clear captive-portal-page-upload history {on <DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>clear captive-portal-page-upload history</th>
<th>Clears captive portal page upload history</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DOMAIN-NAME&gt;</td>
<td>Optional. Clears captive portal page upload history on a specified RF Domain</td>
</tr>
<tr>
<td>• &lt;DOMAIN-NAME&gt; – Specify the RF Domain name.</td>
<td></td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>service clear [command-history</td>
<td>reboot-history</td>
</tr>
<tr>
<td>clear [command-history</td>
<td>reboot-history</td>
</tr>
<tr>
<td>Note:</td>
<td>This command is applicable only on the NX45XX, NX65XX, NX9500, and NX9510 series service platforms.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Clears history 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>
<tr>
<td>Note:</td>
<td>When executing the clear virtual-machine-history command, provide the name of the service platform running the VMs.</td>
</tr>
<tr>
<td>service clear noc statistics</td>
<td>Clears Network Operations Center (NOC) applicable statistics counters</td>
</tr>
<tr>
<td>service clear unsanctioned aps {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td>Clears the unsanctioned APs list</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Clears the unsanctioned APs list on a specified device or RF 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>
<tr>
<td>service clear wireless [ap</td>
<td>client] {&lt;MAC&gt;} {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>The following keywords are common to the ‘ap’ and ‘client’ parameters:</td>
</tr>
<tr>
<td>{on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td>&lt;MAC&gt;</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
</tr>
<tr>
<td>service clear wireless controller-mobility-database</td>
<td>Clears the controller assisted mobility database</td>
</tr>
<tr>
<td>service clear wireless radio statistics {&lt;MAC/HOSTNAME&gt;} {&lt;1-3&gt;} {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td>Clears applicable wireless radio statistics counters</td>
</tr>
</tbody>
</table>
### Command Syntax:

- **service clear wlan statistics** `<MAC/HOSTNAME>` `<1-3>` `{on <DEVICE-OR-DOMAIN-NAME>}`
  
  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 AP, wireless controller, service platform, or RF Domain.
  
- **service clear xpath requests** `<1-100000>`
  
  Optional. Specifies the session number (cookie from show sessions)
  
  - `<1-100000>` – Specify the session number from 1 - 100000.
  
  **Note:** Omit for this session
  
- **service cli-tables-skin** `[ansi|hashes|minimal|none|percent|stars|thick|thin|utf-8]` `{grid}`
  
  Selects a formatting layout or skin for CLI tabular outputs
  
  - 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
  - stars – Uses asterisks (*) for borders
  - thick – Uses thick lines for borders
  - thin – Uses thin lines for borders
  - utf-8 – Uses UTF-8 characters for borders
  
- **grid**
  
  Optional. Uses a complete grid instead of just title lines
  
- **service cluster force** `[active|configured-state|standby]`
  
  Enables cluster protocol management
  
  Forces action commands on a cluster (active, configured-state, and standby)
  
  Changes the cluster run status to active
  
  Restores a cluster to the configured state
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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 all off-line access points</td>
</tr>
<tr>
<td>• service delete-offline-aps offline-for days &lt;0-999&gt; {time &lt;TIME&gt;}</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>Optional. Deletes off-line access points for a specified time</td>
</tr>
<tr>
<td>force-send-config {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td>Resends configuration to device(s)</td>
</tr>
<tr>
<td>force-update-vm-stats {on &lt;DEVICE-NAME&gt;}</td>
<td>Forcefully pushes VM statistics on to the NOC</td>
</tr>
<tr>
<td>load-balancing clear-client-capability [&lt;MAC&gt;</td>
<td>all] {on &lt;DEVICE-NAME&gt;}</td>
</tr>
<tr>
<td>load-balancing clear-client-capability [&lt;MAC&gt;</td>
<td>all] {on &lt;DEVICE-NAME&gt;}</td>
</tr>
<tr>
<td>locator {&lt;1-60&gt;}</td>
<td>Enables LEDs</td>
</tr>
<tr>
<td>• on &lt;DEVICE-NAME&gt;</td>
<td>Sets LED flashing time from 1 - 60 seconds.</td>
</tr>
<tr>
<td>locator {&lt;1-60&gt;}</td>
<td>The following keyword is recursive and common to the &lt;1-60&gt; parameter:</td>
</tr>
<tr>
<td>• on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Enables LEDs on a specified device</td>
</tr>
<tr>
<td>• &lt;DEVICE-NAME&gt;</td>
<td>Specify name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>
- **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>] <PORT> <1024-65535> <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

  `<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.
### COMMON COMMANDS

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `service set display-mode [global|rf-domain <DOMAIN-NAME>]` | Sets the display mode for the current session  
  - global – Executes the show command on all configured RF Domains  
  - rf-domain <DOMAIN-NAME> – Executes the show command on a specified RF Domain. Specify the RF Domain’s name. Once configured, the show command displays information for the specified RF Domain. |
| `service set validation-mode [full|partial] {on <DEVICE-NAME>}` | Sets the validation mode  
  - full – Performs a full configuration validation  
  - partial – Performs a partial configuration validation  
  Optional. Performs full or partial configuration validation on a specified device  
  - <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
| `service show block-adopter-config-update` | Displays NOC configuration blocking status |
| `service show captive-portal [servers|user-cache] {on <DEVICE-NAME>}` | Displays running system statistics based on the parameters passed  
  - servers - Displays server information for active captive portals  
  - user-cache - Displays cached user details for a captive portal  
  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-vendor <OUI/MAC>|noc diag|snmp session|xpath-history]` | Displays running system statistics based on the parameters passed  
  - cli - Displays CLI tree of the current mode |
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>client-identity-defaults</td>
<td>Displays default client-identities and their configuration</td>
</tr>
<tr>
<td>configuration-revision</td>
<td>Displays current configuration revision number</td>
</tr>
</tbody>
</table>
| mac-vendor <OUI/MAC> | Displays vendor name for a specified MAC address or Organizationally Unique Identifier (OUI) part of the MAC address
  - <OUI/MAC> – 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. |
| noc diag           | Displays NOC diagnostic details                                            |
| snmp session       | Displays SNMP session details                                              |
| xpath-history      | Displays XPath history                                                     |
| service show [command-history|crash-info|info|mem|process|reboot-history|startup-log|sysinfo|top|upgrade-history|watchdog] {on <DEVICE-NAME>} | Displays running system statistics based on the parameters passed |
| show               | Displays running system statistics based on the parameters passed          |
| command-history    | Displays command history (lists all commands executed)                    |
| crash-info         | Displays information about core, panic, and AP dump files                 |
| info               | Displays snapshot of available support information                         |
| mem                | Displays a system’s current memory usage (displays the total memory and available memory) |
| process            | Displays active system process information (displays all processes currently running on the system) |
| reboot-history     | Displays the device’s reboot history                                       |
| startup-log        | Displays the device’s startup log                                          |
| sysinfo            | Displays system’s memory usage information                                |
| top                | Displays system resource information                                       |
| upgrade-history    | Displays the device’s upgrade history (displays details, such as date, time, and status of the upgrade, old version, new version etc.) |
| watchdog           | Displays the device’s watchdog status                                      |
| on <DEVICE-NAME>  | 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 { <INTERFACE-NAME> | on | pppoe1 | vlan <1-4094> | wan1 } { on <DEVICE-NAME> } | Displays running system statistics based on the parameters passed |
| show               | Displays running system statistics based on the parameters passed          |
| dhcp-lease         | Displays DHCP lease information received from the server                   |
| <INTERFACE>        | Optional. Displays DHCP lease information for a specified router interface
  - <INTERFACE> – Specify the router interface name. |
on

Optional. Displays DHCP lease information for a specified device

pppoe1

Optional. Displays DHCP lease information for a PPP over Ethernet interface

vlan <1-4094>

Optional. Displays DHCP lease information for a VLAN interface

- <1-4094> – Specify a VLAN index from 1 - 4094.

wwan1

Optional. Displays DHCP lease information for a Wireless WAN interface

on <DEVICE-NAME>

The following keywords are common to all of the above:

- on <DEVICE-NAME> – Optional. Displays DHCP lease information 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 diag [led-status|stats] {on <DEVICE-NAME>}

show

Displays running system statistics based on the parameters passed

diag

Displays diagnostic statistics, such as LED status, fan speed, and sensor temperature

led-status

Displays LED state variables and the current state

stats

Displays fan speed and sensor temperature statistics

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.

- service show fast-switching {on <DEVICE-NAME>}

show

Displays running system statistics based on the parameters passed

fast-switching

Displays fast switching state

Note: This command is available only the NX45XX, NX65XX, and NX9000 series service platforms.

on <DEVICE-NAME>

Optional. Displays fast switching state 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 [fib|fib6] {table-id <0-255>}

show

Displays running system statistics based on the parameters passed

fib

Displays entries in the Forwarding Information Base (FIB)

fib6

Displays FIB IPv6 static routing entries

The WiNG 5.6 release allows the IPv6 FIB to maintain only IPv6 static and interface routes. FIB is 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.

The WiNG 5.6 release allows the IPv6 FIB to maintain only IPv6 static and interface routes.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show hardware-switch mac-address-table</code></td>
<td>Displays the mac-address-table. Note: This command is available only the NX45XX and NX65XX series service platforms.</td>
</tr>
<tr>
<td>`show mint {adopted-devices {on &lt;DEVICE-NAME&gt;}}</td>
<td>ports`</td>
</tr>
<tr>
<td><code>show pm {history} {(on &lt;DEVICE-NAME&gt;)}</code></td>
<td>Displays the Process Monitor (PM) controlled process details</td>
</tr>
<tr>
<td><code>show rf-domain-manager diag {&lt;MAC/HOSTNAME&gt;} {(on &lt;DEVICE-OR-DOMAIN-NAME&gt;)}</code></td>
<td>Displays RF Domain manager related diagnostics statistics. Optional. Specifies the MAC address or hostname of the RF Domain manager. On &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays diagnostics statistics on a specified device or 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 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>show virtual-machine-history</th>
<th>Displays virtual machine history based on the parameters passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>on &lt;DEVICE-NAME&gt; – Optional. Displays virtual machine history on 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 service platform.</td>
</tr>
</tbody>
</table>

**Note:** This command is applicable only to the NX45XX, NX65XX, and NX9500, and NX9510 series service platforms. It is also available on the Privilege Executable Mode of these devices.

### service show wireless [aaa-stats|credential-cache|dns-cache|vlan-usage] {on <DEVICE-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>aaa-stats</td>
<td>Displays AAA policy statistics</td>
</tr>
<tr>
<td>credential-cache</td>
<td>Displays clients cached credentials statistics (VLAN, keys etc.)</td>
</tr>
<tr>
<td>dns-cache</td>
<td>Displays cache of resolved names of servers related to wireless networking</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 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>
</tbody>
</table>

### service show wireless [ap300 <MAC>|config-internal|log-internal|neighbors]

<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>ap300 &lt;MAC&gt;</td>
<td>Displays a WLAN’s AP300 statistics</td>
</tr>
<tr>
<td></td>
<td>• &lt;MAC&gt; – Specify the AP300’s MAC address.</td>
</tr>
<tr>
<td>config-internal</td>
<td>Displays internal configuration parameters</td>
</tr>
<tr>
<td>log-internal</td>
<td>Displays recent internal wireless debug logs (info and above severity)</td>
</tr>
<tr>
<td>neighbors</td>
<td>Displays neighboring device statistics for roaming and flow migration</td>
</tr>
</tbody>
</table>

### service show wireless [client|meshpoint neighbor] proc [info|stats] {<MAC>} {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>client</td>
<td>Displays WLAN client statistics</td>
</tr>
<tr>
<td>meshpoint neighbor</td>
<td>Displays meshpoint related proc entries</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>proc</td>
<td>The following keyword is common to client and meshpoint neighbor parameters:&lt;br&gt;  - proc – Displays dataplane proc entries based on the parameter selected&lt;br&gt;  <strong>Note:</strong> These proc entries provide statistics on each wireless client on the WLAN.&lt;br&gt;  <strong>Note:</strong> For the meshpoint parameter, it displays proc entries about neighbors.</td>
</tr>
<tr>
<td>info</td>
<td>This parameter is common to client and meshpoint neighbor parameters. Displays information for a specified wireless client or neighbor.</td>
</tr>
<tr>
<td>stats</td>
<td>This parameter is common to client and meshpoint neighbor parameters. Displays information for a specified wireless client or neighbor.</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>Displays information for a specified wireless client or neighbor.</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>This parameter is common to client and meshpoint neighbor parameters. Displays information for a specified wireless client or neighbor.</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system statistics based on the parameters passed.</td>
</tr>
<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 etc.)</td>
</tr>
<tr>
<td>info</td>
<td>This parameter is common to client and meshpoint neighbor parameters. Displays information for a specified wireless client or neighbor.</td>
</tr>
<tr>
<td>stats</td>
<td>This parameter is common to client and meshpoint neighbor parameters. Displays information for a specified wireless client or neighbor.</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>Displays information for a specified wireless client or neighbor.</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>This parameter is common to client and meshpoint neighbor parameters. Displays information for a specified wireless client or neighbor.</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system statistics based on the parameters passed.</td>
</tr>
<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.&lt;br&gt;  - &lt;DEVICE-OR-DOMAIN-NAME&gt; – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
<tr>
<td>smart-rf</td>
<td>Enables Smart RF management.</td>
</tr>
<tr>
<td>clear-config</td>
<td>Clears WLAN Smart RF configuration on a specified device or on all devices</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>&lt;MAC&gt;</code></td>
<td>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.</td>
</tr>
<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>on <code>&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</td>
<td>Enables Smart RF management</td>
</tr>
<tr>
<td>clear-history</td>
<td>Clears WLAN Smart RF history on all devices</td>
</tr>
<tr>
<td>interactive-calibration</td>
<td>Enables an interactive Smart RF calibration</td>
</tr>
<tr>
<td>run-calibration</td>
<td>Starts a new Smart RF calibration process</td>
</tr>
<tr>
<td>save-config</td>
<td>Saves the Smart RF configuration on all devices, and also saves the history on the RF Domain Manager</td>
</tr>
<tr>
<td>stop-calibration</td>
<td>Stops an in-progress Smart RF calibration</td>
</tr>
<tr>
<td>on <code>&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 interactive-calibration-result</td>
<td>Displays interactive Smart RF calibration results</td>
</tr>
<tr>
<td>discard</td>
<td>Discards interactive Smart RF calibration results</td>
</tr>
<tr>
<td>replace-current-config</td>
<td>Replaces current radio configuration</td>
</tr>
<tr>
<td>write-to-configuration</td>
<td>Writes and saves radio settings to configuration</td>
</tr>
<tr>
<td>on <code>&lt;DOMAIN-NAME&gt;</code></td>
<td>Optional. Displays interactive Smart RF calibration results on a specified RF Domain</td>
</tr>
<tr>
<td>snmp sysoid wing5</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. Same hardwares running the WiNG 4.X and WiNG 5.X images will have different sysoids. For example, the sysoid for a RFS4000 using the WiNG 4.X image will differ from another RFS4000 running the WiNG 5.X image.</td>
</tr>
</tbody>
</table>
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:
- RFS4000 – 1.3.6.1.4.1.388.18
- RFS6000 – 1.3.6.1.4.1.388.16
- RFS7000 – 1.3.6.1.4.1.388.15

The WiNG 5.X sysoids are:
- RFS4000 – 1.3.6.1.4.1.388.50.1.1.35
- RFS6000 – 1.3.6.1.4.1.388.50.1.1.36
- RFS7000 – 1.3.6.1.4.1.388.50.1.1.37

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>service ssm dump-core-snapshot</td>
<td>Triggers a debug core dump of the SSM module</td>
</tr>
<tr>
<td>syslog test {level [&lt;0-7&gt;][alerts</td>
<td>critical</td>
</tr>
<tr>
<td>level</td>
<td>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.</td>
</tr>
<tr>
<td>&lt;0-7&gt; – Optional. Specify the logging severity level from 0-7. The various levels and their implications are as follows:</td>
<td></td>
</tr>
<tr>
<td>alerts – Optional. Immediate action needed (severity=1)</td>
<td></td>
</tr>
<tr>
<td>critical – Optional. Critical conditions (severity=2)</td>
<td></td>
</tr>
<tr>
<td>debugging – Optional. Debugging messages (severity=7)</td>
<td></td>
</tr>
<tr>
<td>emergencies – Optional. System is unusable (severity=0)</td>
<td></td>
</tr>
<tr>
<td>errors – Optional. Error conditions (severity=3)</td>
<td></td>
</tr>
<tr>
<td>informational – Optional. Informational messages (severity=6)</td>
<td></td>
</tr>
<tr>
<td>notifications – Optional. Normal but significant conditions (severity=5)</td>
<td></td>
</tr>
<tr>
<td>warnings – Optional. Warning conditions (severity=4). This is the default setting.</td>
<td></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 name of the AP, wireless controller, or service platform.</td>
<td></td>
</tr>
<tr>
<td>service ssm trace pattern &lt;WORD&gt; {on &lt;DEVICE-NAME&gt;}</td>
<td>Displays the SSM module trace based on parameters passed</td>
</tr>
<tr>
<td>pattern &lt;WORD&gt;</td>
<td>Configures the pattern to match</td>
</tr>
<tr>
<td>&lt;WORD&gt; – Specify the pattern to match.</td>
<td></td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays the SSM module trace 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>
### COMMON COMMANDS

- **service wireless client beacon-request <MAC> mode [active|passive|table] ssid [<SSID>|any] channel-report [<CHANNEL-LIST>|none] {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wireless client beacon-requests</td>
<td>Sends beacon measurement requests to a wireless client</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>Specify the wireless client’s MAC address.</td>
</tr>
<tr>
<td>mode [active</td>
<td>passive</td>
</tr>
<tr>
<td></td>
<td>• Active – Requests beacon measurements in the active mode</td>
</tr>
<tr>
<td></td>
<td>• Passive – Requests beacon measurements in the passive mode</td>
</tr>
<tr>
<td></td>
<td>• Table – Requests beacon measurements in the table mode</td>
</tr>
<tr>
<td>ssid [&lt;SSID&gt;</td>
<td>any]</td>
</tr>
<tr>
<td></td>
<td>• &lt;SSID&gt; – Requests beacon measurement for a specified SSID</td>
</tr>
<tr>
<td></td>
<td>• any – Requests beacon measurement for any SSID</td>
</tr>
<tr>
<td>channel-report [&lt;CHANNEL-LIST&gt;</td>
<td>none]</td>
</tr>
<tr>
<td></td>
<td>• &lt;CHANNEL-LIST&gt; – Request includes a list of channels. The client has to send beacon measurements only for those channels included in the request</td>
</tr>
<tr>
<td></td>
<td>• none – Request applies to all channels</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Sends requests 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>

- **service wireless client quiet-element [start|stop]**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wireless client quiet-element</td>
<td>Enables/disables the quite-element information in beacons sent to wireless clients</td>
</tr>
<tr>
<td>start</td>
<td>Enables the quite-element information in beacons sent to wireless clients. This is the interval for which all wireless clients are to remain quiet.</td>
</tr>
<tr>
<td>stop</td>
<td>Disables the quite-element information in beacons sent to wireless clients. Once disabled, this information is no longer included in beacons.</td>
</tr>
</tbody>
</table>

- **service wireless client trigger-bss-transition mac <MAC> {timeout <0-65535} {url <URL>} {on <DEVICE-OR-DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wireless client trigger-bss-transition</td>
<td>Sends a 80211v-Wireless Network Management BSS transition request to a client</td>
</tr>
<tr>
<td>mac &lt;MAC&gt;</td>
<td>Specifies the wireless client’s MAC address</td>
</tr>
<tr>
<td>timeout &lt;0-65535&gt;</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-65535&gt; – Specify a time from 0-65535 seconds.</td>
</tr>
<tr>
<td>url &lt;URL&gt;</td>
<td>Optional. Specifies session termination URL</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Sends request on a specified device</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 wireless client trigger-wnm mac <MAC> type [deauth-imminent|subscription-remediation] {uri <WORD>}

<table>
<thead>
<tr>
<th>wireless client trigger-wnm</th>
<th>Sends a WNM notification (action frame) to a wireless client</th>
</tr>
</thead>
<tbody>
<tr>
<td>mac &lt;MAC&gt;</td>
<td>Specifies the wireless client’s MAC address</td>
</tr>
<tr>
<td>type [deauth-imminent</td>
<td>subscription-remediation]</td>
</tr>
<tr>
<td>uri &lt;WORD&gt;</td>
<td>Optional. Specifies the unique resource identifier (URI)</td>
</tr>
</tbody>
</table>

### service wireless dump-core-snapshot

| wireless client dump-core-snapshot | Triggers a debug core-dump of the wireless module |

### service wireless meshpoint zl <MESHPOINT-NAME> [on <DEVICE-NAME>] {<ARGS>}

<table>
<thead>
<tr>
<th>service wireless meshpoint</th>
<th>Runs zonal level commands for a meshpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>zl</td>
<td>Runs zonal commands</td>
</tr>
<tr>
<td>&lt;MESHPOINT-NAME&gt;</td>
<td>Runs zonal commands for the meshpoint identified by the &lt;MESHPOINT-NAME&gt; keyword</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Runs zonal commands for the specified meshpoint on a specified AP, wireless controller, or service platform</td>
</tr>
<tr>
<td>&lt;ARGS&gt;</td>
<td>Optional. Specifies the zonal arguments</td>
</tr>
</tbody>
</table>

### service wireless qos delete-tspec <MAC> tid <0-7>

<table>
<thead>
<tr>
<th>wireless qos delete-tspec</th>
<th>Sends a delete TSPEC request to a wireless client</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;MAC&gt;</td>
<td>Specify the MAC address of the wireless client.</td>
</tr>
<tr>
<td>tid &lt;0-7&gt;</td>
<td>Deletes the Traffic Identifier (TID)</td>
</tr>
<tr>
<td></td>
<td>&lt;0-7&gt; – Select the TID from 0 - 7.</td>
</tr>
</tbody>
</table>

### service wireless trace pattern <WORD> {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>wireless trace pattern</th>
<th>Displays the wireless module trace based on parameters passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>pattern &lt;WORD&gt;</td>
<td>Configures the pattern to match</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays the wireless module trace on a specified device</td>
</tr>
</tbody>
</table>

| <WORD> – Specify the pattern to match. |
| <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform. |
- **service wireless unsanctioned ap air-terminate <MAC> {on <DOMAIN-NAME>}**

  **wireless unsanctioned ap air-terminate** 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>]**

  **wireless wips** 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 from the blacklist
  - **<MAC>** – Specify the wireless client’s MAC address.

- **service wireless wips clear-event-history {on <DEVICE-OR-DOMAIN-NAME>}**

  **wireless wips** Enables WIPS management

  **clear-event-history** Clears event history

  **on <DEVICE-OR-DOMAIN-NAME>** Optional. Clears event history on a device or RF Domain

  - **<DEVICE-OR-DOMAIN-NAME>** – Specify the name of the AP, wireless controller, service platform, or RF Domain.

**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 [ap300|block-adopter-config-updates|clear|cli-tables-skin|cluster|copy|
  delete|delete-offline-aps|force-send-config|force-update-vm-stats|load-balancing|
  locator|mint|pktcap|pm|radio|radius|request-full-config-from-adopter|set|show|
  signal|smart-rf|snmp|ssm|start-shell|syslog|trace|troubleshoot|wireless]

service copy tech-support [<FILE>|<URL>]

service clear crash-info {on <DEVICE-NAME>}

service delete sessions <SESSION-COOKIES>

service mint [clear|debug-log|expire|flood]

service mint [clear [lsp-db|mlcp]] debug-log [flash-and-syslog|flash-only]|
  expire [lsp|spf]|flood [cspn|lsp]

service pktcap on [bridge|deny|drop|ext-vlan|interface|radio|rim|router|vpn|wireless]

service pktcap on [bridge|deny|drop|ext-vlan 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>|
PPPoe1|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 show last-passwd

service signal [abort <PROCESS-NAME>|kill <PROCESS-NAME>]

service start-shell

service trace <PROCESS-NAME> {summary}

service troubleshoot pmtu <DEST-MiNT-ID>

### Parameters (Privilege Exec Mode)

- **service copy tech-support [FILE]|<URL>**
  - Copies files for technical support
  - tech-support – Copies extensive system information useful for troubleshooting

  - **<FILE>**
    - Specify the file name and location using one of the following formats:
      - cf:/path/file
      - usb1:/path/file
      - usb2:/path/file

  - **<URL>**
    - Specify the file location in 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

  - **clear crash-info {on <DEVICE-NAME>**}
    - Clears all crash files

  - **<DEVICE-NAME>**
    - Optional. Clears crash files on a specified device. These crash files are core, panic, and AP dump
      - <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

  - **delete sessions <SESSION-COOKIES>**
    - Deletes session cookies

  - **<SESSION-COOKIES>**
    - Provide a list of cookies to delete.

    - Enables MiNT protocol management (clears LSP database, enables debug logging, enables running silence etc.)

  - **<SESSION-COOKIES>**
    - Clears LSP database and MiNT Link Control Protocol (MLCP) links
      - lsp-dp – Clears MiNT Label Switched Path (LSP) database
      - mlcp – Clears MLCP links
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>debug-log</td>
<td>Enables debug message logging</td>
</tr>
<tr>
<td>[flash-and-syslog]</td>
<td>• flash-and-syslog – Logs debug messages to the flash and syslog files</td>
</tr>
<tr>
<td>[flash-only]</td>
<td>• flash-only – Logs debug messages to the flash file only</td>
</tr>
<tr>
<td>expire [lsp</td>
<td>spf]</td>
</tr>
<tr>
<td>[acl-name &lt;ACL&gt;, count &lt;1-1000000&gt;, direction [any</td>
<td>inbound</td>
</tr>
<tr>
<td>pktcap on</td>
<td>Captures data packets crossing at a specified location</td>
</tr>
<tr>
<td>[on &lt;DEVICE-NAME&gt;, bridge</td>
<td>deny</td>
</tr>
<tr>
<td>bridge</td>
<td>Captures packets transiting through the Ethernet bridge</td>
</tr>
<tr>
<td>deny</td>
<td>Captures packets denied by an Access Control List (ACL)</td>
</tr>
<tr>
<td>drop</td>
<td>Captures packets at the drop locations</td>
</tr>
<tr>
<td>ext-vlan</td>
<td>Captures packets forwarded to or from an extended VLAN</td>
</tr>
<tr>
<td>rim</td>
<td>Captures packets at the Radio Interface Module (RIM)</td>
</tr>
<tr>
<td>router</td>
<td>Captures packets transiting through an IP router</td>
</tr>
<tr>
<td>vpn</td>
<td>Captures packets forwarded to or from a VPN link</td>
</tr>
<tr>
<td>wireless</td>
<td>Captures packets forwarded to or from a wireless device</td>
</tr>
<tr>
<td>acl-name &lt;ACL&gt;</td>
<td>Optional. Specify the ACL that matches the acl-name for the 'deny' location</td>
</tr>
<tr>
<td>count &lt;1-1000000&gt;</td>
<td>Optional. Limits the captured packet count. Specify a value from 1 -1000000.</td>
</tr>
<tr>
<td>direction [any</td>
<td>inbound</td>
</tr>
</tbody>
</table>
### filter

Optional. Filters packets based on the option selected (must be used as a last option)

The filter options are:

- `<LINE>` – Defines user defined packet capture filter
- `arp` – Matches ARP packets
- `capwap` – Matches CAPWAP packets
- `cdp` – Matches CDP packets
- `dot11` – Matches 802.11 packets
- `dropreason` – Matches packet drop reason
- `dst` – Matches IP destination
- `ether` – Matches Ethernet packets
- `host` – Matches host destination
- `icmp` – Matches ICMP packets
- `igmp` – Matches IGMP packets
- `ip` – Matches IPV4 packets
- `ipv6` – Matches IPV6 packets
- `l2` – Matches L2 header
- `l3` – Matches L3 header
- `l4` – Matches L4 header
- `lldp` – Matches LLDP packets
- `mint` – Matches MiNT packets
- `net` – Matches IP in subnet
- `not` – Filters out any packet that matches the filter criteria (For example, if not TCP is used, all tcp packets are filtered out)
- `port` – Matches TCP or UDP port
- `priority` – Matches packet priority
- `radio` – Matches radio
- `src` – Matches IP source
- `stp` – Matches STP packets
- `tcp` – Matches TCP packets
- `udp` – Matches UDP packets
- `vlan` – Matches VLAN
- `wlan` – Matches WLAN

### 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 tcpdump. The tcpdump analyzes network behavior, performance, and infrastructure. It also analyzes applications that generate or receive traffic.

### verbose

Optional. Displays full packet body
### COMMON COMMANDS 5 - 37

**write**
Captures packets to a specified file. Provide the file name and location in the following format:

- **FILE** – flash:/path/file
- **cf:**/path/file
- **usb1:**/path/file
- **usb2:**/path/file
- **vram:**/startup-config

**URL** – tftp://<hostname|IP>[:port]/path/file

ftp://<user>:<passwd>@<hostname|IP>[:port]/path/file
sftp://<user>@<hostname|IP>[:port]/path/file

**tzsp** – *Tazman Sniffer Protocol (TZSP)* host. Specify the TZSP host’s IP address or hostname.

- **service pktcap on radio** [<1-1024>|all] {<acl-name <ACL>,count <1-100000>,direction [any|inbound|outbound],filter <LINE>,hex, promiscuous, rate <1-100>, snap <1-2048>, tcpdump, verbose, write [file|url|tzsp <IP/TZSP-HOSTNAME>]}
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>write</td>
<td>Captures packets to a specified file. Provide the file name and location in the following format:</td>
</tr>
<tr>
<td></td>
<td>FILE – flash:/path/file</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>nvram:startup-config</td>
</tr>
<tr>
<td></td>
<td>URL – 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>
<tr>
<td></td>
<td>tzsp – The TZSP host. Specify the TZSP host’s IP address or hostname.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>service pktcap on interface</th>
<th>Captures data packets at a specified interface</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>on – Specify the capture location.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>interface</th>
<th>Captures packets at a specified interface. The options are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>[&lt;INTERFACE&gt;</td>
<td>ge &lt;1-4&gt;</td>
</tr>
<tr>
<td></td>
<td>• ge &lt;1-4&gt; – Selects a GigabitEthernet interface index from 1 - 4</td>
</tr>
<tr>
<td></td>
<td>• me1 – Selects the FastEthernet interface</td>
</tr>
<tr>
<td></td>
<td>• port-channel &lt;1-2&gt; – Selects a port-channel interface index from 1 - 2</td>
</tr>
<tr>
<td></td>
<td>• vlan &lt;1-4094&gt; – Selects a VLAN ID from 1 - 4094</td>
</tr>
</tbody>
</table>

| 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                  | Optional. Changes the packet direction with respect to a device. The direction can be set as any, |
| [any|inbound|outbound]               | 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. Provide the file name and location in the following format:
  FILE – flash:/path/file
cf:/path/file
usb1:/path/file
usb2:/path/file
nvram:startup-config
URL – tftp://<hostname|IP>[:port]/path/file
  ftp://<user>:<passwd>@<hostname|IP>[:port]/path/file
  sftp://<user>@<hostname|IP>[: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

- service troubleshoot pmtu <DES-MiNT-ID>

troubleshoot pmtu Troubleshoots the Path Maximum Transmission Unit (PMTU) to a specified destination MiNT ID

<DES-MiNT-ID>

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 analytics [clear-data|get-last-detailed-status|migrate|nfsserver|primary|restart|secondary|start|start-detailed-status|status|stop|wifi]
service analytics nfsserver [<IP>|<HOST-NAME>]

service analytics primary [<IP>|<HOST-NAME>]

service analytics secondary [<IP>|<HOST-NAME>]

service copy [<URL>|analytics-support|mac-user-db|tech-support]

service copy <URL>

service copy analytics-support [<FILE>|<URL>]

Parameters (Privilege Exec Mode: NX9000, NX9500, and NX9510)

<table>
<thead>
<tr>
<th>service</th>
</tr>
</thead>
<tbody>
<tr>
<td>service</td>
</tr>
<tr>
<td>analytics</td>
</tr>
<tr>
<td>[clear-data]</td>
</tr>
<tr>
<td>[get-last-detailed-status]</td>
</tr>
<tr>
<td>[migrate]</td>
</tr>
<tr>
<td>[restart]</td>
</tr>
<tr>
<td>[start]</td>
</tr>
<tr>
<td>[start-detailed-status]</td>
</tr>
<tr>
<td>[status]</td>
</tr>
<tr>
<td>[stop]</td>
</tr>
<tr>
<td>[wifi]</td>
</tr>
</tbody>
</table>

**service analytics** Provides analytics services

**Note:** The analytics feature is a separately licensed feature available only on the NX9500 and NX9510 model (NOC) service platforms and their managed controllers, service platforms, and access points. When enabled, this feature provides granular and robust analytic reporting for a controller managed (RFS4000, RFS6000, RFS7000, NX45XX, and NX65XX) network. Using analytics, data is collected at administrator defined intervals.

**Note:** Use `nfsserver` command to configure the Network File Server (NFS)

**Note:** To configure the license string for the hotspot analytics feature, see license.

<table>
<thead>
<tr>
<th>clear-data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clears analytics data</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>get-last-detailed-status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrieves the last detailed status (Hadoop/Hbase status and database sync status)</td>
</tr>
</tbody>
</table>

**Note:** In case no status is returned, retry the command after an interval, as the command issued to determine the detailed status (start-detail-status) might not have completed.

<table>
<thead>
<tr>
<th>migrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deletes current analytics data and migrated 5.4.X analytics data</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>restart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restarts analytics services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>start</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starts analytics services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>start-detailed-status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiates a detailed status computation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays the status of analytics services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stops analytics services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>wifi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables WiFi statistics polling. When enabled, this feature processes and stores wireless statistics and events in the Analytics module. This feature is disabled by default.</td>
</tr>
</tbody>
</table>

**Note:** To check WiFi data polling status, execute the `service > analytics > status` command.

**Note:** To disable WiFi data polling, execute the `no > service analytics > wifi` command.

**service analytics** Provides analytics services
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `nfsserver [<IP>|<HOST-NAME>]` | Configures the analytics NFS server. Use one of the following options to identify the NFS server:  
  • `<IP>` – Specifies the NFS server’s IP address  
  • `<HOST-NAME>` – Specifies the NFS server’s hostname |
| `service analytics primary [<IP>|<HOST-NAME>]` | Provides analytics services  
  Configures the analytics primary server. Use one of the following options to identify the primary server:  
  • `<IP>` – Specifies the primary server’s IP address  
  • `<HOST-NAME>` – Specifies the primary server’s hostname |
| `service analytics secondary [<IP>|<HOST-NAME>]` | Provides analytics services  
  Configures the analytics primary server. Use one of the following options to identify the secondary server:  
  • `<IP>` – Specifies the secondary server’s IP address  
  • `<HOST-NAME>` – Specifies the secondary server’s hostname |
| `service copy analytics-support [<FILE>|<URL>]` | Enables copying of analytics information to a specified file. Use one of the following options to specify the file:  
  **Note:** This information is useful to troubleshoot issues by the Technical Support team.  
  Specify the file name and location using one of the following formats:  
  - `usb1:/path/file`  
  - `usb2:/path/file`  
  Specify the file location in 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` |
| `service copy <URL>` | Imports files from a specified location. Use one of the following options to specify the file to copy and the location:  
  **URL** – `tftp://<hostname|IP>[:port]/path/file`  
  - `ftp://<user>:<passwd>@<hostname|IP>[:port]/path/file`  
  - `sftp://<user>:<passwd>@<hostname|IP>[:port]/path/file` |
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>}

Parameters (Global Config Mode)

- service set [command-history <10-300]|upgrade-history <10-100>|reboot-history <10-100>] {on <DEVICE-NAME>}

set

<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>}> 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.
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 pktcap on interface vlan 2
Capturing up to 50 packets. Use Ctrl-C to abort.

rfs7000-37FABE>service show cli
User Exec mode:  +-do
+  help [help]
  +  show
  +  configuration-tree [help show configuration-tree]
  +  search
    +  WORD [help search WORD ([detailed|only-show|skip-show])
      +  detailed [help search WORD ([detailed|only-show|skip-show])
      +  only-show [help search WORD ([detailed|only-show|skip-show])
      +  skip-show [help search WORD ([detailed|only-show|skip-show])
    +  show
      +  commands [show commands]
      +  running-config [show (running-config|session-config) ([include-factory])
        +  include-factory [show running-config interface ([`WORD|ge <1-4>|me1|pc <1-4>|vlan <1-4094>']) ([include-factory])
        +  WORD [show running-config interface ([`WORD|ge <1-4>|me1|pc <1-4>|vlan <1-4094>'])
          +  include-factory [show running-config interface ([`WORD|ge <1-4>|me1|pc <1-4>|vlan <1-4094>'])
            +  ge
              +  <1-4> [show running-config interface ([`WORD|ge <1-4>|me1|pc <1-4>|vlan <1-4094>'])
                +  include-factory [show running-config interface ([`WORD|ge <1-4>|me1|pc <1-4>|vlan <1-4094>'])
                  +  interface [show running-config interface ([`WORD|ge <1-4>|me1|pc <1-4>|vlan <1-4094>'])
                    +  include-factory]
          +  include-factory
        +  include-factory
      +  search
    +  help [help search WORD ([detailed|only-show|skip-show])
      +  detailed [help search WORD ([detailed|only-show|skip-show])
      +  only-show [help search WORD ([detailed|only-show|skip-show])
      +  skip-show [help search WORD ([detailed|only-show|skip-show])
    +  show
      +  commands [show commands]
      +  running-config [show (running-config|session-config) ([include-factory])
        +  include-factory [show running-config interface ([`WORD|ge <1-4>|me1|pc <1-4>|vlan <1-4094>']) ([include-factory])
        +  WORD [show running-config interface ([`WORD|ge <1-4>|me1|pc <1-4>|vlan <1-4094>'])
          +  include-factory [show running-config interface ([`WORD|ge <1-4>|me1|pc <1-4>|vlan <1-4094>'])
            +  ge
              +  <1-4> [show running-config interface ([`WORD|ge <1-4>|me1|pc <1-4>|vlan <1-4094>'])
                +  include-factory [show running-config interface ([`WORD|ge <1-4>|me1|pc <1-4>|vlan <1-4094>'])
                  +  interface [show running-config interface ([`WORD|ge <1-4>|me1|pc <1-4>|vlan <1-4094>'])
                    +  include-factory]
      +  include-factory
    +  search

--More--
rfs7000-37FABE>

rfs7000-37FABE#service signal kill testp
Sending a kill signal to testp
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 Config mode:
+  help [help]
  +  search
    +  WORD [help search WORD ([detailed|only-show|skip-show])
      +  detailed [help search WORD ([detailed|only-show|skip-show])
      +  only-show [help search WORD ([detailed|only-show|skip-show])
      +  skip-show [help search WORD ([detailed|only-show|skip-show])
    +  show
      +  commands [show commands]
      +  eval
        +  LINE [show eval LINE]
      +  debugging [show debugging ([on DEVICE-OR-DOMAIN-NAME)])
        +  cfgd [show debugging cfgd]
        +  on
          +  DEVICE-OR-DOMAIN-NAME [show debugging ([on DEVICE-OR-DOMAIN-NAME)])
          +  wireless [show debugging wireless ([on DEVICE-OR-DOMAIN-NAME)])
          +  on
+-DEVICE-OR-DOMAIN-NAME [show debugging wireless {([on DEVICE-OR-DOMAIN-NAME])}
+-voice [show debugging voice {([on DEVICE-OR-DOMAIN-NAME])]
+-on
+-DEVICE-OR-DOMAIN-NAME [show debugging voice {([on DEVICE-OR-DOMAIN-NAME])]

--More--

rfs7000-37FABE(config)#

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 20 06:08:57 2014</td>
<td>admin</td>
<td>192.168.100.226 26</td>
<td>reload force</td>
</tr>
<tr>
<td>Jan 20 06:08:57 2014</td>
<td>admin</td>
<td>192.168.100.226 26</td>
<td>write memory</td>
</tr>
<tr>
<td>Jan 08 04:24:53 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>exit</td>
</tr>
<tr>
<td>Jan 08 04:24:51 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>revert</td>
</tr>
<tr>
<td>Jan 08 04:18:58 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>wlan 2</td>
</tr>
<tr>
<td>Jan 08 04:01:52 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>exit</td>
</tr>
<tr>
<td>Jan 08 04:01:50 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>exit</td>
</tr>
<tr>
<td>Jan 08 03:40:30 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>interface upl</td>
</tr>
<tr>
<td>Jan 08 03:40:23 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>interface mel</td>
</tr>
<tr>
<td>Jan 08 03:40:17 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>interface fe 1</td>
</tr>
<tr>
<td>Jan 08 03:40:10 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>exit</td>
</tr>
<tr>
<td>Jan 08 03:11:03 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>association-list global test</td>
</tr>
<tr>
<td>Jan 08 03:09:12 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>association-list global test</td>
</tr>
<tr>
<td>Jan 08 03:00:59 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>interface radio 1</td>
</tr>
<tr>
<td>Jan 08 03:00:50 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>profile rfs4000 test</td>
</tr>
<tr>
<td>Jan 08 03:00:40 2014</td>
<td>admin</td>
<td>192.168.100.186 18</td>
<td>exit</td>
</tr>
</tbody>
</table>

--More--

rfs4000-229D58>

rfs7000-37FABE>service show diag stats

fan 1 current speed: 6660 min_speed: 2000 hysteresis: 250
fan 2 current speed: 6720 min_speed: 2000 hysteresis: 250
fan 3 current speed: 6540 min_speed: 2000 hysteresis: 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

7.9M out of 8.0M available for logs.
32.9M out of 34.0M available for history.
81.9M out of 84.0M available for crashinfo.

List of Files:

- anald.log 1.3K Apr 4 10:48
- cfgd.log 9.7K Apr 4 14:38
- dpd2.log 21.4K Apr 4 10:48
- messages.log 0 Apr 4 10:46
- startup.log 9.5K Apr 4 10:48
- upgrade.log 1.6K Apr 4 10:50
- vlan-usage.log 0 Apr 4 14:32
- command.history 1.6K Apr 4 14:37
- reboot.history 2.1K Apr 4 10:46
- upgrade.history 522 Apr 4 10:45

Please export these files or delete them for more space.

rfs7000-37FABE>
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>Mar 18 04:45:36 2014</td>
<td>5.6.0.0-045R</td>
<td>5.6.0.0-046R</td>
<td>Successful</td>
</tr>
<tr>
<td>Mar 14 04:51:04 2014</td>
<td>5.6.0.0-044R</td>
<td>5.6.0.0-045R</td>
<td>Successful</td>
</tr>
<tr>
<td>Mar 10 10:31:25 2014</td>
<td>5.6.0.0-042B</td>
<td>5.6.0.0-044R</td>
<td>Successful</td>
</tr>
<tr>
<td>Mar 06 04:45:53 2014</td>
<td>5.6.0.0-041B</td>
<td>5.6.0.0-042B</td>
<td>Successful</td>
</tr>
<tr>
<td>Mar 03 03:37:20 2014</td>
<td>5.6.0.0-040B</td>
<td>5.6.0.0-041B</td>
<td>Successful</td>
</tr>
<tr>
<td>Feb 24 04:14:01 2014</td>
<td>5.6.0.0-037B</td>
<td>5.6.0.0-040B</td>
<td>Successful</td>
</tr>
<tr>
<td>Feb 17 04:28:31 2014</td>
<td>5.6.0.0-036B</td>
<td>5.6.0.0-037B</td>
<td>Successful</td>
</tr>
<tr>
<td>Feb 13 04:36:00 2014</td>
<td>5.6.0.0-035B</td>
<td>5.6.0.0-036B</td>
<td>Successful</td>
</tr>
<tr>
<td>Jan 27 04:18:39 2014</td>
<td>5.6.0.0-031B</td>
<td>5.6.0.0-033B</td>
<td>Successful</td>
</tr>
<tr>
<td>Jan 20 06:10:54 2014</td>
<td>5.6.0.0-029B</td>
<td>5.6.0.0-031B</td>
<td>Successful</td>
</tr>
<tr>
<td>Jan 06 01:57:30 2014</td>
<td>5.6.0.0-028B</td>
<td>5.6.0.0-029B</td>
<td>Successful</td>
</tr>
<tr>
<td>Dec 09 02:53:05 2013</td>
<td>5.6.0.0-025B</td>
<td>5.5.1.0-011B</td>
<td>Successful</td>
</tr>
</tbody>
</table>

--More--

rfs4000-229D58>service show xpath-history

<table>
<thead>
<tr>
<th>DATE&amp;TIME</th>
<th>USER</th>
<th>XPATH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DURATION(MS)</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Wed Jan 22 07:20:33 2014</td>
<td>system</td>
<td>/wing-stats/device/19.6C.88.09/_actions/cdp_lldp_update 15</td>
</tr>
<tr>
<td>Wed Jan 22 07:20:33 2014</td>
<td>system</td>
<td>/wing-stats/device/19.6C.88.09/_actions/cdp_lldp_update 15</td>
</tr>
<tr>
<td>Wed Jan 22 07:20:27 2014</td>
<td>system</td>
<td>/wing-stats/device/19.6C.88.09/_actions/cdp_lldp_update 15</td>
</tr>
</tbody>
</table>

--More--

rfs7000-37FABE>service show wireless config-internal

! Startup-Config-Playback Completed: Yes
no debug wireless
no country-code

wlan-qos-policy default
  no rate-limit wlan to-air
  no rate-limit wlan from-air
  no rate-limit client to-air
  no rate-limit client from-air

wlan wlan1
  ssid wlan1
  vlan 1
  qos-policy default
  encryption-type none
  authentication-type none
  no accounting radius
  no accounting syslog
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>Jan 20 06:16:05 2014</td>
<td>team-urc</td>
<td>autostart</td>
</tr>
<tr>
<td>Jan 20 06:14:31 2014</td>
<td>team-urc</td>
<td>stop (WiNG shutdown)</td>
</tr>
<tr>
<td>Jan 15 11:36:26 2014</td>
<td>team-urc</td>
<td>autostart</td>
</tr>
<tr>
<td>Jan 15 11:34:57 2014</td>
<td>team-urc</td>
<td>stop (WiNG shutdown)</td>
</tr>
<tr>
<td>Jan 06 14:35:32 2014</td>
<td>team-urc</td>
<td>autostart</td>
</tr>
<tr>
<td>Jan 06 14:33:57 2014</td>
<td>team-urc</td>
<td>stop (WiNG shutdown)</td>
</tr>
<tr>
<td>Dec 30 11:18:38 2013</td>
<td>team-urc</td>
<td>autostart</td>
</tr>
<tr>
<td>Dec 30 11:17:04 2013</td>
<td>team-urc</td>
<td>stop (WiNG shutdown)</td>
</tr>
</tbody>
</table>

```
x4500-5CFA2B>
```

```
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 20 06:19:56 2014</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Jan 06 02:03:18 2014</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Dec 29 22:14:49 2013</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Dec 22 23:27:08 2013</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Dec 16 00:14:15 2013</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
<tr>
<td>Dec 11 23:12:26 2013</td>
<td>Domain-0</td>
<td>autostart</td>
</tr>
</tbody>
</table>

```
x9500-6C874D>
```

```
nx9500-6C874D> service show virtual-machine-history
Configured size of virtual machine history is 100
```

```
x9500-6C874D> service show virtual-machine-history
```

The following examples show the service > analytics > wifi and service > analytics > status outputs on a NX9500 service platform:

```
nx9500-6C8809# service analytics wifi
Wifi data polling will be enabled. Please run status command to check Wifi data polling status.
```

```
nx9500-6C8809# service analytics status
*******************************************************************************
Analytics Service: Primary
*******************************************************************************
WARNING: Please configure NFS. This is very important for data recovery and export!!
*******************************************************************************
Analytics ip/dns configuration:
hdfs://127.0.0.1
127.0.0.1 127.0.0.1 localhost.localdomain localhost nx9500-6C8809
*******************************************************************************
Analytics last few commands history:
Sun Dec 22 23:27:08 UTC 2013 start
Sun Dec 29 22:10:24 UTC 2013 stop
Sun Dec 29 22:10:48 UTC 2013 stop
Sun Dec 29 22:14:49 UTC 2013 start
Mon Jan 6 01:58:58 UTC 2014 stop
Mon Jan 6 01:59:23 UTC 2014 stop
Mon Jan 6 02:03:18 UTC 2014 start
```
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-C7-99-71-17-28] - AP
[B4-C7-99-58-72-58] - AP

-- Site [TechPubsLAN] --
[00-23-68-88-0D-A7] - Controller, Adopted, Master
Cfg Status: configured

-- Site [TechPubs] --
[00-23-68-22-9D-58] - Controller, Adopted
Cfg Status: configured

[B4-C7-99-5C-FA-2B] - Controller, Adopted
Cfg Status: configured

nx9500-6C8809>

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
de80::/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#
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
show <PARAMETER>
```

Parameters

None

Examples

```
rfs7000-37FABE#show ?
 adoption                    Display information related to adoption to wireless controller
 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
 clock                      Display system clock
 cluster                    Cluster Protocol
 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
 environmental-sensor      Display Environmental Sensor Module status
 event-history              Display event history
 event-system-policy        Display event system policy
 file                       Display filesystem information
 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
 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 Access list
 mac-address-table         Display MAC address table
 macauth                    MAC AUTH
 mint                       MiNT protocol
 ntp                        Network time protocol
 password-encryption       Password encryption
 pppoe-client               PPP Over Ethernet client
```
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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>rtls</td>
<td>RTLS Statistics</td>
</tr>
<tr>
<td>running-config</td>
<td>Current operating configuration</td>
</tr>
<tr>
<td>session-changes</td>
<td>Configuration changes made in this session</td>
</tr>
<tr>
<td>session-config</td>
<td>This session configuration</td>
</tr>
<tr>
<td>sessions</td>
<td>Display CLI sessions</td>
</tr>
<tr>
<td>site-config-diff</td>
<td>Difference between site configuration on the NOC and actual site configuration</td>
</tr>
<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>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>vrrp</td>
<td>VRRP protocol</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#

**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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
write [memory|terminal]
```

Parameters

- write [memory|terminal]

<table>
<thead>
<tr>
<th>Memory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>Writes to the non-volatile (NV) memory</td>
</tr>
<tr>
<td>Terminal</td>
<td>Writes to the terminal</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE>write memory
[OK]
rfs7000-37FABE>
```
CHAPTER 6
SHOW COMMANDS

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.
### 6.1 show commands

Table 6.1 summarizes show commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>show</td>
<td>Displays settings for the specified system component</td>
<td>page 6-5</td>
</tr>
<tr>
<td>adoption</td>
<td>Displays information related to adoption</td>
<td>page 6-11</td>
</tr>
<tr>
<td>boot</td>
<td>Displays a device boot configuration</td>
<td>page 6-15</td>
</tr>
<tr>
<td>bonjour</td>
<td>Displays the configured Bonjour services available on local and remote sites</td>
<td>page 6-16</td>
</tr>
<tr>
<td>captive-portal</td>
<td>Displays WLAN hotspot functions</td>
<td>page 6-17</td>
</tr>
<tr>
<td>captive-portal-page-upload</td>
<td>Displays captive portal page related information</td>
<td>page 6-19</td>
</tr>
<tr>
<td>cdp</td>
<td>Displays a Cisco Discovery Protocol (CDP) neighbor table</td>
<td>page 6-20</td>
</tr>
<tr>
<td>clock</td>
<td>Displays the software system clock</td>
<td>page 6-22</td>
</tr>
<tr>
<td>cluster</td>
<td>Displays cluster commands</td>
<td>page 6-23</td>
</tr>
<tr>
<td>commands</td>
<td>Displays command list</td>
<td>page 6-24</td>
</tr>
<tr>
<td>context</td>
<td>Displays information about the current context</td>
<td>page 6-25</td>
</tr>
<tr>
<td>critical-resources</td>
<td>Displays critical resource information</td>
<td>page 6-26</td>
</tr>
<tr>
<td>crypto</td>
<td>Displays encryption mode information</td>
<td>page 6-27</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>Displays device firmware upgradation information for devices adopted by a wireless controller or access point</td>
<td>page 6-30</td>
</tr>
<tr>
<td>dot1x</td>
<td>Displays dot1x information on interfaces</td>
<td>page 6-32</td>
</tr>
<tr>
<td>environmental-sensor</td>
<td>Displays environmental sensor's historical data (applicable only to AP8132)</td>
<td>page 6-34</td>
</tr>
<tr>
<td>event-history</td>
<td>Displays event history</td>
<td>page 6-38</td>
</tr>
<tr>
<td>event-system-policy</td>
<td>Displays event system policy configuration information</td>
<td>page 6-39</td>
</tr>
<tr>
<td>file</td>
<td>Displays file system information</td>
<td>page 6-40</td>
</tr>
<tr>
<td>firewall</td>
<td>Displays wireless firewall information</td>
<td>page 6-41</td>
</tr>
<tr>
<td>global</td>
<td>Displays global information for network devices based on the parameters passed</td>
<td>page 6-45</td>
</tr>
<tr>
<td>gre</td>
<td>Displays GRE tunnel related information</td>
<td>page 6-47</td>
</tr>
<tr>
<td>interface</td>
<td>Displays interface status</td>
<td>page 6-48</td>
</tr>
<tr>
<td>ip</td>
<td>Displays IP related information</td>
<td>page 6-52</td>
</tr>
<tr>
<td>ip-access-list</td>
<td>Displays IP access list statistics</td>
<td>page 6-59</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>ipv6</td>
<td>Displays IPv6 related information</td>
<td>page 6-61</td>
</tr>
<tr>
<td>ipv6-access-list</td>
<td>Displays IPv6 access list statistics</td>
<td>page 6-65</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>Displays Layer 2 Tunnel Protocol Version 3 (L2TPV3) information</td>
<td>page 6-66</td>
</tr>
<tr>
<td>ldap-agent</td>
<td>Displays an LDAP agent’s join status (join status to a LDAP server domain)</td>
<td>page 6-69</td>
</tr>
<tr>
<td>licenses</td>
<td>Displays installed licenses and usage information</td>
<td>page 6-70</td>
</tr>
<tr>
<td>lldp</td>
<td>Displays Link Layer Discovery Protocol (LLDP) information</td>
<td>page 6-73</td>
</tr>
<tr>
<td>logging</td>
<td>Displays logging information</td>
<td>page 6-74</td>
</tr>
<tr>
<td>mac-access-list-stats</td>
<td>Displays MAC access list statistics</td>
<td>page 6-75</td>
</tr>
<tr>
<td>mac-address-table</td>
<td>Displays MAC address table entries</td>
<td>page 6-76</td>
</tr>
<tr>
<td>mac-auth</td>
<td>Displays details of wired ports that have MAC address-based authentication enabled</td>
<td>page 6-77</td>
</tr>
<tr>
<td>mint</td>
<td>Displays MiNT protocol configuration commands</td>
<td>page 6-79</td>
</tr>
<tr>
<td>ntp</td>
<td>Displays Network Time Protocol (NTP) information</td>
<td>page 6-82</td>
</tr>
<tr>
<td>password-encryption</td>
<td>Displays password encryption status</td>
<td>page 6-83</td>
</tr>
<tr>
<td>pppoe-client</td>
<td>Displays Point to Point Protocol over Ethernet (PPPoE) client information</td>
<td>page 6-84</td>
</tr>
<tr>
<td>privilege</td>
<td>Displays current privilege level information</td>
<td>page 6-85</td>
</tr>
<tr>
<td>radius</td>
<td>Displays the amount of access time consumed and the access time remaining for all guest users configured on a RADIUS server</td>
<td>page 6-86</td>
</tr>
<tr>
<td>reload</td>
<td>Displays scheduled reload information</td>
<td>page 6-87</td>
</tr>
<tr>
<td>rf-domain-manager</td>
<td>Displays RF Domain manager selection details</td>
<td>page 6-88</td>
</tr>
<tr>
<td>role</td>
<td>Displays role-based firewall information</td>
<td>page 6-89</td>
</tr>
<tr>
<td>route-maps</td>
<td>Display route map statistics</td>
<td>page 6-90</td>
</tr>
<tr>
<td>rtls</td>
<td>Displays Real Time Location Service (RTLS) statistics of access points</td>
<td>page 6-91</td>
</tr>
<tr>
<td>running-config</td>
<td>Displays configuration file contents</td>
<td>page 6-92</td>
</tr>
<tr>
<td>session-changes</td>
<td>Displays configuration changes made in this session</td>
<td>page 6-98</td>
</tr>
<tr>
<td>session-config</td>
<td>Displays a list of currently active open sessions on the device</td>
<td>page 6-99</td>
</tr>
<tr>
<td>sessions</td>
<td>Displays CLI sessions</td>
<td>page 6-100</td>
</tr>
<tr>
<td>site-config-diff</td>
<td>Displays the difference between site configuration available on NOC and the actual site configuration</td>
<td>page 6-101</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>smart-rf</td>
<td>Displays Smart RF management commands</td>
<td>page 6-102</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Displays spanning tree information</td>
<td>page 6-105</td>
</tr>
<tr>
<td>startup-config</td>
<td>Displays complete startup configuration script on the console</td>
<td>page 6-108</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 6-109</td>
</tr>
<tr>
<td>terminal</td>
<td>Displays terminal configuration parameters</td>
<td>page 6-112</td>
</tr>
<tr>
<td>timezone</td>
<td>Displays timezone information for the system and managed devices</td>
<td>page 6-113</td>
</tr>
<tr>
<td>upgrade-status</td>
<td>Displays image upgrade status</td>
<td>page 6-114</td>
</tr>
<tr>
<td>version</td>
<td>Displays a device’s software and hardware version</td>
<td>page 6-115</td>
</tr>
<tr>
<td>vrrp</td>
<td>Displays Virtual Router Redundancy Protocol (VRRP) protocol details</td>
<td>page 6-116</td>
</tr>
<tr>
<td>what</td>
<td>Displays details of a specified search phrase</td>
<td>page 6-118</td>
</tr>
<tr>
<td>wireless</td>
<td>Displays wireless configuration parameters</td>
<td>page 6-119</td>
</tr>
<tr>
<td>wwan</td>
<td>Displays the wireless WAN status</td>
<td>page 6-137</td>
</tr>
<tr>
<td>slot</td>
<td>Displays Peripheral Component Interconnect (PCI) express slot statistics</td>
<td>page 6-138</td>
</tr>
<tr>
<td>smart-cache</td>
<td>Displays details on the cached entry for a specific URL or all URLs</td>
<td>page 6-139</td>
</tr>
<tr>
<td>virtual-machine</td>
<td>Displays the virtual-machine (VM) configuration, logs, and statistics (applicable only to the NX45XX and NX65XX service platforms)</td>
<td>page 6-141</td>
</tr>
<tr>
<td>mirroring</td>
<td>Displays the port mirroring sessions (applicable only to the NX4524 and NX6524 service platforms)</td>
<td>page 6-145</td>
</tr>
<tr>
<td>raid</td>
<td>Displays Redundant Array of Independent Disks (RAID) related information, such as array status, consistency check status, and RAID log.</td>
<td>page 6-146</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show <PARAMETER>
```

**Parameters**

None

**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                    Display information related to adoption to
                                 wireless controller
    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
    clock                       Display system clock
    cluster                    Cluster Protocol
    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
    environmental-sensor       Display Environmental Sensor Module status
    event-history              Display event history
    event-system-policy        Display event system policy
    file                       Display filesystem information
    firewall                   Wireless Firewall
    global                     Global-level information
    gre                        Displays gre related information
    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
mint        MiNT protocol
mirroring   Show mirroring sessions
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
upgrade-status Display last image upgrade status
version     Display software & hardware version
virtual-machine Virtual Machine
vrrp        VRSP protocol
what        Perform global search
wireless    Wireless commands
wwan        Display wireless WAN Status

<DEVICE>(config)#
rfs7000-37FABE(config)#show clock
2013-02-15 15:28:26 UTC
rfs7000-37FABE(config)#

PRIVILEGE EXEC Mode
<DEVICE>##show ?
adoption   Display information related to adoption to
            wireless controller
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
clock       Display system clock
cluster     Cluster Protocol
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
environmental-sensor Display Environmental Sensor Module status
event-history Display event history
event-system-policy Display event system policy
file        Display filesystem information
firewall    Wireless Firewall
global      Global-level information
gre         Negate a command or set its defaults
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
mint                        MiNT protocol
mirroring                   Show mirroring sessions
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
upgrade-status              Display last image upgrade status
version                     Display software & hardware version
virtual-machine             Virtual Machine
vrrp                        VRRP protocol
what                        Perform global search
wireless                    Wireless commands
wwan                        Display wireless WAN Status

<DEVICE>#
rfs7000-37FABE#show terminal
Terminal Type: xterm
Length: 24     Width: 80
rfs7000-37FABE#

USER EXEC Mode
<DEVICE>=>show ?
   adoption                    Display information related to adoption to wireless controller
   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
   clock                       Display system clock
   cluster                    Cluster Protocol
   commands                   Show command lists
   context                    Information about current context
   critical-resources         Critical Resources
   crypto                     Encryption related commands
debug
debugging
device-upgrade
dot1x
environmental-sensor
event-history
event-system-policy
firewall
global
gre
interface
ip
ipv6
licenses
lldp
logging
mac-address-table
mac-auth
mint
mirroring
ntp
password-encryption
pppoe-client
privilege
radius
rf-domain-manager
role
route-maps
rtls
running-config
session-changes
session-config
sessions
site-config-diff
slot
smart-rf
spanning-tree
startup-config
t5
terminal
timezone
version
vrrp
what
wireless
wwan

<DEVICE>>
nx9500-6C8809(config)#show wireless ap configured

IDX       NAME               MAC              PROFILE       RF-DOMAIN        ADOPTED-BY
---------------------------------------------------------------------------------------
1   ap8132-74B45C    B4-C7-99-74-B4-5C   default-ap81xx    default     B4-C7-99-6D-B5-D4
2   ap6522-587258    B4-C7-99-58-72-58   default-ap6522     default     un-adopted
3   ap8132-711728    B4-C7-99-71-17-28   default-ap81xx    default     B4-C7-99-5C-FA-8E
4   rfs4000-880DA7   00-23-68-88-0D-A7   default-rfs4000    default     B4-C7-99-6C-88-09
5   ap7131-11E6C4    00-23-68-11-E6-C4   default-ap71xx    default     B4-C7-99-6D-B5-D4
6   rfs4000-229D58   00-23-68-22-9D-58   default-rfs4000    default     B4-C7-99-6C-88-09
---------------------------------------------------------------------------------------
nx9500-6C8809(config)#
The following Show commands are specific to the NX45XX and NX65XX series service platforms:

```
show slot
```

```
SLOT TYPE MODULE STATUS
1  []  wing  Enabled
2  []  wing  Enabled
3  []  wing  Enabled
4  []  wing  Enabled
```

```
show smart-cache
```

```
active-requests  Active requests
clients          Client list
purge-requests   Purge-requests
statistics       Statistics
storage          Storage
```

```
show smart-cache storage
```

```
USED   TOTAL   USAGE
1592   3354432 0%
```

```
show smart-cache statistics
```

```
DURATION | DATA (KB) | BANDWIDTH (Kbps) | REQUESTS
----------|-----------|------------------|-----------
Since boot| 0         | 0.0              | 0         |
```

```
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) - - -
```

The following Show commands are specific to the NX9500 series service platform:

```
show raid
```

Logical drive info:
Size 930 GB, State optimal
Alarm enabled
Last check: Sat Sep 14 06:00:03 2013
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
The following `Show` commands are specific to the NX9500 and NX9510 series service platforms:

```
ng-6C874D(config)#show virtual-machine configuration

<table>
<thead>
<tr>
<th>NAME</th>
<th>AUTOSTART</th>
<th>MEMORY (MB)</th>
<th>VCPUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing</td>
<td>-</td>
<td>16384</td>
<td>-</td>
</tr>
<tr>
<td>adsp</td>
<td>start</td>
<td>16384</td>
<td>12</td>
</tr>
<tr>
<td>team-cmt</td>
<td>start</td>
<td>1024</td>
<td>1</td>
</tr>
</tbody>
</table>
```

`ng-6C874D(config)#`
6.1.2 adoption

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.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

show adoption
show adoption config-errors
show adoption log
show adoption offline

Parameters

- 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>}

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, or NX9510.
- Site controller – NX45XX, NX65XX, RFS7000, RFS6000, or RFS4000.
log [adoptee|adopter] {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

- 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. 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.

- show adoption [history|controllers|info|pending|status|timeline] {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>adoption</th>
<th>Displays adoption related information. It also displays configuration errors.</th>
</tr>
</thead>
<tbody>
<tr>
<td>controllers</td>
<td>Displays information about adopted controllers. This is applicable in a Hierarchically managed network, where site controllers are adopted by the NOC controllers.</td>
</tr>
<tr>
<td>history</td>
<td>Displays adoption history of the logged device and its adopted access points</td>
</tr>
<tr>
<td>info</td>
<td>Displays adopted device information</td>
</tr>
<tr>
<td>pending</td>
<td>Displays information for devices pending adoption</td>
</tr>
<tr>
<td>status</td>
<td>Displays adoption status for logged devices</td>
</tr>
<tr>
<td>timeline</td>
<td>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 &lt;device-name&gt; option to specify the device.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>on &lt;DEVICE-NAME&gt;</th>
<th>The following keywords are common to all of the above parameters:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- on &lt;DEVICE-NAME&gt; – Optional. Displays a device’s adoption information, based on the parameter passed.</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 adoption offline

```
<table>
<thead>
<tr>
<th>MAC CONNECTED-TO</th>
<th>HOST-NAME</th>
<th>TYPE</th>
<th>RF-DOMAIN</th>
<th>TIME OFFLINE</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>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B4-C7-99-58-72-58</td>
<td>ap6522-5872s5</td>
<td>ap6522</td>
<td>default</td>
<td>unknown</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B4-C7-99-71-17-28</td>
<td>ap8132-711728</td>
<td>ap81xx</td>
<td>default</td>
<td>unknown</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B4-C7-99-74-B4-5C</td>
<td>ap8132-74B45C</td>
<td>ap81xx</td>
<td>default</td>
<td>unknown</td>
</tr>
</tbody>
</table>
```

Total number of devices displayed: 4

nx9500-6C8809#

ap7131-11B6C4(config)#show adoption log adoptee

2014-01-21 06:11:18:MLCP created VLAN link on VLAN 1, offer from B4-C7-99-5C-FA-8E
2014-01-21 06:11:18:MLCP VLAN link already exists
2014-01-21 06:11:18:Ignoring MLCP Offer, vlan_state MLCP_REPLY_WAIT != MLCP_DISCOVERING / MLCP_STP_WAITING
2014-01-21 06:11:18:Ignoring MLCP Offer, vlan_state MLCP_REPLY_WAIT != MLCP_DISCOVERING / MLCP_STP_WAITING
2014-01-21 06:11:18:Ignoring MLCP Offer, vlan_state MLCP_REPLY_WAIT != MLCP_DISCOVERING / MLCP_STP_WAITING
2014-01-21 06:11:18:Sending MLCP Request to B4-C7-99-5C-FA-8E vlan 1

--More--

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>
</tr>
</thead>
<tbody>
<tr>
<td>rfs6000-81742D</td>
<td>default</td>
<td>00-15-70-81-74-2D</td>
<td>70.81.74.2D</td>
<td>192.168.13.11</td>
</tr>
<tr>
<td>nx9500-6C8809</td>
<td>default</td>
<td>00-23-68-22-9D-58</td>
<td>68.22.5D.58</td>
<td>192.168.13.9</td>
</tr>
<tr>
<td>rfs4000-229D58</td>
<td>default</td>
<td>00-23-68-88-0D-A7</td>
<td>68.88.0D.A7</td>
<td>192.168.0.1</td>
</tr>
<tr>
<td>rfs4000-880DA7</td>
<td>default</td>
<td>B4-C7-99-5C-FA-8E</td>
<td>19.5C.FA.8E</td>
<td>192.168.0.1</td>
</tr>
<tr>
<td>nx9500-6C8809</td>
<td>default</td>
<td>B4-C7-99-6D-B5-D4</td>
<td>19.6D.B5.D4</td>
<td>192.168.13.16</td>
</tr>
<tr>
<td>nx4500-5CFA2B</td>
<td>default</td>
<td>B4-C7-99-6D-CD-4B</td>
<td>19.6D.CB.4B</td>
<td>192.168.13.15</td>
</tr>
<tr>
<td>nx9500-6C8809</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

Total number of devices displayed: 7

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>00-15-70-81-74-2D</td>
<td>RFS6000</td>
<td>adopted</td>
<td>2014-02-28 09:16:47</td>
<td>N.A.</td>
</tr>
<tr>
<td>00-15-70-81-74-2D</td>
<td>RFS6000</td>
<td>un-adopted</td>
<td>2014-02-28 09:11:51</td>
<td>Adoptee Not</td>
</tr>
<tr>
<td>00-23-68-22-9D-58</td>
<td>RFS4000</td>
<td>adopted</td>
<td>2014-02-27 08:33:31</td>
<td>N.A.</td>
</tr>
<tr>
<td>B4-C7-99-6D-CD-4B</td>
<td>RFS7000</td>
<td>adopted</td>
<td>2014-02-27 08:33:31</td>
<td>N.A.</td>
</tr>
<tr>
<td>00-23-68-88-0D-A7</td>
<td>RFS4000</td>
<td>adopted</td>
<td>2014-02-27 08:33:31</td>
<td>N.A.</td>
</tr>
<tr>
<td>B4-C7-99-6D-B5-D4</td>
<td>RFS6000</td>
<td>adopted</td>
<td>2014-02-27 08:33:31</td>
<td>N.A.</td>
</tr>
<tr>
<td>00-15-70-81-74-2D</td>
<td>RFS6000</td>
<td>adopted</td>
<td>2014-02-27 08:33:31</td>
<td>N.A.</td>
</tr>
<tr>
<td>B4-C7-99-5C-FA-8E</td>
<td>nx45xx</td>
<td>adopted</td>
<td>2014-02-27 08:33:31</td>
<td>N.A.</td>
</tr>
<tr>
<td>B4-C7-99-5C-FA-2B</td>
<td>nx45xx</td>
<td>adopted</td>
<td>2014-02-27 08:33:29</td>
<td>N.A.</td>
</tr>
<tr>
<td>B4-C7-99-5C-FA-2B</td>
<td>nx45xx</td>
<td>un-adopted</td>
<td>2014-02-27 08:33:03</td>
<td>Adoptee Not</td>
</tr>
</tbody>
</table>

---More---

nx9500-6C8809(config)#
### 6.1.3 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show boot {on <DEVICE-NAME>}
```

**Parameters**

- `show boot {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>boot</td>
<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>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays a specified device’s boot configuration</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><strong>Note:</strong></td>
<td>Use the <code>on &lt;DEVICE-NAME&gt;</code> option to view a remote device’s boot configuration.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config)# show boot
--------------------------------------------------------------------------------
IMAGE            BUILD DATE             INSTALL DATE          VERSION
--------------------------------------------------------------------------------
Primary       02/14/2014 15:47:17     02/17/2014 04:34:35     5.6.0.0-037B
Secondary     02/22/2014 11:30:49     02/24/2014 04:12:55     5.6.0.0-040B
--------------------------------------------------------------------------------
Current Boot       : Secondary
Next Boot          : Secondary
Software Fallback  : Enabled
rfs4000-229D58(config)#
```
### 6.1.4 bonjour

**show commands**

Displays the configured Bonjour services available on local and remote sites

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show bonjour services {on <DEVICE-NAME>}
```

**Parameters**

- `show bonjour services {on <DEVICE-NAME>}`
  - `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.

**Examples**

```
rfs7000-37FABE#show bonjour services on ap7131-11E6C4
---------------------------------------------------------------------------------------
SERVICE_NAME                                                INSTANCE_NAME
IP:PORT       VLAN-ID VLAN_TYPE  EXPIRY
---------------------------------------------------------------------------------------
_home-sharing._tcp.local                                  bob's
Library_05ADD1A24FA8_1._home-sharing._tcp.local   41.41.41.112:3689   41      Local     Fri
Feb 28 02:26:24 2014
---------------------------------------------------------------------------------------
---------------------------------------------------------------------------------------
rfs7000-37FABE#
```

<table>
<thead>
<tr>
<th>bonjour services</th>
<th>Displays the configured Bonjour services available on local and remote sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays Bonjour services available on a specified device</td>
</tr>
</tbody>
</table>

- `<DEVICE-NAME>` – Specify the name of the AP, wireless controller, or service platform.
### 6.1.5 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
show captive-portal sessions {include-ipv6|on|statistics} {[filter [captive-portal|ip|ipv6|state|vlan|wlan]]} ((on <DEVICE-OR-DOMAIN-NAME>)
```

**Parameters**
- **captive-portal sessions**
  
  Displays active captive portal client session details
- **include-ipv6**
  
  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**
  
  Displays statistical information regarding client sessions
- **on <DEVICE-OR-DOMAIN-NAME>**
  
  Displays active captive portal session details on a specified device or RF Domain. 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, and wlan
- **captive-portal [<CAPTIVE-PORTAL>] [not <CAPTIVE-PORTAL>]**
  
  Optional. Displays captive portal client/client sessions information, based on the captive portal name passed
  
  - `<CAPTIVE-PORTAL>` — Displays client details for a captive portal identified by the `<CAPTIVE-PORTAL>` parameter
  
  - not `<CAPTIVE-PORTAL>` — Inverts the match selection
- **ip [<IPv4>] [not <IPv4>]**
  
  Optional. Displays captive portal client/client sessions information, based on the IPv4 address passed
  
  - `<IPv4>` — Displays information of the client identified by the `<IPv4>` parameter
  
  - not `<IPv4>` — Inverts the match selection
- **ipv6 [<IPv6>] [not <IPv6>]**
  
  Optional. Displays captive portal client/client sessions information, based on the IPv6 address passed
  
  - `<IPv6>` — Displays information of the client identified by the `<IPv6>` parameter
  
  - not `<IPv6>` — Inverts the match selection
### Examples

```bash
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#
```
6.1.6 captive-portal-page-upload

Displays captive portal page information, such as upload history, upload status, and page file download status.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

show captive-portal-page-upload {history|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>]}  

Parameters
- show captive-portal-page-upload load-image-status
  
<table>
<thead>
<tr>
<th>load-image-status</th>
<th>Displays captive portal advanced page file download status on the logged device</th>
</tr>
</thead>
</table>

- show captive-portal-page-upload history {on <RF-DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>history</th>
<th>Displays captive portal page upload history</th>
</tr>
</thead>
<tbody>
<tr>
<td>{on &lt;RF-DOMAIN-NAME&gt;}</td>
<td>- Optional. Displays captive portal page upload history within a specified RF Domain. Specify the RF Domain name.</td>
</tr>
</tbody>
</table>

- show captive-portal-page-upload status {on [<RF-DOMAIN-NAME>|<RF-DOMAIN-MANAGER>]}  

<table>
<thead>
<tr>
<th>status {on &lt;RF-DOMAIN-NAME&gt;}</th>
<th>Displays captive portal page upload status</th>
</tr>
</thead>
<tbody>
<tr>
<td>{on &lt;RF-DOMAIN-NAME&gt;}</td>
<td>- Optional. Displays captive portal page upload status within a specified RF Domain. Specify the RF Domain name.</td>
</tr>
<tr>
<td>on &lt;RF-DOMAIN-MANAGER&gt;</td>
<td>- Optional. Displays captive portal page upload status for a specified RF Domain Manager. Specify the RF Domain Manager name.</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE>show captive-portal-page-upload status
Number of APs currently being uploaded : 0
Number of APs waiting in queue to be uploaded : 0
--------------------------------------------------------------------------------
AP STATE  UPLOAD TIME   PROGRESS RETRIES LAST UPLOAD ERROR    UPLOADED BY
--------------------------------------------------------------------------------

rfs7000-37FABE>

rfs7000-37FABE>show captive-portal-page-upload history
---------------------------------------------------------------------------------------
AP      RESULT                 TIME  RETRIES        UPLOADED-BY LAST-UPLOAD-ERROR
---------------------------------------------------------------------------------------
No upload history is present
rfs7000-37FABE>

rfs7000-37FABE>show captive-portal-page-upload load-image-status
No captive portal advanced page file download is in progress
rfs7000-37FABE>
6.1.7 cdp

Displays the Cisco Discovery Protocol (CDP) neighbor table

Supported in the following platforms:

* Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
* Wireless Controllers — RFS4000, RFS6000, RFS7000
* Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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. |

Examples

The following example shows detailed CDP neighbors table:

```
nx4500-5CFA2B#show cdp neighbors detail
Device ID: rfs4000-880DA7
Entry address(es):
  IP Address: 192.168.13.8
  IP Address: 192.168.0.1
  IP Address: 1.2.3.4
Platform: RFS-4011-11110-US, Capabilities: Router Switch
Interface: up1, Port ID (outgoing port): ge1
Hold Time: 170 sec
advertisements version: 2
Native VLAN: 1
Duplex: full
Version:
  5.6.0.0-031B
-------------------------
Device ID: rfs6000-434CAA
Entry address(es):
  IP Address: 192.168.0.1
  IP Address: 192.168.13.5
Platform: RFS6000, Capabilities: Router Switch
Interface: up1, Port ID (outgoing port): ge1
Hold Time: 178 sec
--More--
nx4500-5CFA2B#
```
The following example shows a non-detailed CDP neighbors table:

nx4500-5CFA2B#show cdp neighbors

<table>
<thead>
<tr>
<th>Device ID</th>
<th>Platform</th>
<th>Local Intrfce</th>
<th>Port ID</th>
<th>Duplex</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs4000-880DA7</td>
<td>RFS-4011-11110-US</td>
<td>up1</td>
<td>ge1</td>
<td>full</td>
</tr>
<tr>
<td>rfs6000-434CAA</td>
<td>RFS6000</td>
<td>up1</td>
<td>ge1</td>
<td>full</td>
</tr>
<tr>
<td>nx9500-6C8809</td>
<td>NX-9500-100R0-WR</td>
<td>up1</td>
<td>ge1</td>
<td>full</td>
</tr>
<tr>
<td>ap8132-711728</td>
<td>AP-8132-66040-US</td>
<td>up1</td>
<td>ge1</td>
<td>full</td>
</tr>
</tbody>
</table>

nx4500-5CFA2B#
6.1.8 clock

Displays a selected system’s clock

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```plaintext
show clock {on <DEVICE-NAME>}
```

Parameters

- `show clock {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>clock</code></td>
<td>Displays a system’s clock</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Displays system clock on a specified device</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;DEVICE-NAME&gt;</code> – Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

Examples

```plaintext
rfs7000-37FABE(config)#show clock
2014-01-27 08:55:15 UTC
rfs7000-37FABE(config)#
```
6.1.9 cluster

Displays cluster information (cluster configuration parameters, members, status etc.)

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

show cluster [configuration|members|status]
show cluster [configuration|members {detail}]|status

Parameters
- show cluster [configuration|members {detail}]|status

Examples

rfs7000-37FABE(config)#show cluster configuration
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

rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show cluster members detail
---------------------------------------------------------------------------------------
ID              MAC           MODE   AP COUNT AAP COUNT AP LICENSE AAP LICENSE      VERSION
---------------------------------------------------------------------------------------
19.6D.CD.4B   B4-C7-99-6D-CD-4B   Active   0        1         0          1           5.6.0.0-033B
---------------------------------------------------------------------------------------

rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show cluster status
Cluster Runtime Information
Protocol version : 1
Cluster operational state : active
AP license : 0
AAP license : 0
AP count : 0
AAP count : 0
Max AP adoption capacity : 1024
Number of connected member(s): 0
rfs7000-37FABE(config)#
6.1.10 commands

Displays commands available for the current mode

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 dhcpsrv (|on DEVICE-NAME)
show debugging role (|on DEVICE-OR-DOMAIN-NAME)
show debugging dot1x(|on DEVICE-NAME)
--More--
rfs4000-229D58(config)#

nx4500-5CFA2B(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
show debugging fib(|on DEVICE-NAME)
show debugging adoption (|on DEVICE-OR-DOMAIN-NAME)
show debugging wireless (|on DEVICE-OR-DOMAIN-NAME)
--More--
nx4500-5CFA2B(config)#
6.1.11 context

Display commands

Shows the current context details

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

Examples

```
rfs4000-229D58(config)#show context

! Configuration of RFS4000 version 5.6.0.0-029B

!

version 2.3
!

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)#
6.1.12 critical-resources

> show commands

Displays critical resource information. Critical resources are resources vital to the network.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```plaintext
show critical-resources {on <DEVICE-NAME>}
```

Parameters

- `show critical-resources {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>critical-resources</th>
<th>Displays critical resources information</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays critical resource information 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

```plaintext
rfs4000-229D58(config)#show critical-resources
-------------------------------------------------------------------------
CRITICAL RESOURCE IP       VLAN     PING-MODE       STATE
-------------------------------------------------------------------------
172.168.1.103               1         arp-icmp    up
-------------------------------------------------------------------------
rfs4000-229D58(config)#
```
6.1.13 crypto

> show commands

Displays encryption mode information

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
show crypto [cmp|ike|ipsec|key|pki]

show crypto cmp request status

show crypto ike sa {detail|on|peer <IP>} {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}
show crypto pki trustpoints {<TRUSTPOINT-NAME>|all} {on <DEVICE-NAME>}
```

Parameters

- **show 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 <IP>} {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>detail</code></td>
<td>Optional. Displays detailed IPSec SA statistics.</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Displays IPSec SAs on a specified device.</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>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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show crypto 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>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 ipsec sa</code></td>
<td>Displays 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 IPSec SA 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>detail</code></td>
<td>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>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>crypto rsa</code></td>
<td>Displays PKI related information.</td>
</tr>
<tr>
<td><code>trustpoints</code></td>
<td>Displays WLAN trustpoints.</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>The following keyword is recursive. &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.</td>
</tr>
<tr>
<td><code>&lt;TRUSTPOINT-NAME&gt;</code></td>
<td>Optional. Displays a specified trustpoint details. Specify the trustpoint name. &lt;TRUSTPOINT-NAME&gt; – Specify the trustpoint name.</td>
</tr>
<tr>
<td><code>all</code></td>
<td>Optional. Displays details of all trustpoints.</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>The following keyword is recursive and common to the ‘trustpoint-name’ and ‘all’ parameters. &lt;DEVICE-NAME&gt; – Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>
Examples

rfs7000-37FABE(config)#show crypto key rsa public-key-detail

RSA key name: test1        Key-length: 1032
-----BEGIN PUBLIC KEY-----
MIGfMA0GCSqGSIb3DQEBAQUAA4GNADCBiQKBgQL+qxgk4HLK7XRKokIinDCiRiA
rElauGMI1qJGSQakhV3WxP1V8NsraRnluhojFmObYTddAgOTgNnQxvrM0nd7yV+3
lXQomy3Xb0wLj0KSp6CPZeZxHbWwRUSNP3K7fNAXSyjQ0LiATctvItKrE0yfLCSdJ
9HZF4Hxum1k0Fy93wIDAQAB
-----END PUBLIC KEY-----

RSA key name: mint_security_trustpoint-srvr-priv-key        Key-length: 1024
-----BEGIN PUBLIC KEY-----
MIGfMA0GCSqGSIb3DQEBAQUAA4GNADCBiQKBgQC/zlGeiIM0YagLvKvIBQFnd/lf
6aw1S+xQNI1DugLqQgA27ylnCtM5YeUKQD+lmjCvXr9Ku+bAeLnnVMF3FpvtZgsH
J3d0ytxedJ/VuRJYCO2ChWYo0dTSfuyK/srzkSU2ak1Oyp9jCXUe/L/A8w1RRUBE
cNeRyDQcEocHImmwhwIDAQAB
-----END PUBLIC KEY-----

RSA key name: default-trustpoint-srvr-priv-key        Key-length: 1024
-----BEGIN PUBLIC KEY-----
MIGfMA0GCSqGSIb3DQEBAQUAA4GNADCBiQKBgQC/zlGeiIM0YagLvKvIBQFnd/lf
6aw1S+xQNI1DugLqQgA27ylnCtM5YeUKQD+lmjCvXr9Ku+bAeLnnVMF3FpvtZgsH
J3d0ytxedJ/VuRJYCO2ChWYo0dTSfuyK/srzkSU2ak1Oyp9jCXUe/L/A8w1RRUBE
cNeRyDQcEocHImmwhwIDAQAB
-----END PUBLIC KEY-----

rfs7000-37FABE(config)#show crypto key rsa
+------------+-------------------------------------------+----------------
|     #      |                  KEY NAME                 |      KEY LENGTH     |
+------------+-------------------------------------------+---------------------+
| 1          | default-trustpoint-srvr-priv-key          | 1024                |
| 2          | default_rsa_key                           | 1024                |
+------------+-------------------------------------------+---------------------+

rfs7000-37FABE(config)#show crypto pki trustpoints all
Trustpoint Name: mint_security_trustpoint        (on-board CA)
CRL present: no
Server Certificate details:
  Key used: mint_security_trustpoint-srvr-priv-key
  Serial Number: 7037fabe03
  Subject Name:
    CN=70.37.fa.be, C=US, O=Motorola Inc
  Issuer Name:
    CN=70.37.fa.be:2010-04-26-15-00-39, C=US, O=Motorola Inc
  Valid From : Mon Apr 26 15:00:41 2010 UTC
  Valid Until: Tue Apr 26 15:00:41 2011 UTC
CA Certificate details:
  Serial Number: 01
  Subject Name:
    CN=70.37.fa.be:2010-04-26-15-00-39, C=US, O=Motorola Inc
  Issuer Name:
    CN=70.37.fa.be:2010-04-26-15-00-39, C=US, O=Motorola Inc
  Valid From : Mon Apr 26 15:00:39 2010 UTC
  Valid Until: Tue Apr 26 15:00:39 2011 UTC
--More--
rfs7000-37FABE(config)#
### 6.1.14 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show device-upgrade [history|load-image-status|status|versions]
```

**Parameters**
- `show device-upgrade [history|load-image-status|status|versions]`

<table>
<thead>
<tr>
<th>command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>device-upgrade</td>
<td>Displays device upgrade information based on the parameters passed</td>
</tr>
<tr>
<td>history</td>
<td>Displays device upgrade history</td>
</tr>
<tr>
<td>load-image-status</td>
<td>Displays firmware image loading status. The output displays the <code>&lt;DEVICE&gt;</code> image loading status in percentage. For example: <code>#show device-upgrade load-image-status</code> Download of ap81xx firmware file is 47 percent complete</td>
</tr>
<tr>
<td>status</td>
<td>Displays device firmware upgrade status</td>
</tr>
<tr>
<td>versions</td>
<td>Displays firmware image versions</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs4000-229D58#show device-upgrade versions
--------------------------------------------------------------------------------
CONTROLLER  DEVICE-TYPE  VERSION
rfs7000-6DCD4B  ap621  5.6.0.0-031B
rfs4000-229D58  ap622  5.6.0.0-031B
rfs4000-229D58  ap650  5.6.0.0-031B
rfs4000-229D58  ap6511 none
rfs4000-229D58  ap6521 5.6.0.0-031B
rfs4000-229D58  ap6522 5.6.0.0-031B
rfs4000-229D58  ap6532 5.6.0.0-031B
rfs4000-229D58  ap6562 5.6.0.0-031B
rfs4000-229D58  ap71xx none
rfs4000-229D58  ap81xx none
rfs4000-229D58  ap82xx none
rfs4000-229D58  rfs4000 none
rfs4000-229D58  rfs6000 none
rfs4000-229D58  rfs7000 none
--------------------------------------------------------------------------------
rfs4000-229D58#
```
SHOW COMMANDS 6-31

rfs4000-229D58#show device-upgrade history

<table>
<thead>
<tr>
<th>Device</th>
<th>RESULT</th>
<th>TIME</th>
<th>RETRIES</th>
<th>UPGRADED-BY LAST-UPDATE-ERROR</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap6532-986C50</td>
<td>failed</td>
<td>2012-01-05 00:26:31</td>
<td>3</td>
<td>rfs4000-229D58 Update</td>
</tr>
<tr>
<td></td>
<td>error:</td>
<td>Bad file, failure in</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>tar. tar: invalid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ap71xx-0F43D8</td>
<td>failed</td>
<td>2012-01-05 00:21:08</td>
<td>3</td>
<td>rfs4000-229D58 Update</td>
</tr>
<tr>
<td></td>
<td>error:</td>
<td>Unable to get update file, failure in ftp/openssl/tar</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Total number of entries displayed: 2

rfs4000-229D58#

rfs4000-229D58#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 : 0
Number of devices waiting in queue to be rebooted : 0

DEVICE STATE UPGRADE TIME REBOOT TIME PROGRESS RETRIES LAST UPDATE ERROR UPGRADED BY

rfs4000-229D58#

nx4500-5CFA2B(config)#show device-upgrade versions

<table>
<thead>
<tr>
<th>CONTROLLER</th>
<th>DEVICE-TYPE</th>
<th>VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>nx4500-5CFA2B</td>
<td>ap621</td>
<td>5.6.0.0-031B</td>
</tr>
<tr>
<td>nx4500-5CFA2B</td>
<td>ap622</td>
<td>5.6.0.0-031B</td>
</tr>
<tr>
<td>nx4500-5CFA2B</td>
<td>ap650</td>
<td>5.6.0.0-031B</td>
</tr>
<tr>
<td>nx4500-5CFA2B</td>
<td>ap6511</td>
<td>5.6.0.0-031B</td>
</tr>
<tr>
<td>nx4500-5CFA2B</td>
<td>ap6521</td>
<td>5.6.0.0-031B</td>
</tr>
<tr>
<td>nx4500-5CFA2B</td>
<td>ap6522</td>
<td>5.6.0.0-031B</td>
</tr>
<tr>
<td>nx4500-5CFA2B</td>
<td>ap6532</td>
<td>5.6.0.0-031B</td>
</tr>
<tr>
<td>nx4500-5CFA2B</td>
<td>ap6562</td>
<td>5.6.0.0-031B</td>
</tr>
<tr>
<td>nx4500-5CFA2B</td>
<td>ap71xx</td>
<td>5.6.0.0-031B</td>
</tr>
<tr>
<td>nx4500-5CFA2B</td>
<td>ap81xx</td>
<td>5.6.0.0-031B</td>
</tr>
<tr>
<td>nx4500-5CFA2B</td>
<td>ap82xx</td>
<td>5.6.0.0-031B</td>
</tr>
</tbody>
</table>

nx4500-5CFA2B(config)#
6.1.15 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 — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**NOTE:** Dot1x 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:** Dot1x authenticator configuration is supported on the following platforms:

- Access Points – ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX
- Wireless Controllers – RFS4000, RFS6000, RFS7000
- Service Platforms – NX4500, NX4524, NX6500, NX6524

**Syntax**

show dot1x {all|interface|on} {on <DEVICE-NAME>}

show dot1x {interface} {on <DEVICE-NAME>}

show dot1x {interface ge <1-4>|port-channel <1-2>} {on <DEVICE-NAME>}

**Parameters**

- **show dot1x {all|interface|on} {on <DEVICE-NAME>}

  Optional. Displays dot1x information for all interfaces

- **show dot1x {interface} {on <DEVICE-NAME>}

  Optional. Displays dot1x information for interfaces on a specified device

- **show dot1x {interface ge <1-4>|port-channel <1-2>} {on <DEVICE-NAME>}

  Optional. Displays dot1x information for a specified GigabitEthernet interface

- **dot1x all {on <DEVICE-NAME>}

  Optional. Displays dot1x information for all interfaces

  - on <DEVICE-NAME> — Optional. Displays dot1x information for all interfaces on a specified device

  - <DEVICE-NAME> — Specify the name of the AP, wireless controller, or service platform.

- **dot1x {on <DEVICE-NAME>}

  Optional. Displays dot1x information for interfaces on a specified device

  - <DEVICE-NAME> — Specify the name of AP, wireless controller, or service platform.

- **dot1x interface {<INTERFACE-NAME> ge <1-4>|port-channel <1-2>} {on <DEVICE-NAME>}

  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.
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) #
6.1.16 environmental-sensor

*show commands*

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 `environmental-sensor`.

---

**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 [history|humidity|light|motion|summary|temperature|version]
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>
<tbody>
<tr>
<td><strong>Note:</strong> History includes the humidity, light, motion, and temperature data recorded by the sensor at specified time interval.</td>
<td></td>
</tr>
</tbody>
</table>

- `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><strong>Note:</strong> 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

---

20-minute 0
1-hour 0
6-hour 0
24-hour 0

---

temperature-sensor: Enabled(Demo)
current value: -40.00 deg. C

---

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

---

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 %

---

20-minute 0/0/0
1-hour 0/0/0
6-hour 0/0/0
24-hour 0/0/0

---

ap8132-711728#

ap8132-711634#show env-sensor history
Current Time: 2013-11-20 14:08:01 UTC

<table>
<thead>
<tr>
<th>Sample-Interval</th>
<th>Motion</th>
<th>Temperature</th>
<th>Light</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humidity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-minute</td>
<td>1</td>
<td>64/65/66</td>
<td>77/</td>
</tr>
<tr>
<td>1-hour</td>
<td>58/60/61</td>
<td>24</td>
<td>63/67/70</td>
</tr>
<tr>
<td>6-hour</td>
<td>57/59/61</td>
<td>128</td>
<td>60/62/69</td>
</tr>
<tr>
<td>79</td>
<td>52/56/71</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```
```
<DEVICE-NAME>#$show env-sensor history 24-hr

<table>
<thead>
<tr>
<th>timestamp</th>
<th>Light</th>
<th>Humidity</th>
<th>Motion</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-11-20 10:10:20 UTC</td>
<td>27</td>
<td>66</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>2013-11-20 10:30:20 UTC</td>
<td>17</td>
<td>66</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>2013-11-20 10:50:20 UTC</td>
<td>17</td>
<td>66</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>2013-11-20 11:10:20 UTC</td>
<td>25</td>
<td>66</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>2013-11-20 11:30:20 UTC</td>
<td>24</td>
<td>66</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>2013-11-20 11:50:20 UTC</td>
<td>26</td>
<td>66</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>2013-11-21 08:10:20 UTC</td>
<td>9</td>
<td>65</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>2013-11-21 08:30:20 UTC</td>
<td>7</td>
<td>65</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>2013-11-21 08:50:20 UTC</td>
<td>12</td>
<td>65</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>2013-11-21 09:10:20 UTC</td>
<td>10</td>
<td>65</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>2013-11-21 09:30:20 UTC</td>
<td>15</td>
<td>65</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>2013-11-21 09:50:20 UTC</td>
<td>19</td>
<td>66</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

<DEVICE-NAME>#$
### 6.1.17 event-history

**show commands**

Displays event history report

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show event-history {on <DEVICE-OR-DOMAIN-NAME>}
```

**Parameters**

- `show event-history {on <DEVICE-OR-DOMAIN-NAME>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>event-history</code></td>
<td>Displays event history report</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code></td>
<td>Optional. Displays event history report on a device or RF Domain.</td>
</tr>
</tbody>
</table>

**Examples**

`rfs4000-229D58(config)#show event-history`

```
EVENT HISTORY REPORT
Generated on '2014-01-27 09:08:07 IST' by 'admin'

2014-01-27 09:06:49     ap7131-11E6C4  SYSTEM     LOGOUT               Logged out user
  'admin' with privilege 'superuser' from '192.168.100.197'
2014-01-27 09:06:49     ap8132-74B45C  SYSTEM     LOGOUT               Logged out user
  'admin' with privilege 'superuser' from '192.168.100.197'
2014-01-27 09:06:33     ap8132-74B45C  SYSTEM     LOGIN                Successfully logged
  in user 'admin' with privilege 'superuser' from 'ssh'
2014-01-27 09:06:20     rfs7000-6DCD4B  SYSTEM     LOGOUT               Logged out user
  'admin' with privilege 'superuser' from '192.168.100.197(web)'
```

`nx4500-5CFA2B(config)#show event-history`

```
EVENT HISTORY REPORT
Generated on '2014-01-27 09:09:54 IST' by 'admin'

2014-01-27 09:09:45     nx4500-5CFA2B  SYSTEM     LOGIN                Successfully logged
  in user 'admin' with privilege 'superuser' from 'ssh'
2014-01-27 08:56:50     nx9500-6C8809  SYSTEM     UI_USER_AUTH_SUCCESS UI user 'admin'
  from: '192.168.100.195' authentication successful
2014-01-27 08:49:26     nx9500-6C8809  SYSTEM     LOGIN                Successfully logged
  in user 'admin' with privilege 'superuser' from 'ssh'
2014-01-27 08:28:28     nx9500-6C8809  DIAG       PWRSPLY_FAIL         Power supply failure, no longer redundant

--More--

```
6.1.18 event-system-policy

show commands
Displays detailed event system policy configuration

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

<table>
<thead>
<tr>
<th>MODULE</th>
<th>EVENT</th>
<th>SYSLOG</th>
<th>SNMP</th>
<th>FORWARD</th>
<th>EMAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>aaa</td>
<td>radius-discon-msg</td>
<td>on</td>
<td>on</td>
<td>on</td>
<td>default</td>
</tr>
</tbody>
</table>

rfs7000-37FABE(config)＃
6.1.19 file

show commands

Displays file system information

NOTE: This command is not available in the USER EXEC mode.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
show file [information <FILE>|systems]

Parameters
- show file [information <FILE>|systems]

<table>
<thead>
<tr>
<th>information &lt;FILE&gt;</th>
<th>Displays file information</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;FILE&gt; – Specify the file name.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>systems</th>
<th>Lists all file systems present in the system</th>
</tr>
</thead>
</table>

Examples
rfs7000-37FABE(config)#show file systems
File Systems:

<table>
<thead>
<tr>
<th>Size(b)</th>
<th>Free(b)</th>
<th>Type</th>
<th>Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>10485760</td>
<td>9916416</td>
<td>flash</td>
<td>nvram:</td>
</tr>
<tr>
<td>20971520</td>
<td>20131840</td>
<td>flash</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>network</td>
<td>(null)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>network</td>
<td>rdp:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>network</td>
<td>sftp:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>network</td>
<td>http:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>network</td>
<td>ftp:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>network</td>
<td>tftp:</td>
</tr>
<tr>
<td>20971520</td>
<td>20131840</td>
<td>-</td>
<td>hotspot:</td>
</tr>
</tbody>
</table>

rfs7000-37FABE(config)#
6.1.20 firewall

Displays wireless firewall information, such as Dynamic Host Configuration Protocol (DHCP) snoop table entries, denial of service statistics, active session summaries etc.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

show firewall [dhcp|dos|flows|neighbors]

show firewall [dhcp snoop-table|dos stats] {on <DEVICE-NAME>}

show firewall flows {filter|management|on|stats|wireless-client}

Parameters

- dhcp snoop-table — Displays DHCP snoop table entries
  - snoop-table — Displays DHCP snoop table entries
  DHCP snooping acts as a firewall between non-trusted hosts and the DHCP server. Snoop 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 snoop table’ and ‘DoS stats’ parameters:
  - <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)}

- firewall flows — Notifies a session has been established

- filter — Optional. Defines additional firewall flow filter parameters

- dir [wired-wired|wireless-wired] — Optional. Matches the packet flow direction
  - wired-wired — Wired to wired flows
  - wireless-wired — Wireless to wireless flows

- wired-wireless|wireless-wired — Optional. Matches the packet flow direction
  - wired-wireless — Wired to wireless flows
  - wireless-wired — Wireless to wired flows

- wireless-wireless — Optional. Matches the packet flow direction
  - wireless-wireless — Wireless to wireless flows
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dst port &lt;1-65535&gt;</td>
<td>Optional. Matches the destination port with the specified port</td>
</tr>
<tr>
<td>ether [dst &lt;MAC&gt;</td>
<td>Optional. Displays Ethernet filter options</td>
</tr>
<tr>
<td>host &lt;MAC&gt;</td>
<td>host &lt;MAC&gt; – Matches only the destination MAC address</td>
</tr>
<tr>
<td>src &lt;MAC&gt;</td>
<td>src &lt;MAC&gt; – Matches flows containing the specified MAC address</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</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 [bridged</td>
<td>Optional. Matches the traffic flow type</td>
</tr>
<tr>
<td>natted</td>
<td>bridged – Bridged flows</td>
</tr>
<tr>
<td>routed</td>
<td>natted – Natted flows</td>
</tr>
<tr>
<td>wired</td>
<td>routed – Routed flows</td>
</tr>
<tr>
<td>wireless</td>
<td>wired – Flows belonging to wired hosts</td>
</tr>
<tr>
<td></td>
<td>wireless – Flows containing a mobile unit</td>
</tr>
<tr>
<td>icmp {code</td>
<td>type}</td>
</tr>
<tr>
<td></td>
<td>code – Matches flows with the specified ICMPv4 code</td>
</tr>
<tr>
<td></td>
<td>type – Matches flows with the specified ICMPv4 type</td>
</tr>
<tr>
<td>icmpv6 {code</td>
<td>type}</td>
</tr>
<tr>
<td></td>
<td>code – Matches flows with the specified ICMPv6 code</td>
</tr>
<tr>
<td></td>
<td>type – Matches flows with the specified ICMPv6 type</td>
</tr>
<tr>
<td>igmp</td>
<td>Optional. Matches Internet Group Management Protocol (IGMP) flows</td>
</tr>
<tr>
<td>ip [dst &lt;IP&gt;</td>
<td>Optional. Filters firewall flows based on the IPv4 parameters passed</td>
</tr>
<tr>
<td>host &lt;IP&gt;</td>
<td>dst &lt;IP&gt; – Matches destination IP address</td>
</tr>
<tr>
<td>proto &lt;0-254&gt;</td>
<td>host &lt;IP&gt; – Matches flows containing IPv4 address</td>
</tr>
<tr>
<td>src &lt;IP&gt;</td>
<td>proto &lt;0-254&gt; – Matches the IPv4 protocol number with the specified number</td>
</tr>
<tr>
<td></td>
<td>src &lt;IPv4&gt; – Matches source IP address</td>
</tr>
<tr>
<td>ipv6 [dst &lt;IPv6&gt;</td>
<td>Optional. Filters firewall flows based on the IPv6 parameters passed</td>
</tr>
<tr>
<td>host &lt;IPv6&gt;</td>
<td>dst &lt;IPv6&gt; – Matches destination IPv6 address</td>
</tr>
<tr>
<td>proto &lt;0-254&gt;</td>
<td>host &lt;IPv6&gt; – Matches flows containing IPv6 address</td>
</tr>
<tr>
<td>src &lt;IPv6&gt;</td>
<td>proto &lt;0-254&gt; – Matches the IPv6 protocol number with the specified number</td>
</tr>
<tr>
<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>
</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>
</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>
</tr>
</tbody>
</table>
**SHOW COMMANDS**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show firewall flows</code></td>
<td>Notifies a session has been established</td>
</tr>
<tr>
<td><code>management {on &lt;DEVICE-NAME&gt;}</code></td>
<td>Optional. Displays management traffic firewall flows</td>
</tr>
<tr>
<td><code>stats {on &lt;DEVICE-NAME&gt;}</code></td>
<td>Optional. Displays active session summary</td>
</tr>
<tr>
<td><code>wireless-client &lt;MAC&gt;</code></td>
<td>Optional. Displays wireless clients firewall flows</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Displays all firewall flows on a specified device</td>
</tr>
<tr>
<td><code>firewall neighbors snoop-table {on &lt;DEVICE-NAME&gt;}</code></td>
<td>Displays IPv6 neighbors snoop table entries</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-NAME&gt;</code></td>
<td>Optional. Displays IPv6 neighbors snoop table entries on a specified device</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config)#show firewall dhcp snoop-table
Snoop Binding <157.235.208.252, 00-15-70-37-FA-BE, Vlan 4>
Type Controller-SVI, Touched 32 seconds ago
-------------------------------------------------------------
Snoop Binding <172.16.10.2, 00-15-70-37-FA-BE, Vlan 1>
Type Controller-SVI, Touched 1 seconds ago
-------------------------------------------------------------
rfs7000-37FABE(config)#
```

```
rfs7000-37FABE(config)#show firewall flows management
========== Flow# 1 Summary ==========
Forward:
Vlan 1, TCP 172.16.10.10 port 3995 > 172.16.10.1 port 22
00-02-B3-28-D1-55 > 00-15-70-37-FA-BE, ingress port gel
Egress port: <local>, Egress interface: vlan1, Next hop: <local> (00-15-70-37-FA-BE)
573 packets, 49202 bytes, last packet 0 seconds ago
Reverse:
Vlan 1, TCP 172.16.10.1 port 22 > 172.16.10.10 port 3995
```
00-15-70-37-FA-BE > 00-02-B3-28-D1-55, ingress port local
Egress port: ge1, Egress interface: vlan1, Next hop: 172.16.10.10 (00-02-B3-28-D1-55)
552 packets, 63541 bytes, last packet 0 seconds ago
TCP state: Established
Flow times out in 1 hour 30 minutes

rfs7000-37FABE(config)#
rfs7000-37FABE(config)#show firewall flows stats
Active Flows  2
TCP flows    1
UDP flows    0
DHCP flows   1
ICMP flows   0
IPsec flows  0
L3/Unknown flows  0
rfs7000-37FABE(config)#
6.1.21 global

> show commands

Displays global information for network devices based on the parameters passed.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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**

- **global device-list**
  - Displays global information for all network devices. Use the following keywords to specify additional filters: offline, online, and rf-domain.

- **filter {offline|online}**
  - Optional. Specifies additional filters
  - offline – Optional. Displays global information for offline devices only
  - online – Optional. Displays global information for online devices only

- **show global device-list {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**
  - Displays global information for all RF Domains and managers in the network
Examples

rfs4000-229D58#show global device-list
---------------------------------------------------------------------------------------
<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>00-23-68-22-9D-58</td>
<td>rfs4000-229D58</td>
<td>rfs4000</td>
<td></td>
<td>default</td>
<td></td>
<td>online</td>
</tr>
</tbody>
</table>
---------------------------------------------------------------------------------------
Total number of clients displayed: 1
rfs4000-229D58#

rfs4000-229D58#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>00-23-68-22-9D-58</td>
<td>rfs4000-229D58</td>
<td>rfs4000</td>
<td></td>
<td>default</td>
<td></td>
<td>online</td>
</tr>
</tbody>
</table>
---------------------------------------------------------------------------------------
Total number of clients displayed: 1
rfs4000-229D58#

rfs4000-229D58#show global domain managers
---------------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>RF-DOMAIN</th>
<th>MANAGER</th>
<th>HOST-NAME</th>
<th>APS CLIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>00-23-68-22-9D-58</td>
<td>rfs4000-229D58</td>
<td>1 0</td>
</tr>
</tbody>
</table>
---------------------------------------------------------------------------------------
Total number of RF-domain displayed: 1
rfs4000-229D58#
6.1.22 gre

`show commands`

Displays GRE tunnel info

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`show gre info`

**Parameters**

- `show gre info`

| show gre info | Displays *Generic Routing Encapsulation* (GRE) information. |

**Examples**

```
nx4500-5CFA2B> show gre info
Gre Tunnel info:
    {'No tunnel found': 0}
nx4500-5CFA2B>
```
6.1.23 interface

- **show commands**
  Displays configured system interfaces and their status

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show interface {<INTERFACE-NAME>|brief|counters|ge|me1|on|port-channel|pppoe1|switchport|vlan|wwan1} {on <DEVICE-NAME>}
show interface {<INTERFACE-NAME>|brief|counters|ge <1-4>|me1|on|port-channel <1-2>|pppoe1|switchport|vlan <1-4094>|wwan1} {on <DEVICE-NAME>}
```

**Parameters**

- `interfaces` 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
- `switch port` 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:

```
rfs7000-37FABE(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
ppoe1         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>
```

Following interfaces are available on a NX45XX and NX65XX series service platform:

```
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
ppoe1       PPP Over Ethernet interface
serial      Serial interface
switchport  Status of Layer2 interfaces
t1e1        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>
```

```
rfs7000-37FABE(config)#show interface switchport
---------------------------------------------------------------------------------------
INTERFACE          STATUS   MODE     VLAN(S)
---------------------------------------------------------------------------------------
ge1                UP       access   1
ge2                UP       access   1
ge3                UP       access   1
ge4                UP       access   1
---------------------------------------------------------------------------------------
```

A '*' next to the VLAN ID indicates the native vlan for that trunk port

```
rfs7000-37FABE(config)#show interface vlan 1
Interface vlan1 is UP
   Hardware-type: vlan, Mode: Layer 3, Address: 00-15-70-37-FA-BE
   Index: 4, Metric: 1, MTU: 1500
   IP-Address: 172.16.10.1/24
   input packets 587971, bytes 58545041, dropped 0, multicast packets 0
   input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
   output packets 56223, bytes 4995566, dropped 0
   output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
   collisions 0
```
rfs7000-37FABE(config)#show interface ge 2
Interface ge2 is DOWN
Hardware-type: ethernet, Mode: Layer 2, Address: 00-15-70-37-FA-C0
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 unicasts, 0 broadcasts, 0 multicasts
Input errors 0, runts 0, giants 0
CRC 0, frame 0, fragment 0, jabber 0
Output packets 501587, bytes 60935912, dropped 0
Sent 3 unicasts, 4613 broadcasts, 496971 multicasts
Output errors 0, collisions 0, late collisions 0
Excessive collisions 0
rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show interface counters
---------------------------------------------------------------------------------------
#       MAC       RX-PKTS       RX-BYTES       RX-DROP       TX-PKTS       TX-BYTES
TX-DROP
---------------------------------------------------------------------------------------
me1     00-...-F7 0             0              0             0             0              0
vlan1   00-...-BE 353854        57627570       0             126392        37379394       0
ge1     00-...-BF 299841        32267476       0             117557        41052744       0
ge2     00-...-C0 0             0              0             274490        30705325       0
ge3     00-...-C1 0             0              0             274490        30705325       0
ge4     00-...-C2 0             0              0             274490        30705325       0
---------------------------------------------------------------------------------------

rfs7000-37FABE(config)#

nx6500-31FABE(config)#show interface switchport
-----------------------------------------------------------------------------------------------
INTERFACE          STATUS   MODE     VLAN(S)
-----------------------------------------------------------------------------------------------
ge1                UP       access   1
ge2                DOWN     access   1
-----------------------------------------------------------------------------------------------
A '*' next to the VLAN ID indicates the native vlan for that trunk port
nx6500-31FABE(config)#

nx6500-31FABE(config)#show interface vlan 1
Interface vlan1 is UP
Hardware-type: vlan, Mode: Layer 3, Address: 00-15-70-37-FA-BE
Index: 4, Metric: 1, MTU: 1500
IP-Address: 172.16.10.1/24
  input packets 587971, bytes 58545041, dropped 0, multicast packets 0
  input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
  output packets 56223, bytes 4995566, dropped 0
  output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
  collisions 0
nx6500-31FABE(config)#
nx6500-31FABE(config)#show interface ge 2
Interface ge2 is DOWN
  Hardware-type: ethernet, Mode: Layer 2, Address: 00-15-70-37-FA-C0
  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 unicasts, 0 broadcasts, 0 multicasts
    Input errors 0, runts 0, giants 0
    CRC 0, frame 0, fragment 0, jabber 0
    Output packets 501587, bytes 60935912, dropped 0
    Sent 3 unicasts, 4613 broadcasts, 496971 multicasts
    Output errors 0, collisions 0, late collisions 0
    Excessive collisions 0

nx6500-31FABE(config)#

nx6500-31FABE(config)#show interface counters

--------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>#</th>
<th>MAC</th>
<th>RX-PKTS</th>
<th>RX-BYTES</th>
<th>RX-DROP</th>
<th>TX-PKTS</th>
<th>TX-BYTES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>vlan1</td>
<td>00-...-BE</td>
<td>58580154</td>
<td>0</td>
<td>56435</td>
<td>5013682</td>
</tr>
<tr>
<td></td>
<td>ge1</td>
<td>00-...-BF</td>
<td>175560930</td>
<td>0</td>
<td>1402226</td>
<td>589235764</td>
</tr>
<tr>
<td></td>
<td>ge2</td>
<td>00-...-C0</td>
<td>0</td>
<td>0</td>
<td>501615</td>
<td>60939303</td>
</tr>
</tbody>
</table>
--------------------------------------------------------------------------

nx6500-31FABE(config)#
6.24 ip

- show commands

Displays IP related information

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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|vlan]
show ip igmp snooping mrouter vlan <1-4095> {on <DEVICE-NAME>}
show ip igmp snooping vlan <1-4095> {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|pppoe1|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>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</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` | 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 IPaddress is specified, the system displays all neighbor-related routes on the logged device. |
| `paths` | Optional. Displays BGP path details |
| `prefix-list` | Optional. Displays routes confirming to the specified prefix-list  
  - `<PREFIX-LIST-NAME>` – Specify the prefix list name. |
| `regexp <LINE>` | Optional. Displays routes matching the specified AS path regular expression  
  - `<LINE>` – Specify the regular expression. |
### show ip ddns bindings {on <DEVICE-NAME>}

Displays Dynamic Domain Name Server (DDNS) configuration details.

- **ip ddns bindings**: Displays DDNS address bindings.
  - **on <DEVICE-NAME>**: Optional. Displays address bindings on a specified device.
  - **<DEVICE-NAME>**: Specify the name of the AP, wireless controller, or service platform.

### show ip dhcp [networks|status] {on <DEVICE-NAME>}

Displays DHCP server related details, such as network and status.

- **ip dhcp**: Displays DHCP server configuration details.
  - **networks**: Displays DHCP server network details.
  - **status**: Displays DHCP server status.
- **on <DEVICE-NAME>**: The following keyword is common to all of the above parameters:
  - **on <DEVICE-NAME>**: Optional. Displays server status and network details on a specified device.
  - **<DEVICE-NAME>**: Specify the name of the AP, wireless controller, or service platform.

### show ip dhcp binding {manual} {on <DEVICE-NAME>}

Displays DHCP address bindings.

- **ip dhcp binding**: Displays the DHCP server configuration details.
  - **manual**: Displays static DHCP address bindings.
- **on <DEVICE-NAME>**: The following keyword is recursive and common to the ‘manual’ parameter:
  - **on <DEVICE-NAME>**: Optional. Displays DHCP address bindings on a specified device.
  - **<DEVICE-NAME>**: Optional. Specify the name of the AP, wireless controller, or service platform.

### show ip extcommunity-list [<1-500>|<NAME>]

Displays the specified extended community list details.

- **ip extcommunity-list**: 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 ip [default-gateways|dhcp-vendor-options|domain-name|name-server|routing] {on <DEVICE-NAME>}

Displays all learnt default gateways.

- **ip default-gateways**: Displays all learnt default gateways.
- **ip dhcp-vendor-options**: Displays DHCP 43 parameters received from the DHCP server. This output includes the interface from which the option was learned.
- **ip domain-name**: Displays the DNS default domain.
- **ip name-server**: Displays the DNS name server details.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ip routing</strong></td>
<td>Displays routing status</td>
</tr>
<tr>
<td><strong>on &lt;DEVICE-NAME&gt;</strong></td>
<td>The following keywords are common to all of the above parameters:</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays IP related information, based on the parameters passed, on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Optional. Specify the name of the AP, wireless controller, or service platform</td>
</tr>
<tr>
<td><strong>show ip igmp snooping mrouter vlan &lt;1-4095&gt; {on &lt;DEVICE-NAME&gt;]</strong></td>
<td>Displays the IGMP snooping multicast router (mrouter) configuration for a VLAN</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4095&gt; – Specify the VLAN ID from 1 - 4095.</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays the IGMP snooping mrouter 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><strong>ip igmp snooping vlan &lt;1-4095&gt; {on &lt;DEVICE-NAME&gt;]</strong></td>
<td>Displays the IGMP snooping VLAN configuration</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4095&gt; – Specify the VLAN ID from 1 - 4095.</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays configuration details 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><strong>ip igmp snooping vlan &lt;1-4095&gt; {&lt;IP&gt;} {on &lt;DEVICE-NAME&gt;</strong>}</td>
<td>Displays the IGMP snooping configuration</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4095&gt; – Specify the VLAN ID from 1 - 4095.</td>
</tr>
<tr>
<td></td>
<td>• &lt;IP&gt; Optional. Specifies the multicast group IP address</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays configuration details 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>**show ip interface {&lt;INTERFACE-NAME&gt;</td>
<td>brief} {on &lt;DEVICE-NAME&gt;**}</td>
</tr>
<tr>
<td></td>
<td>• &lt;INTERFACE-NAME&gt; – Specify the interface name</td>
</tr>
<tr>
<td></td>
<td>• brief Displays a brief summary of all interface status and configuration</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays interface status and summary, based on the parameters passed, 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>
<tr>
<td><strong>show ip nat translations verbose {on &lt;DEVICE-NAME&gt;</strong>}</td>
<td>Displays Network Address Translation (NAT) translations</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays detailed NAT translations 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>
### show ip route

- **ip route**
  Displays route table details. The route tables use flags to distinguish between routes. The different flags are:
  - C – Connected
  - G – Gateway
  - O – OSPF route
  - S – Static route

  **Note:** Flags ‘S’ and ‘O’ identify static learned routes and dynamic learned routes respectively.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;INTERFACE-NAME&gt;</td>
<td>Displays route table details for a specified interface. Specify the interface name</td>
</tr>
<tr>
<td>ge &lt;1-4&gt;</td>
<td>Displays GigabitEthernet interface route table details</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4&gt; – Specify the GigabitEthernet interface index from 1 - 4.</td>
</tr>
<tr>
<td>me1</td>
<td>Displays FastEthernet interface route table details</td>
</tr>
<tr>
<td>port-channel &lt;1-2&gt;</td>
<td>Displays port channel interface route table details. Specify the port channel index from 1 - 2.</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>Displays VLAN interface route table details. Select the VLAN interface ID from 1 - 4094.</td>
</tr>
<tr>
<td>pppoe1</td>
<td>Displays Point-to-point Protocol over Ethernet (PPPoE) interface route table details</td>
</tr>
<tr>
<td>wwan1</td>
<td>Displays Wireless WAN route table details</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>The following keywords are recursive and common to all of the above parameters:</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Displays route table details, based on the parameters passed, 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>

### show ip ospf

- **ip ospf**
  Displays overall OSPF information

- **border-router**
  Optional. Displays details of all the border routers connected

- **interface**
  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

- **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

rfs7000-37FABE(config)#show ip arp

<table>
<thead>
<tr>
<th>IP</th>
<th>MAC</th>
<th>INTERFACE</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>172.16.10.12</td>
<td>5C-D9-98-4C-04-51</td>
<td>vlan1</td>
<td>dynamic</td>
</tr>
<tr>
<td>172.16.10.4</td>
<td>00-15-70-38-06-49</td>
<td>vlan1</td>
<td>dynamic</td>
</tr>
</tbody>
</table>

rfs7000-37FABE(config)#

rfs7000-37FABE(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>172.16.10.1/24</td>
<td>primary</td>
<td>UP</td>
<td>up</td>
</tr>
</tbody>
</table>

rfs7000-37FABE(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)#

rfs7000-37FABE(config)#show ip route pc

<table>
<thead>
<tr>
<th>DESTINATION</th>
<th>GATEWAY</th>
<th>FLAGS</th>
<th>INTERFACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.0.0/24</td>
<td>direct</td>
<td>C</td>
<td>me1</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

rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show ip route vlan 1

<table>
<thead>
<tr>
<th>DESTINATION</th>
<th>GATEWAY</th>
<th>FLAGS</th>
<th>INTERFACE</th>
</tr>
</thead>
<tbody>
<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)#

rfs7000-37FABE(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

rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show ip routing

IP routing is enabled.

rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show ip dhcp status

State of DHCP server: running
Interfaces: vlan2, vlan3

rfs7000-37FABE(config)#
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(config)#

rfs7000-37FABE#show ip route vlan 1

<table>
<thead>
<tr>
<th>DESTINATION</th>
<th>GATEWAY</th>
<th>FLAGS</th>
<th>INTERFACE</th>
</tr>
</thead>
<tbody>
<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 O - OSPF S - Static

rfs4000-882A17#show ip route on ap7131-0B863C

<table>
<thead>
<tr>
<th>DESTINATION</th>
<th>GATEWAY</th>
<th>FLAGS</th>
<th>INTERFACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.9.0/24</td>
<td>192.168.0.12</td>
<td>O</td>
<td>vlan10</td>
</tr>
<tr>
<td>192.168.0.0/24</td>
<td>direct</td>
<td>C</td>
<td>vlan10</td>
</tr>
<tr>
<td>192.168.5.0/24</td>
<td>192.168.0.12</td>
<td>O</td>
<td>vlan10</td>
</tr>
<tr>
<td>192.168.6.0.0/24</td>
<td>192.168.0.12</td>
<td>O</td>
<td>vlan10</td>
</tr>
<tr>
<td>172.20.15.0/24</td>
<td>direct</td>
<td>C</td>
<td>vlan66</td>
</tr>
<tr>
<td>99.99.99.96/32</td>
<td>192.168.0.53</td>
<td>S</td>
<td>vlan10</td>
</tr>
<tr>
<td>99.99.99.97/32</td>
<td>192.168.0.40</td>
<td>S</td>
<td>vlan10</td>
</tr>
</tbody>
</table>

Flags: C - Connected G - Gateway O - OSPF S - Static

rfs4000-882A17#

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)#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#
### 6.1.25 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>)}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip-access-list stats</td>
<td>Displays IP access list statistics</td>
</tr>
<tr>
<td>&lt;IP-ACCESS-LIST-NAME&gt;</td>
<td>Optional. Displays statistics for a specified IP access list. Specify the IP access list name.</td>
</tr>
<tr>
<td>detail &lt;IP-ACCESS-LIST-NAME&gt;</td>
<td>Optional. Displays detailed statistics for a specified IP access list. Specify the IP access list name.</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>The following keyword is recursive and common to the ‘IP-ACCESS-LIST-NAME’ and ‘detail’ parameters:</td>
</tr>
</tbody>
</table>

- `on <DEVICE-NAME>` — Optional. Displays all or a specified IP access list statistics on a specified device.
- `<DEVICE-NAME>` — Optional. 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:

```plaintext
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:

```plaintext
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#
```

```plaintext
nx6524-5483B0#show ip-access-list stats scaleacl | i 125
    permit ip host 125.1.1.1 any rule-precedence 125    Hitcount: 893    Hardware
    Hitcount: 3120
    permit ip host 125.2.1.1 any rule-precedence 346    Hitcount: 0    Hardware
Hitcount: 0
nx6524-5483B0#
```
### 6.1.26 ipv6

Show commands

Displays IPv6 related information

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show ipv6 [default-gateways|delegated-prefix|dhcp|hoplimit|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|t1e1|up|
   vlan <1-4095>|vmif|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)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipv6</td>
<td>Displays IPv6 related information</td>
</tr>
<tr>
<td>default-gateways</td>
<td>Displays all learnt default gateways</td>
</tr>
<tr>
<td>delegated-prefix</td>
<td>Displays prefix delegation information</td>
</tr>
<tr>
<td>hop-limit</td>
<td>Displays the configured IPv6 hop count value</td>
</tr>
<tr>
<td>name-server</td>
<td>Displays DNS name servers</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>This parameter is common to all of the above keywords.</td>
</tr>
</tbody>
</table>

- `show ipv6 dhcp [client received-options|relay status|status] {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipv6</td>
<td>Displays IPv6 related information</td>
</tr>
<tr>
<td>dhcp</td>
<td>Displays DHCPv6 related information</td>
</tr>
<tr>
<td>client received-options</td>
<td>Displays DHCP options received from clients</td>
</tr>
<tr>
<td>relay status</td>
<td>Displays the DHCPv6 relay agent’s running status</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>show ipv6 interface</code></td>
<td>Displays IPv6 status and configuration on a specified interface.</td>
</tr>
<tr>
<td>`{&lt;IF-NAME&gt;</td>
<td>brief}`</td>
</tr>
<tr>
<td><code>ipv6</code></td>
<td>Displays IPv6 related information</td>
</tr>
<tr>
<td><code>interface</code></td>
<td>{on &lt;DEVICE-NAME&gt;} – Optional. Displays the specified information on a device (access point, wireless controller, or service platform)</td>
</tr>
<tr>
<td>`{&lt;IF-NAME&gt;</td>
<td>brief}`</td>
</tr>
<tr>
<td><code>ipv6 mld snooping</code></td>
<td>Displays Multicast Listener Discovery Protocol (MLD) snooping related information</td>
</tr>
<tr>
<td>`{mrouter vlan &lt;1-4095&gt;</td>
<td>querier vlan &lt;1-4095&gt;</td>
</tr>
<tr>
<td><code>ipv6 neighbors</code></td>
<td>Displays IPv6 neighbors on the specified VLAN</td>
</tr>
<tr>
<td><code>{&lt;VLAN-NAME&gt;}</code></td>
<td>{on &lt;DEVICE-NAME&gt;} – Optional. Displays IPv6 neighbors on a specified device (access point, wireless controller, or service platform)</td>
</tr>
<tr>
<td><code>ipv6 route</code></td>
<td>Displays IPv6 route table</td>
</tr>
<tr>
<td>`{&lt;IF-NAME&gt;</td>
<td>ge &lt;1-X&gt;</td>
</tr>
</tbody>
</table>

**status**
Displays the DHCPv6 stateless server daemon’s status. In case the DHCPv6 server is up and running, it also displays interface names.

**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)

- `show ipv6 interface` `{<IF-NAME>|brief} {(on `<DEVICE-NAME>`)}`
<table>
<thead>
<tr>
<th>Keyword</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>me1</td>
<td>Optional. Displays IPv6 route table for the FastEthernet interface</td>
</tr>
<tr>
<td>port-channel &lt;1-2&gt;</td>
<td>Optional. Displays IPv6 route table for the selected port-channel interface</td>
</tr>
<tr>
<td>pppoe1</td>
<td>Optional. Displays IPv6 route table for the PPP over Ethernet interface</td>
</tr>
<tr>
<td>serial &lt;1-4&gt;</td>
<td>Optional. Displays IPv6 route table for the selected serial (slot) interface</td>
</tr>
<tr>
<td>t1e1 &lt;1-4&gt;</td>
<td>Optional. Displays IPv6 route table for the selected t1e1 interface</td>
</tr>
<tr>
<td>vlan &lt;1-4095&gt;</td>
<td>Optional. Displays IPv6 route table for the selected VLAN interface</td>
</tr>
<tr>
<td>vmif &lt;1-8&gt;</td>
<td>Optional. Displays IPv6 route table for the selected virtual machine (VM) interface</td>
</tr>
<tr>
<td>wwan1</td>
<td>Optional. Displays IPv6 route table for the wireless WAN interface</td>
</tr>
<tr>
<td>xge &lt;1-4&gt;</td>
<td>Optional. Displays IPv6 route table for the selected TenGigabitEthernet interface</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>This parameter is common to all of the above keywords.</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays the specified information on a device (access point, wireless controller, or service platform)</td>
</tr>
</tbody>
</table>

**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)#
rfs4000-229D58(config)#show ipv6 route
```

```
+-----------------+-----------------+-----------------+--------+-------------+
<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#show ipv6 default-gateways

<table>
<thead>
<tr>
<th>Source</th>
<th>Gateway-address</th>
<th>Preference</th>
<th>Status</th>
<th>Insatllled</th>
<th>Interface</th>
<th>Remaining Lifetime</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv6-RA</td>
<td>fe80::100:1</td>
<td>medium</td>
<td>not-monitored</td>
<td>NO</td>
<td>vlan100</td>
<td>1471 sec</td>
<td></td>
</tr>
<tr>
<td>IPv6-RA</td>
<td>fe80::1:2</td>
<td>low</td>
<td>not-monitored</td>
<td>NO</td>
<td>vlan1</td>
<td>1488 sec</td>
<td></td>
</tr>
<tr>
<td>Static-Route</td>
<td>fe80::2000:1</td>
<td>NA</td>
<td>unreachable</td>
<td>NO</td>
<td>vlan2000</td>
<td>forever</td>
<td></td>
</tr>
<tr>
<td>IPv6-RA</td>
<td>fe80::11:1</td>
<td>high</td>
<td>reachable</td>
<td>YES</td>
<td>vlan11</td>
<td>1471 sec</td>
<td></td>
</tr>
</tbody>
</table>

rfs4000-229D58#
6.1.27 `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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show ipv6-access-list stats <IPv6-ACCESS-LIST-NAME> {(on <DEVICE-NAME>)}
```

**Parameters**

- `<IPv6-ACCESS-LIST-NAME>` — Optional. Displays statistics for a specified IPv6 access list. Specify the IPv6 access list name. **Note:** If IPv6 ACL name is not provided, the system displays statistics for all ACLs configured and applied.
- `<DEVICE-NAME>` — Specify the name of the AP, wireless controller, or service platform.

**Examples**

```
rfs6000-6DB5D4#show ipv6-access-list stats
IPv6 Access-list: test
   deny ipv6 any any rule-precedence 20       Hitcount: 4

rfs6000-6DB5D4#
```
### 6.1.28 l2tpv3

> **show commands**

Displays a Layer 2 Tunnel Protocol Version 3 (L2TPV3) session information.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>}
  {(on <DEVICE-NAME>)}**
  - Displays a L2TPv3 tunnel and session details or summary.
  - **on <DEVICE-NAME>** – Optional. Displays 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).
SHOW COMMANDS

```
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tunnel-summary {on &lt;DEVICE-NAME&gt;}</td>
<td>Optional. Displays L2TPv3 tunnel summary</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Displays a L2TPv3 tunnel summary on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

```

```
• l2tpv3 {tunnel-summary} {down/up} {on <DEVICE-NAME>}

l2tpv3 Displays a L2TPv3 tunnel and session details or summary

tunnel-summary Optional. Displays a L2TPv3 tunnel summary, based on the parameters passed
down Optional. Displays un-established tunnels summary
up Optional. Displays established tunnels summary

on <DEVICE-NAME> The following keyword is common to the ‘down’ and ‘up’ parameters:
   • on <DEVICE-NAME> – Optional. Displays summary, for un-established or established tunnels, on a specified device
   • <DEVICE-NAME> – Specify the name of AP, wireless controller, or service platform.

Examples

```
ap7131-11E6C4#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
ap7131-11E6C4#

```
ap7131-11E6C4#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 : Motorola Solutions
   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
   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#
6.1.29 **ldap-agent**

> **show commands**

Displays an LDAP agent’s join status (join status to a LDAP server domain)

---

**NOTE:** This command is not available in the USER EXEC Mode.

---

Supported in the following platforms:
- Access Points — AP300, AP622, AP650, ES6510, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show ldap-agent join-status {on <DEVICE-NAME>}
```

**Parameters**
- show ldap-agent join-status {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>ldap-agent {on &lt;DEVICE-NAME&gt;}</th>
<th>Displays if a specified device (LDAP agent) has successfully joined a LDAP server’s domain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; – Optional. Specifies the device name.</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the name of the access point, wireless controller, or service</td>
</tr>
<tr>
<td></td>
<td>platform.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs6000-81701D#sh ldap-agent join-status
Primary LDAP Server's agent join-status : Joined domain SYMBOL.
Secondary LDAP Server's agent join-status : Not Configured
rfs6000-81701D#
```
6.1.30 licenses

Displays installed licenses and usage information

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
show licenses {borrowed|lent}
```

Parameters

- `show licenses {borrowed|lent}`

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
```
ADVANCED-SECURITY
String : DEFAULT-ADV-SEC-LICENSE
rfs4000-229D58#

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 : 41a5a30ee9bb0bd78e943dba0a36ac34d3cdc66c956ef1f449d89f1c28beb032ac9747a8f0c9f98f
    Value  : 1
  AAP-LICENSE
    String : 41a5a30ee9bb0bd7f8d421c001f7c9cbd3cdc66c956ef1f41960aa2a030abb41ac9747a8f0c9f98f
    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.

```
show licenses lent
```

```
MAC       HOST-NAME       TYPE  LENT  BORROWER-MAC       BORROWER-HOST-NAME
----------------------------------------
00-15-70-37-FA-BE   rfs7000-37FABE     AP    1     00-00-00-04-04-0A  rfs4000-04040A
               93 days, 5 hours
00-15-70-37-FA-BE   rfs7000-37FABE     AAP   1     00-00-00-04-04-0B  rfs4000-04040B
               93 days, 5 hours
00-15-70-37-FA-BE   rfs7000-37FABE     AAP   2     00-23-68-88-1E-4B  rfs4000-881E4B
               current
00-15-70-81-70-1D  rfs6000-81701D     AP    1     00-23-68-88-1E-4B  rfs4000-881E4B
               current
```

```
show licenses borrowed
```

```
MAC       HOST-NAME       TYPE  BORROWED   VALIDITY
----------------------------------------
00-15-70-37-FD-89  rfs7000-37FD89     AAP   2         99 days, 23 hours
00-15-70-81-70-1D  rfs6000-81701D     AP    1         99 days, 23 hours
```

```
6.1.31 lldp

Displays Link Layer Discovery Protocol (LLDP) information

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>}
  - lldp Displays an LLDP neighbors table or aggregated LLDP neighbors table
  - neighbors Displays an LLDP neighbors table
  - on <DEVICE-NAME> Optional. Displays an LLDP neighbors table on a specified device
    - <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

- show lldp report {detail} {(on <DEVICE-OR-DOMAIN-NAME>)}
  - lldp Displays an LLDP neighbors table or aggregated LLDP neighbors table
  - report detail Displays an aggregated LLDP neighbors table
    - detail – Optional. Displays detailed aggregated LLDP neighbors table
  - on <DEVICE-NAME> The following keyword is recursive and common to the ‘report detail’ parameter:
    - <DEVICE-NAME> – Specify the name of the AP, wireless controller, or service platform.

Examples
rfs7000-37FABE(config)#show lldp neighbors
rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show lldp neighbors
rfs7000-37FABE(config)#
6.1.32 logging

Displays the network’s activity log

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
show logging {on <DEVICE-NAME>}
```

Parameters

- `show logging {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>logging</th>
<th>Displays logging information on a specified device</th>
</tr>
</thead>
<tbody>
<tr>
<td>{on &lt;DEVICE-NAME&gt;}</td>
<td>- &lt;DEVICE-NAME&gt; – Optional. Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

Examples

```
rfs4000-229D58(config)#show logging

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

Log Buffer (359 bytes):

Jan 23 19:50:40 2013: rfs4000-229D58 : %SYSTEM-3-LOGIN_FAIL: Log-in failed for user 'admin' from 'ssh'
Jan 22 00:04:14 2013: rfs4000-229D58 : %SYSTEM-3-UI_USER_AUTH_FAIL: UI user 'Admin' from: '192.168.13.10' authentication failed
rfs4000-229D58(config)#
```
### 6.1.33 `mac-access-list-stats`

- **show commands**

Displays MAC access list statistics

---

**NOTE:** This command is not present in USER EXEC mode.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>` — Optional. Displays statistics for a specified MAC access list. Specify the MAC access list name.
- `<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#
```
6.1.34 **mac-address-table**

- **show commands**

Displays MAC address table entries

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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**

```
rfs7000-37FABE(config)#show mac-address-table
--------------------------------------------------------
BRIDGE VLAN PORT      MAC               STATE
--------------------------------------------------------
1      1    ge1              00-02-B3-28-D1-55 forward
1      1    ge1              00-23-68-11-E6-C4 forward
1      1    ge1              00-A0-F8-68-D5-66 forward
1      1    ge1              5C-D9-98-4C-04-51 forward
--------------------------------------------------------
Total number of MACs displayed: 4
rfs7000-37FABE(config)#
```
### 6.1.35 mac-auth

*show commands*

Displays details of wired ports that have MAC address authentication enabled.

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>|up1]|{on <DEVICE-NAME>})
```

**Parameters**

- `show mac-auth [all|interface [interface-name|ge <1-5>|port-channel <1-3>|up1]|{on <DEVICE-NAME>})`

<table>
<thead>
<tr>
<th><code>mac-auth</code></th>
<th>Displays MAC authentication related information for all interfaces or all interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>all</code></td>
<td>Displays MAC authentication related information for all interfaces</td>
</tr>
<tr>
<td><code>interface</code></td>
<td>Displays MAC authentication related information for a specified interface. Specify the interface using one of the following options:</td>
</tr>
<tr>
<td><code>&lt;interface-name&gt;</code></td>
<td>Selects the interface identified by the <code>&lt;interface-name&gt;</code> keyword</td>
</tr>
<tr>
<td><code>ge &lt;1-5&gt;</code></td>
<td>Selects the GigabitEthernet interface identified by the index number</td>
</tr>
<tr>
<td><code>port-channel &lt;1-3&gt;</code></td>
<td>Selects the port channel interface identified by the index number</td>
</tr>
<tr>
<td><code>up1</code></td>
<td>Selects the WAN Ethernet interface</td>
</tr>
</tbody>
</table>

- `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.

**Examples**

```
rfs4000-229D58(config)#show macauth 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)#
6.1.36  mint

Displays MiNT protocol configuration commands

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

show mint [config|id|info|known-adaptors|links|lsp|lsp-db|mlcp|neighbors|route|stats|tunnel-controller|tunneled-vlans]

show mint [config|id|info|known-adaptors|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-adaptors|route|stats|tunneled-vlans] {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mint</td>
<td>Displays MiNT protocol information based on the parameters passed</td>
</tr>
<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-adaptors</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>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>The following keywords are common to all of the above parameters:</td>
</tr>
<tr>
<td>- on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays MiNT protocol details 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>

- show mint [dis|links|neighbors|tunnel-controller] {details} {(on <DEVICE-NAME>)}

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mint</td>
<td>Displays MiNT protocol information based on the parameters passed</td>
</tr>
<tr>
<td>dis</td>
<td>Displays MiNT network Designated Intermediate Systems (DISes) and 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>
### tunnel-controller
Displays details of MiNT VLAN network tunnel wireless controllers for extended VLAN load balancing.

### details
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

### Examples
```plaintext
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)#
```

```plaintext
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)#

rfs7000-37FABE(config)#show mint route
Destination : Next-Hop(s)
70.37.FA.BE : 70.37.FA.BE via self
rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show mint known-adopters
70.37.FA.BE
rfs7000-37FABE(config)#

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
rfs7000-37FABE(config)#
6.1.37 ntp

show commands

Displays Network Time Protocol (NTP) information. NTP enables clock synchronization within a network.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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  
|-----------------------------|----------------------------------|  
|                            | • 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.  

| ntp status {on <DEVICE-NAME>} | Displays NTP association status  
|-------------------------------|----------------------------------|  
|                               | • 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

rfs7000-37FABE>show ntp associations
address ref clock st when poll reach delay offset disp
* master (synced), # master (unsynced), + selected, - candidate, ~ configured
rfs7000-37FABE>

rfs7000-37FABE>show ntp status
Clock is synchronized, stratum 0, actual frequency is 0.0000 Hz, precision is 2**0
reference time is 00000000.00000000 (Feb 07 06:28:16 UTC 2036)
clock offset is 0.000 msec, root delay is 0.000 msec
root dispersion is 0.000 msec
rfs7000-37FABE>
6.1.38 password-encryption

Displays password encryption status (enabled/disabled)

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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)#
6.1.39 **pppoe-client**

Displays *Point-to-Point Protocol over Ethernet* (PPPoE) client information

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
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**

```plaintext
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)#
```
### 6.1.40 privilege

> show commands

Displays a device's existing privilege level

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show privilege
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config)# show privilege
Current user privilege: superuser
rfs7000-37FABE(config)#
```
6.1.41 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 the 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

show radius guest-users time

Parameters

- show radius guest-users time

<table>
<thead>
<tr>
<th>radius guest-users</th>
<th>Displays RADIUS server's guest user statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>time</td>
<td>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</td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58#show radius guest-users time

<table>
<thead>
<tr>
<th>TIME (min:sec)</th>
<th>REMAINING</th>
<th>GUEST USER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:00</td>
<td>9:00</td>
<td>time9</td>
</tr>
<tr>
<td>0:00</td>
<td>5:00</td>
<td>time5</td>
</tr>
<tr>
<td>0:00</td>
<td>15:00</td>
<td>time15</td>
</tr>
<tr>
<td>0:00 305416:35</td>
<td>notime</td>
<td></td>
</tr>
<tr>
<td>2:31</td>
<td>7:29</td>
<td>time10</td>
</tr>
</tbody>
</table>

rfs4000-229D58#
6.1.42 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show reload {on <DEVICE-OR-DOMAIN-NAME>}
```

**Parameters**
- `show reload {on <DEVICE-OR-DOMAIN-NAME>}`

<table>
<thead>
<tr>
<th>reload {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</th>
<th>Displays scheduled reload information for a specified device</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays configuration on a specified device</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 reload
No reload is scheduled.
rfs7000-37FABE(config)#
```
6.1.43 rf-domain-manager

Displays RF Domain manager selection details

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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)#
```
### 6.1.44 role

- **show commands**
  Displays role based firewall information

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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</th>
<th>Displays</th>
</tr>
</thead>
<tbody>
<tr>
<td>ldap-stats</td>
<td>Displays LDAP server status and statistics</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; — Optional. Displays LDAP server status on a specified device</td>
</tr>
<tr>
<td>wireless-clients</td>
<td>Displays clients associated with roles</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-NAME&gt; — Optional. Displays clients associated with roles on a specified device</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config)#show role wireless-client
No ROLE statistics found.
rfs7000-37FABE(config)#
```
6.1.45 route-maps

Displays route map statistics for defined device routes

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

`show route-maps {on <DEVICE-NAME>}`

Parameters

- `show route-maps {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>route-maps</td>
<td>Displays configured route map statistics for all defined routes</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays route map statistics on a specified device</td>
</tr>
</tbody>
</table>

Note: For more information on route maps, see `route-map on page 24-5`.

Examples

```
rfs7000-37FABE(config)#show route-maps
rfs7000-37FABE(config)#
```
### 6.1.46 rtls

*show commands*

Displays *Real Time Location Service* (RTLS) statistics for access points contributing locationing information.

Supported in the following platforms:
- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show rtls [aeroscout|ekahau] {<MAC/HOSTNAME>} {on <DEVICE-OR-DOMAIN-NAME>}
```

**Parameters**
- **rtls**
  - Displays access point RTLS statistics
- **aeroscout**
  - Displays access point Aeroscout statistics
- **ekahau**
  - Displays access point Ekahau statistics
- **<MAC/HOSTNAME>**
  - Optional. Displays Aeroscout or Ekahau statistics for a specified access point. Specify the MAC address or hostname of the access point.
- **on <DEVICE-OR-DOMAIN-NAME>**
  - The following keyword is recursive and common to ‘Aeroscout’ and ‘Ekahau’ parameters:
    - **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)#
```
6.1.47 running-config

Displays configuration files (where all configured MAC and IP access lists are applied to an interface)

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

show running-config

Syntax:

- `show running-config {aaa-policy|association-acl-policy|auto-provisioning-policy|captive-portal-policy|device|dhcp-server-policy|firewall-policy|include-factory|interface|ip-access-list|mac-access-list|management-policy|meshpoint|profile|radio-qos-policy|rf-domain|smart-rf-policy|wlan|wlan-qos-policy}
- `show running-config {aaa-policy|association-acl-policy|auto-provisioning-policy|captive-portal-policy|dhcp-server-policy|firewall-policy|management-policy|radio-qos-policy|smart-rf-policy|wlan-qos-policy} <POLICY-NAME> {include-factory}
- `show running-config {device [<MAC>|self]} {include-factory}
- `show running-config {interface} {include-factory}
- `show running-config {interface} {<INTERFACE-NAME>|ge|include-factory|me|port-channel|ppoe1|vlan|wwan1} {include-factory}
- `show running-config {interface} {<INTERFACE-NAME>|ge <1-4>|include-factory|me1|port-channel <1-2>|ppoe1|vlan <1-4094>|wwan1} {include-factory}
- `show running-config {ip-access-list <IP-ACCESS-LIST-NAME>|mac-access-list <MAC-ACCESS-LIST-NAME} {include-factory}
- `show running-config {meshpoint <MESHPOINT-NAME>} {include-factory}
- `show running-config {profile [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] <PROFILE-NAME>} {include-factory}
- `show running-config {rf-domain <DOMAIN-NAME>} {include-factory}
- `show running-config {wlan <WLAN-NAME>} {include-factory}

Parameters

- `show running-config {aaa-policy|association-acl-policy|auto-provisioning-policy|captive-portal-policy|dhcp-server-policy|firewall-policy|management-policy|radio-qos-policy|smart-rf-policy|wlan-qos-policy} <POLICY-NAME> {include-factory}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>running-config</td>
<td>Optional. Displays current running configuration</td>
</tr>
<tr>
<td>aaa-policy</td>
<td>Optional. Displays AAA policy configuration</td>
</tr>
<tr>
<td>association-acl-policy</td>
<td>Optional. Displays association ACL policy configuration</td>
</tr>
<tr>
<td>auto-provisioning-policy</td>
<td>Optional. Displays auto provisioning policy configuration</td>
</tr>
<tr>
<td>captive-portal-policy</td>
<td>Optional. Displays captive portal policy configuration</td>
</tr>
<tr>
<td>dhcp-server-policy</td>
<td>Optional. Displays the DHCP server policy configuration</td>
</tr>
<tr>
<td>firewall-policy</td>
<td>Optional. Displays firewall policy configuration</td>
</tr>
<tr>
<td>management-policy</td>
<td>Optional. Displays management policy configuration</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>radio-qos-policy</strong></td>
<td>Optional. Displays radio QoS policy configuration</td>
</tr>
<tr>
<td><strong>smart-rf-policy</strong></td>
<td>Optional. Displays Smart RF policy configuration</td>
</tr>
<tr>
<td><strong>wlan-qos-policy</strong></td>
<td>Optional. Displays WLAN QoS policy configuration</td>
</tr>
</tbody>
</table>
| **<POLICY-NAME>** | The following keyword is common to all policies:  
  • **<POLICY-NAME>** – Specify the name of the policy. |
| **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** Optional. Includes factory defaults

- **show running-config {include-factory}**
  
  **running-config** Displays current running configuration
  
  **include-factory** Optional. Includes factory defaults

- **show running-config {interface} {<INTERFACE-NAME>|ge <1-4>|include-factory|me1|port-channel <1-2>|pppoe1|vlan <1-4094>|wwan1} {include-factory}**
  
  **running-config** Displays current running configuration
  
  **interface** Optional. Displays interface configuration
  
  **<INTERFACE-NAME>** Optional. Displays a specified interface configuration. Specify the interface name.
  
  **ge <1-4>** Optional. Displays GigabitEthernet interface configuration  
  • **<1-4>** – Specify the GigabitEthernet interface index from 1 - 4.  
  **Note**: The GE interface range for NX45XX and NX65XX service platforms is <1 - 24>.
  
  **me1** Optional. Displays FastEthernet interface configuration
  
  **port-channel <1-2>** Optional. Displays port channel interface configuration  
  • **<1-2>** – Specify the port channel interface index from 1 - 2.
  
  **pppoe1** Optional. Displays PPP over Ethernet interface configuration
  
  **vlan <1-4094>** Displays VLAN interface configuration  
  • **<1-4094>** – Specify the VLAN interface number from 1 - 4094.
  
  **wwan1** Optional. Displays Wireless WAN interface configuration
  
  **include-factory** The following keyword is common to all interfaces:  
  • **Optional. Includes factory defaults**
### Running Config

- **show running-config**
  - **{ip-access-list \(<IP-ACCESS-LIST-NAME>\)|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>Displays current running configuration</td>
</tr>
<tr>
<td>ip-access-list</td>
<td>Optional. Displays IP access list configuration</td>
</tr>
<tr>
<td>(&lt;IP-ACCESS-LIST-NAME&gt;)</td>
<td>- Specify the IP access list name</td>
</tr>
<tr>
<td>mac-access-list</td>
<td>Optional. Displays MAC access list configuration</td>
</tr>
<tr>
<td>(&lt;MAC-ACCESS-LIST-NAME&gt;)</td>
<td>- Specify the MAC access list name</td>
</tr>
<tr>
<td>include-factory</td>
<td>The following keyword is common to the ‘ip-access-list’ and ‘mac-access-list’ parameters:</td>
</tr>
<tr>
<td></td>
<td>- Optional. Includes factory defaults</td>
</tr>
</tbody>
</table>

- **show running-config**
  - **{meshpoint \(<MESHPOINT-NAME>\)} \{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>meshpoint</td>
<td>Optional. Displays meshpoint configuration</td>
</tr>
<tr>
<td>(&lt;MESHPOINT-NAME&gt;)</td>
<td>- Specify the meshpoint name</td>
</tr>
<tr>
<td>include-factory</td>
<td>Optional. Includes factory defaults along with running configuration details</td>
</tr>
</tbody>
</table>

- **show running-config**
  - **{profile \{ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000\} \(<PROFILE-NAME>\)} \{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>profile</td>
<td>Optional. Displays current configuration for a specified profile</td>
</tr>
<tr>
<td>ap621</td>
<td>Displays AP621 profile configuration</td>
</tr>
<tr>
<td>(&lt;PROFILE-NAME&gt;)</td>
<td>- Displays configuration for a specified AP621 profile. Specify the AP621 profile name.</td>
</tr>
<tr>
<td>ap622</td>
<td>Displays AP622 profile configuration</td>
</tr>
<tr>
<td>(&lt;PROFILE-NAME&gt;)</td>
<td>- Displays configuration for a specified AP622 profile. Specify the AP622 profile name.</td>
</tr>
<tr>
<td>ap650</td>
<td>Displays AP650 profile configuration</td>
</tr>
<tr>
<td>(&lt;PROFILE-NAME&gt;)</td>
<td>- Displays configuration for a specified AP650 profile. Specify the AP650 profile name.</td>
</tr>
<tr>
<td>ap6511</td>
<td>Displays AP6511 profile</td>
</tr>
<tr>
<td>(&lt;PROFILE-NAME&gt;)</td>
<td>- Displays configuration for a specified AP6511 profile. Specify the AP6511 profile name.</td>
</tr>
<tr>
<td>ap6521</td>
<td>Displays AP6521 profile</td>
</tr>
<tr>
<td>(&lt;PROFILE-NAME&gt;)</td>
<td>- Displays configuration for a specified AP6521 profile. Specify the AP6521 profile name.</td>
</tr>
<tr>
<td>ap6522</td>
<td>Displays AP6522 profile</td>
</tr>
<tr>
<td>(&lt;PROFILE-NAME&gt;)</td>
<td>- Displays configuration for a specified AP6522 profile. Specify the AP6522 profile name.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><code>show running-config</code></td>
<td>Displays current running configuration</td>
</tr>
</tbody>
</table>
| `ap6532 <PROFILE-NAME>` | Displays AP6532 profile configuration  
  - `<PROFILE-NAME>` – Displays configuration for a specified AP6532 profile. Specify the AP6532 profile name. |
| `ap6562 <PROFILE-NAME>` | Displays AP6562 profile configuration  
  - `<PROFILE-NAME>` – Displays configuration for a specified AP6562 profile. Specify the AP6562 profile name. |
| `ap71xx <PROFILE-NAME>` | Displays AP71XX profile configuration  
  - `<PROFILE-NAME>` – Displays configuration for a specified AP71XX profile. Specify the AP71XX profile name. |
| `ap81xx <PROFILE-NAME>` | Displays AP81XX profile configuration  
  - `<PROFILE-NAME>` – Displays configuration for a specified AP81XX profile. Specify the AP81XX profile name. |
| `ap82xx <PROFILE-NAME>` | Displays AP82XX profile configuration  
  - `<PROFILE-NAME>` – Displays configuration for a specified AP82XX profile. Specify the AP82XX profile name. |
| `rfs4000 <PROFILE-NAME>` | Displays RFS4000 profile configuration  
  - `<PROFILE-NAME>` – Displays configuration for a specified RFS4000 profile. Specify the RFS4000 profile name. |
| `rfs6000 <PROFILE-NAME>` | Displays RFS6000 profile configuration  
  - `<PROFILE-NAME>` – Displays configuration for a specified RFS6000 profile. Specify the RFS6000 profile name. |
| `rfs7000 <PROFILE-NAME>` | Displays RFS7000 profile configuration  
  - `<PROFILE-NAME>` – Displays configuration for a specified RFS7000 profile. Specify the RFS7000 profile name. |
| `nx45xx <PROFILE-NAME>` | Displays NX45XX series service platform profile configuration  
  - `<PROFILE-NAME>` – Displays configuration for a specified NX45XX profile. Specify the NX45XX series profile name. |
| `nx65xx <PROFILE-NAME>` | Displays NX65XX series service platform profile configuration  
  - `<PROFILE-NAME>` – Displays configuration for a specified NX65XX profile. Specify the NX65XX series profile name. |
| `nx9000 <PROFILE-NAME>` | Displays NX9000 Series service platform profile configuration  
  - `<PROFILE-NAME>` – Displays configuration for a specified NX9000 profile. Specify the NX9000 Series profile name. |
| `include-factory` | Optional. This parameter is common to all profiles. It includes factory defaults |

- `show running-config {rf-domain <DOMAIN-NAME>} {include-factory}`
show running-config

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)

rfs7000-37FABE(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--
rfs7000-37FABE(config)
nx6500-31FABE(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--
nx6500-31FABE(config)#
6.1.48 session-changes

* show commands

Displays configuration changes made in the current session

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show session-changes
```

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config)#show session-changes

No changes in this session

rfs7000-37FABE(config)#
```
6.1.49 **session-config**

*show commands*

Lists active open sessions on a device

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show session-config {include-factory}
```

**Parameters**

- `show session-config {include-factory}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>session-config</td>
<td>Displays current session configuration</td>
</tr>
<tr>
<td>include-factory</td>
<td>- Optional. Includes factory defaults</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config)#show session-config
!
! Configuration of RFS4000 version 5.6.0.0-029B
!
!
version 2.3
!
client-identity TestClientIdentity
dhcp 1 message-type request option-codes exact hexstring 5e4d36780b3a7f
!
client-identity-group ClientIdentityGroup
!
client-identity TestClientIdentity precedence 1
!
alias network testNetworkAlias address-range 192.168.13.4 to 192.168.13.10
!
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 l

rfs4000-229D58(config)#
```
6.1.50 sessions

Displays CLI sessions initiated on a device

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
show sessions {on <DEVICE-NAME>}
```

Parameters

- `show sessions {on <DEVICE-NAME>}`

<table>
<thead>
<tr>
<th>sessions</th>
<th>Displays CLI sessions initiated on a device</th>
</tr>
</thead>
<tbody>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays CLI sessions on a specified device</td>
</tr>
</tbody>
</table>

Examples

```
rfs4000-229D58(config)#show sessions
INDEX COOKIE NAME START TIME FROM ROLE
1 49 admin 2013-02-15 15:45:10 192.168.100.225 superuser
2 2 snmp 2013-01-16 22:37:59 127.0.0.1 superuser
3 3 snmp2 2013-01-16 22:37:59 127.0.0.1 superuser
rfs4000-229D58(config)#
```
### 6.1.51 site-config-diff

> **show commands**

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:
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

---

**NOTE:** This command returns an output only when executed on a NOC controller.

---

**Syntax**

```
show site-config-diff <SITE-NAME>
```

**Parameters**

- `show site-config-diff <SITE-NAME>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>site-config-diff</code></td>
<td>Displays the configuration difference for the specified site</td>
</tr>
<tr>
<td><code>&lt;SITE-NAME&gt;</code></td>
<td>Specify the site name.</td>
</tr>
</tbody>
</table>

**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#
```
6.1.52 smart-rf

Displays Smart RF management commands

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
show smart-rf [ap|calibration-config|calibration-status|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 radio {<MAC>|all-11an|all-11bgn|channel|energy|neighbors} {on <DOMAIN-NAME>}
```

Parameters

- **ap**
  - Displays access point related commands
  - `<MAC>` Optional. Uses MAC addresses to identify access points. Displays all access points, if no MAC address is specified.
  - `<DEVICE-NAME>` Optional. Uses an administrator defined name to identify an access point.
  - `on <DOMAIN-NAME>` Optional. Displays access point details on a specified RF Domain. Specify the domain name.

- **show smart-rf ap {activity|energy|neighbors} {<MAC>|<DEVICE-NAME>} {on <DOMAIN-NAME>}
  - Displays AP related commands
    - `activity` Optional. Displays AP activity for a specified AP or all APs
    - `energy` Optional. Displays AP energy for a specified AP or all APs
    - `neighbors` Optional. Displays AP neighbors
  - `<MAC>`/ `<DEVICE-NAME>` The following keywords are common to all of the above parameters:
    - `<MAC>` – Displays a specified AP related information. Uses MAC address to identify the AP
    - `<DEVICE-NAME>` – Displays a specified AP related information. Uses device name to identify the AP
  - `on <DOMAIN-NAME>` Optional. Displays access point details on a specified RF Domain. Specify the domain name.
### SHOW COMMANDS

#### show smart-rf [calibration-config|calibration-status|channel-distribution|history|history-timeline] {on <DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>calibration-config</td>
<td>Displays interactive calibration configurations</td>
</tr>
<tr>
<td>calibration-status</td>
<td>Displays Smart RF calibration status</td>
</tr>
<tr>
<td>channel-distribution</td>
<td>Displays Smart RF channel distribution</td>
</tr>
<tr>
<td>history</td>
<td>Displays Smart RF calibration history</td>
</tr>
<tr>
<td>history-timeline</td>
<td>Displays extended Smart RF calibration history on an hourly or daily timeline</td>
</tr>
</tbody>
</table>

*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.

#### show smart-rf radio {<MAC>|all-11an|all-11bgn|energy <MAC>} {on <DOMAIN-NAME>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>radio</td>
<td>Displays radio related commands</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>Optional. Displays details of a specified radio. Specify the radio's MAC address in the AA-BB-CC-DD-EE-FF format.</td>
</tr>
<tr>
<td>all-11an</td>
<td>Optional. Displays all 11a radios currently in the configuration</td>
</tr>
<tr>
<td>all-11bgn</td>
<td>Optional. Displays all 11bg radios currently in the configuration</td>
</tr>
<tr>
<td>energy {&lt;MAC&gt;}</td>
<td>Optional. Displays radio energy</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>Specify the MAC address of the radio</td>
</tr>
<tr>
<td>activity</td>
<td>Optional. Displays changes related to radio power, number of radio channels, or coverage holes. Use additional filters to view specific details.</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>Optional. Displays radio activity for a specified radio</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>Specify the radio's MAC address.</td>
</tr>
<tr>
<td>all-11an</td>
<td>Optional. Displays radio activity of all 11a radios in the configuration</td>
</tr>
<tr>
<td>all-11bgn</td>
<td>Optional. Displays radio activity of all 11bg radios in the configuration</td>
</tr>
</tbody>
</table>

*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 interfering-ap {<MAC>|<DEVICE-NAME>|on}

<table>
<thead>
<tr>
<th>interfering-ap</th>
<th>Displays interfering access points (requiring potential isolation) information</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;MAC&gt;</td>
<td>Optional. Displays information of a specified interfering access point</td>
</tr>
<tr>
<td></td>
<td>• &lt;MAC&gt; – Specify the access point’s MAC address.</td>
</tr>
<tr>
<td></td>
<td>Note: Considers all APs if this parameter is omitted</td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays interfering access point information on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the device name.</td>
</tr>
<tr>
<td></td>
<td>Note: Considers all APs if this parameter is omitted</td>
</tr>
<tr>
<td>on &lt;DOMAIN-NAME&gt;</td>
<td>Optional. Displays all interfering access point information within a specified RF Domain</td>
</tr>
<tr>
<td></td>
<td>• &lt;DOMAIN-NAME&gt; – Specify the RF Domain name.</td>
</tr>
</tbody>
</table>

### show smart-rf interfering-neighbors {<MAC>|<DEVICE-NAME>|on|threshold <50-100>}

<table>
<thead>
<tr>
<th>interfering-ap</th>
<th>Displays interfering neighboring access point information</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;MAC&gt;</td>
<td>Optional. Displays interfering neighboring access point information</td>
</tr>
<tr>
<td></td>
<td>• &lt;MAC&gt; – Specify the access point’s MAC address.</td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt;</td>
<td>Optional. Displays all interfering neighboring access point information on a specified device</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEVICE-NAME&gt; – Specify the device name.</td>
</tr>
<tr>
<td></td>
<td>Note: Considers all APs if this parameter is omitted</td>
</tr>
<tr>
<td>threshold &lt;50-100&gt;</td>
<td>Specifies the maximum attenuation threshold of interfering neighbors. Specify a value from 50-100.</td>
</tr>
<tr>
<td>on &lt;DOMAIN-NAME&gt;</td>
<td>Optional. Displays radio activity of all radios within a specified RF Domain</td>
</tr>
<tr>
<td></td>
<td>• &lt;DOMAIN-NAME&gt; – Specify the RF Domain name.</td>
</tr>
</tbody>
</table>

### Examples

```bash
rfs7000-37FABE(config)#show smart-rf calibration-status
No calibration currently in progress
rfs7000-37FABE(config)#
```

```bash
rfs7000-37FABE(config)#show smart-rf history
---
TIME EVENT DESCRIPTION
---
---
Total number of history entries displayed: 0
rfs7000-37FABE(config)#
```
### 6.1.53 spanning-tree

> show commands

Displays spanning tree utilization information

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

- `show spanning-tree mst {configuration|detail|instance|on}
- 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**

- **spanning-tree** Displays spanning tree utilization information
- **mst** Displays Multiple Spanning Tree (MST) related information
- **configuration** Optional. Displays MST configuration
  - `{on <DEVICE-NAME>}` – Optional. Displays MST configuration on a specified device
  - `<DEVICE-NAME>` – Specify the name of the AP or wireless controller.

**Note:** The GE interface range for NX45XX and NX65XX service platforms is <1 - 24>
- **me1** – Displays FastEthernet interface MST configuration
- **port-channel** – Displays port channel interface MST configuration
  - `<1-2>` – Select the port channel interface index from 1 - 2.

Contd..
### show spanning-tree mst

Usage:
```
show spanning-tree mst {instance <1-15>} {interface <INTERFACE-NAME>} (on <DEVICE-NAME>)
```

- **pppoe1** – Displays PPP over Ethernet interface MST configuration
- **vlan** – Displays VLAN interface MST configuration
  - `<1-4094>` – Select the SVI VLAN ID from 1 - 4094.
- **wwan1** – Displays Wireless WAN interface MST configuration

#### 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)#
```

```
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 portfast 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
rfs7000-37FABE(config)#
```
% portfast bpdu-filter disabled
% portfast bpdu-guard disabled
% portfast portfast errdisable timeout disabled
% portfast errdisable timeout interval 300 sec
% cisco interoperability not configured - Current cisco interoperability off

% ge4: Port 2004 - Id 87d4 - Role Disabled - State Forwarding
% ge4: Designated External Path Cost 0 - Internal Path Cost 0
% ge4: Configured Path Cost 11520 - Add type Implicit - ref count 1
% ge4: Designated Port Id 0 - CST Priority 128
% ge4: ge4: CIST Root 0000000000000000
% ge4: ge4: Regional Root 0000000000000000
% ge4: ge4: Designated Bridge 0000000000000000
% ge4: Message Age 0 - Max Age 0
% ge4: CIST Hello Time 0 - Forward Delay 0
% ge4: CIST Forward Timer 0 - Msg Age Timer 0 - Hello Timer 0
% ge4: Version Multiple Spanning Tree Protocol - Received None - Send MSTP

--More--

rfs7000-37FABE(config)#

rfs7000-37FABE(config)#show spanning-tree mst instance 1 interface test

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
% 1: portfast bpdu-guard disabled
% portfast portfast errdisable timeout disabled
% portfast errdisable timeout interval 300 sec
% cisco interoperability not configured - Current cisco interoperability off
% --More--

rfs7000-37FABE(config)#
6.1.54 startup-config

Displays complete startup configuration script

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
show startup-config {include-factory}
```

Parameters

- `show startup-config {include-factory}`

Examples

```
rfs4000-229D58(config)#show startup-config
!
! Configuration of RFS4000 version 5.6.0.0-029B
!
! version 2.3
!
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)#
```
### 6.1.55 t5

#### show commands

Displays adopted T5 controller details

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

---

**NOTE:** This command is applicable only on WiNG controllers with adopted and managed T5 controllers.

---

#### Syntax

```bash
show t5 [boot|clock|cpe|error|interface|system|temperature|uptime|version|wireless]
{on <DEVICE-NAME>}
```

#### Parameters

- **show t5 [boot|clock|cpe|error|interface|system|temperature|uptime|version|wireless]
{on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show t5</td>
<td>Displays adopted T5 controller details</td>
</tr>
<tr>
<td>boot</td>
<td>Displays the T5 device’s boot details</td>
</tr>
<tr>
<td>clock</td>
<td>Displays the T5 device’s clock</td>
</tr>
<tr>
<td>cpe</td>
<td>Displays the following details for CPEs linked with the specified T5 controller:</td>
</tr>
<tr>
<td></td>
<td>- address – Displays CPE address information</td>
</tr>
<tr>
<td></td>
<td>- boot – Displays CPE boot information</td>
</tr>
<tr>
<td></td>
<td>- led – Displays CPE LED information (enabled/disabled)</td>
</tr>
<tr>
<td></td>
<td>- system – Displays CPE system information</td>
</tr>
<tr>
<td></td>
<td>- uptime – Displays CPE’s uptime information</td>
</tr>
<tr>
<td></td>
<td>- version – Displays CPEs current software information</td>
</tr>
<tr>
<td>error</td>
<td>Displays error history</td>
</tr>
<tr>
<td>interface</td>
<td>Displays T5 interface details</td>
</tr>
<tr>
<td>system</td>
<td>Displays T5 system information</td>
</tr>
<tr>
<td>temperature</td>
<td>Displays T5 temperature</td>
</tr>
<tr>
<td>uptime</td>
<td>Displays T5 uptime information</td>
</tr>
<tr>
<td>version</td>
<td>Displays the image version running on the T5</td>
</tr>
<tr>
<td>wireless</td>
<td>Displays the T5 WiFi related information</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>Specify the T5 device’s hostname. An error message is displayed if no T5 device name is specified,</td>
</tr>
</tbody>
</table>
Examples
The following examples are for show commands executed on the 't5-ED5EE8' controller adopted by the 'rfs7000-37FABE' wireless controller:

```
rfs7000-37FABE#show t5 boot on t5-ED5EE8
Primary Version:  5.2.0.0-007D
Secondary Version:  5.2.0.0-006D
Next Boot: Primary
Upgrade Status: none
Upgrade Progress %:  0
rfs7000-37FABE#
```

```
rfs7000-37FABE#show t5 version on t5-ED5EE8
Bootloader Version:   5.0.0.0-070R
Application Version:  5.2.0.0-007D
rfs7000-37FABE#
```

```
rfs7000-37FABE#show t5 system on t5-ED5EE8
Serial Number           13322522400053
SKU                     TS-0524-WR
Hardware Rev            5
Mac Address            B4:C7:99:ED:5E:E8
Description             24-port PowerBroadband VDSL2 Switch Version 5.2.0.0-007D
Contact                 NULL
Name                    t5-ED5EE8
Location                NULL
rfs7000-37FABE#
```

```
rfs7000-37FABE#show t5 error history
Error history for T5 device B4-C7:99-ED:5E:E8
interface vlan10 ip-address 10.10.10.1/24 :: Table Full (rc 8)
rfs7000-37FABE#
```

```
rfs7000-37FABE#show t5 clock on t5-ED5EE8
Time 27-2-2014 14:40:13 UTC
rfs7000-37FABE#
```

```
rfs7000-37FABE#show t5 interface ge counter on t5-ED5EE8
-----------------------------------------------------------------------------------
INTERFACE RX OCTETS RX PACKETS RX PAUSE PKTS TX OCTETS TX PACKETS TX PAUSE PKTS
-----------------------------------------------------------------------------------
ge1       21...496 1074917     0             87957721 498090      0
ge2        0        0           0             0        0           0
-----------------------------------------------------------------------------------
rfs7000-37FABE#
```

```
rfs7000-37FABE#show t5 uptime on t5-ED5EE8
Up Time 6 days 23:50:08
rfs7000-37FABE#
```

```
rfs7000-37FABE#show t5 temperature on t5-ED5EE8
============ Temperature  ============
--------------------------------------------------------------------
INDEX CURRENT (C) FANS @ FULL SPEED (C) FANS @ VARIABLE SPEED (C)
--------------------------------------------------------------------
1      41          70                    60
--------------------------------------------------------------------
rfs7000-37FABE#
```

```
rfs7000-37FABE#show t5 cpe address on t5-ED5EE8
--------------------------------------------------------------------------------
-------------------------------
DEVICE                STATUS                IP ADDRESS                MAC
--------------------------------------------------------------------------------
```
cpe1                  disconnected           0.0.0.0                  00:00:00:00:00:00
cpe2                  disconnected           0.0.0.0                  00:00:00:00:00:00
cpe3                  disconnected           0.0.0.0                  00:00:00:00:00:00
--More--
rfs7000-37FABE#

rfs7000-37FABE#show t5 cpe led on t5-ED5EE8

<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>
<tr>
<td>cpe6</td>
<td>enable</td>
</tr>
<tr>
<td>cpe7</td>
<td>enable</td>
</tr>
<tr>
<td>cpe8</td>
<td>enable</td>
</tr>
<tr>
<td>cpe9</td>
<td>enable</td>
</tr>
<tr>
<td>cpe10</td>
<td>enable</td>
</tr>
<tr>
<td>cpe11</td>
<td>enable</td>
</tr>
<tr>
<td>cpe12</td>
<td>enable</td>
</tr>
<tr>
<td>cpe13</td>
<td>enable</td>
</tr>
<tr>
<td>cpe14</td>
<td>enable</td>
</tr>
<tr>
<td>cpe15</td>
<td>enable</td>
</tr>
<tr>
<td>cpe16</td>
<td>enable</td>
</tr>
<tr>
<td>cpe17</td>
<td>enable</td>
</tr>
<tr>
<td>cpe18</td>
<td>enable</td>
</tr>
<tr>
<td>cpe19</td>
<td>enable</td>
</tr>
<tr>
<td>cpe20</td>
<td>enable</td>
</tr>
<tr>
<td>cpe21</td>
<td>enable</td>
</tr>
<tr>
<td>cpe22</td>
<td>enable</td>
</tr>
<tr>
<td>cpe23</td>
<td>enable</td>
</tr>
<tr>
<td>cpe24</td>
<td>enable</td>
</tr>
</tbody>
</table>

rfs7000-37FABE#
6.1.56 terminal

Displays terminal configuration parameters

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

show terminal

Parameters

None

Examples

rfs7000-37FABE(config)#show terminal
Terminal Type: xterm
Length: 24     Width: 200
rfs7000-37FABE(config)#
6.1.57 timezone

Displays a device's timezone

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

show timezone

Parameters

None

Examples

rfs7000-37FABE(config)#show timezone
Timezone is America/Los_Angeles
rfs7000-37FABE(config)#
6.1.58 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

show upgrade-status {detail|on}
show upgrade-status {detail} {on <DEVICE-NAME>}

Parameters

- show upgrade-status {detail} {on <DEVICE-NAME>}

Examples

rfs4000-229D58(config)#show upgrade-status
Last Image Upgrade Status : Successful
Last Image Upgrade Time : 2013-04-10 09:10:05
rfs4000-229D58(config)#

rfs4000-229D58(config)#show upgrade-status detail
Last Image Upgrade Status : Successful
Last Image Upgrade Time : 2013-11-11 14:05:55
Running from partition /dev/mtdblock7
var2 is 3 percent full
/tmp is 5 percent full
Free Memory 114464 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 5.6.0.0-029B
Writing Kernel to /dev/mtd4
Writing BootOS to /dev/mtd2
Successful
rfs4000-229D58(config)#

rfs7000-6DCD4B#show upgrade-status
Last Image Upgrade Status : Failed(Extracting files (this may take some time).)
Last Image Upgrade Time : 2013-12-23 09:56:20
rfs7000-6DCD4B#
6.1.59 version

Displays a device’s software and hardware version.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

show version {on <DEVICE-NAME>}

Parameters
- show version {on <DEVICE-NAME>}

<table>
<thead>
<tr>
<th>version {on &lt;DEVICE-NAME&gt;}</th>
<th>Displays software and hardware versions on all devices or a specified device</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>on &lt;DEVICE-NAME&gt; – Optional. Displays software and hardware versions 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(config)#show version
RFS4000 version 5.6.0.0-029B
Copyright (c) 2004-2013 Motorola Solutions, Inc. All rights reserved.
Booted from primary

rfs4000-229D58 uptime is 14 days, 03 hours 55 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 2.28
Radio HAL version is 92 (DFS:73)

rfs4000-229D58(config)#
### 6.1.60 vrrp

- **show commands**

Displays *Virtual Router Redundancy Protocol* (VRRP) protocol details

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show vrrp {brief|details|error-stats|stats}
show vrrp {brief|details|stats} {<1-255>} {on <DEVICE-NAME>}
show vrrp error-stats {on <DEVICE-NAME>}
```

**Parameters**

- **brief** Displays virtual router information in brief
- **details** Displays virtual router information in detail
- **stats** Displays virtual router statistics
- **<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

**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)#
6.1.61 what

Displays details of a specified search phrase (performs global search)

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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) NAME/VALUE  NAME/VALUE NAME/VALUE
NAME/VALUE                     NAME/VALUE                     NAME/VALUE
---------------------------------------------------------------------------------------
-------------------------------------------------------------
https-trustpoint               type                           mac
rfDomainName
1   device-cfg           default-trustpoint             rfs4000                        00-
23-68-22-9D-58              default
__obj_name__                   name
2   firewall_policy      default                        default                        True
30
__obj_name__                   name                           https
idle_session_timeout
3   management_policy    default                        default
30
qos_policy                     name                           control_vlan
--More--
rfs4000-229D58#
6.1.62 wireless

Displays wireless configuration parameters

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```plaintext
show wireless [ap|client|meshpoint|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 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 meshpoint {config|detail|multicast|neighbor|on|path|proxy|root|
            security|statistics|tree|usage-mappings}
show wireless meshpoint {config} {filter [device <DEVICE-NAME>|
            rf-domain <DOMAIN-NAME>]}
show wireless meshpoint {detail} {<MESHPOINT-NAME>}
show wireless meshpoint {on <DEVICE-OR-DOMAIN-NAME>}
show wireless meshpoint {multicast|path|proxy|root|security|statistics}
            {[<MESHPOINT-NAME>]|detail} {on <DEVICE-OR-DOMAIN-NAME>}
show wireless meshpoint neighbor {[<MESHPOINT-NAME>]|detail|statistics {rf}]
            {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 radio {detail|on <DEVICE-OR-DOMAIN-NAME>|statistics|tspec|wlan-map}
show wireless radio {detail} {<DEVICE-NAME>|filter|on <DEVICE-OR-DOMAIN-NAME>}
show wireless radio {detail} {<DEVICE-NAME} {<1-3>|filter|on}
show wireless radio {detail} {filter <RADIO-MAC>} {on <DEVICE-OR-DOMAIN-NAME>}
show wireless radio {statistics} {detail|on|rf|windows-data}
### show wireless radio

```
show wireless radio {statistics} {on <DEVICE-OR-DOMAIN-NAME>}
rf {on <DEVICE-OR-DOMAIN-NAME>}
show wireless radio {statistics} {detail|window-data} {<DEVICE-NAME>} {<1-3>}
filter <RADIO-MAC> {on <DEVICE-OR-DOMAIN-NAME>}
show wireless radio {tspec} {<DEVICE-NAME>|filter|on <DEVICE-OR-DOMAIN-NAME>}
option
show wireless radio {wlan-map} {on <DEVICE-OR-DOMAIN-NAME>}
show wireless regulatory {channel-info <WORD>|country-code <WORD>|device-type
show wireless regulatory device-type [ap300|ap621|ap622|ap650|ap651|ap6521|ap6522|
ap6532|ap6562|ap7131|ap7161|ap7181|ap71xx|ap82xx|rfs4000|rfs6000|rfs7000] <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 {config filter {device <DEVICE-NAME>|rf-domain <DOMAIN-NAME>}}
show wireless wlan statistics {<WLAN>|detail|traffic} {on <DEVICE-OR-DOMAIN-NAME>}
```

### Parameters

- **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
- **detail**
  - Optional. Displays detailed information for all APs or a specified AP
  - `<MAC/HOST-NAME>` – Optional. Displays information for a specified AP
- **on <DEVICE-OR-DOMAIN-NAME>**
  - The following keyword is recursive and common to the ‘detail <MAC/HOST-NAME>’ parameter:
    - `<MAC/HOST-NAME>` – Optional. Displays information for a specified AP
    - `<DEVICE-OR-DOMAIN-NAME>` – Optional. Displays 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.
- **load-balancing**
  - 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>configured</td>
<td>Displays managed access point information</td>
</tr>
<tr>
<td>detail &lt;MAC/HOST-NAME&gt;</td>
<td>Optional. Displays detailed information for all APs or a specified AP</td>
</tr>
</tbody>
</table>
| on <DEVICE-OR-DOMAIN-NAME> | The following keyword is recursive and common to the ‘detail <MAC/HOST-NAME>’ parameter:
  | - `<MAC/HOST-NAME>` – Optional. Displays information for a specified AP
  | - `<DEVICE-OR-DOMAIN-NAME>` – Optional. Displays information on a specified device or RF Domain
<p>| - <code>&lt;DEVICE-OR-DOMAIN-NAME&gt;</code> – 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>show wireless client {association-history &lt;MAC&gt; {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}}</td>
<td>Displays association history for a specified client. The keyword is recursive and common to the 'client-capability', 'events', and 'neighbors' parameters.</td>
</tr>
<tr>
<td>load-balancing {client-capability</td>
<td>events</td>
</tr>
<tr>
<td>on &lt;DEVICE-NAME&gt;</td>
<td>The following keyword is recursive and common to the 'client-capability', 'events', and 'neighbors' parameters:</td>
</tr>
<tr>
<td>filter IP [&lt;IP&gt;</td>
<td>not &lt;IP&gt;]</td>
</tr>
<tr>
<td>wireless</td>
<td>Displays wireless configuration parameters</td>
</tr>
<tr>
<td>client</td>
<td>Displays client information based on the parameters passed</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>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>filter IP [&lt;IP&gt;</td>
<td>not &lt;IP&gt;]</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>`show wireless client {filter} {state [data-ready</td>
<td>not [data-ready</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code></td>
<td>Optional. Displays selected wireless client information on a specified device or RF Domain.</td>
</tr>
<tr>
<td>`show wireless client {filter} {wlan [&lt;WLAN-NAME&gt;</td>
<td>not &lt;WLAN-NAME&gt;]}`</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code></td>
<td>Optional. Filters clients on a specified WLAN.</td>
</tr>
<tr>
<td>`show wireless client {statistics} {detail &lt;MAC&gt;</td>
<td>rf</td>
</tr>
<tr>
<td><code>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</code></td>
<td>Optional. Displays detailed client statistics on a specified device or RF Domain.</td>
</tr>
</tbody>
</table>

The following keyword is common to the 'IP' and 'not IP' parameters:
- `on <DEVICE-OR-DOMAIN-NAME>` – Optional. Displays selected client details on a specified device or RF Domain.

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.
<table>
<thead>
<tr>
<th>SHOW COMMANDS 6 - 123</th>
</tr>
</thead>
</table>
| **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 |
| **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. |
| **on <DEVICE-OR-DOMAIN-NAME>** | The following keyword is recursive and common to the `tspec <MAC>` parameter:  
  - **on <DEVICE-OR-DOMAIN-NAME>** – Optional. Displays detailed TSPEC information for wireless 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 |
| **show wireless client {include-ipv6} {detail <MAC>} {(on <DEVICE-OR-DOMAIN-NAME>)}** |
| **wireless** | Displays wireless configuration parameters |
| **client** | Displays client information based on the parameters passed |
| **include-ipv6** | Includes IPv6 address (if known) of wireless clients |
| **detail <MAC>** | Optional. Displays detailed wireless client(s) information  
  - **<MAC>** – Optional. Displays detailed information for a specified wireless client. Specify the MAC address of the client. |
| **on <DEVICE-OR-DOMAIN-NAME>** | The following keyword is recursive and common to the `detail <MAC>` parameter:  
  - **on <DEVICE-OR-DOMAIN-NAME>** – Optional. Displays detailed 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 client {include-ipv6} {filter {ip|ipv6|state|wlan}}** |
| **wireless** | Displays wireless configuration parameters |
| **client** | Displays wireless client information based on the parameters passed |
| **include-ipv6 {filter}** | Optional. Includes IPv6 address (if known) of wireless clients  
  - **filter** – Optional. Defines additional filters. Use one of the following options to filter clients: ip, ipv6, state, and wlan  
  **Note:** By default the system only displays the IPv4 address of clients. The `include-ipv6` parameter includes the known IPv6 address of each client. |
show wireless meshpoint

- `show wireless meshpoint`
  - `detail `<MESHPOINT-NAME>`
    Optional. Displays detailed information for all meshpoints or a specified meshpoint
    - `<MESHPOINT-NAME>` – Optional. Displays detailed information for a specified meshpoint. Specify the meshpoint name.

- `show wireless meshpoint {multicast|path|proxy|root|security|statistics} [on `<DEVICE-OR-DOMAIN-NAME>`]`
  Optional. Displays meshpoint multicast, path, proxy, root, security, and statistics information

- `show wireless meshpoint {config} {filter [device `<DEVICE-NAME>`|rf-domain `<DOMAIN-NAME>`]}`
  Optional. Provides additional filter options, such as device name and RF Domain name.
    - `<DEVICE-NAME>` – Displays meshpoints applied to a specified device
    - `<DEVICE-NAME>` – Specify the device name
    - `<DOMAIN-NAME>` – Displays meshpoints applied to a specified RF Domain
    - `<DOMAIN-NAME>` – Specify the domain name

- `show wireless meshpoint {config} {filter [device `<DEVICE-NAME>`|rf-domain `<DOMAIN-NAME>`]}`
  Optional. Displays meshpoint configuration parameters
<table>
<thead>
<tr>
<th>proxy</th>
<th>Optional. Displays meshpoint proxy information</th>
</tr>
</thead>
<tbody>
<tr>
<td>root</td>
<td>Optional. Displays meshpoint root information</td>
</tr>
<tr>
<td>security</td>
<td>Optional. Displays meshpoint security information</td>
</tr>
<tr>
<td>statistics</td>
<td>Optional. Displays meshpoint statistics</td>
</tr>
</tbody>
</table>
| [<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. |

• show wireless meshpoint `{neighbor} [<MESHPOINT-NAME]|detail|statistics `{rf}`  
  {on <DEVICE-OR-DOMAIN-NAME>}

| wireless | Displays wireless configuration parameters |
| neighbor | Optional. Displays meshpoint neighbor information, based on the parameters passed |
| [<MESHPOINT-NAME>| detail|statistics `{rf}`] | Select one of the following parameter to view neighbor related information  
  • `<MESHPOINT-NAME>` – Displays detailed multicast information for a specified meshpoint. Specify the meshpoint name.  
  • `detail` – Displays detailed multicast information for all meshpoints  
  • `statistics` – Displays neighbors related statistics  
  • `rf` – Optional. Displays RF related statistics for neighbors |
| on <DEVICE-OR-DOMAIN-NAME> | The following keyword is common to all of the above parameters:  
  • `on <DEVICE-OR-DOMAIN-NAME>` – Optional. Displays meshpoint neighbor information, based on the parameters passed, on a specified device or RF Domain. |

• show wireless meshpoint `{tree}`  
  {on <DEVICE-OR-DOMAIN-NAME>}

| wireless | Displays wireless configuration parameters |
| meshpoint | Displays meshpoint related information  
  **Note:** The show > wireless > meshpoint > tree command can be executed only from a wireless controller. |
| tree | Optional. Displays meshpoint network tree |
| on <DEVICE-OR-DOMAIN-NAME> | Optional. Displays meshpoint network tree on a specified device or RF Domain  
  • `<DEVICE-OR-DOMAIN-NAME>` – Optional. Specify the name of AP, wireless controller, service platform, or RF Domain |

• show wireless meshpoint `{usage-mappings|on <DEVICE-OR-DOMAIN-NAME>}`

| wireless | Displays wireless configuration parameters |
| meshpoint | Displays meshpoint related information |


<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show wireless mobility-database {on &lt;DEVICE-NAME&gt;}</td>
<td>Displays controller-assisted mobility database</td>
</tr>
<tr>
<td>show wireless radio {detail} {&lt;DEVICE-NAME&gt; {&lt;1-3&gt;</td>
<td>filter</td>
</tr>
<tr>
<td>show wireless radio {detail} {filter &lt;RADIO-MAC&gt;} {(on &lt;DEVICE-OR-DOMAIN-NAME&gt;)}</td>
<td>Displays detailed radio operation status for all or a specified device or RF Domain.</td>
</tr>
</tbody>
</table>

- **usgae-mappings**: Optional. Lists all devices and profiles using the meshpoint.
- **on <DEVICE-OR-DOMAIN-NAME>**: Optional. Displays meshpoint applied to a specified device or RF Domain.
  - **<DEVICE-OR-DOMAIN-NAME>**: Optional. Specify the name of AP, wireless controller, service platform, or RF Domain.
- **show wireless mobility-database {on <DEVICE-NAME>}**
- **wireless**: Displays wireless configuration parameters.
- **mobility-database**: Displays controller-assisted mobility database.
- **on <DEVICE-OR-DOMAIN-NAME>**: The following keyword is recursive and common to the ‘filter <RADIO-MAC>’ parameter:
  - **<DEVICE-OR-DOMAIN-NAME>**: Optional. Displays detailed radio operation status for all or a specified device or RF Domain.
- **show wireless radio {detail} {<DEVICE-NAME> {<1-3>|filter|on}}**
- **wireless**: Displays wireless configuration parameters.
- **radio**: Displays radio operation status and other related information.
- **detail**: Optional. Displays detailed radio operation status.
- **<DEVICE-NAME>**: 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.
- **<1-3>**: Optional. Specify the radio interface index from 1 - 3 (if not specified as part of the radio ID).
- **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 radio {detail} {filter <RADIO-MAC>} {(on <DEVICE-OR-DOMAIN-NAME>)}**
- **wireless**: Displays wireless configuration parameters.
- **radio**: Displays radio operation status and other related information.
- **detail**: Optional. Displays detailed radio operation status.
- **filter <RADIO-MAC>**: Optional. Provides additional filter options
  - **<RADIO-MAC>**: Uses MAC address to filter radios.
- **on <DEVICE-OR-DOMAIN-NAME>**: The following keyword is recursive and common to the ‘filter <RADIO-MAC>’ parameter:
  - **<DEVICE-OR-DOMAIN-NAME>**: Optional. Displays detailed radio operation status for all or a specified device or RF Domain.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show wireless radio {statistics} {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td>Displays wireless configuration parameters</td>
</tr>
<tr>
<td>rf {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td>Displays radio operation status and other related information</td>
</tr>
<tr>
<td>statistics</td>
<td>Optional. Displays radio traffic and RF statistics</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. Displays traffic and RF related statistics on a specified device or RF Domain</td>
</tr>
<tr>
<td>rf {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td>Optional. Displays RF statistics on a specified device or RF Domain</td>
</tr>
<tr>
<td>show wireless radio {statistics} {detail</td>
<td>window-data} {&lt;DEVICE-NAME&gt;} {&lt;1-3&gt;} filter &lt;RADIO-MAC&gt; {on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</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</td>
</tr>
<tr>
<td>statistics</td>
<td>Optional. Displays radio traffic and RF statistics. Use additional filters to view specific details. The options are:</td>
</tr>
<tr>
<td>detail</td>
<td>Displays detailed traffic and RF statistics of all radios</td>
</tr>
<tr>
<td>window-data</td>
<td>Displays historical data over a time window</td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt; {&lt;1-3&gt;}</td>
<td>The following keywords are common to the ‘detail’ and ‘window-data’ parameters:</td>
</tr>
<tr>
<td>filter &lt;RADIO-MAC&gt;</td>
<td>Optional. Provides additional filters</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>Optional. After specifying the MAC address, further refine the search by specifying a device or RF Domain.</td>
</tr>
<tr>
<td>show wireless radio {tspec} {&lt;DEVICE-NAME&gt;</td>
<td>filter</td>
</tr>
<tr>
<td>&lt;DEVICE-NAME&gt;</td>
<td>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.</td>
</tr>
<tr>
<td>option</td>
<td>}</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>show wireless regulatory [channel-info &lt;WORD&gt;</td>
<td>county-code &lt;WORD&gt;]</td>
</tr>
<tr>
<td>wireless</td>
<td>Displays wireless configuration parameters</td>
</tr>
<tr>
<td>regulatory</td>
<td>Displays wireless regulatory information</td>
</tr>
<tr>
<td>device-type [ap300</td>
<td>ap621</td>
</tr>
<tr>
<td>AP300</td>
<td>Displays AP300 information</td>
</tr>
<tr>
<td>AP621</td>
<td>Displays AP621 information</td>
</tr>
<tr>
<td>AP622</td>
<td>Displays AP622 information</td>
</tr>
<tr>
<td>AP650</td>
<td>Displays AP650 information</td>
</tr>
<tr>
<td>AP6511</td>
<td>Displays AP6511 information</td>
</tr>
<tr>
<td>AP6521</td>
<td>Displays AP6521 information</td>
</tr>
<tr>
<td>AP6522</td>
<td>Displays AP6522 information</td>
</tr>
<tr>
<td>AP6532</td>
<td>Displays AP6532 information</td>
</tr>
<tr>
<td>AP6562</td>
<td>Displays AP6562 information</td>
</tr>
<tr>
<td>AP7131</td>
<td>Displays AP7131 information</td>
</tr>
<tr>
<td>AP7161</td>
<td>Displays AP7161 information</td>
</tr>
<tr>
<td>AP7181</td>
<td>Displays AP7181 information</td>
</tr>
<tr>
<td>AP71XX</td>
<td>Displays AP71XX information</td>
</tr>
<tr>
<td>AP81XX</td>
<td>Displays AP81XX information</td>
</tr>
<tr>
<td>AP82XX</td>
<td>Displays AP82XX information</td>
</tr>
<tr>
<td>RFS4000</td>
<td>Displays RFS4000 information</td>
</tr>
<tr>
<td>RFS6000</td>
<td>Displays RFS6000 information</td>
</tr>
<tr>
<td>RFS7000</td>
<td>Displays RFS7000 information</td>
</tr>
<tr>
<td>The following keyword is common to all of the above:</td>
<td></td>
</tr>
<tr>
<td>&lt;WORD&gt;</td>
<td>Specify the two letter ISO-3166 country code.</td>
</tr>
</tbody>
</table>
- `show wireless rf-domain statistics {detail} {on <DEVICE-OR-DOMAIN-NAME>}`

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>rf-domain statistics</td>
<td>Displays RF Domain statistics</td>
</tr>
<tr>
<td>details</td>
<td>Optional. Displays detailed RF Domain statistics</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>The following keyword is recursive and common to the ‘detail’ parameter:</td>
</tr>
<tr>
<td></td>
<td>- on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays RF Domain statistics 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 sensor-server {on <DEVICE-OR-DOMAIN-NAME>}`

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>sensor-server</td>
<td>Displays AirDefense sensor server configuration details</td>
</tr>
<tr>
<td>{on &lt;DEVICE-OR-DOMAIN-NAME&gt;}</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays AirDefense sensor server configuration on a specified device or RF Domain</td>
</tr>
</tbody>
</table>

- `show wireless unsanctioned aps {detailed|statistics} {on <DEVICE-OR-DOMAIN-NAME>}`

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>unsanctioned aps</td>
<td>Displays unauthorized APs. Use additional filters to view specific details.</td>
</tr>
<tr>
<td>detailed</td>
<td>Optional. Displays detailed unauthorized APs information</td>
</tr>
<tr>
<td>statistics</td>
<td>Optional. Displays channel statistics</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>The following keyword is common to the ‘detailed’ and ‘statistics’ parameters:</td>
</tr>
<tr>
<td></td>
<td>- on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

- `show wireless wips [client-blacklist|event-history] {on <DEVICE-OR-DOMAIN-NAME>}`

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>wips [client-blacklist</td>
<td>event-history]</td>
</tr>
<tr>
<td></td>
<td>- client-blacklist – Displays blacklisted clients</td>
</tr>
<tr>
<td></td>
<td>- event-history – Displays event history</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>The following keyword is common to the ‘client-blacklist’ and ‘event-history’ parameters:</td>
</tr>
<tr>
<td></td>
<td>- on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Specify the name of the AP, wireless controller, service platform, or RF Domain.</td>
</tr>
</tbody>
</table>

- `show wlan {detail <WLAN>|on <DEVICE-OR-DOMAIN-NAME>|policy-mappings|usage-mappings}`

<table>
<thead>
<tr>
<th>wireless</th>
<th>Displays wireless configuration parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>wlan</td>
<td>Displays WLAN related information based on the parameters passed</td>
</tr>
<tr>
<td>detail &lt;WLAN&gt;</td>
<td>Optional. Displays WLAN configuration</td>
</tr>
<tr>
<td></td>
<td>- &lt;WLAN&gt; – Specify the WLAN name.</td>
</tr>
</tbody>
</table>
### Usage Guidelines

The customize command enables you to customize the `show > wireless` command output.

```plaintext
rfs7000-37FABE(config)#customize ?
hostname-column-width Customize hostname column width
show-adoption-status Customize the output of (show adoption status) 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-legacy-mesh-client-stats-detail Customize the output of (show wireless mint client stats detail) command
show-wireless-legacy-mesh-client-stats-rf Customize the output of (show wireless mint client stats rf) command
show-wireless-meshpoint Customize the output of (show wireless meshpoint) command
```
The default setting for the `show > wireless > client` command is as follows:

```
rfs7000-37FABE(config)#show wireless client

+-----------------+---------+-----------+-----------+-----------------+-------+
| MAC             | IP      | VENDOR    | VLAN      | RADIO-ID        | STATE |
|-----------------+---------+-----------+-----------+-----------------+-------+
|                 |         |           |           |                 |       |
+-----------------+---------+-----------+-----------+-----------------+-------+

Total number of wireless clients displayed: 0
```

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 wlan radio-id state wlan location radio-alias radio-type
rfs7000-37FABE(config)#commit
```

```
rfs7000-37FABE(config)#show wireless client

+-----------------+---------+-----------+-----------+-----------------+-------+
| MAC             | IP      | VENDOR    | VLAN      | RADIO-ID        | STATE |
| AP-LOCATION     | RADIO   | RADIO     | RADIO-TYPE|                 |       |
+-----------------+---------+-----------+-----------+-----------------+-------+
|                 |         |           |           |                 |       |
+-----------------+---------+-----------+-----------+-----------------+-------+

Total number of wireless clients displayed: 0
```

For more information on the `customize` command, see `customize on page 4-91`.

**Examples**

```
rfs7000-37FABE(config)#show wireless wips mu-blacklist
No mobile units blacklisted
```

```
rfs7000-37FABE(config)#show wireless wlan config

+--------+---------+-------+----------+-----------------+-------+
| NAME   | ENABLE  | SSID  | ENCRYPTION| AUTHENTICATION  | VLAN  |
|--------+---------+-------+----------+-----------------+-------+
| test   | Y       | test   | none     | none            | 1     |
| motorola | Y    | motorola | none     | none            | 1     |
| wlan1  | Y       | wlan1 | none     | none            | 1     |
```
rfs7000-37FABE(config)#show wireless wlan statistics
+---------------------+----------+----------+--------+--------+--------+--+
|         WLAN        | TX BYTES | RX BYTES |TX PKTS |RX PKTS |TX KBPS |RX KBPS |DROPPED |
| ERRORS |
+---------------------+----------+----------+--------+--------+--------+--+
|            motorola |        0 |        0 |      0 |      0 |      0 |      0 |      0 |      0 |
|               wlan1 |        0 |        0 |      0 |      0 |      0 |      0 |      0 |      0 |
+---------------------+----------+----------+--------+--------+--------+--+
Total number of wlan displayed: 2
rfs7000-37FABE(config)#
rfs7000-37FABE(config)#show wireless regulatory channel-info 1
Center frequency for channel 1 is 2412MHz
rfs7000-37FABE(config)#
rfs7000-37FABE(config)#show wireless regulatory country-code
ISO CODE                       NAME
------------------------------------------------------------
al                           Algeria
ai                           Anguilla
ar                           Argentina
au                           Australia
at                           Austria
bs                           Bahamas
bh                           Bahrain
bb                           Barbados
by                           Belarus
be                           Belgium
bm                           Bermuda

rfs7000-37FABE(config)#
rfs7000-37FABE(config)#show wireless regulatory device-type ap650 in
---------------------------------------------------------------------------------------
#  Channel Set Power(mW) Power (dBm)    Placement          DFS       CAC(mins)        TPC
---------------------------------------------------------------------------------------
1   1-13        1000      30          Indoor/Outdoor   NA             NA        NA
2   36-64       200       23          Indoor           Not Required   0         Not Required
3   149-165     1000      30          Outdoor          Not Required   0         Not Required
4   149-165     200       23          Indoor           Not Required   0         Not Required
---------------------------------------------------------------------------------------
rfs7000-37FABE(config)#
rfs7000-37FABE(config)#show wireless ap detail
AP: 00-23-68-22-9D-58
AP Name              : rfs4000-229D58
Location             : default
RF-Domain            : default
Type                 : rfs4000
Model                : RFS-4010-00010-WR
IP                   : 192.168.0.1
Num of radios        : 0
Num of clients       : 0
Last Smart-RF time   : not done
Stats update mode    : auto
Stats interval       : 31
Radio Modes          :
                    radio-1 : None
Country-code         : not-set
Site-Survivable      : True
Last error           :
Fault Detected       : False

AP: B4-C7-99-58-72-58
AP Name              : ap5142-587258
Location             : default
RF-Domain            : default
Type: ap5142
Model: AP-5142-66040-WR
IP: 192.168.13.24
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: not-set
Site-Survivable: True
Last error:
Fault Detected: False

AP: B4-C7-99-71-17-28
AP Name: ap8132-711728
Location: default
RF-Domain: default
Type: ap81xx
Model: AP-8132-66040-US
IP: 192.168.13.25
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: not-set
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: 3

rfs7000-6DCD4B(config)#

rfs4000-229D58(config)#show wireless ap load-balancing on default/rfs4000-229D58

AP: 00-23-68-11-E6-C4
Client requests on 5ghz: allowed
Client requests on 2.4ghz: allowed

Average AP load in neighborhood: 0 %
Load on this AP: 0 %
Total 2.4ghz band load in neighborhood: 0 %
Total 5ghz band load in neighborhood: 0 %
Configured band ratio 2.4ghz to 5ghz: 1:1
Current band ratio 2.4ghz to 5ghz: 0:0
Average 2.4ghz channel load in neighborhood: 0 %
Average 5ghz channel load in neighborhood: 0 %
Load on this AP's 2.4ghz channel: 0 %
Load on this AP's 5ghz channel: 0 %

Total number of APs displayed: 1
rfs4000-229D58(config)#
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
0 192.168.2.136 ::
ap6522-57F674 TechPubs.. B4-C7-99-57-F6-74 2 W-W
0 192.168.2.214 ::

------------------------------------------------------------------
------------------------------------------------------------------
------------------------------------------------------------------
------------------------------------------------------------------

Total number of APs displayed: 2
rfs6000-6DB5D4#

rfs4000-1B3596#show wireless meshpoint tree
1: c00466 [5 MPs(3 roots, 2 bound)]
| - ap7131-96FAAC
|   | - ap7131-96F998
|   | - ap7131-96F6B4
| - 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#

rfs4000-1B3596#show wireless meshpoint

MESH NEXT 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
c00466 ap7131-96FAAC 0 YES YES N/A N/A
A N/A
A N/A
c00466 ap7131-96F6B4 2 NO NO ap7131-96FAAC 1
days 02:01:31 ap7131-96FAAC 1 days 02:01:31

Total number of meshpoint displayed: 3
rfs4000-1B3596#

ap6532-000001#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 commands 6 - 135

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>Fixed 00-23-68-00-00-01:R2 Enabled</td>
<td>00-23-68-30-07-82.00-23-68-30-F8-F0</td>
<td>00-23-68-2E-97-60</td>
<td>115 1</td>
<td></td>
</tr>
<tr>
<td>Root 00-23-68-00-00-01:R2 Enabled</td>
<td>00-23-68-2E-AB-50.00-23-68-2E-AB-50</td>
<td>00-23-68-2E-97-60</td>
<td>92 0</td>
<td></td>
</tr>
</tbody>
</table>

Total number of meshpoint displayed: 1

ap6532-000001#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</td>
<td>Permanent</td>
<td>101</td>
<td>180654310</td>
</tr>
<tr>
<td>00-1E-E5-A6-66-E2</td>
<td>ap6532-000001</td>
<td>00-23-68-2E-64-B2</td>
<td>Untimed</td>
<td>103</td>
<td>231920</td>
</tr>
</tbody>
</table>

Total number of meshpoint displayed: 1

ap6532-000001#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

ap6532-000001#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>Metric</th>
<th>Timeout Path-Timeout Sequence</th>
<th>MiNT ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>23847 86.31.19.58</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>23847 86.31.19.58</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>3481 86.31.1A.50</td>
<td></td>
</tr>
</tbody>
</table>

ap6532-000001#```
rfs4000-22A24E#show wireless client

Report start on RF-Domain: qsl
MAC IP VENDOR RADIO-ID WLAN VLAN STATE
---------------------------------------------------------------------------------------
00-01-02-03-04-10 2.3.4.16 3Com Corp 00-01-02-03-04-00:R1 sim-wlan-1 1 Data-Ready
00-01-02-03-05-10 2.3.5.16 3Com Corp 00-01-02-03-04-00:R2 sim-wlan-1 1 Data-Ready

Report end on RF-Domain: qsl
---------------------------------------------------------------------------------------

Report start on RF-Domain: Store-1
MAC IP VENDOR RADIO-ID WLAN VLAN STATE
---------------------------------------------------------------------------------------
00-01-02-03-04-10 2.3.4.16 3Com Corp 00-01-02-03-04-00:R1 sim-wlan-1 1 Data-Ready
00-01-02-03-05-10 2.3.5.16 3Com Corp 00-01-02-03-04-00:R2 sim-wlan-1 1 Data-Ready

Report end on RF-Domain: Store-1
---------------------------------------------------------------------------------------

Report start on RF-Domain: default
  database not available
Report end on RF-Domain: default
---------------------------------------------------------------------------------------

Total number of clients displayed: 2
rfs4000-22A24E#
### 6.1.63 wwan

> **show commands**

Displays wireless WAN status

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show wwan {configuration|status} {on <DEVICE-OR-DOMAIN-NAME>}
```

**Parameters**

- `show wwan {configuration|status} {on <DEVICE-OR-DOMAIN-NAME>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wwan</td>
<td>Displays wireless WAN configuration and status details</td>
</tr>
<tr>
<td>configuration</td>
<td>Displays wireless WAN configuration information</td>
</tr>
<tr>
<td>status</td>
<td>Displays wireless WAN status information</td>
</tr>
<tr>
<td>on &lt;DEVICE-OR-DOMAIN-NAME&gt;</td>
<td>The following keyword is common to the ‘configuration’ and ‘status’ parameters:</td>
</tr>
<tr>
<td></td>
<td>• on &lt;DEVICE-OR-DOMAIN-NAME&gt; – Optional. Displays configuration or status details on a specified device or RF Domain</td>
</tr>
</tbody>
</table>

**Examples**

```
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)#

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                    |
+-------------------------------------------
rfs4000-229D58(config-device-00-23-68-22-9D-58)#

rfs7000-37FABE(config)#show wwan configuration
>>> WWAN Configuration:
+-------------------------------------------
| Access Port Name : None                   |
| User Name        : None                    |
+-------------------------------------------
rfs7000-37FABE(config)#
```
### 6.1.64 slot

- **show commands**

Displays *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`

**Examples**

```
nx4500-5CFA2B>show slot
----------------------------
  SLOT  TYPE   MODULE   STATUS
----------------------------
  1    []    wing     Enabled
  2    []    wing     Enabled
  3    []    wing     Enabled
  4    []    wing     Enabled
----------------------------
nx4500-5CFA2B>
```

<table>
<thead>
<tr>
<th><code>show slot</code></th>
<th>Shows PCI express card statistics</th>
</tr>
</thead>
</table>

* nx4500-5CFA2B*
6.1.65 **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, 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>smart-cache</td>
<td>Displays smart-cache related information</td>
</tr>
<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>Displays smart-cache related information on a specified device</td>
</tr>
</tbody>
</table>

**Examples**

```
x4500-5CFA2B>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.

<table>
<thead>
<tr>
<th>DURATION</th>
<th>DATA (KB)</th>
<th>BANDWIDTH (Kbps)</th>
<th>REQUESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOTAL</td>
<td>CACHE</td>
<td>WAN</td>
</tr>
<tr>
<td>Since boot</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

nx4500-5CFA2B>nx4500-5CFA2B(config)#show smart-cache statistics content-type

<table>
<thead>
<tr>
<th>DURATION</th>
<th>VIDEO (KB)</th>
<th>AUDIO (KB)</th>
<th>IMAGE (KB)</th>
<th>TEXT (KB)</th>
<th>OTHERS (KB)</th>
<th>CACHE</th>
<th>TOTAL</th>
<th>CACHE</th>
<th>TOTAL</th>
<th>CACHE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Since boot</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
```

---
nx4500-5CFA2B(config)#

nx4500-5CFA2B#show smart-cache storage
-------------------------------------
USED    TOTAL      USAGE
-------------------------------------
 0 MB   DISABLED   DISABLED
-------------------------------------

nx4500-5CFA2B#
### 6.1.66 virtual-machine

- **show commands**

Displays the virtual-machine (VM) configuration, logs, and statistics

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524, 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}
```

```
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**

- **show virtual-machine [configuration|statistics] {<VM-NAME>|adsp|team-cmt} {on <DEVICE-NAME>}**

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Description</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>
</tbody>
</table>

- `<VM-NAME>` is optional. Displays VM configuration or statistics for the virtual machine identified by the `<VM-NAME>` keyword. Specify the VM name.

- team-urc is optional. Displays TEAM-URC (IP-PBX) VM configuration/statistics.

- team-rls is optional. Displays TEAM-RLS (Radio Link Server) VM configuration/statistics.

- team-vowlan is 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>` specifies the name of the device on which the command is executed.

- `<DEVICE-NAME>` is optional. Specify the name of the service platform.

- **show virtual-machine [configuration|statistics] {<VM-NAME>|adsp|team-cmt} {on <DEVICE-NAME>}**
| `<VM-NAME>|adsp|team-cmt` | 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. |
| `on <DEVICE-NAME>` | Specifies the name of the device on which the command is executed  
- `<DEVICE-NAME>` – Specify the name of the service platform. |
| ***show virtual-machine debugging {level[debug|error|info|warning]} {on <DEVICE-NAME>}*** | Displays VM logs  
- **level** [debug|error|info|warning] – 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.  
- `<DEVICE-NAME>` – Specify the name of the service platform. |
| ***show virtual-machine export <VM-NAME> {on <DEVICE-NAME>}*** | Displays VM configuration export related information  
- `<VM-NAME>` – 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  
- `<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/moto/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-10c1aeb0a170
    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 statistics
--------------------------------------------------------------------------------
NAME         STATE       VCPUS MEM (MB)   BRIDGE-IF           IP
--------------------------------------------------------------------------------
WiNG             -                 4     1009     -               -
team-rls      (not_installed)   -     -        -              -
team-urc      Running           1     1200     eth0 (vmif2)   192.168.13.103
team-vowlan   (not_installed)   -     -        -              -
--------------------------------------------------------------------------------
x4500-5CFA2B#

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    -     -        unknown         -
team-cmt         Halted    -     -        unknown         -
--------------------------------------------------------------------------------
x9500-6C874D#

nx9500-6C874D#show virtual-machine configuration
--------------------------------------------------------------------------------
NAME               AUTOSTART         MEMORY(MB)          VCPUS
--------------------------------------------------------------------------------
WiNG                     -                 18432              -
adsp                     ignore            12000              12
 team-cmt                 ignore            1024               1
--------------------------------------------------------------------------------
x9500-6C874D#
nx9500-6C874D>show virtual-machine statistics adsp
VM name: adsp
Base Version : unknown
Install Status : not_installed
nx9500-6C874D>
6.1.67 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>show 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#
6.1.68 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>show raid {on &lt;DEVICE-NAME&gt;}</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></td>
<td>• &lt;DEVICE-NAME&gt; — 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.

The system maintains a couple of default profiles. The default profile is automatically applied to service platforms and wireless controllers. The default AP profile is applied to an AP automatically discovered by a wireless controller or service platform. After adoption, if a change is made in one of the parameters in the profile, it is 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 are manually created for each supported service platform, wireless controller, and access point model. User-defined profiles are 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
- AP81XX – Adds an AP81XX access point profile supporting the AP8122 and AP8132 models
- AP82XX – Adds an AP82XX access point profile supporting the AP8222 and AP8232 models
- 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
- NX65XX – Adds an NX65XX series service platform profile supporting the NX6500 and NX6524 models
- NX9XXX – Adds an NX9XXX series service platform profile supporting the NX9000, NX9500, and NX9510 models
- 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

To view the list of device profiles supported, use the following command:

```
<DEVICE>(config)#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
ap81xx      AP81XX access point profile
ap82xx      AP82XX access point profile
containing Specify profiles that contain a sub-string in the profile name
filter     Specify addition selection filter
nx45xx      NX45XX integrated services platform profile
nx65xx      NX65XX integrated services platform profile
nx9000      NX9000 wireless controller profile
```
The following example shows the commands specific to a NX45XX and NX65XX series service platform profile:

```
nx4500-5CFA2B(config)#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
ap81xx       AP81XX access point profile
ap82xx       AP82XX access point profile
containing    Specify profiles that contain a sub-string in the profile name
filter       Specify addition selection filter
nx45xx       NX45XX integrated services platform profile
nx65xx       NX65XX integrated services platform profile
rfs4000      RFS4000 wireless controller profile
rfs6000      RFS6000 wireless controller profile
rfs7000      RFS7000 wireless controller profile
t5           T5 wireless controller profile
<cr>
nx4500-5CFA2B(config)#
```

Use centralized auto-provisioning policy when adopted by another controller

- **alias**
- **analytics**
- **ap300**
- **area**
- **arp**
- **auto-learn-staging-config**
- **autogen-uniqueid**
- **autoinstall**
- **bridge**
- **captive-portal**
- **cdp**
- **cluster**
- **configuration-persistence**
- **controller**
- **critical-resource**
- **crypto**
<table>
<thead>
<tr>
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<td>device-upgrade</td>
<td>Device firmware upgrade</td>
</tr>
<tr>
<td>dot1x</td>
<td>Configure IP DSCP to 802.1p priority mapping for untagged frames</td>
</tr>
<tr>
<td>dscp-mapping</td>
<td>Configure IP DSCP to 802.1p priority mapping for untagged frames</td>
</tr>
<tr>
<td>email-notification</td>
<td>Email notification configuration</td>
</tr>
<tr>
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</tr>
<tr>
<td>environmental-sensor</td>
<td>Environmental Sensors Configuration</td>
</tr>
<tr>
<td>events</td>
<td>System event messages</td>
</tr>
<tr>
<td>export</td>
<td>Export a file</td>
</tr>
<tr>
<td>floor</td>
<td>Set the floor within a area where the system is located</td>
</tr>
<tr>
<td>gre</td>
<td>GRE protocol</td>
</tr>
<tr>
<td>http-analyze</td>
<td>Specify HTTP-Analysis configuration</td>
</tr>
<tr>
<td>interface</td>
<td>Select an interface to configure</td>
</tr>
<tr>
<td>ip</td>
<td>Internet Protocol (IP)</td>
</tr>
<tr>
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<td>Internet Protocol version 6 (IPv6)</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>L2tpv3 protocol</td>
</tr>
<tr>
<td>l3e-lite-table</td>
<td>L3e lite Table</td>
</tr>
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<td>led</td>
<td>Turn LEDs on/off on the device</td>
</tr>
<tr>
<td>led-timeout</td>
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</tr>
<tr>
<td>legacy-auto-downgrade</td>
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<td>MAC Address Table</td>
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</tr>
<tr>
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<tr>
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<td>min-misconfiguration-recovery-time</td>
<td>Check controller connectivity after configuration is received</td>
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<td>mint</td>
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</tr>
<tr>
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<td>Check controller connectivity after configuration is received</td>
</tr>
<tr>
<td>neighbor-inactivity-timeout</td>
<td>Configure neighbor inactivity timeout</td>
</tr>
<tr>
<td>neighbor-info-interval</td>
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</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
</tr>
<tr>
<td>noc</td>
<td>Configure the noc related setting</td>
</tr>
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<tr>
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<tr>
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</tr>
<tr>
<td>raid</td>
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<td>rf-domain-manager</td>
<td>RF Domain Manager</td>
</tr>
<tr>
<td>router</td>
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</tr>
<tr>
<td>slot</td>
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</tr>
<tr>
<td>spanning-tree</td>
<td>Spanning tree</td>
</tr>
<tr>
<td>traffic-class-mapping</td>
<td>Configure IPv6 traffic class to 802.1p priority mapping for</td>
</tr>
</tbody>
</table>
untagged frames

Tunnel Controller group this controller belongs to

Set setting to use

VRRP configuration

Publish interface via OSPF/BGP only if the interface VRRP state is not BACKUP

Enable support for 802.11 WEP shared key authentication

Clears the display screen

Commit all changes made in this session

Run commands from Exec mode

End current mode and change to EXEC mode

End current mode and down to previous mode

Description of the interactive help system

Revert changes

Service Commands

Show running system information

Write running configuration to memory or terminal

Select an interface to configure

Internet Protocol (IP)

Negate a command or set its defaults

Configure NTP

Set setting to use

Clears the display screen

Commit all changes made in this session

Run commands from Exec mode

End current mode and change to EXEC mode

End current mode and down to previous mode

Description of the interactive help system

Revert changes

Service Commands

Show running system information

Write running configuration to memory or terminal
### 7.1 Profile Config Commands

Table 7.1 summarizes profile configuration commands.

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<td>Enables the use of a centralized auto provisioning policy on this profile</td>
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<td>Configures network, network-group, network-service, VLAN, and string aliases on this profile</td>
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<tr>
<td>analytics</td>
<td>Enables analytics in the NX9000 profile/device configuration context</td>
<td>page 7-17</td>
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<td>Enables adoption of AP300s</td>
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<td>Sets the system’s area of location (the area name)</td>
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<td>arp</td>
<td>Configures static address resolution protocol</td>
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<tr>
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<td>Enables network configuration learning of devices</td>
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<td>Configures bridge specific parameters</td>
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<td>Enables Cisco Discovery Protocol (CDP) on a device</td>
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<td>Configures a cluster name</td>
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<td>Enables persistence of configuration across reloads</td>
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<td>Configures a wireless controller or service platform</td>
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<td><strong>Description</strong></td>
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</tr>
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<td>environmental-sensor</td>
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<tr>
<td>events</td>
<td>Displays system event messages</td>
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</tr>
<tr>
<td>export</td>
<td>Enables export of startup.log file after every boot</td>
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<tr>
<td>floor</td>
<td>Sets the floor name where the system is located</td>
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<td>gre</td>
<td>Enables Generic Routing Encapsulation (GRE) tunneling on this profile</td>
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<td>http-analyze</td>
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<tr>
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<tr>
<td>led</td>
<td>Turns device LEDs on or off</td>
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<td>led-timeout</td>
<td>Configures LED-timeout timer. This command is specific to the NX9000 series service platforms.</td>
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<td>Auto upgrades a legacy device firmware</td>
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<td>lldp</td>
<td>Configures Link Layer Discovery Protocol (LLDP)</td>
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<td>Configures meshpoint monitoring interval</td>
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<tr>
<td>Command</td>
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<td>Reference</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>
<td>mint</td>
<td>Configures MiNT protocol</td>
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<tr>
<td>misconfiguration-recovery-time</td>
<td>Verifies device connectivity after a configuration is received</td>
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<tr>
<td>neighbor-inactivity-timeout</td>
<td>Configures neighbor inactivity timeout</td>
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<tr>
<td>neighbor-info-interval</td>
<td>Configures neighbor information exchange interval</td>
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</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 7-364</td>
</tr>
<tr>
<td>noc</td>
<td>Configures NOC settings</td>
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</tr>
<tr>
<td>ntp</td>
<td>Configures an NTP server</td>
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<tr>
<td>offline-duration</td>
<td>Sets the duration, in minutes, for which a device remains unadopted before it generates offline event</td>
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<tr>
<td>power-config</td>
<td>Configures the power mode</td>
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<td>preferred-controller-group</td>
<td>Specifies the wireless controller or service platform group preferred for adoption</td>
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<td>preferred-tunnel-controller</td>
<td>Configures the tunnel wireless controller or service platform preferred by the system to tunnel extended VLAN traffic</td>
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<tr>
<td>radius</td>
<td>Configures device-level RADIUS authentication parameters</td>
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<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>
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<tr>
<td>rf-domain-manager</td>
<td>Enables RF Domain manager</td>
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<tr>
<td>router</td>
<td>Configures dynamic router protocol settings</td>
<td>page 7-379</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Configures spanning tree commands</td>
<td>page 7-381</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>
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<tr>
<td>tunnel-controller</td>
<td>Configures the name of tunneled WLAN (extended VLAN) wireless controller or service platform</td>
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<tr>
<td>use</td>
<td>Uses pre configured policies with this profile</td>
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</tr>
<tr>
<td>vrrp</td>
<td>Configures Virtual Router Redundancy Protocol (VRRP) group settings</td>
<td>page 7-391</td>
</tr>
<tr>
<td>vrrp-state-check</td>
<td>Publishes interface via OSPF or BGP based on Virtual Router Redundancy Protocol (VRRP) status</td>
<td>page 7-395</td>
</tr>
</tbody>
</table>

**Table 7.1 Profile-Config Commands**
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<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
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<td>wep-shared-key-auth</td>
<td>Enables support for 802.11 WEP shared key authentication</td>
<td>page 7-396</td>
</tr>
<tr>
<td>slot</td>
<td>Assigns a physical slot for running Team-Centro VM on this profile/device. This feature is support only on the NX45XX and NX65XX series service platforms.</td>
<td>page 7-401</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
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.

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

use-adopter-auto-provisioning-policy-lookup

Parameters

None

Examples

rfs4000-229D58 (config-profile-testRFS4000)#adopter-auto-provisioning-policy-lookup
rfs4000-229D58 (config-profile-testRFS4000)#

rfs4000-229D58 (config-profile-testRFS4000)#show context
profile rfs4000 testRFS4000
bridge vlan 1
tunnel-over-level2
ip igmp snooping
ip igmp snooping querier
no autoinstall configuration
no autoinstall firmware
device-upgrade persist-images
..............................................................
qos trust 802.1p
interface ge4
ip dhcp trust
qos trust dscp
qos trust 802.1p
interface ge5
ip dhcp trust
qos trust dscp
qos trust 802.1p
interface wwan1
interface pppoe1
use firewall-policy default
service pm sys-restart
use-adopter-auto-provisioning-policy
rfs4000-229D58 (config-profile-testRFS4000)#

Related Commands

| no | Removes the use of centralized auto provisioning policy on this profile or device |
7.1.2 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

- `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]
  network-group <NETWORK-GROUP-ALIAS-NAME> [address-range <STARTING-IP> to <ENDING-IP>]
  network-group <NETWORK-GROUP-ALIAS-NAME> [address-range <STARTING-IP> to <ENDING-IP>]
  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]` `{(<1-65535>|<WORD>|bgp|dns|ftp|ftp-data|gopher|https|ldap|nntp|ntp|pop3|proto|sip|smtp|sourceport|ssh|telnet|tftp|www})`

- `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>`

  | **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.  
  | <ADDRESS-RANGE-ALIAS-NAME> | Specify the address range alias name.  
  | **<STARTING-IP>** | Associates a range of IP addresses with this address range alias  
  | **to <ENDING-IP>** | You can apply overrides to the alias at the device level.  
  | **Note:** Alias name should begin with 'S'.

  | **<STARTING-IP>** | Specify the first IP address in the range.  
  | **to <ENDING-IP>** | Specify the last IP address in the range.  

  | **Note:** If using an existing address-range alias, you can apply overrides to the alias at the profile level.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| alias host <HOST-ALIAS-NAME> <HOST-IP> | Creates a new host alias for this profile. Or associates an existing host alias with this profile. A host alias maps a name to a single network host.  
  - <HOST-ALIAS-NAME> – Specify the host alias name.  
  **Note:** Alias name should begin with `$`.  
  <HOST-IP> Associates the network host’s IP address with this host alias  
  - <HOST-IP> – Specify the network host’s IP address.  
  **Note:** If using an existing host alias, you can apply overrides to the alias at the profile level |
| alias network <NETWORK-ALIAS-NAME> <NETWORK-ADDRESS/MASK> | Creates a new network alias for this profile. Or associates an existing network alias with this profile. A network alias maps a name to a single network address.  
  - <NETWORK-ALIAS-NAME> – Specify the network alias name.  
  **Note:** Alias name should begin with `$`.  
  <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> {<STARTING-IP> to <ENDING-IP>}|host <HOST-IP> {<HOST-IP>} | network <NETWORK-ADDRESS/MASK> {<NETWORK-ADDRESS/MASK>}] | 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> {<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> {<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. |
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| network <NETWORK-ADDRESS/MASK> {<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 [<0-254>|<WORD>|eigrp|gre|igmp|igp|ospf|vrrp] {(<1-65535>|<WORD>|bgp|dns|ftp|ftp-data|gopher|https|ldap|ntp|pop3|proto|sip|smtp|sourceport {<1-65535>|<WORD>|ssh|telnet|tftp|www}) | Creates a new network-service alias for this profile. Or associates an existing network-service alias with this profile. 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:** 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. |
| 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.  
* igmp – Selects Internet Group Management Protocol (IGMP). The protocol number is 2.  
* igp – Selects Interior Gateway Protocol (IGP). The protocol number is 9.  
* 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)
- `ldap` – Optional. Configures the default Lightweight Directory Access Protocol (LDAP) services port (389)
- `nntp` – Optional. Configures the default Newsgroup (NNTP) services port (119)
- `ntp` – Optional. Configures the default Network Time Protocol (NTP) services port (123)
- `POP3` – Optional. Configures the default Post Office Protocol (POP3) services port (110)
- `proto` – Optional. Use this option to select another Internet protocol in addition to the one selected in the previous step.
- `sip` – Optional. Configures the default Session Initiation Protocol (SIP) services port (5060)
- `smtp` – Optional. Configures the default Simple Mail Transfer Protocol (SMTP) services port (25)
- `sourceport[<1-65535>][<WORD>]` – 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.
- `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)

 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. For example, alias string `$DOMAIN test.motorola.com`. In this example, the string alias name is: `$DOMAIN` and the string value it is mapped to is: `test.motorola.com`. In this example, the string alias refers to a domain name.

- `<VLAN-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.
### Examples

The following example shows the global aliases configured. Note the network-service alias `$kerberos` settings.

```plaintext
rfs4000-229D58(config)#show context
!
! Configuration of RFS4000 version 5.6.0.0-029B
!
!
version 2.3
!
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--
rfs4000-229D58(config)#
```

The following examples show the overrides applied to the network-service alias `$kerberos` at the profile level:

```plaintext
rfs4000-229D58(config-profile-TestRFS4000)#alias network-service $kerberos proto tcp 88 proto udp 80
rfs4000-229D58(config-profile-TestRFS4000)#
```

The following example shows the overrides applied to the network-service alias `$kerberos` at the profile level:

```plaintext
rfs4000-229D58(config-profile-TestRFS4000)#show context
profile rfs4000 TestRFS4000
no autoinstall configuration
no autoinstall firmware

interface ge5
ip dhcp trust
qos trust dscp
qos trust 802.1p
interface wwan1
interface pppoe1
use firewall-policy default
service pm sys-restart
router ospf
alias network-service $kerberos proto tcp 88 proto udp 80
```

---

<table>
<thead>
<tr>
<th>alias vlan &lt;VLAN-ALIAS-NAME&gt; &lt;1-4094&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>alias vlan &lt;VLAN-ALIAS-NAME&gt;</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>• &lt;VLAN-ALIAS-NAME&gt; – Specify the VLAN alias name.</td>
</tr>
<tr>
<td>Note: Alias name should begin with <code>$</code>.</td>
</tr>
<tr>
<td>&lt;1-4094&gt;</td>
</tr>
<tr>
<td>Maps the VLAN alias to a VLAN ID</td>
</tr>
<tr>
<td>• &lt;1-4094&gt; – Specify the VLAN ID from 1 - 4094.</td>
</tr>
<tr>
<td>Note: If using an existing VLAN alias, you can apply overrides to the alias at the profile level.</td>
</tr>
</tbody>
</table>
**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the use of centralized auto provisioning policy on this profile or device</td>
</tr>
</tbody>
</table>
### 7.1.3 analytics

**Profile Config Commands**

Enables analytics on a NX9000 profile. When executed on a NX9000 device, enables analytics on the device. Analytics is disabled by default.

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

**Syntax**

analytics

**Parameters**

None

**Examples**

```plaintext
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#analytics

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
  66069c24b3bb1259eb36826cab3cc83999dd408f0ff891e74b62b2d3594f0b3dde7967f30e49e497
  country-code in
  analytics
  ip default-gateway 192.168.13.2
  interface vlan1
    ip address 192.168.13.13/24
    no ipv6 enable
    no ipv6 request-dhcpv6-options
  --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 analytics on a NX9000 profile/device</td>
</tr>
</tbody>
</table>
## 7.1.4 ap300

### Profile Config Commands

Enables or disables adoption of an AP300 by devices using this profile.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000, NX9500, NX9510

### Syntax

```
ap300 [<MAC>|adopt-unconfigured]
ap300 <MAC> [adopt|deny]
ap300 adopt-unconfigured
```

### Parameters

- `ap300 <MAC> [adopt|deny]`
- `ap300 adopt-unconfigured`

### Examples

```
rfs7000-37FABE(config-profile-default-rfs7000)#ap300 00-15-70-63-4F-86 adopt
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
   bridge vlan 1
     bridging-mode isolated-tunnel
     ip igmp snooping querier
     ip igmp snooping querier
     arp timeout 2000
     crypto ikev1 policy ikev1-default
     isakmp-proposal default encryption aes-256 group 2 hash sha
     qos trust 802.1p
     interface pppoe1
     --More--
     use firewall-policy default
   ap300 00-15-70-63-4F-86 adopt
   service pm sys-restart
   router ospf
rfs7000-37FABE(config-profile-default-rfs7000)#
```

### Related Commands

- `no`
  - Dissociates (unmaps) an AP300 from the adopt or deny list. Also disables non-configured AP300 adoption.
7.1.5 area

Profile Config Commands

Sets the system’s area of location (the area name)

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

area <WORD>

Parameters

- area <WORD>

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#area Ecospace
rfs7000-37FABE(config-profile-default-rfs7000)#

rfs7000-37FABE(config-profile-default-rfs7000)#show 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--
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

- no
  Resets the configured area name
### 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```
arp [IP] [timeout]
arp <IP> <MAC> arpa [<L3-INTERFACE-NAME>|pppo1|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>|pppo1|vlan <1-4094>|wwan1|serial <1-4> [1-1] [1-1] {dhcp-server|router}**
  - Adds a static ARP IPv4 address in the ARP cache
  - **<IP>** – Specify the static IP address.
  - **<MAC>** Specify the MAC address associated with the IP and the *Switch Virtual Interface (SVI).*
  - **arpa** Sets ARP encapsulation type to ARPA
  - **<L3-INTERFACE-NAME>** Configures static ARP entry for a specified router interface
    - **<L3-INTERFACE-NAME>** – Specify the router interface name.
  - **pppo1** Configures static ARP entry for PPP over Ethernet interface
  - **vlan <1-4094>** Configures static ARP entry for a VLAN interface
    - **<1-4094>** – Specify a SVI VLAN ID from 1 - 4094.
  - **wwan1** Configures static ARP entry for Wireless WAN interface
  - **serial <1-4> [1-1] [1-1]** Configures the static ARP entry for serial interface
    - **<1-4>** – Specify the Slot ID
    - **<1-1>** – Specify the port ID.
    - **<1-1>** – Specify the Channel group ID.
    - The serial interface is applicable for the NX45XX and NX65XX series service platforms only.
### arp timeout <15-86400>

<table>
<thead>
<tr>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfs7000-37FABE(config-profile-default-rfs7000)#arp timeout 2000</td>
</tr>
<tr>
<td>rfs7000-37FABE(config-profile-default-rfs7000)#show context</td>
</tr>
<tr>
<td>profile rfs7000 default-rfs7000</td>
</tr>
<tr>
<td>bridge vlan 1</td>
</tr>
<tr>
<td>bridging-mode isolated-tunnel</td>
</tr>
<tr>
<td>ip igmp snooping</td>
</tr>
<tr>
<td>ip igmp snooping querier</td>
</tr>
<tr>
<td><strong>arp timeout 2000</strong></td>
</tr>
<tr>
<td>crypto ikev1 policy ikev1-default</td>
</tr>
<tr>
<td>isakmp-proposal default encryption aes-256 group 2 hash sha</td>
</tr>
<tr>
<td>crypto ikev2 policy ikev2-default</td>
</tr>
<tr>
<td>isakmp-proposal default encryption aes-256 group 2 hash sha</td>
</tr>
<tr>
<td>crypto ipsec transform-set default esp-aes-256 esp-sha-hmac</td>
</tr>
<tr>
<td>crypto ikev1 remote-vpn</td>
</tr>
<tr>
<td>crypto ikev2 remote-vpn</td>
</tr>
<tr>
<td>crypto auto-ipsec-secure</td>
</tr>
<tr>
<td>interface mel</td>
</tr>
<tr>
<td>interface ge1</td>
</tr>
<tr>
<td>ip dhcp trust</td>
</tr>
<tr>
<td>qos trust dscp</td>
</tr>
<tr>
<td>qos trust 802.1p</td>
</tr>
<tr>
<td>interface ge2</td>
</tr>
<tr>
<td>ip dhcp trust</td>
</tr>
<tr>
<td>--More--</td>
</tr>
<tr>
<td>rfs7000-37FABE(config-profile-default-rfs7000)#</td>
</tr>
</tbody>
</table>

### Related Commands

<table>
<thead>
<tr>
<th>no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removes an entry from the ARP cache</td>
</tr>
</tbody>
</table>
7.1.7 auto-learn-staging-config

Profile Config Commands

Enables automatic recognition of devices pending adoption

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

auto-learn-staging-config

Parameters

None

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#auto-learn-staging-config
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 automatic recognition of devices pending adoption</td>
</tr>
</tbody>
</table>
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 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.

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 – MotoAP6522
- substitution token – $SN

The unique ID is generated using MotoAP6522$SN, where $SN is replaced with the device’s serial number.

When executed on an AP6522 (having serial number B4C7996C8809), the autogen-uniqueid MotoAP6522$SN command generates the unique ID: MotoAP6522B4C7996C8809. 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 ‘MotoAP6522’.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

autogen-uniqueid <WORD>

Parameters

- autogen-uniqueid <WORD>

<table>
<thead>
<tr>
<th>autogen-uniqueid &lt;WORD&gt;</th>
<th>Autogenerates a device’s unique ID (not exceeding 64 characters in length)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The ID generated is a combination of the text provided and the substitution token $SN or $MiNT-ID. Where ever the autogen-uniqueid is used the device’s serial number OR MiNT-ID is referenced depending on the substitution token used.</td>
</tr>
<tr>
<td></td>
<td>&lt;WORD&gt; – Specify a auto generate unique ID format using one of the following substitution tokens:</td>
</tr>
<tr>
<td></td>
<td>Available tokens:</td>
</tr>
<tr>
<td></td>
<td>$SN - references SERIAL NUMBER of the device</td>
</tr>
<tr>
<td></td>
<td>$MiNT-ID - references MiNT-ID of the device</td>
</tr>
<tr>
<td></td>
<td>For example, ORG-$SN-DEPT, In this example ‘ORG’ and ‘DEPT’ represent the user-defined prefix and suffix respectively. And $SN is the substitution token.</td>
</tr>
</tbody>
</table>
Examples

nx4500-5CFA2B(config-profile-testAP6522)#autogen-uniqueid MotoAP6522$SN

nx4500-5CFA2B(config-profile-testAP6522)#show context
profile ap621 testAP6522
autogen-uniqueid MotoAP6522$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 Moto-$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 Moto-$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

no

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.
### 7.1.9 autoinstall

#### Profile Config Commands

Automatically installs firmware image and configuration parameters on the selected device.

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```
autoinstall [configuration|firmware|start-interval <WORD>]
```

#### Parameters

- `autoinstall [configuration|firmware|start-interval <WORD>]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>configuration</td>
<td>Autoinstalls startup configuration. Setup parameters are automatically configured on devices using this profile.</td>
</tr>
<tr>
<td>firmware</td>
<td>Autoinstalls firmware image. Firmware images are automatically installed on devices using this profile.</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>
</tbody>
</table>

- `<WORD>` – Specify the interval in minutes.

#### 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 me1
    interface ge1
      ip dhcp trust
      ip dhcp trust
      --More--
```

#### Related Commands

- `no` Disables the auto install settings
7.1.10 bridge

Profile Config Commands

Table 7.2 summarizes Ethernet bridge configuration 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 7-27</td>
</tr>
<tr>
<td>bridge-vlan-mode</td>
<td>Summarizes bridge VLAN configuration mode commands</td>
<td>page 7-30</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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Switch Note:** The interfaces mentioned below are supported as follows:

- **ge <index>** – RFS7000 and RFS4000 supports 4 GEs, AP621 supports 8 GEs, NX45XX supports 24 GEs
- **me1** – Only supported on RFS7000 and RFS6000

**Syntax**

```plaintext
bridge [nat|vlan]

bridge nat source list <IP-ACCESS-LIST-NAME> precedence <1-500> interface
[<LAYER3-INTERFACE-NAME>|pppoel|vlan <1-4094>|wwan1] [{address|interface|overload|pool <NAT-POOL-NAME>}]`

bridge vlan [<1-4095>|<VLAN-ALIAS-NAME>]
```
### Parameters

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `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>]` | Configures bridge NAT parameters.  
  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.  
  - `<IP-ACCESS-LIST-NAME>` – Specify access list name.  
  - `precedence <1-500>` – Specifies a precedence value for this bridge NAT policy.  

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `bridge vlan <1-4095>|<VLAN-ALIAS-NAME>` | Configures the numerical identifier for the Bridge VLAN when it was initially created.  
  - `<1-4095>` – Specify a VLAN index from 1 - 4095.  

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `bridge vlan <VLAN-ALIAS-NAME>` | Configures the VLAN alias (should be existing and configured) identifying the Bridge VLAN  
  - `<VLAN-ALIAS-NAME>` – Specify a VLAN alias name.  

### 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)
    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

Table 7.3 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 7-31</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 7-32</td>
</tr>
<tr>
<td>description</td>
<td>Configures VLAN bridge description</td>
<td>page 7-33</td>
</tr>
<tr>
<td>edge-vlan</td>
<td>Enables edge VLAN mode</td>
<td>page 7-34</td>
</tr>
<tr>
<td>firewall</td>
<td>Enables firewall on this bridge VLAN interface</td>
<td>page 7-35</td>
</tr>
<tr>
<td>http-analyze</td>
<td>Enables the analysis of URLs and data traffic on this Bridge VLAN. When enabled</td>
<td>page 7-36</td>
</tr>
<tr>
<td>ip</td>
<td>Configures IP components</td>
<td>page 7-37</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures IPv6 components</td>
<td>page 7-40</td>
</tr>
<tr>
<td>l2-tunnel-broadcast-optimization</td>
<td>Enables broadcast optimization</td>
<td>page 7-43</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 7-44</td>
</tr>
<tr>
<td>stateful-packet-inspection-l2</td>
<td>Enables statedly packet inspection in the layer 2 fire wall</td>
<td>page 7-49</td>
</tr>
<tr>
<td>tunnel</td>
<td>Enables tunneling of unicast messages to unknown MAC destinations, on the selected VLAN bridge</td>
<td>page 7-50</td>
</tr>
<tr>
<td>tunnel-over-level2</td>
<td>Enables extended VLAN traffic over level 2 MiNT links</td>
<td>page 7-52</td>
</tr>
<tr>
<td>use</td>
<td>Uses pre configured access lists with this PF bridge policy</td>
<td>page 7-53</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous mode</td>
<td>page 5-5</td>
</tr>
<tr>
<td>help</td>
<td>Displays interactive help system</td>
<td>page 5-6</td>
</tr>
<tr>
<td>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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 modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>auto</td>
<td>Automatically selects the bridging mode to match the WLAN, VLAN and bridging mode configurations (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, are 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

captive-portal ip-snooping subnet <IP/M> {excluded-address <IP>}

**Parameters**
- captive-portal ip-snooping subnet <IP/M> {excluded-address <IP>}

<table>
<thead>
<tr>
<th>captive-portal ip-snooping</th>
<th>Enables snooping of IP packets for wired captive portal clients</th>
</tr>
</thead>
<tbody>
<tr>
<td>subnet &lt;IP/M&gt;</td>
<td>Enables IP packet snooping on a specified subnet</td>
</tr>
<tr>
<td></td>
<td>• &lt;IP/M&gt; – Specify the subnet address in the A.B.C.D/M format.</td>
</tr>
<tr>
<td>excluded-address &lt;IP&gt;</td>
<td>Optional. Configures an address excluded from snooping</td>
</tr>
<tr>
<td></td>
<td>• &lt;IP/M&gt; – Specify the IP address. Use this parameter to configure the gateway’s IP address.</td>
</tr>
</tbody>
</table>

**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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

description <WORD>

Parameters

- description <WORD>

Examples

rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#description "This is a description for the bridged VLAN"

rfs7000-37FABE(config-profile default-rfs7000-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
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#

Related Commands

- no

Removes VLAN bridge description
7.1.10.2.4 edge-vlan

* bridge-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 enabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**
```
edge-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**

```
no
```
Disables the edge VLAN mode
### 7.10.2.5 firewall

*bridge-vlan-mode commands*

Enables firewall on this bridge VLAN interface. This feature is enabled by default.

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>no</td>
<td>Disables firewall on this bridge VLAN interface</td>
</tr>
</tbody>
</table>
7.1.10.2.6 http-analyze

This command 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
```
http-analyze {filter [images|post|query-string]}
```

Parameters
- `http-analyze {filter [images|post|query-string]}`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`http-analyze filter [images</td>
<td>post</td>
</tr>
<tr>
<td>filter</td>
<td>Optional. Filters out specific URLs</td>
</tr>
<tr>
<td>images</td>
<td>Filters out URLs referring to images</td>
</tr>
<tr>
<td>post</td>
<td>Filters out URLs referring to POST</td>
</tr>
<tr>
<td>query-string</td>
<td>Filters out query strings received from URLs</td>
</tr>
</tbody>
</table>

Examples
```
rfs4000-229D58(config-device 00-23-68-22-9D-58-bridge-vlan-4)#http-analyze filter images
rfs4000-229D58(config-device 00-23-68-22-9D-58-bridge-vlan-4)#show context bridge vlan 4
  http-analyze filter images
rfs4000-229D58(config-device 00-23-68-22-9D-58-bridge-vlan-4)#
```

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

### Syntax

- `ip [arp|dhcp|igmp]`
- `ip [arp|dhcp] trust`
- `ip igmp snooping {forward-unknown-multicast|mrouter|querier}`
- `ip igmp snooping {forward-unknown-multicast}`
- `ip igmp snooping {mrouter [interface|learn]}`
- `ip igmp snooping {mrouter [interface <INTERFACE-LIST>|learn pim-dvmrp]}`
- `ip igmp {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 disabled by default.
  - **trust** – Trusts DHCP responses on the VLAN bridge
- `ip igmp snooping {forward-unknown-multicast}`
  - Configures Internet Group Management Protocol (IGMP) snooping parameter
  - The IGMP protocol 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, thereby reducing unnecessary flooding of the network with multicast traffic.
  - **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 disabled by default.
### ip igmp snooping {mrouter [interface <INTERFACE-LIST>|learn pim-dvmrp]}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip</td>
<td>Configures the VLAN bridge IP parameters</td>
</tr>
<tr>
<td>igmp snooping</td>
<td>Configures the IGMP snooping parameters</td>
</tr>
<tr>
<td>mrouter</td>
<td>Optional. Configures the multicast router parameters</td>
</tr>
<tr>
<td>interface &lt;INTERFACE-LIST&gt;</td>
<td>Configures the multicast router interfaces</td>
</tr>
<tr>
<td>learn pim-dvmrp</td>
<td>Configures the multicast router learning protocols</td>
</tr>
</tbody>
</table>

- **mrouter**: 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>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip</td>
<td>Configures the VLAN bridge IP parameters</td>
</tr>
<tr>
<td>igmp snooping</td>
<td>Configures the IGMP snooping parameters</td>
</tr>
<tr>
<td>querier</td>
<td>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.</td>
</tr>
<tr>
<td>address &lt;IP&gt;</td>
<td>Optional. Configures the IGMP querier source IP address</td>
</tr>
<tr>
<td>max-response-time &lt;1-25&gt;</td>
<td>Optional. Configures the IGMP querier maximum response time</td>
</tr>
<tr>
<td>timer expiry &lt;60-300&gt;</td>
<td>Optional. Configures the IGMP querier timeout</td>
</tr>
<tr>
<td>version &lt;1-3&gt;</td>
<td>Optional. Configures the IGMP version</td>
</tr>
</tbody>
</table>

- **querier**: 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>**: Optional. Configures the IGMP querier source IP address

- **max-response-time <1-25>**: Optional. Configures the IGMP querier maximum response time

- **timer expiry <60-300>**: Optional. Configures the IGMP querier timeout

- **version <1-3>**: Optional. Configures the IGMP version
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\ of\ 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 ge2 ge1
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 or reverts the VLAN Ethernet bridge parameters</td>
</tr>
</tbody>
</table>
7.1.10.2.8 ipv6

**bridge-vlan-mode commands**

Configures this VLAN bridge’s IPv6 components

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>}

ipv6 nd raguard

**Parameters**

- **ipv6 dhcpv6 trust**

<table>
<thead>
<tr>
<th>ipv6</th>
<th>Configures the VLAN bridge IPv6 parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>dhcpv6 trust</td>
<td>Configures the DHCPv6 trust parameter</td>
</tr>
<tr>
<td></td>
<td>• trust – Trusts DHCPv6 responses on this VLAN</td>
</tr>
</tbody>
</table>

- **ipv6 firewall**

<table>
<thead>
<tr>
<th>ipv6</th>
<th>Configures the VLAN bridge IPv6 parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>firewall</td>
<td>Enables IPv6 firewall on this bridge VLAN. This option is enabled by default.</td>
</tr>
<tr>
<td></td>
<td>Devices utilizing IPv6 addressing require firewall protection unique to IPv6 traffic,</td>
</tr>
<tr>
<td></td>
<td>IPv6 addresses are composed of eight groups of four hexadecimal digits separated by colons.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>
**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</td>
</tr>
<tr>
<td></td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>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</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</td>
</tr>
<tr>
<td></td>
<td>• pim-dvmrp – Enables DVMRP snooping of packets</td>
</tr>
</tbody>
</table>

**ipv6 mld snooping**  \{**querier**}  \{**max-response-time <1-25000>|timer expiry <60-300>|version <1-2\}\n
<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</td>
</tr>
<tr>
<td></td>
<td>This option is enabled 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 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. The default is 1 milliseconds.</td>
</tr>
</tbody>
</table>
IPv6 ND Raguard

**Examples**

```bash
rfs7000-37FABE(config-profile test-bridge-vlan-2)#ipv6 nd raguard
```

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ipv6 nd raguard</code></td>
<td>Enables or reverts the VLAN Ethernet bridge IPv6 parameters.</td>
</tr>
<tr>
<td><code>ipv6</code></td>
<td>Configures the VLAN bridge IPv6 parameters.</td>
</tr>
<tr>
<td><code>nd raguard</code></td>
<td>Allows router advertisement (RA) or ICMPv6 redirects on this VLAN bridge.</td>
</tr>
<tr>
<td><code>timer expiry &lt;60-300&gt;</code></td>
<td>Optional. Configures the MLD other querier’s timeout. This option is disabled by default.</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;60-300&gt;</code> – Specify the MLD other querier’s timeout from 60 - 300 seconds. The default is 60 seconds.</td>
</tr>
<tr>
<td><code>version &lt;1-2&gt;</code></td>
<td>Optional. Configures the MLD version. This option is disabled by default.</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;1-2&gt;</code> – Specify the MLD version. The versions are 1-2. The default is 2.</td>
</tr>
</tbody>
</table>

**Related Commands**

- `no` Disables or reverts the VLAN Ethernet bridge IPv6 parameters
7.1.10.2.9 l2-tunnel-broadcast-optimization

**Bridge-vlan-mode commands**

Enables broadcast optimization on this VLAN interface. Enabling this feature aids in the identification of each incoming packet. This feature is disabled by default.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>no</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
no [bridging-mode|captive-portal|description|edge-vlan|firewall|http-analyze|ip|ipv6|
    l2-tunnel-broadcast-optimization|stateful-packet-inspection-12|tunnel|
    tunnel-over-level12|use]

no [bridging-mode|description|edge-vlan|firewall|l2-tunnel-broadcast-optimization|
    stateful-packet-inspection-12|tunnel-over-level12]

no captive-portal ip-snooping subnet
no http-analyze {filter [images|post|query-string]}
no ip [arp|dhcp|igmp]
no ip [arp|dhcp] trust
no ip igmp snooping {forward-unknown-multicast|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 tunnel [rate-limit|unknown-unicast]

no use [captive-portal|ip-access-list|ipv6-access-list|mac-access-list] tunnel out
```

**Parameters**

- **no bridging-mode** Resets the bridging mode to ‘auto’
- **no description** Removes the VLAN’s description
- **no edge-vlan** Disables the edge VLAN mode
- **no firewall** Disables firewall on this bridge VLAN interface
- **no l2-tunnel-broadcast-optimization** Disables broadcast optimization
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no tunnel-over-level2</td>
<td>Disables extended VLAN traffic over level 2 MiNT links</td>
</tr>
<tr>
<td>no stateful-packet-inspection-12</td>
<td>Disables stateful packet inspection in the layer 2 firewall</td>
</tr>
<tr>
<td>no captive-portal ip-snooping subnet</td>
<td>Disables IP packet snooping for wired captive portals</td>
</tr>
<tr>
<td>no http-analyze {filter [images</td>
<td>post</td>
</tr>
<tr>
<td>no ip [arp</td>
<td>dhcp] trust</td>
</tr>
<tr>
<td>no ip</td>
<td>Negates or reverts the VLAN bridge IP settings</td>
</tr>
<tr>
<td>arp trust</td>
<td>Disables the trust of ARP responses on the VLAN</td>
</tr>
<tr>
<td>dhcp trust</td>
<td>Disables the trust of DHCP responses on the VLAN</td>
</tr>
<tr>
<td>no ip igmp snooping {forward-unknown-multicast}</td>
<td>Optional. Disables the forwarding of unknown multicast packets</td>
</tr>
<tr>
<td>no ip igmp snooping {mrouter [interface &lt;INTERFACE-LIST&gt;</td>
<td>learn pim-dvmrp]}</td>
</tr>
<tr>
<td>no ip igmp snooping {mrouter [interface &lt;INTERFACE-LIST&gt;</td>
<td>learn pim-dvmrp]}</td>
</tr>
<tr>
<td>no ip igmp snooping {querier {address</td>
<td>max-response-time</td>
</tr>
<tr>
<td>no ip igmp snooping {querier {address</td>
<td>max-response-time</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>no ipv6 dhcpv6 trust</td>
<td>Negates or reverts VLAN bridge IPv6 settings</td>
</tr>
<tr>
<td>no ipv6 mld snooping</td>
<td>Negates or reverts the VLAN bridge IPv6 settings</td>
</tr>
<tr>
<td>forward-unknown-multicast</td>
<td>Optional. Disables the forwarding of unknown multicast packets on this VLAN bridge interface</td>
</tr>
<tr>
<td>mrouter [interface &lt;INTERFACE-LIST&gt;</td>
<td>Optional. Resets or disables multicast router parameters</td>
</tr>
<tr>
<td>learn pim-dvmrp</td>
<td>Disables multicast router learning protocols</td>
</tr>
<tr>
<td>querier</td>
<td>Optional. Disables the MLD querier. Once disabled all MLD querier related settings (max-response-time, version, and MLD timer) are disabled.</td>
</tr>
<tr>
<td>max-response-time</td>
<td>Optional. Reverts to the default MLD querier’maximum response time</td>
</tr>
<tr>
<td>timer expiry</td>
<td>Optional. Reverts to the default MLD querier timeout</td>
</tr>
<tr>
<td>version &lt;1-2&gt;</td>
<td>Optional. Reverts to the default MLD version</td>
</tr>
<tr>
<td>no tunnel rate-limit</td>
<td>Disables rate-limiting of tunneled VLAN traffic over level 2 MiNT links</td>
</tr>
<tr>
<td>no tunnel unknown-unicast</td>
<td>Disables tunneling of unicast messages, to unknown MAC destinations, on the selected VLAN bridge</td>
</tr>
</tbody>
</table>
no use tunnel out

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>captive-portal</td>
<td>Removes the captive portal associated with this VLAN bridge</td>
</tr>
<tr>
<td>ip-access-list</td>
<td>Removes the IP access list associated with this VLAN bridge</td>
</tr>
<tr>
<td></td>
<td>• tunnel – Prevents the IP access list from being applied to all packets</td>
</tr>
<tr>
<td></td>
<td>going into a tunnel</td>
</tr>
<tr>
<td></td>
<td>• out – Prevents the IP access list from being applied to all outgoing</td>
</tr>
<tr>
<td></td>
<td>packets</td>
</tr>
<tr>
<td>ipv6-access-list</td>
<td>Removes the IPv6 access list associated with this VLAN bridge</td>
</tr>
<tr>
<td></td>
<td>• tunnel – Prevents the IPv6 access list from being applied to all packets</td>
</tr>
<tr>
<td></td>
<td>going into a tunnel</td>
</tr>
<tr>
<td></td>
<td>• out – Prevents the IPv6 access list from being applied to all outgoing</td>
</tr>
<tr>
<td></td>
<td>packets</td>
</tr>
<tr>
<td>mac-access-list</td>
<td>Removes the MAC access list associated with VLAN bridge</td>
</tr>
<tr>
<td></td>
<td>• tunnel – Prevents the MAC access list from being applied to all packets</td>
</tr>
<tr>
<td></td>
<td>going into a tunnel</td>
</tr>
<tr>
<td></td>
<td>• out – Prevents the MAC access list from being applied to all outgoing</td>
</tr>
<tr>
<td></td>
<td>packets</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#no description
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#no ip igmp snooping mrouter
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#no ip igmp snooping mrouter learn pim-dvmrp
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#no ip igmp snooping querier max-response-time
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#no ip igmp snooping querier version

rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#show context bridge vlan 1
  no edge-vlan
  no stateful-packet-inspection-l2
  ip igmp snooping
  no ip igmp snooping unknown-multicast-fwd
  no ip igmp snooping mrouter learn pim-dvmrp
  no ip igmp snooping querier

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>bridging-mode</td>
<td>Configures the VLAN's bridging mode</td>
</tr>
<tr>
<td>description</td>
<td>Configures the VLAN's description</td>
</tr>
<tr>
<td>edge-vlan</td>
<td>Enables the edge VLAN mode</td>
</tr>
<tr>
<td>firewall</td>
<td>Enables firewall on this bridge VLAN interface</td>
</tr>
<tr>
<td>http-analyze</td>
<td>Enables the analysis of URLs and data traffic on this Bridge VLAN. When</td>
</tr>
<tr>
<td></td>
<td>enabled, URLs and data are forwarded to the controller running the HTTP</td>
</tr>
<tr>
<td></td>
<td>analytics engine</td>
</tr>
<tr>
<td>ip</td>
<td>Configures the VLAN's IP components</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures the VLAN's IPv6 components</td>
</tr>
<tr>
<td>l2-tunnel-broadcast-</td>
<td>Enables broadcast optimization</td>
</tr>
<tr>
<td>optimization</td>
<td>stateful-packet-inspection-l2</td>
</tr>
<tr>
<td></td>
<td>Enables stateful packet inspection in the layer 2 firewall</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>tunnel</strong></td>
<td>Enables tunneling of unicast messages to unknown MAC destinations, on the selected VLAN bridge</td>
</tr>
<tr>
<td><strong>tunnel-over-level2</strong></td>
<td>Enables extended VLAN traffic over level 2 MiNT links</td>
</tr>
<tr>
<td><strong>use</strong></td>
<td>Uses pre-configured access lists with this VLAN bridge policy</td>
</tr>
<tr>
<td><strong>clrscr</strong></td>
<td>Clears the display screen</td>
</tr>
<tr>
<td><strong>commit</strong></td>
<td>Commits (saves) changes made in the current session</td>
</tr>
<tr>
<td><strong>end</strong></td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
</tr>
<tr>
<td><strong>exit</strong></td>
<td>Ends the current mode and moves to the previous mode</td>
</tr>
<tr>
<td><strong>help</strong></td>
<td>Displays interactive help system</td>
</tr>
<tr>
<td><strong>revert</strong></td>
<td>Reverts changes to their last saved configuration</td>
</tr>
<tr>
<td><strong>service</strong></td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
</tr>
<tr>
<td><strong>show</strong></td>
<td>Displays running system information</td>
</tr>
<tr>
<td><strong>write</strong></td>
<td>Writes information to memory or terminal</td>
</tr>
</tbody>
</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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><code>no</code></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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX,
  AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
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>]}**

  Configures a rate-limit parameters (max-burst-size and rate) for tunneled VLAN traffic over level 2 MiNT links.
  - **rate** — Optional. Configures the data rate, in kilobits per second, for the incoming and outgoing extended VLAN traffic tunneled over MiNT level 2 links.
  - **<50-1000000>** — Specify a value from 50 - 1000000 kbps. The default is 5000 kbps.
  - **max-burst-size** — Optional. Configures the maximum burst size.
  - **<2-1024>** — Specify the maximum burst size from 2 - 1024 kbytes. The default is 320 kbytes.

  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**

  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)#

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>no</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

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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)#commit
```

```
rfs4000-229D58(config-profile testRFS4000-bridge-vlan-1)#show context
bridge vlan 1
  description This\ is\ a\ test\ bridge\ 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
rfs4000-229D58(config-profile testRFS4000-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 extended VLAN traffic over level 2 MiNT links</td>
</tr>
</tbody>
</table>
7.1.10.2.14 use

**Bridge-vlan-mode commands**

Uses pre-configured access lists with this bridge policy.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX5650, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
use [captive-portal|ip-access-list|ipv6-access-list|mac-access-list]
use captive-portal <CAPTIVE-PORTAL-NAME>
use [ip-access-list|ipv6-access-list|mac-access-list] tunnel out <IP/IPv6/MAC-ACCESS-LIST-NAME>
```

**Parameters**

- **use captive-portal <CAPTIVE-PORTAL-NAME>**
  
  Applies an existing captive portal configuration to restrict access to the bridge VLAN configuration.
  
  A captive portal is an access policy for providing temporary and restrictive access using a standard Web browser. Captive portals provide authenticated access by capturing and redirecting a wireless user’s Web browser session to a captive portal login page where the user must enter valid credentials to access the network. Once logged into the captive portal, additional terms and agreement, welcome, fail, and no-service pages provide the administrator with a number of options on captive portal screen flow and user appearance.
  
  - `<CAPTIVE-PORTAL-NAME>` – Specify the captive portal name.

- **use [ip-access-list|mac-access-list] tunnel out <IP/IPv6/MAC-ACCESS-LIST-NAME>**

  **ip-access-list**
  
  Associates a pre-configured IPv4 access list with this VLAN-bridge interface.

  **ipv6-access-list**
  
  Associates a pre-configured IPv6 access list with this VLAN-bridge interface.

  **mac-access-list**
  
  Uses a pre-configured MAC access list with this VLAN-bridge interface.

  **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.
**Examples**

```bash
rfs7000-37FABE(config-profile default-rfs7000-bridge-vlan-1)#use mac-access-list tunnel out PERMIT-ARP-AND-IPv4

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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables or reverts VLAN Ethernet bridge settings</td>
</tr>
</tbody>
</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

captive-portal page-upload count <1-20>

Parameters

- captive-portal page-upload count <1-20>

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>page-upload</td>
<td>Enables captive portal advanced Web page upload</td>
</tr>
<tr>
<td>count &lt;1-20&gt;</td>
<td>Sets the maximum number of APs that can be uploaded concurrently</td>
</tr>
</tbody>
</table>

- <1-20> – Set a value from 1 - 20.

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#captive-portal page-upload count 10
rfs7000-37FABE(config-profile-default-rfs7000)#
7.1.12 cdp

Profile Config Commands

Uses Cisco Discovery Protocol (CDP) as a layer 2 protocol that discovers information about neighboring network devices.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>&lt;10-1800&gt; – Specify a value from 10 - 1800 seconds. The default is 180 seconds.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>run</th>
<th>Enables/disables 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 time between advertisements</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5-900&gt;</td>
<td>&lt;5-900&gt; – 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

- cluster [force-configured-state|force-configured-state-delay <3-1800>|handle-stp|
master-priority <1-255>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>force-configured-state</td>
<td>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.</td>
</tr>
<tr>
<td>force-configured-state-delay &lt;3-1800&gt;</td>
<td>Forces cluster transition to the configured state after a specified interval. 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 active controller becomes active again.</td>
</tr>
<tr>
<td>handle-stp</td>
<td>Enables/disables 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.</td>
</tr>
</tbody>
</table>
### cluster member [ip <IP> {level [1|2]}|vlan <1-4094>]

- **member**: Adds a member to the cluster. It also configures the cluster VLAN where members can be reached.
- **ip <IP> level [1|2]**: Adds IP address of the new cluster member
  - <IP> – Specify the IP address.
  - level – Optional. Configures routing level for the new member. Select one of the following routing levels:
    - 1 – Level 1, local routing
    - 2 – Level 2, In-site routing
- **vlan <1-4094>**: Configures the cluster VLAN where members can be reached
  - <1-4094> – Specify the VLAN ID from 1- 4094.

### cluster mode [active|standby]

- **mode [active|standby]**: Configures cluster member’s mode as active or standby
  - active – Configures cluster mode as active. This is the default setting.
  - standby – Configures cluster mode as standby

A member can be in either an Active or Standby mode. All active member controllers can adopt access points. Standby members only adopt access points when an active member has failed or sees an access point not adopted by a controller.

### cluster name <CLUSTER-NAME>

- **name <CLUSTER-NAME>**: Configures the cluster name
  - <CLUSTER-NAME> – Specify the cluster name.

### cluster radius-counter-db-sync-time <1-1440>

- **radius-counter-db-sync-time <1-1440>**: Configures the interval, in minutes, at which the RADIUS counter database is synchronized with the dedicated NTP server resource.
  - <1-1440> – Specify a value from 1 - 1440 minutes. The default is 5 minutes.

**Note:** Use the `show > cluster > configuration` command to view RADIUS counter DB sync time.

### Examples

```bash
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

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

configuration-persistence {secure}

Parameters

- configuration-persistence {secure}

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

<table>
<thead>
<tr>
<th>no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disables automatic write up of startup configuration file</td>
</tr>
</tbody>
</table>
### 7.1.15 controller

**Profile Config Commands**

Configures the WiNG controller (wireless controller or service platform) settings

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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

controller [adopted-devices|adoption|group|hello-interval|vlan|host]

controller adopted-devices [aps {controllers}|controllers {aps}|external-devices]

ccontroller adoption

controller [group <CONTROLLER-GROUP-NAME>|vlan <1-4094>]

controller hello-interval <1-120> adjacency-hold-time <2-600>

controller host [<IP>|<HOSTNAME>] {ipsec-secure|level|pool|remote-vpn-client}

controller host [<IP>|<HOSTNAME>] {level [1|2]|pool <1-2> level [1|2] (ipsec-secure {gw})}

controller host [<IP>|<HOSTNAME>] {remote-vpn-client}

**Parameters**

- **controller adopted-devices [aps {controllers}|controllers {aps}|external-devices]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>controller</td>
<td>Configures the WLAN’s controller settings</td>
</tr>
<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 access points by this controller. This is the default setting.</td>
</tr>
<tr>
<td></td>
<td>• controllers – Optional. Enables the adoption of controllers by this controller</td>
</tr>
<tr>
<td></td>
<td>All adopted devices (referred to as adoptee) receive complete configuration from the adopting controller (referred to as adopter).</td>
</tr>
<tr>
<td>controllers {aps}</td>
<td>Enables the adoption of controllers by this controllers</td>
</tr>
<tr>
<td></td>
<td>• aps – Optional. Enables the adoption of access points by this controller</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>

Use the `no > controller > adopted-devices` command to remove this setting.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>external-devices</strong></td>
<td>Enables adoption of external devices by this controller. When enabled, a WiNG controller can adopt and manage T5 controllers (using the IPX operating system) within a WiNG managed device subnet. This setting is disabled by default. To disable T5 CPE 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 platforms.</td>
</tr>
</tbody>
</table>

- **controller adoption**
  - Enables adoption of the logged wireless controller or service platform. Use the `no > controller > adoption` command to disable adoption.

- **controller [group <CONTROLLER-GROUP-NAME>|vlan <1-4094>]**
  - Configures the WLAN's controller settings.
  - **group <CONTROLLER-GROUP-NAME>** - Configures the wireless controller or service platform group.
  - **<1-4094>** - Specifies the VLAN ID from 1 - 4094.

- **controller hello-interval <1-120> adjacency-hold-time <2-600>**
  - 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>** - Specifies 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>** - Specifies a value from 2 - 600 seconds.

- **controller host [<IP>|<HOSTNAME>] {level [1|2]|pool <1-2> level [1|2]} {(ipsec-secure {gw})}**
  - Configures the WLAN's controller settings.
  - **host [<IP>|<HOSTNAME>]** - Configures wireless controller or service platform’s IP address or name.
  - **<IP>** - Configures wireless controller or service platform’s IP address.
  - **<HOSTNAME>** - Configures wireless controller or service platform’s name.
controller host [<IP>|<HOSTNAME>] 

**controller**

Configures the WLAN's controller settings

**host**

Configures wireless controller or service platform's IP address or name

- **<IP>** – Configures wireless controller or service platform's IP address
- **<HOSTNAME>** – Configures wireless controller or service platform's name

**remote-vpn-client**

Forces *MNIT 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. 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.

**Examples**

```
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
```

level [1|2]

The following keywords are common to the 'IP' and 'hostname' parameters:

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

pool <1-2> level [1|2]

The following keywords are common to the 'IP' and 'hostname' parameters:

Optional. Sets the wireless controller or service platform's 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}

The following keywords are recursive and common to the 'level' and 'pool' parameters:

- **ipsec-secure** – Optional. Configures secure gateway with the IPSec tunnel
- **gw** – Optional. Specifies a IPSec gateway other than the wireless controller or service platform

- **controller host [<IP>|<HOSTNAME>] {remote-vpn-client}**
gcos trust 802.1p
interface ge4
ip dhcp trust
gos trust dscp
gos trust 802.1p
use firewall-policy default
controller host 1.2.3.4 pool 2
controller group test
service pm sys-restart

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
controller adopted-devices aps controllers
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>Disables or reverts settings to their default</td>
</tr>
</tbody>
</table>
7.1.16 critical-resource

Profile Config Commands

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. When enabled, the system monitors these devices regularly and logs their status.

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

critical-resource [<CRITICAL-RESRC-NAME>|monitor]
critical-resource <CRITICAL-RESRC-NAME> monitor direct [all|any] <IP> {<IP>|
    arp-only vlan <1-4094> {<IP>|port [LAYER2-IP-NAME]|ge <1-4>|port-channel <1-2>}}
critical-resource <CRITICAL-RESRC-NAME> monitor via [<IP>|LAYER3-INTERFACE-NAME|
    pppoe1|vlan|wwan1]
critical-resource <CRITICAL-RESRC-NAME> monitor via [<IP]|LAYER3-INTERFACE-NAME|
    pppoe1|vlan <1-4094>|wwan1 [all|any] <IP> {<IP>|
    arp-only vlan <1-4094> {<IP>|
    port [LAYER2-IP-NAME]|ge <1-4>|port-channel <1-2>}}
critical-resource monitor interval <5-86400>

Parameters
- critical-resource <CRITICAL-RESRC-NAME> monitor direct [all|any] <IP> {<IP>|
    arp-only vlan <1-4094> {<IP>|
    port [LAYER2-IP-NAME]|ge <1-4>|port-channel <1-2>}}

<table>
<thead>
<tr>
<th>&lt;CRITICAL-RESRC-NAME&gt;</th>
<th>Specify the critical resource name</th>
</tr>
</thead>
<tbody>
<tr>
<td>monitor</td>
<td>Monitors configured critical resource(s)</td>
</tr>
<tr>
<td>direct</td>
<td>Monitors critical resources using the default routing engine</td>
</tr>
<tr>
<td>[all</td>
<td>any]</td>
</tr>
<tr>
<td></td>
<td>Monitors any resource that is going down (generates an event when any one of the specified critical resource is unreachable)</td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
<td>Specifies the IP address to monitor</td>
</tr>
</tbody>
</table>
The following keywords are common to the ‘all’ and ‘any’ parameters:
- `arp-only <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]>` – Optional. Limits ARP to a specified port

- `critical-resource <CRITICAL-RESRC-NAME> monitor via [<IP>|<LAYER3-INTERFACE-NAME>|ppoe1|vlan <1-4094>|wwan1] [all|any] <IP> {<IP>|arp-only [vlan <1-4094>] {<IP>}}`

<table>
<thead>
<tr>
<th><code>&lt;CRITICAL-RESRC-NAME&gt;</code></th>
<th>Specify the critical resource name</th>
</tr>
</thead>
<tbody>
<tr>
<td>monitor</td>
<td>Monitors configured critical resource(s)</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><code>&lt;IP&gt;</code></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>
<tr>
<td><code>&lt;LAYER3-INTERFACE-NAME&gt;</code></td>
<td>Specify the layer 3 Interface name (router interface)</td>
</tr>
<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
  - 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) |

- `arp-only <1-4094> {<IP>|port [LAYER2-IF-NAME]> ge[port-channel]}`

The following keywords are common to the ‘all’ and ‘any’ parameters:
- `arp-only <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 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]>` – Optional. Limits ARP to a specified port
• `critical-resource monitor interval <5-86400>`

| `monitor interval <5-86400>` | Configures the critical resource monitoring frequency  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;5-86400&gt;</code> – Specifies the frequency in seconds. Specify the time from 5 - 86400 seconds. The default is 30 seconds.</td>
</tr>
</tbody>
</table>

**Examples**

```shell
rfs7000-37FABE(config-profile-default-rfs7000)#critical-resource monitor interval 40

rfs7000-37FABE(config-profile-default-rfs7000)#critical-resource monitor direct all 172.16.10.2 arp-only vlan 1

rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  bridge vlan 1
    bridging-mode isolated-tunnel

use firewall-policy default
ap300 00-15-70-63-4F-86 adopt
ap300 00-15-70-63-4F-97 adopt
ap300 00-A0-FC-1E-DA adopt
  `critical-resource monitor interval 40`
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#
```
### 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. Table 7.4 summarizes crypto configuration commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>crypto</code></td>
<td>Invokes commands used to configure ISAKMP policy, ISAKMP client, and ISAKMP peer</td>
<td>page 7-69</td>
</tr>
<tr>
<td><code>crypto-auto-ipsec-tunnel commands</code></td>
<td>Creates an auto IPSec VPN tunnel and changes the mode to auto-ipsec-secure mode for further configuration</td>
<td>page 7-75</td>
</tr>
<tr>
<td><code>crypto-ikev1/ikev2-policy commands</code></td>
<td>Configures crypto IKEv1/IKEv2 policy parameters</td>
<td>page 7-82</td>
</tr>
<tr>
<td><code>crypto-ikev1/ikev2-peer commands</code></td>
<td>Configures IKEv1 peer parameters</td>
<td>page 7-90</td>
</tr>
<tr>
<td><code>crypto-map-config-commands</code></td>
<td>Configures crypto map parameters</td>
<td>page 7-99</td>
</tr>
<tr>
<td><code>crypto-remote-vpn-client commands</code></td>
<td>Configures remote VPN client settings</td>
<td>page 7-124</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 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

<table>
<thead>
<tr>
<th>Command</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>crypto</td>
<td>crypto [auto-ipsec-secure</td>
</tr>
<tr>
<td>crypto</td>
<td>crypto [auto-ipsec-secure</td>
</tr>
<tr>
<td>crypto</td>
<td>crypto ike-version [ikev1-only</td>
</tr>
<tr>
<td>crypto</td>
<td>crypto ikev1 [dpd-keepalive &lt;10-3600&gt;</td>
</tr>
<tr>
<td>crypto</td>
<td>crypto ikev2 [cookie-challenge-threshold &lt;1-100&gt;</td>
</tr>
<tr>
<td>crypto</td>
<td>crypto ipsec [df-bit</td>
</tr>
<tr>
<td>crypto</td>
<td>crypto ipsec df-bit [clear</td>
</tr>
<tr>
<td>crypto</td>
<td>crypto ipsec security-association lifetime [kilobytes &lt;500-2147483646&gt;</td>
</tr>
<tr>
<td>crypto</td>
<td>crypto ipsec transform-set &lt;TRANSFORM-SET-TAG&gt; [esp-3des</td>
</tr>
<tr>
<td>crypto</td>
<td>crypto map &lt;CRYPTO-MAP-TAG&gt; &lt;1-1000&gt; [ipsec-isakmp {dynamic}</td>
</tr>
<tr>
<td>crypto</td>
<td>crypto pki import crl &lt;TRUSTPOINT-NAME&gt; URL &lt;1-168&gt;</td>
</tr>
<tr>
<td>crypto</td>
<td>crypto plain-text-deny-acl-scope [global</td>
</tr>
<tr>
<td>crypto</td>
<td>crypto remote-vpn-client</td>
</tr>
</tbody>
</table>

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-uniqueids
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 <1-100>|nat-keepalive <10-3600>|peer <IKEV1-PEER>|policy <IKEV1-POLICY-NAME>|remote-vpn]
**ikev1**
Configures the IKEv1 parameters

- **dpd-keepalive <10-3600>**
  Sets the global *Dead Peer Detection* (DPD) interval from 10 - 3600 seconds

- **dpd-retries <1-1000>**
  Sets the global DPD retries count from 1-1000

- **nat-keepalive <10-3600>**
  Sets the global NAT keepalive interval from 10 - 3600 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 <1-100>|nat-keepalive <10-3600>|peer <IKEV2-PEER>]
**ikev2**
Configures the IKEv2 parameters

- **cookie-challenge-threshold <1-100>**
  Starts cookie challenge after half open IKE SAs exceeds the specified limit. Sets the limit from 1 - 100

- **dpd-keepalive <10-3600>**
  Sets the global DPD interval from 10 - 3600 seconds

- **dpd-retries <1-100>**
  Sets the global DPD retries count from 1 - 100

- **nat-keepalive <10-3600>**
  Sets the global NAT keepalive interval from 10 - 3600 seconds

- **peer <IKEV2-PEER>**
  Specify the Name/Identifier for the IKEV2 peer
### Profiles 7 - 71

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`crypto ipsec df-bit [clear</td>
<td>copy</td>
</tr>
<tr>
<td></td>
<td>- clear – Clears the DF bit in the outer header and ignores in the inner header</td>
</tr>
<tr>
<td></td>
<td>- copy – Copies the DF bit from the inner header to the outer header</td>
</tr>
<tr>
<td></td>
<td>- set – Sets the DF bit in the outer header</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`crypto ipsec security-association lifetime [kilobytes &lt;500-2147483646&gt;</td>
<td>seconds &lt;120-86400&gt;]`</td>
</tr>
<tr>
<td></td>
<td>- kilobytes – Specifies a volume-based key duration (minimum is 500 KB and maximum is 2147483646 KB)</td>
</tr>
<tr>
<td></td>
<td>- &lt;500-2147483646&gt; – Specify a value from 500 - 2147483646 KB.</td>
</tr>
<tr>
<td></td>
<td>- seconds – Specifies a time-based key duration (minimum is 120 seconds and maximum is 86400 seconds)</td>
</tr>
<tr>
<td></td>
<td>- &lt;120-86400&gt; – Specify a value from 120 - 86400 seconds.</td>
</tr>
<tr>
<td></td>
<td>The security association lifetime can be overridden under crypto maps.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`crypto ipsec transform-set &lt;TRANSFORM-SET-TAG&gt; [esp-3des</td>
<td>esp-aes</td>
</tr>
<tr>
<td></td>
<td>- &lt;TRANSFORM-SET-TAG&gt; – Specify the transform set name.</td>
</tr>
<tr>
<td></td>
<td>Specify the transform set used by the IPSec transport connection to negotiate the transform algorithm.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>esp-3des</code></td>
<td>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.</td>
</tr>
<tr>
<td><code>esp-aes</code></td>
<td>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.</td>
</tr>
<tr>
<td><code>esp-aes-192</code></td>
<td>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.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>esp-aes-256</td>
<td>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.</td>
</tr>
<tr>
<td>esp-des</td>
<td>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.</td>
</tr>
<tr>
<td>esp-null</td>
<td>Configures the ESP transform with no encryption</td>
</tr>
<tr>
<td>{esp-md5-hmac</td>
<td>esp-sha-hmac}</td>
</tr>
<tr>
<td></td>
<td>• esp-md5-hmac – Configures ESP transform using HMAC-MD5 authorization</td>
</tr>
<tr>
<td></td>
<td>• esp-sha-hmac – Configures ESP transform using HMAC-SHA authorization</td>
</tr>
<tr>
<td></td>
<td>• crypto map &lt;CRYPTO-MAP-TAG&gt; &lt;1-1000&gt; [ipsec-isakmp {dynamic}</td>
</tr>
<tr>
<td></td>
<td>map &lt;CRYPTO-MAP-TAG&gt;</td>
</tr>
<tr>
<td></td>
<td>• &lt;CRYPTO-MAP-TAG&gt; – Specify a name for the crypto map. The name should not exceed 32 characters. For crypto map configuration commands, see Crypto-Map-IPSec-Manual Commands.</td>
</tr>
<tr>
<td></td>
<td>&lt;1-1000&gt; Defines the crypto map entry sequence. Specify a value from 1 - 1000.</td>
</tr>
<tr>
<td>ipsec-isakmp {dynamic}</td>
<td>Configures IPSEC w/ISAKMP.</td>
</tr>
<tr>
<td></td>
<td>• dynamic – Optional. Configures dynamic map entry (remote VPN configuration) for XAUTH with mode-config or ipsec-l2tp configuration</td>
</tr>
<tr>
<td>ipsec-manual</td>
<td>Configures IPSEC w/manual keying. Remote configuration is not allowed for manual crypto map</td>
</tr>
<tr>
<td></td>
<td>• crypto pki import crl &lt;TRUSTPOINT-NAME&gt; &lt;URL&gt; &lt;1-168&gt;</td>
</tr>
<tr>
<td>pki</td>
<td>Configures certificate parameters. The Public Key Infrastructure (PKI) protocol creates encrypted public keys using digital certificates from certificate authorities.</td>
</tr>
<tr>
<td>import</td>
<td>Imports a trustpoint related configuration</td>
</tr>
<tr>
<td>crl &lt;TRUSTPOINT-NAME&gt;</td>
<td>Imports a Certificate Revocation List (CRL). Imports a trustpoint including either a private key and server certificate or a CA certificate or both</td>
</tr>
<tr>
<td></td>
<td>• &lt;TRUSTPOINT-NAME&gt; – Specify the trustpoint name.</td>
</tr>
<tr>
<td>&lt;URL&gt;</td>
<td>Specify the CRL source address in the following format:</td>
</tr>
<tr>
<td></td>
<td>tftp://&lt;hostname&gt;[</td>
</tr>
<tr>
<td></td>
<td>ftp://&lt;user&gt;:&lt;passwd&gt;[@&lt;hostname&gt;</td>
</tr>
<tr>
<td></td>
<td>sftp://&lt;user&gt;:&lt;passwd&gt;[@&lt;hostname&gt;</td>
</tr>
<tr>
<td></td>
<td>http://&lt;hostname&gt;[</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>&lt;1-168&gt;</td>
<td>Sets command replay duration from 1 - 168 hours</td>
</tr>
<tr>
<td></td>
<td>• crypto plain-text-deny-acl-scope [global</td>
</tr>
<tr>
<td>plain-text-deny-acl-scope</td>
<td>Configures plain-text-deny-acl-scope parameters</td>
</tr>
</tbody>
</table>
crypto remote-vpn-client

| remote-vpn-client | Configures remote VPN client settings. For more information, see crypto-remote-vpn-client commands. |

Examples

```plaintext
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
rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  bridge vlan 1
  tunnel-over-level2
  ip igmp snooping
  ip igmp snooping querier
  no autoinstall configuration
  no autoinstall firmware
  device-upgrade persist-images
  crypto ikev1 dpd-retries 1
  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-md5-hmac
  crypto ipsec transform-set tpsec-tag1 esp-aes-256 esp-md5-hmac
  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
```
Crypto Ipsec Configuration commands:
- **mode**  Encapsulation mode (transport/tunnel)
- **no**  Negate a command or set its defaults
- **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

---

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables or reverts settings to their default</td>
</tr>
</tbody>
</table>
7.1.17.2 crypto-auto-ipsec-tunnel commands

**Create 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 **Security Associations** (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).

**Internet Key Exchange** (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 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
- **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)#
```

Table 7.5 summarizes the crypto IPSec auto tunnel commands.

**Table 7.5 IPSec-Auto-Tunnel Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>groupid</td>
<td>Specifies the identity string used for IKE authentication</td>
<td>page 7-76</td>
</tr>
<tr>
<td>ip</td>
<td>Enables the controller or service platform to uniquely identify APs and the hosts present in the AP’s subnet</td>
<td>page 7-77</td>
</tr>
<tr>
<td>ike-lifetime</td>
<td>Configures the IKE SAs key lifetime in seconds</td>
<td>page 7-78</td>
</tr>
<tr>
<td>ikev2</td>
<td>Enables/disables the forced reauthentication of IKEv2 peer</td>
<td>page 7-79</td>
</tr>
<tr>
<td>remotegw</td>
<td>Defines the IKE version used for an auto IPSec tunnel using secure gateways</td>
<td>page 7-80</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 7-81</td>
</tr>
</tbody>
</table>
7.1.17.2.1 groupid

.crypto-auto-ipsec-tunnel commands

Specifies the identity string used for IKE authentication

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

groupid <WORD> [psk|rsa]
groupid <WORD> [psk [0 <WORD>|2 <WORD>|<WORD>]|rsa]

Parameters

- groupid <WORD> [psk [0 <WORD>|2 <WORD>|<WORD>]|rsa]

<WORD> Specify a string up to 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.

psk [0 <WORD>|2 <WORD>|<WORD>]
Configures the pre-shared key
- 0 <WORD> – Enter a clear text key
- 2 <WORD> – Enter 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 motorolasolutions@123 rsa

rfs7000-37FABE(config-profile-default-rfs7000-crypto-auto-ipsec-secure)#show context crypto auto-ipsec-secure
groupid motorolasolutions@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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ip nat crypto
```

**Parameters**

- `ip nat crypto`

| `ip nat crypto` | Enables unique identification of APs and the hosts present in each AP’s subnet. 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. For more information, see `remotegw` and `crypto`. |

**Examples**

```
rfs4000-229D58(config-profile-test)#ip nat crypto
rfs4000-229D58(config-profile-test)#
```

```
rfs4000-229D58(config-profile-test)#show context crypto auto-ipsec-secure
remotegw ike-version ikev2 uniqueid
ip nat crypto
rfs4000-229D58(config-profile-test)#
```
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ike-lifetime <600-86400>
```

**Parameters**

- `ike-lifetime <600-86400>`

**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)#
```
7.1.17.2.4 ikev2

crypto-auto-ipsec-tunnel commands

Enables/disables the forced IKEv2 peer re-authentication

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 reauthenticate themselves. When enabled, IKE tunnel peers have to reauthenticate each time the IKE SA is renegotiated.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
ikev2 peer reauth

Parameters

ikev2 peer reauth

| ikev2 peer reauth | Enables IKEv2 peer re-authentication. When enabled, IKE tunnel peers are forced to reauthenticate each time the IKE key is renegotiated. |

Examples
rfs4000-229D58 (config-profile-test-RFS4000-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 using a secure gateway

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
remotegw ike-version [ikev1-aggr|ikev1-main|ikev2] {uniqueid}

Parameters
- remotegw ike-version [ikev1-aggr|ikev1-main|ikev2] {uniqueid}

<table>
<thead>
<tr>
<th>remotegw ike-version</th>
<th>Configures the IKE version used for initiating auto IPSec tunnel with secure gateways</th>
</tr>
</thead>
<tbody>
<tr>
<td>ikev1-aggr</td>
<td>Aggregation mode is used by the auto IPSec tunnel initiator to set up the connection</td>
</tr>
<tr>
<td>ikev1-main</td>
<td>Main mode is used by the auto IPSec tunnel initiator to establish the connection</td>
</tr>
<tr>
<td>ikev2</td>
<td>IKEV2 is the preferred method when wireless controller/AP only is used</td>
</tr>
<tr>
<td>uniqueid</td>
<td>This keyword is common to all of the above parameters.</td>
</tr>
</tbody>
</table>

- uniqueid — Optional. Enables the assigning of a unique ID to APs (using this profile) behind a router by prefixing the MAC address to the groupid

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)#

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

Negates a command or set its defaults

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

\[\text{no } \text{[groupid|ike-lifetime|ikev2|ip]}\]

Parameters

- no [groupid|ike-lifetime|ikev2|ip]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>groupid</td>
<td>Removes local/remote identity for auto IPSec IKE</td>
</tr>
<tr>
<td>ike-lifetime</td>
<td>Removes the ISAKMP associations’ lifetime period</td>
</tr>
<tr>
<td>ikev2</td>
<td>Removes the need of peer re-authenticate in case of ike rekey</td>
</tr>
<tr>
<td>ip nat crypto</td>
<td>Disables unique identification of APs behind the NAT router</td>
</tr>
</tbody>
</table>

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 motorolasolutions@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:

```
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

 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 policy config
instance, use the following commands:

<DEVICE>(config)#profile <DEVICE-TYPE> <PROFILE-NAME>
<DEVICE>(config-profile-<PROFILE-NAME>)#crypto ikev1/ikev2 policy
<IKEV1/IKEV2-POLICY-NAME>

rfs7000-37FAE(config-profile-default-rfs7000)#crypto ikev1 policy ikev1-testpolicy
rfs7000-37FAE(config-profile-default-rfs7000-ikev1-policy-ikev1-testpolicy)#?

Crypto IKEv1 Policy Configuration commands:

dpd-keepalive    Set Dead Peer Detection interval in seconds
get                    Configure ISAKMP Proposals
lifetime         Set lifetime for ISAKMP security association
mode             IKEv1 mode (main/aggressive)
no               Negate a command or set its defaults
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

rfs7000-37FAE(config-profile-default-rfs7000-ikev1-policy-ikev1-testpolicy)#

rfs7000-37FAE(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)
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

rfs7000-37FAE(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.
Table 7.6 summarizes crypto IKEv1/iKEv2 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 7-84</td>
</tr>
<tr>
<td>dpd-retries</td>
<td>Sets the maximum number of attempts for sending Dead-Peer-Detection (DPD) keep alive packets (applicable only to the IKEv1 policy)</td>
<td>page 7-85</td>
</tr>
<tr>
<td>isakmp-proposal</td>
<td>Configures ISAKMP proposals</td>
<td>page 7-86</td>
</tr>
<tr>
<td>lifetime</td>
<td>Specifies how long an IKE SA is valid before it expires</td>
<td>page 7-87</td>
</tr>
<tr>
<td>mode</td>
<td>Sets the mode of the tunnels (applicable only to the IKEv1 policy)</td>
<td>page 7-88</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 7-89</td>
</tr>
</tbody>
</table>
7.1.17.3.1 dpd-keepalive

Sets the DPD keep-alive packet interval

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 interval 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-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-testpolicy)#
7.1.17.3.2 dpd-retries

Sets the maximum number of attempts for sending DPD keep alive packets to a peer. Once this value is exceeded, without a response, the VPN tunnel connection is declared dead. This option is available only for the IKEv1 policy.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

dpd-retries <1-100>

Parameters
- dpd-retries <1-100>

| <1-100> | Declares a peer dead after the specified number of retries. Specify a value from 1-100. |

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
```

**Parameters**


<table>
<thead>
<tr>
<th>&lt;WORD&gt;</th>
<th>Specify the name of the ISAKMP proposal</th>
</tr>
</thead>
</table>
| encryption [3des|aes|aes-192|aes-256] | Configures the encryption level transmitted using the crypto isakmp command  
  - 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) |
| group [14|2|5] | Specifies the Diffie-Hellman (DH) group (1 or 2) used by the IKE policy to generate keys (used to create IPSec SA). Specifying the group enables you to declare the modulus size used in DH calculation.  
  - 14 – Configures DH group 14  
  - 2 – Configures DH group 2  
  - 5 – Configures DH group 5 |
| hash [md5|sha] | Specifies the hash algorithm used to authenticate data transmitted over the IKE SA  
  - md5 – Uses Message Digest 5 (MD5) hash algorithm  
  - sha – Uses Secure Hash Authentication (SHA) hash algorithm |

**Examples**

```plaintext
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-ikev1-testpolicy)#isakmp-proposal testproposal encryption aes group 2 hash sha

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 is valid before it expires

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
lifetime <600-86400>
```

**Parameters**

- `lifetime <600-86400>`

<table>
<thead>
<tr>
<th>&lt;lifetime 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.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-test-ikev1policy)#lifetime 655
```

```plaintext
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-policy-testpolicy)#show context
crypto ikev1 policy testpolicy
dpd-keepalive 11
dpd-retries 10
dpd-keepalive 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)#
```
7.1.17.3.5 mode

- **crypto-ikev1/ikev2-policy commands**

  Configures the IPSec mode of operation for the IKEv1 policy

  Supported in the following platforms:
  - Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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

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 testproposal 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

Negates a command or set its defaults

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [dpd-keepalive|dpd-retries|isakmp-proposal|lifetime|mode]

Parameters

- no [dpd-keepalive|dpd-retries|isakmp-proposal|lifetime|mode]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dpd-keepalive</td>
<td>Resets the DPD keepalive interval to default</td>
</tr>
<tr>
<td>dpd-retries</td>
<td>Resets the DPD keepalive retries count to default (applicable only to the IKEv1 policy)</td>
</tr>
<tr>
<td>isakmp-proposal</td>
<td>Removes the configured ISAKMP proposal</td>
</tr>
<tr>
<td>lifetime</td>
<td>Resets the ISAKMP security association lifetime</td>
</tr>
<tr>
<td>mode</td>
<td>Resets the tunnelling mode to default (main mode) (applicable only to the IKEv1 policy)</td>
</tr>
</tbody>
</table>

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
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)#
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 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:**
- `authentication` Configure Authentication credentials
- `ip` Configure peer address/fqdn
- `localid` Set local identity
- `no` Negate a command or set its defaults
- `remoteid` Configure remote peer identity
- `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-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:**
- `authentication` Configure Authentication credentials
- `ip` Configure peer address/fqdn
- `localid` Set local identity
- `no` Negate a command or set its defaults
- `remoteid` Configure remote peer identity
- `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-ikev2-peer-peer1)#
```

Table 7.7 summarizes crypto IPSec IKEv1/IKEv2 peer configuration 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 credentials</td>
<td>page 7-92</td>
</tr>
<tr>
<td>ip</td>
<td>Configures the peer's IP address</td>
<td>page 7-93</td>
</tr>
<tr>
<td>localid</td>
<td>Configures a peer's local identity details</td>
<td>page 7-94</td>
</tr>
<tr>
<td>remoteid</td>
<td>Configures a remote peer's identity details</td>
<td>page 7-95</td>
</tr>
</tbody>
</table>
### Table 7.7 Crypto-IKEv1/IKEv2-Peer-Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>use</td>
<td>Associates a IKEv1 policy and IKEv2 policy with the IKEv1 and IKEv2 peer respectively</td>
<td>page 7-96</td>
</tr>
<tr>
<td>no</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 7-97</td>
</tr>
</tbody>
</table>
7.17.4.1 authentication

* crypto-ikev1/ikev2-peer commands

Configures IKEv1/IKEv2 peer’s authentication mode and credentials

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
authentication [psk|rsa]
```

```
authentication psk [0 <WORD>|2 <WORD>|<WORD>]
```

Parameters

- `authentication [psk [0 <WORD>|2 <WORD>|<WORD>] | rsa]`

| psk [0 <WORD>|2 <WORD>|<WORD>] | Configures pre-shared key (PSK) authentication method |
|----------------------------------|-----------------------------------------------------|
| `0 <WORD>`                      | - Specifies a clear text key. The key must be from 8 - 21 characters |
| `2 <WORD>`                      | - Specifies an encrypted key. The key must be from 8 - 21 characters |
| `<WORD>`                        | - Pre-shared key. The key must be from 8 - 21 characters |

- `rsa` Configures RSA-SIG authentication method

Examples

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#authentication rsa
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#
```

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#authentication
psk 0 moto@123456
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#show context
crypto ikev2 peer peer1
  authentication psk 0 moto@123456 local
  authentication psk 0 moto@123456 remote
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#
```
7.1.17.4.2 ip

### crypto-ikev1/ikev2-peer commands

Sets the IP address of the peer device. This can be set for multiple remote peers. The remote peer can be either an IP address or hostname.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```
ip [address <IP>|fqdn <WORD>]
```

#### Parameters

- `ip [address <IP>|fqdn <WORD>]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>address &lt;IP&gt;</td>
<td>Specify the peer device’s IP address.</td>
</tr>
<tr>
<td>fqdn &lt;WORD&gt;</td>
<td>Specify the peer device’s FQDN hostname.</td>
</tr>
</tbody>
</table>

#### 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 moto@123456 local
  authentication psk 0 moto@123456 remote
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#
```
7.1.17.4.3 localid

- **crypto-ikev1/ikev2-peer commands**

Sets a IKEv1/IKEv2 peer's local identity credentials

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
localid [address|dn|email|fqdn|string]
localid [address <IP>|dn <WORD>|email <WORD>|fqdn <WORD>|string <WORD>]
```

The following command is specific to the IKEv2 peer configuration:

`localid autogen-uniqueid <WORD>`

**Parameters**

- `localid [address <IP>|dn <WORD>|email <WORD>|fqdn <WORD>|string <WORD>]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>address &lt;IP&gt;</td>
<td>Configures the peer's IP address. The IP address is used as local identity.</td>
</tr>
<tr>
<td>dn &lt;WORD&gt;</td>
<td>Configures the peer's distinguished name. (for example, “C=us ST=&lt;state&gt; L=&lt;location&gt; O=&lt;organization&gt; OU=&lt;org unit&gt;”. 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.</td>
</tr>
</tbody>
</table>

- `localid autogen-uniqueid <WORD>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>autogen-uniqueid &lt;WORD&gt;</td>
<td>Prefixes the autogen-uniqueid of the device to the string provided here. The device’s autogen-uniqueid should be existing and configured. For more information on autogen-uniqueid, see <code>autogen-uniqueid</code>.</td>
</tr>
<tr>
<td>&lt;WORD&gt;</td>
<td>– Provide the string that is prefixed to the device’s autogen-uniqueid.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#localid email bob@zebra.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@zebra.com
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#
```
7.17.4.4 remoteid

- **crypto-ikev1/ikev2-peer commands**

  Configures a IKEV1/IKEV2 peer’s remote identity credentials

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

remoteid [address <IP>|dn <WORD>|email <WORD>|fqdn <WORD>|string <WORD>]

**Parameters**

- **remoteid [address <IP>|dn <WORD>|email <WORD>|fqdn <WORD>|string <WORD>]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>address &lt;IP&gt;</td>
<td>Configures the remote IKEV1/IKEV2 peer’s IP address. The IP address is used as the peer’s remote identity.</td>
</tr>
<tr>
<td>dn &lt;WORD&gt;</td>
<td>Configures the remote 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 remote peer’s e-mail address. The maximum length is 128 characters.</td>
</tr>
<tr>
<td>fqdn &lt;WORD&gt;</td>
<td>Configures a peer’s FQDN. The maximum length is 128 characters.</td>
</tr>
<tr>
<td>string &lt;WORD&gt;</td>
<td>Configures a peer’s identity string. The maximum length is 128 characters.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#remoteid dn San Jose

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@zebra.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)#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 configuration settings with IKEv1/IKEv2 peer

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 IKE policy and the peer IKE policy must have matching group settings for successful negotiations.

- use ikev2-policy <IKEV2-POLICY-NAME>
  - Specify the IKEv2 policy name.
  - The local IKE policy and the peer IKE 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
remotednSanJose
localidemailbob@zebra.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
remotednaddress157.235.209.63
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
no [authentication|ip|localid|remoteid|use]
```

**Parameters**

- **no [authentication|ip|localid|remoteid|use]**

---

<table>
<thead>
<tr>
<th>no authentication</th>
<th>Removes a IKEv1/IKEv2 peer’s authentication credentials</th>
</tr>
</thead>
<tbody>
<tr>
<td>no ip</td>
<td>Removes a IKEv1/IKEv2 peer’s IP address / FQDN</td>
</tr>
<tr>
<td>no localid</td>
<td>Removes a IKEv1/IKEv2 peer’s local identity details</td>
</tr>
<tr>
<td>no remoteid</td>
<td>Removes a IKEv1/IKEv2 peer’s remote identity details</td>
</tr>
<tr>
<td>no use</td>
<td>Removes the IKEv1/IKEv2 policy associated with IKEv1/IKEv2 peer respectively</td>
</tr>
</tbody>
</table>

**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@zebra.com
  use ikev1-policy test-ikev1policy
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#
```

```
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
rfs7000-37FABE(config-profile-default-rfs7000-ikev1-peer-peer1)#
```

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
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#
```

The following example shows the Crypto IKEV2 peer1 settings after the ‘no’ commands are executed:

```
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#show context
crypto ikev2 peer peer1
  use ikev2-policy test
rfs7000-37FABE(config-profile-default-rfs7000-ikev2-peer-peer1)#
```
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)#
7.1.17.5 crypto-map-config-commands

This section explains crypto map 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).

Internet Key Exchange (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 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:
<DEVICE>(config-device-<DEVICE-MAC>)#crypto map <CRYPTO-MAP-TAG> <1-1000>
    [ipsec-isakmp {dynamic}|ipsec-manual]

In the profile-config mode:
<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

rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#

Table 7.8 summarizes crypto map configuration mode commands.

**Table 7.8 Crypto-Map-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 7-101</td>
</tr>
<tr>
<td>crypto-map-ipsec-manual-instance</td>
<td>Configures a manual site-to-site VPN</td>
<td>page 7-115</td>
</tr>
</tbody>
</table>
7.1.17.6 crypto-map auto-vpn-tunnel/remote-vpn-client instance

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

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}
revert | Revert changes
service | Service Commands
show | Show running system information
write | Write running configuration to memory or terminal

rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#

Table 7.9 lists the IPSec-Auto-VPN/Remote-VPN tunnel configuration 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 7-103</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 7-104</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 7-105</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 7-106</td>
</tr>
<tr>
<td>pfs</td>
<td>Configures the Perfect Forward Secrecy (PFS) for the VPN tunnel. This command is applicable to the site-to-site VPN tunnel and remote VPN client.</td>
<td>page 7-107</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 7-108</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 7-109</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 7-111</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 7-112</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts site-to-site VPN tunnel or remote VPN client settings</td>
<td>page 7-113</td>
</tr>
</tbody>
</table>
7.1.17.6.1 ip

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 setting is disabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ip nat crypto
```

**Parameters**

- `ip nat crypto`

| `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**

```
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
   ip nat crypto
```

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#
```
7.1.17.6.2 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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)#
7.1.17.6.3 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
```
modeconfig [pull|push]
```

Parameters
- `modeconfig [pull|push]`

Examples
Remote VPN client:
```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#modeconfig push
```
7.1.17.6.4 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
peer <1-3> [ikev1|ikev2] <IKEv1/IKEv2-PEER-NAME>

Parameters
- peer <1-3> [ikev1|ikev2] <IKEv1/IKEv2-PEER-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)#

<table>
<thead>
<tr>
<th>peer &lt;1-3&gt;</th>
<th>Creates a new peer and configures the peer's priority level. Peer '1' is the primary peer, and peer '3' is redundant.</th>
</tr>
</thead>
</table>
| 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. |
7.1.17.6.5 pfs

crypto-map auto-vpn-tunnel/remote-vpn-client instance

Configures the Perfect Forward Secrecy (PFS) for the auto site-to-site VPN tunnel or remote VPN client.

PFS is 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. The option is disabled by default.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

`pfs [14|2|5]`

Parameters

- `pfs [14|2|5]` Configures the PFS:
  - 14 – Configures D-H Group14 (2048-bit modp)
  - 2 – Configures D-H Group2 (1024-bit modp)
  - 5 – 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)#
```
7.1.17.6.6 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
remote-type [none|xauth]
```

**Parameters**

- `remote-type [none|xauth]`

| remote-type [none|xauth] | Specify the remote VPN's client type |
|-------------------------|-------------------------------------|
| none                    | Specifies remote VPN client with No XAUTH |
| xauth                   | Specify remote VPN client as using XAUTH (applicable only for IKEv1). This is the default setting |

**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. The default setting is XAuth.

**Examples**

Remote VPN client:

```
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#2)#remote-type none
nrfs4000-229D58(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)#
```
7.1.17.6.7 security-association

Define the IPSec SAs (created by this auto site-to-site VPN tunnel or remote VPN client) settings.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
security-association [inactivity-timeout|level|lifetime]
security-association [inactivity-timeout <120-86400>|level prehost]
security-association lifetime [kilobytes <500-2147483646>|seconds <120-86400>]
```

Parameters

- **security-association [inactivity-timeout <120-86400>|level prehost]**
  - 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 prehost Specifies the granularity level for this IPSec VPN SA
    - prehost – 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 SAs 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.
    - 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.

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)#
7.17.6.8 transform-set

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, which can be customized with its own data protection and peer authentication schemes.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
transform-set <TRANSFORM-SET-TAG>

Parameters
- transform-set <TRANSFORM-SET-TAG>

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)#
7.17.6.9 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```plaintext
use ip-access-list <IP-ACCESS-LIST-NAME>
```

Parameters

- use ip-access-list <IP-ACCESS-LIST-NAME>

Examples

Site-to-site VPN tunnel:

```plaintext
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 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)#
```

Remote VPN client:

```plaintext
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 test 2 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)#
```
7.1.17.6.10 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

no [ip|local-endpoint|modeconfig|peer|pfs|remote-type|security-association|transform-set|use]

**Parameters**

- no [ip|local-endpoint|modeconfig|peer|pfs|remote-type|security-association|transform-set|use]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no ip</td>
<td>Disables this setting to utilize IP/Port NAT on the auto site-to-site VPN tunnel</td>
</tr>
<tr>
<td>no local-endpoint-ip</td>
<td>Removes the configured IP as local tunnel endpoint address</td>
</tr>
<tr>
<td>no modeconfig</td>
<td>Resets the remote VPN client’s mode config method to default (push)</td>
</tr>
<tr>
<td>no peer</td>
<td>Removes the configured IKEv1 or IKEv2 peer for the auto site-to-site VPN tunnel or remote VPN client</td>
</tr>
<tr>
<td>no pfs</td>
<td>Removes the PFS configured for this auto site-to-site VPN tunnel</td>
</tr>
<tr>
<td>no remote-type</td>
<td>Resets the remote VPN client type to default (XAUTH)</td>
</tr>
<tr>
<td>no security-association</td>
<td>Removes the VPN tunnel or remote VPN client’s IPSec SA settings</td>
</tr>
<tr>
<td>no transform-set</td>
<td>Removes the transform set applied to the VPN tunnel or remote VPN client</td>
</tr>
<tr>
<td>no use</td>
<td>Removes IP access list applied to the auto site-to-site VPN tunnel or remote VPN client</td>
</tr>
</tbody>
</table>

**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 250000t
  security-association inactivity-timeout 200
  transform-set AutVPN
  ip nat crypto

rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#

rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#no use ip-access-list
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#no security-association level perhost
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#no ip nat crypto
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#no pfs
rfs4000-229D58(config-device-00-23-68-22-9D-58-cryptomap-test#1)#no local-endpoint-ip
The following example shows the IPSec site-to-site VPN tunnel ‘test’ settings after the ‘no’ commands are executed:

```plaintext
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:

```plaintext
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)#
```

```plaintext
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:

```plaintext
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)#
```
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

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 7-116</td>
</tr>
<tr>
<td>mode</td>
<td>Set the tunnel mode</td>
<td>page 7-117</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
<td>page 7-119</td>
</tr>
<tr>
<td>peer</td>
<td>Set peer</td>
<td>page 7-119</td>
</tr>
<tr>
<td>security-association</td>
<td>Set security association parameters</td>
<td>page 7-120</td>
</tr>
<tr>
<td>session-key</td>
<td>Set security session key parameters</td>
<td>page 7-120</td>
</tr>
<tr>
<td>use</td>
<td>Set setting to use</td>
<td>page 7-120</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
<td>page 7-121</td>
</tr>
<tr>
<td>commit</td>
<td>Commit all changes made in this session</td>
<td>page 7-122</td>
</tr>
<tr>
<td>do</td>
<td>Run commands from Exec mode</td>
<td>page 7-123</td>
</tr>
<tr>
<td>end</td>
<td>End current mode and change to EXEC mode</td>
<td>page 7-123</td>
</tr>
<tr>
<td>exit</td>
<td>End current mode and down to previous mode</td>
<td>page 7-123</td>
</tr>
<tr>
<td>help</td>
<td>Description of the interactive help system</td>
<td>page 7-123</td>
</tr>
<tr>
<td>revert</td>
<td>Revert changes</td>
<td>page 7-123</td>
</tr>
<tr>
<td>service</td>
<td>Service Commands</td>
<td>page 7-123</td>
</tr>
<tr>
<td>show</td>
<td>Show running system information</td>
<td>page 7-123</td>
</tr>
<tr>
<td>write</td>
<td>Write running configuration to memory or terminal</td>
<td>page 7-123</td>
</tr>
</tbody>
</table>

Table 7.10 lists the IPSec manual VPN tunnel configuration commands:

Table 7.10 Crypto-Map-IPSec-Manual Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>local-endpoint-ip</td>
<td>Uses the configured IP as local tunnel endpoint address, instead of the interface IP (Advanced Configuration)</td>
<td>page 7-116</td>
</tr>
<tr>
<td>mode</td>
<td>Sets the tunnel mode</td>
<td>page 7-117</td>
</tr>
<tr>
<td>peer</td>
<td>Sets the peer device's IP address</td>
<td>page 7-118</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 7-119</td>
</tr>
<tr>
<td>session-key</td>
<td>Defines encryption and authentication keys for a crypto map</td>
<td>page 7-120</td>
</tr>
<tr>
<td>use</td>
<td>Uses the configured IP access list</td>
<td>page 7-122</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 7-123</td>
</tr>
</tbody>
</table>
7.1.17.7.1 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>– Specify the IP address. The specified IP address must be available on the interface.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#local-endpoint-ip 172.16.10.3
```
7.1.17.2 mode

- crypto-map-ipsec-manual-instance

Sets the crypto map tunnel mode

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

mode [transport|tunnel]

Parameters

- mode [transport|tunnel]

| mode [transport|tunnel] | Sets the mode of the tunnels for this crypto map |
|------------------------|-----------------------------------------------|
|                        | • transport – Initiates transport mode        |
|                        | • 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)#
7.1.17.7.3 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
peer <IP>

Parameters
- peer <IP>

| peer <IP> | Enter the peer device's IP address. If not configured, it implies respond to any peer. |

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)#
7.1.17.7.4 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
security-association lifetime [kilobytes <500-2147483646>|seconds <120-86400>]
```

Parameters

- `security-association lifetime [kilobytes <500-2147483646>|seconds <120-86400>]`

| lifetime [kilobytes <500-2147483646>|seconds <120-86400>] | 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 bytes. |
| seconds <120-86400> | - Defines time based key duration. Specify the time frame from 120 - 86400 seconds. |

**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 crypto map map2 2 ipsec-isakmp security-association lifetime seconds 123
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map2#2)#
```
### 7.1.17.7.5 session-key

**crypto-map-ipsec-manual-instance**

Defines encryption and authentication keys for this crypto map

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>**
  - 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 MDS 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>**
  - 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.
    - <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

```plaintext
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)#
```
7.1.17.7.6 use

Use the configured IP access list

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
use ip-access-list <IP-ACCESS-LIST-NAME>
```

Parameters

| ip-access-list <IP-ACCESS-LIST-NAME> | Specify the IP access list name. |

Examples

```
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#use ip-access-list test
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 5876897
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#
```
7.1.17.7 no

- **crypto-map-ipsec-manual-instance**

Negates a command or reverts settings to their default

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
no [local-endpoint-ip|mode|peer|security-association|session-key|use]
```

**Parameters**

- no [local-endpoint-ip|mode|peer|security-association|session-key|use]

<table>
<thead>
<tr>
<th>no local-endpoint-ip</th>
<th>Deletes the local IP address</th>
</tr>
</thead>
<tbody>
<tr>
<td>no mode</td>
<td>Resets the tunnelling mode to default (Tunnel)</td>
</tr>
<tr>
<td>no peer</td>
<td>Deletes the remote peer settings</td>
</tr>
<tr>
<td>no security-association</td>
<td>Deletes the security association parameters</td>
</tr>
<tr>
<td>no session-key</td>
<td>Deletes the session key parameters</td>
</tr>
<tr>
<td>no use</td>
<td>Resets the IP access list parameters values</td>
</tr>
</tbody>
</table>

**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 5876897
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 5876897
rfs7000-37FABE(config-profile-default-rfs7000-cryptomap-map1#1)#
```
7.1.17.8 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-config 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:

```
rfs4000-229D58(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:
```
rfs4000-229D58(config-profile-testRFS4000)#controller host <HOST-IP> remote-vpn-client
```

On a device:
```
rfs4000-229D58(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

```
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#
```

Table 7.11 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>dhcp-peer</td>
<td>Configures DHCP peer’s local ID and authentication settings</td>
<td>page 7-126</td>
</tr>
<tr>
<td>peer</td>
<td>Adds a remote IKEv2 peer</td>
<td>page 7-127</td>
</tr>
<tr>
<td>shutdown</td>
<td>Disables the remote VPN client</td>
<td>page 7-128</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 7-129</td>
</tr>
<tr>
<td>no</td>
<td>Removes the remote VPN client settings</td>
<td>page 7-130</td>
</tr>
</tbody>
</table>
7.17.8.1 dhcp-peer

**crypto-remote-vpn-client commands**

Configures DHCP peer’s local ID and authentication settings

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

dhcp-peer [authentication|localid]

dhcp-peer authentication [psk [0 <WORD>|2 <WORD>|<WORD>]|rsa]]

**Parameters**

- dhcp-peer authentication [psk [0 <WORD>|2 <WORD>|<WORD>]|rsa]

| dhcp-peer authentication psk [0 <WORD>| 2 <WORD>|<WORD>] | 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 |       |

<table>
<thead>
<tr>
<th>dhcp-peer authentication rsa</th>
<th>Configures the DHCP peer’s authentication type as RSA. This is the default setting.</th>
</tr>
</thead>
</table>

**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)#
7.17.8.2 peer

**crypto-remote-vpn-client commands**

Adds a new remote peer. 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
peer <1-3> ikev2 <IKEV2-PEER-NAME>
```

**Parameters**

- `peer <1-3> ikev2 <IKEV2-PEER-NAME>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>peer &lt;1-3&gt;</code></td>
<td>Adds a IKEV2 peer. You can add multiple peers to achieve redundancy</td>
</tr>
<tr>
<td><code>ikev2</code></td>
<td>Specifies a name for this IKEV2 peer.</td>
</tr>
</tbody>
</table>

**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)#
```

7.1.17.8.3 shutdown

crypto-remote-vpn-client commands

Disables remote-vpn-client on this profile or device. Remote VPN client feature is disabled by default.

To enable remote VPN client, use the `no shutdown` command.

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`shutdown`

**Parameters**

None

**Examples**

```bash
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#
shutdown
rfs4000-229D58(config-profile-testRFS4000-crypto-ikev2-remote-vpn-client)#
```
7.1.17.8.4 transform-set

crypto-remote-vpn-client commands

Specifies the IPSec Transform to use with the 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
transform-set <IPSEC-XFORM-TAG>
```

Parameters

- `transform-set <IPSEC-XFORM-TAG>`

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)#
```
7.1.17.8.5 no

*crypto-remote-vpn-client commands*

Removes the remote VPN client settings

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
no [peer <1-3>|shutdown|transform-set]
```

**Parameters**

- `no [peer <1-3>|shutdown|transform-set]`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no peer &lt;1-3&gt;</td>
<td>Removes the remote IKEv2 peer with the specified priority</td>
</tr>
<tr>
<td>no shutdown</td>
<td>Enables remote VPN client</td>
</tr>
<tr>
<td>transform-set</td>
<td>Disassociates the transform set attached with this remote VPN client</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
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)#

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 device-upgrade

#### Profile Config Commands

Configures device firmware upgrade settings on this profile. Access points, wireless controllers, and service platforms using this profile automatically upgrade firmware on adopted devices.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
device-upgrade [add-auto|auto|count|persist-images]
```

```
device-upgrade add-auto [(ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000)]
```

```
device-upgrade auto { (ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000) }
```

```
device-upgrade count <1-20>
```

```
device-upgrade persist-images
```

**Parameters**

- **Device Upgrade add-auto**
  - `{(ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000)}`

<table>
<thead>
<tr>
<th>device-upgrade add-auto</th>
<th>Configures a list of device types for automatic firmware upgrade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This command specifies the types of devices that can be automatically upgraded (if enabled). To enable automatic device firmware upgrade, use the ‘auto’ 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>
</tbody>
</table>

| [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] | Adds selected devices to the device type list |
|------------------------------------------------|------------------------------------------------|
| [ap621] – Adds AP621 device to the auto device type list |
| [ap622] – Adds AP622 device to the auto device type list |
| [ap650] – Adds AP650 device to the auto device type list |
| [ap6511] – Adds AP6511 device to the auto device type list |
| [ap6521] – Adds AP6521 device to the auto device type list |
| [ap6522] – Adds AP6522 device to the auto device type list |
| [ap6532] – Adds AP6532 device to the auto device type list |
| [ap6562] – Adds AP6562 device to the auto device type list |
| [ap71xx] – Adds AP71XX device to the auto device type list |
| [ap81xx] – Adds AP81XX device to the auto device type list |
| [ap82xx] – Adds AP82XX device to the auto device type list |
| [rfs4000] – Adds RFS4000 device to the auto device type list |
| [rfs6000] – Adds RFS6000 device to the auto device type list |
| [rfs7000] – Adds RFS7000 device to the auto device type list |

Contd..
**device-upgrade auto**  
Enables automatic firmware upgrade on specified device types. 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.

```text
{ (ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000) }
```

- **NX45XX** – Adds NX45XX device to the auto device type list
- **NX65XX** – Adds NX65XX device to the auto device type list
- **NX9500** – Adds NX9500 device to the auto device type list

**Note:** Multiple device types can be added to the add-auto list

**device-upgrade count <1-20>**  
Configures the maximum number of concurrent upgrades possible

- `<1-20>` – specify a value from 1 - 20.

**device-upgrade persist-images**  
Configures parameters for automatic firmware upgrade of adopted devices. Use this command to select the device types and the maximum number of concurrent upgrades.

- **images**  
Enables RF Domain manager to retain AP firmware image after upgrade, subject to availability of space
  By default this feature is enabled for wireless controllers and disabled for access points.
Examples

rfs4000-229D58(config-profile-default-rfs4000)#device-upgrade auto ap71xx

rfs4000-229D58(config-profile-default-rfs4000)#show context
profile rfs4000 default-rfs4000
  autoinstall configuration
  autoinstall firmware
  device-upgrade auto ap71xx
  device-upgrade persist-ap-image
  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 radio1
  interface radio2
  interface up1
  ip dhcp trust
  qos trust dscp
  qos trust 802.1p
  interface gel
  ip dhcp trust
  qos trust dscp
  qos trust 802.1p

--More--

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes device firmware upgrade settings on this profile</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>Displays device upgrade details</td>
</tr>
</tbody>
</table>
7.1.19 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 — ES6510, AP6511, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax

dot1x [guest-vlan|system-auth-control|use]

dot1x system-auth-control

dot1x guest-vlan supplicant

dot1x use aaa-policy <AAA-POLICY-NAME>

Parameters
- dot1x system-auth-control
  - system-auth-control Enables or disables system auth control. Enables/disables dot1x authorization globally for the controller. This feature is disabled by default.

- 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>
  - use aaa-policy Associates a specified 802.1x AAA policy with this access point profile
    - <AAA-POLICY-NAME> — Specify the AAA policy name. Once specified, this AAA policy is utilized for authenticating user requests.
Examples

rfs7000-37FABE(config-profile-default-rfs7000)#dot1x use aaa-policy test

rfs7000-37FABE(config-profile-default-rfs7000)#dot1x system-auth-control

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 pppoe1
  use firewall-policy default
ap300 00-15-70-63-4F-86 adopt
ap300 00-15-70-63-4F-97 adopt
ap300 00-A0-F8-CF-1E-DA adopt
service pm sys-restart
router ospf
dot1x system-auth-control
dot1x use aaa-policy test
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables or reverts settings to their default</td>
</tr>
</tbody>
</table>
7.1.20 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
dscp-mapping <WORD> priority <0-7>
```

**Parameters**

- `dscp-mapping <word> priority <0-7>`

<table>
<thead>
<tr>
<th><code>&lt;WORD&gt;</code></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>0 – Best effort</td>
<td>1 – Background</td>
</tr>
<tr>
<td>2 – Spare</td>
<td>3 – Excellent effort</td>
</tr>
<tr>
<td>4 – Controlled load</td>
<td>5 – Video</td>
</tr>
<tr>
<td>6 – Voice</td>
<td>7 – Network control</td>
</tr>
</tbody>
</table>

**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 me1
interface ge1
ip dhcp trust
qos trust dscp
rfs7000-37FABE(config-profile-default-rfs7000)#
```

**Related Commands**

`no` Disables or reverts settings to their default
7.1.21 **email-notification**

**Profile Config Commands**

Configures e-mail notification settings

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
email-notification [host|recipient]

email-notification recipient <RECIPIENT-NAME>

email-notification host <SMTP-SERVER-IP> sender <SENDER-EMAIL> {port|username}

email-notification host <SMTP-SERVER-IP> sender <SENDER-EMAIL> {username <SMTP-USERNAME>} [password [2 <WORD>|<WORD>]]

email-notification host <SMTP-SERVER-IP> sender <SENDER-EMAIL> {username <SMTP-USERNAME>} [password [2 <WORD>|<WORD>]] {port <1-65535>}
```

**Parameters**

- **email-notification recipient <RECIPIENT-EMAIL>**
  - **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).

- **email-notification host <SMTP-SERVER-IP> sender <SENDER-EMAIL> {port <1-65535>}
  {username <SMTP-USERNAME>} [password [2 <WORD>|<WORD>]]**
  - **host <SMTP-SERVER-IP>**
    - Configures the host SMTP server
    - `<SMTP-SERVER-IP>` — Specify the SMTP server’s IP address.
  - **sender <SENDER-EMAIL>**
    - Defines the sender’s e-mail address
    - `<SENDER-EMAIL>` — Specify the sender’s e-mail address (should not exceed 64 characters in length).
  - **port <1-65535>**
    - Optional. Configures the SMTP server port
    - `<1-65535>` — Specify the port from 1 - 65535.
  - **username <SMTP-USERNAME>**
    - Optional. Configures the SMTP username
    - `<SMTP-USERNAME>` — Specify the SMTP username (should not exceed 64 characters in length).
  - **password [2 <WORD>|<WORD>]**
    - Configures the SMTP server password
    - 2 <WORD> — Configures an encrypted password
    - <WORD> — Specify the password (should not exceed 127 characters in length).
email-notification host <SMTP-SERVER-IP> sender <SENDER-EMAIL>
{username <SMTP-USERNAME>} [password [2 <WORD>]<WORD>] {port <1-65535>}

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>host &lt;SMTP-SERVER-IP&gt;</td>
<td>Configures the host SMTP server</td>
</tr>
<tr>
<td>sender &lt;SENDER-EMAIL&gt;</td>
<td>Defines sender’s e-mail address</td>
</tr>
<tr>
<td>username &lt;SMTP-USERNAME&gt;</td>
<td>Optional. Configures the SMTP username</td>
</tr>
<tr>
<td>password [2 &lt;WORD&gt;]&lt;WORD&gt;</td>
<td>Configures the SMTP server password</td>
</tr>
<tr>
<td>port &lt;1-65535&gt;</td>
<td>Optional. Configures the SMTP server port</td>
</tr>
</tbody>
</table>

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#email-notification recipient test@motorolasoultions.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@zebra.com
service pm sys-restart
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

no | Disables or reverts settings to their default
7.1.22 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 |
| cluster | Verifies firmware versions before clustering |
| full | Allows adoption or clustering when the first four octets of the firmware versions match (for example 5.4.2.0) |
| major | Allows adoption or clustering when the first two octets of the firmware versions match (for example 5.4) |
| minor | Allows adoption or clustering when the first three octets of the firmware versions match (for example 5.4.2) |
| none | Allows adoption or clustering between any firmware versions |
| strict | Allows adoption or clustering only when firmware versions exactly match (for example 5.4.2.0-006D) |

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#enforce-version cluster full
rfs7000-37FABE(config-profile-default-rfs7000)#enforce-version adoption major

Related Commands

- no | Disables or reverts settings to their default |
### 7.1.23 `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**

```plaintext
environmental-sensor [humidity|light|motion|polling-interval|temperature]
environmental-sensor [humidity|motion|polling-interval <1-100>|temperature]
environmental-sensor light {holdtime|radio-shutdown|threshold}
environmental-sensor light {holdtime <2-201>|radio-shutdown [all|radio-1|radio-2]}
environmental-sensor light {threshold [high <100-10000>|low <0-1000>]
```

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>humidity</td>
<td>Enables (turns on) humidity sensors. This setting is enabled by default.</td>
</tr>
<tr>
<td>motion</td>
<td>Enables (turns on) motion sensors. This setting is enabled by default.</td>
</tr>
<tr>
<td>polling-interval &lt;1-100&gt;</td>
<td>Configures polling interval, in seconds, on all sensors. This is the interval after which the sensor module polls its environment to assess the various parameters, such as light intensity.</td>
</tr>
<tr>
<td>temperature</td>
<td>Enables (turns on) temperature sensors. This setting is enabled by default.</td>
</tr>
<tr>
<td>light</td>
<td>Enables (turns on) light sensors and specifies its settings.</td>
</tr>
<tr>
<td>holdtime &lt;2-201&gt;</td>
<td>Optional. Configures a holdtime, in seconds, for the light sensor</td>
</tr>
<tr>
<td>radio-shutdown [all</td>
<td>radio1</td>
</tr>
</tbody>
</table>

**Note:** AP8132’s using this profile have their radios shut down, when the radio’s power falls below the specified threshold.
environmental-sensor light \{threshold [high <100-10000>|low <0-1000>]\}

<table>
<thead>
<tr>
<th>environmental-sensor</th>
<th>Configures environmental sensor settings on this profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>light</td>
<td>Enables (turns on) light sensors and specifies its settings</td>
</tr>
<tr>
<td>threshold</td>
<td>Optional. Configures the upper and lower thresholds for the amount of light in the environment</td>
</tr>
<tr>
<td>high &lt;100-10000&gt;</td>
<td>Specifies the upper threshold from 100 - 10000 lumens. This value determines whether lighting is on in the AP8132’s deployment location. The default is 500 lux. \textbf{Note:} The light sensor triggers an event if the amount of light exceeds the specified value.</td>
</tr>
<tr>
<td>low &lt;0-1000&gt;</td>
<td>Specifies the lower threshold from 0 - 1000 lumens. This value determines whether lighting is off in the AP8132’s deployment location. The default is 100 lux. \textbf{Note:} The light sensor triggers an event if the amount of light drops below the specified value.</td>
</tr>
</tbody>
</table>

\textbf{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
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--
rfs4000-229D58 (config-profile-testRFS4000)#

\textbf{Related Commands}

\textit{no} | Removes the environmental sensor’s settings
7.1.24 events

Profile Config Commands

Displays system event messages

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

events [forward on|on]

Parameters

- event [forward on|on]

<table>
<thead>
<tr>
<th>Parameter</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>Enables forwarding of system events</td>
</tr>
<tr>
<td>on</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

- no | Disables or reverts settings to their default |
7.1.25 **export**

**Profile Config Commands**

Enables export of startup.log file after every boot

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
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><code>max-retries</code></td>
<td>Configures the maximum number of retries in case the export process fails</td>
</tr>
<tr>
<td><code>retry-interval</code></td>
<td>Configures the interval between two consecutive retries</td>
</tr>
<tr>
<td><code>url</code></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</td>
</tr>
<tr>
<td></td>
<td>- sftp://&lt;user&gt;@&lt;hostname</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000)#export startup-log max-retries 10
retry-interval 30 url test@zebra.com

rfs7000-37FABE(config-profile-default-rfs7000)#show context
profile rfs7000 default-rfs7000
  bridge vlan 1
  ......................................................
  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
export startup-log max-retries 10 retry-interval 30 url test@zebra.com
ap300 00-15-70-63-4F-86 adopt
ap300 00-15-70-63-4F-97 adopt
ap300 00-A0-F8-CF-1E-DA adopt
service pm sys-restart
router ospf
rfs7000-37FABE(config-profile-default-rfs7000)#
```

**Related Commands**

- `no` Disables export of startup.log file
7.1.26 floor

Profile Config Commands

Sets the floor name where the system is located

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
floor <WORD> {<1-4094>}

Parameters
- floor <WORD> {<1-4094>}

Sets the floor name where the system is located
- <WORD> — Specify the floor name.
- <1-4094> — Optional. Configures the floor number from 1 - 4094.

Examples
rfs7000-37FABE(config-profile-default-rfs7000)#floor fifth
rfs7000-37FABE(config-profile-default-rfs7000)#

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
### 7.1.27 `gre`

*Profile Config Commands*

**Table 7.12** GRE-Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>gre</code></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 7-146</td>
</tr>
<tr>
<td><code>gre-config-instance</code></td>
<td>Summarizes GRE tunnel configuration mode commands</td>
<td>page 7-148</td>
</tr>
</tbody>
</table>
7.1.27.1 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 VLANs 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.

NOTE: Only one GRE tunnel can be created for every profile.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

gre tunnel <GRE-TUNNEL-NAME>

Parameters

- gre tunnel <GRE-TUNNEL-NAME>

Examples

rfs4000-229D58(config-profile testRFS4000-gre-tunnel-testGREtunnel)#?
GRE Tunnel Mode commands:
  dscp Differentiated Services Code Point
  failover Gre tunnel failover
  native Native trunking characteristics
  no Negate a command or set its defaults
  peer GRE peer
  tunneled-vlan VLANs to tunnel
  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

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

use firewall-policy default
service pm sys-restart
router ospf
gre tunnel testGREtunnel
  peer 1 ip 192.168.13.8
  peer 2 ip 192.168.13.10
rfs4000-229D58(config-profile testRFS4000)#

Related Commands

| no | Disables GRE tunneling on this profile |
### 7.1.27.2 gre-config-instance

<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)</em> / 802.1q priority value</td>
<td>page 7-149</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 7-150</td>
</tr>
<tr>
<td>native</td>
<td>Configures native trunking settings for this GRE tunnel</td>
<td>page 7-151</td>
</tr>
<tr>
<td>no</td>
<td>Removes the GRE tunnel settings based on the parameters passed</td>
<td>page 7-152</td>
</tr>
<tr>
<td>peer</td>
<td>Configures the GRE tunnel's end-point peers</td>
<td>page 7-153</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 7-154</td>
</tr>
</tbody>
</table>
7.1.27.2.1 dscp

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

dscp [<0-63>|reflect]

Parameters

- **dscp [0-63]** Specifies the DSCP 802.1q priority value for outer packets from 0 - 63. The default is 1.
- **dscp reflect** Copies the DSCP 802.1q value from inner packets

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
7.1.27.2.2 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
failover interval <0-86400> retry <0-10>
```

**Parameters**

- **failover interval <0-86400> retry <0-10>**

<table>
<thead>
<tr>
<th>failover interval &lt;0-86400&gt; retry &lt;0-10&gt;</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0-86400&gt;</td>
<td>Specify a value from 0 - 86400 seconds.</td>
</tr>
<tr>
<td>retry &lt;0-10&gt;</td>
<td>Specifies the maximum number attempts made to ping the primary gateway before the session is terminated.</td>
</tr>
<tr>
<td>&lt;0-10&gt;</td>
<td>Specify a value from 0 - 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**

```
no
```

Removes the GRE tunnel settings based on the parameters passed
### 7.1.27.2.3 native

**gre-config-instance**

Configures native trunking settings for this GRE tunnel

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
native [tagged|vlan <1-4094>]
```

**Parameters**

- native [tagged|vlan <1-4094>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>native tagged</td>
<td>Tags the native VLAN</td>
</tr>
<tr>
<td></td>
<td>The IEEE 802.1Q specification is supported for tagging frames and coordinating VLANs between devices.</td>
</tr>
<tr>
<td></td>
<td>IEEE 802.1Q adds four bytes to each frame identifying the VLAN ID for upstream devices that the frame</td>
</tr>
<tr>
<td></td>
<td>belongs. If the upstream Ethernet device does not support IEEE 802.1Q tagging, it does not interpret</td>
</tr>
<tr>
<td></td>
<td>the tagged frames. When VLAN tagging is required between devices, both devices must support tagging</td>
</tr>
<tr>
<td></td>
<td>and be configured to accept tagged VLANs. When a frame is tagged, the 12 bit frame VLAN ID is added to</td>
</tr>
<tr>
<td></td>
<td>the 802.1Q header so upstream Ethernet devices know which VLAN ID the frame belongs to. The device</td>
</tr>
<tr>
<td></td>
<td>reads the 12 bit VLAN ID and forwards the frame to the appropriate VLAN. When a frame is received with</td>
</tr>
<tr>
<td></td>
<td>no 802.1Q header, the upstream device classifies the frame using the default or native VLAN assigned to</td>
</tr>
<tr>
<td></td>
<td>the Trunk port. The native VLAN allows an Ethernet device to associate untagged frames to a VLAN when</td>
</tr>
<tr>
<td></td>
<td>no 802.1Q frame is included in the frame. This feature is disabled by default.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>native vlan &lt;1-4094&gt;</td>
<td>Specifies a numerical VLAN ID (1 - 4094) for the native VLAN</td>
</tr>
<tr>
<td></td>
<td>The native VLAN allows an Ethernet device to associate untagged frames to a VLAN, when no 802.1q frame</td>
</tr>
<tr>
<td></td>
<td>is included in the frame. Additionally, the native VLAN is the VLAN untagged traffic is directed over</td>
</tr>
<tr>
<td></td>
<td>when using a port in trunk mode.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#native tagged
```

```
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#native vlan 1
```

```
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#show context
gre tunnel testGRETunnel
  native tagged
dscp 20
  failover interval 200 retry 5
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#
```

**Related Commands**

```
o
```

Removes the GRE tunnel settings based on the parameters passed
7.1.27.2.4 no

- **gre-config-instance**

Removes the GRE tunnel settings based on the parameters passed.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
no [dscp|failover|native|peer|tunneled-vlan]
```

**Parameters**

- `no [dscp|failover|native|peer|tunneled-vlan]`

**Examples**

The following example shows the GRE tunnel ‘testGRETunnel’ settings before the no commands are executed:

```
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)#no dscp
```

```
rfs4000-229D58(config-device 00-23-68-22-9D-58-gre-tunnel-testGRETunnel)#no native vlan
```

```
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:

```
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)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>dscp</code></td>
<td>Sets the GRE tunnel’s DSCP / 802.1q priority value</td>
</tr>
<tr>
<td><code>failover</code></td>
<td>Enables periodic pinging of the primary gateway to assess its availability, in case it is unreachable</td>
</tr>
<tr>
<td><code>native</code></td>
<td>Configures native trunking settings for this GRE tunnel</td>
</tr>
<tr>
<td><code>peer</code></td>
<td>Configures the GRE tunnel’s end-point peers</td>
</tr>
<tr>
<td><code>tunneled-vlan</code></td>
<td>Defines the VLAN that connected clients use to route GRE tunneled traffic within their respective WLANs</td>
</tr>
</tbody>
</table>
7.1.27.25 peer

peer-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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
peer <1-2> ip <IP>

Parameters
- peer <1-2> ip <IP>

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
7.1.27.2.6 tunneled-vlan

Defineds the VLAN that connected clients use to route GRE tunneled traffic within their respective WLANs

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
tunneled-vlan <VLAN-ID>
```

Parameters

- `tunneled-vlan <VLAN-ID>`

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
## 7.1.28 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 the WiNG 5.6 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 adopted. 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 hierarchically network, see `device-upgrade`.

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>compress</td>
<td>Compresses update files before forwarding to the controller. This option is disabled by default.</td>
</tr>
<tr>
<td>update-interval &lt;1-3600&gt;</td>
<td>Sets the interval, in seconds, at which buffered packets are pushed to analyze the HTTP connection</td>
</tr>
</tbody>
</table>

- `<1-3600>` – Specify the interval from 1 - 3600 seconds. The default is 60 seconds.

### Examples

```
rfs7000-37FABE(config-profile-default-rfs7000)#http-analyze compress
rfs7000-37FABE(config-profile-default-rfs7000)#
```

```
rfs7000-37FABE(config-profile-default-rfs7000)#http-analyze update-interval 200
rfs7000-37FABE(config-profile-default-rfs7000)#
```

```
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 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
  ...
gro trust 802.1p
interface pppoel
use firewall-policy default
http-analyze update-interval 200
http-analyze compress
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 HTTP analyze settings</td>
</tr>
</tbody>
</table>
7.1.29 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 the WiNG 5.6 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 adopted. 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, NX6500, NX6524, NX9000, NX9500, NX9510

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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>http-analyze</td>
<td>Configures HTTP analysis related parameters</td>
</tr>
<tr>
<td>compress</td>
<td>Compresses update files before forwarding to the controller. This option is disabled by default.</td>
</tr>
<tr>
<td>controller</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>
</tbody>
</table>
| update-interval <1-3600>   | Configures the interval, in seconds, at which buffered packets are pushed to the controller  
|                            | • <1-3600> – Specify the interval from 1 - 3600 seconds. The default is 60 seconds.                                                        |

- **http-analyze external-server [password <WORD>|proxy <URL>|update-interval|url|username|validate-server-certificate]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>http-analyze external-server</td>
<td>Configures the external HTTP analytics engine’s parameters</td>
</tr>
</tbody>
</table>
| password <WORD>            | Configures the external analytics engine’s password  
|                            | • <WORD> – Provide the login password.                                                                                                        |
| proxy <URL>                | Configures the proxy server’s URL  
|                            | • <URL> – Specify the proxy server’s URL in the following format:  
|                            | http://username:password@proxy-server:port. For example, http://mot:sym@wwwgate0.mot.com:1080                                           |
| update-interval <1-3600>   | Configures the interval, in seconds, at which buffered packets are pushed to the external analytics engine  
|                            | • <1-3600> – Specify the interval from 1 - 3600 seconds. The default is 60 seconds.                                                          |
| url <URL>                  | Configures the external analytics engine’s IP address or uniform resource locator (URL)  
|                            | • <URL> – Provide the IP address or URL.                                                                                                      |
| username <WORD>            | Configures the user name needed to access the external analytics engine  
|                            | • <WORD> – Provide the user name.                                                                                                           |
| validate-server-certificate| Validates the external analytics engine’s certificate, if it is using HTTPS as the mode of access                                            |

## 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
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
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)#

nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B)#http-analyze external-server proxy http://mot:sym@wwwgate0.mot.com:1080

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
slot 1
  no shutdown
  assign team-centro
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 proxy http://mot:sym@wwwgate0.mot.com:1080

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>no</td>
<td>Disables HTTP analytics settings on an NX series service platform</td>
</tr>
</tbody>
</table>
7.1.30 interface

Profile Config Commands

Table 7.14 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 7-161</td>
</tr>
<tr>
<td>interface-config-</td>
<td>Summarizes Ethernet interface (associated with the wireless controller or</td>
<td>page 7-164</td>
</tr>
<tr>
<td>instance</td>
<td>service platform) configuration commands</td>
<td></td>
</tr>
<tr>
<td>interface-config-</td>
<td>Summarizes VLAN interface configuration commands</td>
<td>page 7-192</td>
</tr>
<tr>
<td>vlan-instance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>interface-config-</td>
<td>Summarizes radio interface configuration commands (applicable to devices with</td>
<td>page 7-211</td>
</tr>
<tr>
<td>radio-instance</td>
<td>built-in radios)</td>
<td></td>
</tr>
<tr>
<td>interface-config-</td>
<td>Summarizes WWAN interface configuration commands</td>
<td>page 7-269</td>
</tr>
<tr>
<td>wwan-instance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>interface-config-</td>
<td>Summarizes serial interface configuration commands (supported only on the</td>
<td>page 7-280</td>
</tr>
<tr>
<td>serial-instance</td>
<td>NX45XX and NX65XX series service platform profiles)</td>
<td></td>
</tr>
<tr>
<td>interface-config-</td>
<td>Summarizes the T1E1 interface configuration commands (supported only on the</td>
<td>page 7-294</td>
</tr>
<tr>
<td>t1e1-instance</td>
<td>NX45XX and NX65XX series service platform profiles)</td>
<td></td>
</tr>
<tr>
<td>interface-config-</td>
<td>Summarizes the virtual machine interface configuration commands (supported</td>
<td>page 7-308</td>
</tr>
<tr>
<td>vm-instance</td>
<td>only on the NX45XX and NX65XX series service platform profiles)</td>
<td></td>
</tr>
</tbody>
</table>
7.1.30.1 interface

Selects an interface to configure

This command is used to enter the interface configuration mode for the specified physical SVI interface. If the VLAN (SVI) interface does not exist, it is automatically created.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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 <1-8]|wwan1|xge <1-4>
```

**Syntax Access Points and Wireless Controllers**
```
interface [<INTERFACE-NAME]|fe <1-4>|ge <1-8]|me1|port-channel <1-4>|pppoe1|
  radio [1|2|3]|up1|vlan <1-4094]|wwan1|xge <1-4>
```

**Parameters**

- **interface [<INTERFACE-NAME>|fe <1-4>|ge <1-24]|me1|port-channel <1-4>|pppoe1|

<table>
<thead>
<tr>
<th>4&lt;INTERFACE-NAME&gt;</th>
<th>Enters the configuration mode of the interface identified by the &lt;INTERFACE-NAME&gt; keyword</th>
</tr>
</thead>
<tbody>
<tr>
<td>fe &lt;1-4&gt;</td>
<td>Selects a FastEthernet interface</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4&gt; – Specify the interface index from 1 - 4.</td>
</tr>
<tr>
<td></td>
<td>This interface is applicable only for AP6511</td>
</tr>
<tr>
<td>ge &lt;1-8&gt;</td>
<td>Selects a GigabitEthernet interface</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-8&gt; – Specify the interface index from 1 - 8. (4 for RFS7000 and 8 for RFS6000).</td>
</tr>
<tr>
<td></td>
<td>The NX45XX and NX65XX series service platforms have 24 GigabitEthernet interface ports.</td>
</tr>
<tr>
<td>me1</td>
<td>Selects a management interface</td>
</tr>
<tr>
<td></td>
<td>Not applicable for RFS4000</td>
</tr>
<tr>
<td></td>
<td>The management interface is applicable only for RFS6000 and RFS7000</td>
</tr>
<tr>
<td>port-channel &lt;1-4&gt;</td>
<td>Selects the port channel interface</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4&gt; – Specify the interface index from 1 - 4.</td>
</tr>
<tr>
<td>pppoe1</td>
<td>Selects the PPP over Ethernet interface to configure</td>
</tr>
<tr>
<td>radio [1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>• 1 – Selects radio interface 1</td>
</tr>
<tr>
<td></td>
<td>• 2 – Selects radio interface 2</td>
</tr>
<tr>
<td></td>
<td>• 3 – Selects radio interface 3</td>
</tr>
<tr>
<td></td>
<td>The radio interface is not available on wireless controllers (exception RFS4011) or service</td>
</tr>
<tr>
<td></td>
<td>platforms.</td>
</tr>
<tr>
<td>Port Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| 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 |
| 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

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
- NX6500 - up1, up2
- NX6524 - ge1-ge24, up1, up2
- NX9000 series - ge1, ge2

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.

**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-relay-incoming` 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
- `remove-override` Remove configuration item override from the device (so profile value takes effect)
- `shutdown` Shutdown the selected interface
- `use` Set setting to use

```
crypto Encryption module
description Vlan description
dhcp-relay-incoming 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)
o Negate a command or set its defaults
remove-override Remove configuration item override from the device (so profile value takes effect)
shutdown Shutdown the selected interface
use Set setting to use
```

```
clrsr Clear the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
del End current mode and change to EXEC mode
del End current mode and down to previous mode
desc Description of the interactive help system
del Revert changes
desc Service Commands
desc Show running system information
del 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

```
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
```

```
clrsr Clear the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
del End current mode and change to EXEC mode
del End current mode and down to previous mode
desc Description of the interactive help system
del Revert changes
desc Service Commands
desc Show running system information
del Write running configuration to memory or terminal
```

```
nx4500-5CFA2B(config-profile-testNX45XX-if-vmif2)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the selected interface</td>
</tr>
</tbody>
</table>
7.1.30.2 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 <1-8>|mel|port-channel <1-4>|pppe1|radio [1|2|3]|up1|vlan <1-4094>|wwan1|xge <1-4>]
<DEVICE>(config-profile-default-rfs7000)# ge 1
```

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
- **channel-group**: Channel group commands
- **description**: Interface specific description
- **dot1x**: 802.1X
- **duplex**: Set duplex to interface
- **ipv6**: Internet Protocol version 6 (IPv6)
- **lldp**: Link Local Discovery Protocol
- **mac-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
- **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-if-ge1)#
```

### NOTE:
The NX45XX and NX65XX series service platforms have 24 GigabitEthernet ports.

Table 7.15 summarizes the interface configuration commands.

### Table 7.15 Interface-Config 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 interface</td>
<td>page 7-166</td>
</tr>
<tr>
<td>cdp</td>
<td>Enables Cisco Discovery Protocol (CDP) on GE ports</td>
<td>page 7-167</td>
</tr>
</tbody>
</table>
### Table 7.15 Interface-Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-group</td>
<td>Configures channel group commands</td>
<td>page 7-168</td>
</tr>
<tr>
<td>description</td>
<td>Creates an interface specific description</td>
<td>page 7-169</td>
</tr>
<tr>
<td>dot1x (authenticator)</td>
<td>Configures 802.1X authenticator settings</td>
<td>page 7-170</td>
</tr>
<tr>
<td>dot1x (supplicant)</td>
<td>Configures 802.1X supplicant settings</td>
<td>page 7-172</td>
</tr>
<tr>
<td>duplex</td>
<td>Specifies the duplex mode for the interface</td>
<td>page 7-173</td>
</tr>
<tr>
<td>ip</td>
<td>Sets the IP address for the assigned Fast Ethernet interface (ME) interface</td>
<td>page 7-174</td>
</tr>
<tr>
<td>ipv6</td>
<td>Sets the DHCPv6 and ICMPv6 neighbor discovery (ND) components for this interface</td>
<td>page 7-175</td>
</tr>
<tr>
<td>lldp</td>
<td>Configures Link Local Discovery Protocol (LLDP)</td>
<td>page 7-177</td>
</tr>
<tr>
<td>mac-auth</td>
<td>Enables MAC-based port authentication on this profile</td>
<td>page 7-178</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its defaults</td>
<td>page 7-179</td>
</tr>
<tr>
<td>power</td>
<td>Configures Power over Ethernet (PoE) settings on this interface</td>
<td>page 7-181</td>
</tr>
<tr>
<td>qos</td>
<td>Enables QoS</td>
<td>page 7-182</td>
</tr>
<tr>
<td>shutdown</td>
<td>Disables the selected interface</td>
<td>page 7-183</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Configures spanning tree parameters</td>
<td>page 7-184</td>
</tr>
<tr>
<td>speed</td>
<td>Specifies the speed of a FastEthernet or GigabitEthernet port</td>
<td>page 7-186</td>
</tr>
<tr>
<td>switchport</td>
<td>Sets interface switching mode characteristics</td>
<td>page 7-187</td>
</tr>
<tr>
<td>use</td>
<td>Defines the settings to use with this command</td>
<td>page 7-190</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to the memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
7.1.30.2.1 captive-portal-enforcement

Enables/disables captive-portal enforcement on this interface

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
captive-portal-enforcement
```

Parameters

None

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
### 7.1.30.2.2 cdp

* interface-config-instance

Enables CDP on the selected GE port

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

cdp [receive|transmit]

**Parameters**
- cdp [receive|transmit]

<table>
<thead>
<tr>
<th>transmit</th>
<th>Enables CDP packet snooping 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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>receive</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 |
7.1.30.2.3 channel-group

Configures the channel group for this port

NOTE: Channel group is not supported on the NX45XX and NX65XX series service platforms.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000, NX9500, NX9510

Syntax

```
channel-group <1-4>
```

Parameters

- channel-group <1-4>

<1-4> Specifies a channel group number from 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
  qos trust dscp
  qos 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
7.1.30.2.4 description

▶ interface-config-instance

Configures a description for a defined interface

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
qos trust dscp
qos trust 802.1p
channel-group 1
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#

Related Commands

- **no** Removes the interface description
7.1.30.2.5 dot1x (authenticator)

Configure 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000

Syntax

```
dot1x authenticator [guest-vlan|host-mode|max-reauth-req|port-control|reauthenticate|timeout]
```

```
```

NOTE: The dot1x (802.1x) supplicant settings are documented in the next section.

<table>
<thead>
<tr>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>dot1x authenticator [guest-vlan &lt;1-4094&gt;</td>
</tr>
<tr>
<td>dot1x authenticator Configure 802.1x authenticator settings</td>
</tr>
<tr>
<td>guest-vlan &lt;1-4094&gt; 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 reauthorization retries for the supplicant. This is the maximum number of reauthentication attempts made before this port is moved to unauthorized.
  - <1-10> — Specify a value from 1 -10. The default is 2. |
Examples

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)#dot1x authenticator max-reauth-req 6
rfs4000-229D58 (config-profile-testRFS4000-if-ge1)#dot1x authenticator reauthenticate

rfs4000-229D58 (config-profile-testRFS4000-if-ge1)#show context interface ge1
dot1x authenticator host-mode multi-host
dot1x authenticator guest-vlan 2
dot1x authenticator reauthenticate
dot1x authenticator max-reauth-count 6
ip dhcp trust
gos trust dscp
gos trust 802.1p
rfs4000-229D58 (config-profile-testRFS4000-if-ge1)#

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>
7.1.30.2.6 dot1x (supplicant)

Configures 802.1X supplicant (client) settings

Supported in the following platforms:
- Access Points — AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>username</td>
<td>Sets the username for authentication</td>
</tr>
<tr>
<td>&lt;USERNAME&gt;</td>
<td>- Specify the supplicant's username.</td>
</tr>
<tr>
<td>password</td>
<td>Sets the password associated with the supplicant's username. Select any one of the following options:</td>
</tr>
<tr>
<td>[0 &lt;WORD&gt;</td>
<td>2 &lt;WORD&gt;</td>
</tr>
<tr>
<td>0 &lt;WORD&gt;</td>
<td>- Sets an encrypted password</td>
</tr>
<tr>
<td>2 &lt;WORD&gt;</td>
<td>- Specify the password.</td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58(config-profile-testRFS4000-if-ge1)#dot1x supplicant username bob password 0 motorolasolutions@123

rfs4000-229D58(config-profile-testRFS4000-if-ge1)#show context interface ge1
  dot1x supplicant username bob password 0 motorolasolutions@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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes 802.1X supplicant (client) settings</td>
</tr>
</tbody>
</table>
7.1.30.2.7 duplex

**interface-config-instance**

Configures duplex mode (for the flow of packets) for an interface

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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</td>
</tr>
<tr>
<td>full</td>
<td>Sets the port to full-duplex mode. Allows communication in both directions simultaneously</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 motorolasolutions@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) |
### 7.1.30.2.8 ip

**interface-config-instance**

Sets the ARP and DHCP components for this interface

Supported in the following platforms:
- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
ip [arp|dhcp]
```

```plaintext
ip [arp [header-mismatch-validation|trust]|dhcp trust]
```

**Parameters**

- **ip [arp [header-mismatch-validation|trust]|dhcp trust]**

| arp [header-mismatch-validation|trust] | Sets ARP for packets on this interface |
|---------------------------------------|----------------------------------------|
|                                       | • header-mismatch-validation – Verifies mismatch for source MAC address in the ARP header and Ethernet header. This option is disabled by default. |
|                                       | • trust – Sets the ARP trust state for ARP responses on this interface. This option is disabled by default. |

<table>
<thead>
<tr>
<th>dhcp trust</th>
<th>Uses a DHCP client to obtain an IP address for the interface (this enables DHCP on a layer 3 SVI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• trust – Sets the DHCP trust state for DHCP responses on this interface. This option is enabled by default.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#ip dhcp trust
```

```plaintext
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#ip arp header-mismatch-validation
```

```plaintext
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 motorolasolutions@123
dhcp trust
dplp header-mismatch-validation
gos trust dscp
gos trust 802.1p
channel-group 1
```

**Related Commands**

| no | Removes the ARP and DHCP components configured for this interface |
### 7.1.30.2.9 ipv6

**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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **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**
  - Enables DHCPv6 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]**
  - Enables the IPv6 ND settings for this 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. This option is enabled by default.
  - **trust**
    - Sets trust state for ND requests received on this interface. 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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes or reverts IPv6 settings on this interface</td>
</tr>
</tbody>
</table>
7.1.30.2.10 lldp

`interface-config-instance`

Configures Link Local Discovery Protocol (LLDP) parameters on the selected interface.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 Protocol Data Units (PDUs) snooping. 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>
<tr>
<td>transmit</td>
<td>Enables LLDP PDUs 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.
### 7.1.30.2.11 mac-auth

**interface-config-instance**

Enables authentication of MAC addresses on the selected wired port. Devices using this profile will be able to authenticate the MAC addresses of devices connecting to this GE interface.

When enabled, this feature authenticates the source MAC address of a device, connecting to this interface, with a RADIUS server. For more information on enabling this feature see, `mac-auth`.

To enable MAC address authentication on a device, execute the `mac-auth` command on the device configuration mode.

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```plaintext
mac-auth
```

**Parameters**

None

**Examples**

```plaintext
rfs4000-229D58 (config-profile-testRFS4000-if-ge1)#mac-auth
rfs4000-229D58 (config-profile-testRFS4000-if-ge1)#
```

```plaintext
rfs4000-229D58 (config-profile-testRFS4000-if-ge1)#show context
interface ge1
    mac-auth
    ip dhcp trust
gos trust dscp
    gos trust 802.1p
channel-group 1
rfs4000-229D58 (config-profile-testRFS4000-if-ge1)#
```

```plaintext
rfs4000-229D58 (config-profile-testRFS4000-if-ge5)#mac-auth
rfs4000-229D58 (config-profile-testRFS4000-if-ge5)#
```

```plaintext
rfs4000-229D58 (config-device-00-23-68-22-9D-58-if-ge5)#show context
interface ge5
    switchport mode access
gswitchport 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)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables authentication of MAC addresses on the selected wired port</td>
</tr>
</tbody>
</table>
7.1.30.2.12 no

Negates a command or sets its defaults

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
no [captive-portal-enforcement|cdp|channel-group|description|dot1x|duplex|ip|ipv6|lldp|mac-auth|power|qos|shutdown|spanning-tree|speed|switchport|use]
```

Parameters
None

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
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>captive-portal-enforcement</td>
<td>Enables/disables captive-portal enforcement on this interface</td>
</tr>
<tr>
<td>cdp</td>
<td>Enables CDP on ports</td>
</tr>
<tr>
<td>channel-group</td>
<td>Configures channel group commands</td>
</tr>
<tr>
<td>description</td>
<td>Creates an interface specific description</td>
</tr>
<tr>
<td>dot1x (authenticator)</td>
<td>Configures 802.1X authentication settings</td>
</tr>
<tr>
<td>dot1x (supplicant)</td>
<td>Configures 802.1X supplicant (client) settings</td>
</tr>
<tr>
<td>duplex</td>
<td>Specifies the duplex mode for the interface</td>
</tr>
<tr>
<td>ip</td>
<td>Sets the IP address for the assigned Fast Ethernet interface (ME)</td>
</tr>
<tr>
<td>ipv6</td>
<td>Sets the DHCPv6 and ICMPv6 ND components for this interface</td>
</tr>
<tr>
<td>lldp</td>
<td>Configures LLDP</td>
</tr>
<tr>
<td>mac-auth</td>
<td>Enables MAC-based port authentication on this profile</td>
</tr>
<tr>
<td>power</td>
<td>Configures PoE settings on this interface</td>
</tr>
<tr>
<td>qos</td>
<td>Enables QoS on the selected interface</td>
</tr>
<tr>
<td>shutdown</td>
<td>Disables the selected interface</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Configures spanning tree parameters</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td><code>speed</code></td>
<td>Specifies the speed of a FastEthernet or GigabitEthernet port</td>
</tr>
<tr>
<td><code>switchport</code></td>
<td>Sets the interface switching mode characteristics</td>
</tr>
<tr>
<td><code>use</code></td>
<td>Defines the settings to use with this command</td>
</tr>
<tr>
<td><code>write</code></td>
<td>Writes information to the memory or terminal</td>
</tr>
</tbody>
</table>
7.1.30.2.13 power

`interface-config-instance`

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 {limit <0-40>|priority [critical|high|low]}`

**Parameters**

- `power {limit <0-40>|priority [critical|high|low]}`

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>limit &lt;0-40&gt;</code></td>
<td>Optional. Configures the PoE power limit from 0 - 40 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</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
```

**Related Commands**

- `no`: Removes PoE settings on this interface
7.1.30.2.14 qos

interface-config-instance

Defines Quality of Service (QoS) settings on this interface

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 |
| dscp                    | dscp – Trusts IP DSCP QOS values ingressing on this interface |

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 motorolasolutions@123
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
### 7.1.30.2.15 shutdown

**Syntax**

```plaintext
shutdown
```

**Parameters**

None

**Examples**

```plaintext
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><code>no</code></td>
<td>Disables or reverts interface settings to their default</td>
</tr>
</tbody>
</table>
### 7.1.30.2.16 spanning-tree

> **interface-config-instance**

Configures spanning tree parameters

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```
spanning-tree [bpdufilter|bpduguard|edgeport|force-version|guard|link-type|mst|
              port-cisco-interoperability|portfast]
spanning-tree [edgeport|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** `<edgeport|force-version|guard root|portfast>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>edgeport</td>
<td>Enables an interface as an edge port</td>
</tr>
<tr>
<td>force-version</td>
<td>Specifies the spanning tree force version. A version identifier of less than 2 enforces the spanning tree protocol. Select one of the following versions:</td>
</tr>
<tr>
<td></td>
<td>- 0 – <em>Spanning Tree Protocol (STP)</em></td>
</tr>
<tr>
<td></td>
<td>- 1 – Not supported</td>
</tr>
<tr>
<td></td>
<td>- 2 – <em>Rapid Spanning Tree Protocol (RSTP)</em></td>
</tr>
<tr>
<td></td>
<td>- 3 – <em>Multiple Spanning Tree Protocol (MSTP)</em> (default setting)</td>
</tr>
<tr>
<td>guard root</td>
<td>Enables Root Guard for the port</td>
</tr>
<tr>
<td></td>
<td>The Root Guard disables superior <em>Bridge Protocol Data Unit</em> (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. Use the no parameter with this command to disable the Root Guard.</td>
</tr>
<tr>
<td>portfast</td>
<td>Enables rapid transitions. Enabling PortFast allows the port to bypass the listening and learning states</td>
</tr>
</tbody>
</table>

- **spanning-tree** `<bpdufilter|bpduguard> [default|disable|enable]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bpdufilter</td>
<td>Sets a PortFast BPDU filter for the port</td>
</tr>
<tr>
<td>(default</td>
<td>disable</td>
</tr>
</tbody>
</table>
### Profiles 7 - 185

- **spanning-tree link-type [point-to-point|shared]**
  - Enables or disables point-to-point or shared link types
  - point-to-point – Enables rapid transition
  - shared – Disables rapid transition

- **spanning-tree mst <0-15> [cost <1-200000000>|port-priority <0-240>]**
  - Configures MST on a spanning tree
  - cost <1-200000000> Defines path cost for a port from 1 - 200000000
  - port-priority <0-240> Defines port priority for a bridge from 1 - 240

- **spanning-tree port-cisco-interoperability [disable|enable]**
  - Enables or disables 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

```bash
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#spanning-tree bpdufilter 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 a 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

- **no** Removes spanning tree settings configured on this interface
### 7.1.30.2.17 speed

**interface-config-instance**

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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. Auto negotiation is a requirement for using 1000BASE-T[3] according to the standard (default setting).</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 a 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 motorolasolutions@123
ip dhcp trust
ip arp header-mismatch-validation
qos trust dscp
qos trust 802.1p
channel-group 1
```

**Related Commands**

```
no
```

Resets speed to default (auto)
### 7.1.30.2.18 switchport

*interface-config-instance*

Sets switching mode characteristics for the selected interface

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
switchport [access|mode|trunk]
switchport access vlan <1-4094>
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>]
```

**Parameters**

- **switchport access vlan <1-4094>**
  - access vlan <1-4094> Sets the VLAN when interface is in the access mode

- **switchport mode [access|trunk]**
  - 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>]**
  - trunk Sets trunking mode characteristics of the port
  - allowed Configures trunk characteristics when the port is in trunk mode
**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**

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
spanning-tree force-version 1
spanning-tree guard root
spanning-tree mst 2 port-priority 10
dot1x supplicant username Bob password 0 motorolasolutions@123
ip dhcp trust
ip arp header-mismatch-validation

---

**switchport trunk native [tagged|vlan <1-4094>]**

- **trunk**
  - Sets trunking mode characteristics of the switchport

- **native [tagged|vlan <1-4094>]**
  - Configures the native VLAN ID for the trunk-mode port
  - 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.
  - **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.
  - **vlan <1-4094>**
    - Sets the native VLAN for classifying untagged traffic when the interface is in trunking mode. Specify a value from 1 - 4094.

---

**vlan [VID]|
add [VID]|
one|
remove [VID]**

Sets allowed VLAN options. The options are:

- **<VID>** – 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
- **add [VID]** – Adds VLANs to the current list
  - **<VID>** – Specify the VLAN IDs. Can be either a range of VLAN (55-60) or a list of comma separated IDs (35, 41 etc.)
- **remove [VID]** – Removes VLANs from the current list
  - **<VID>** – Specify the VLAN IDs. Can be either a range of VLAN (55-60) or a list of comma separated IDs (35, 41 etc.)

**Note:** Allowed VLANs are configured only when the switching mode is set to “trunk”.

---
```
gos trust dscp
gos trust 802.1p
channel-group 1
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#
```

### 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 settings to their default</td>
</tr>
</tbody>
</table>
7.1.30.2.19 use

**interface-config-instance**

Specifies the IP access list and MAC access list used with this interface

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
use [ip-access-list in <IP-ACCESS-LIST-NAME>|ipv6-access-list <IPv6-ACCESS-LIST-NAME>|mac-access-list in <MAC-ACCESS-LIST-NAME>]
```

**Parameters**

- use [ip-access-list in <IP-ACCESS-LIST-NAME>|ipv6-access-list <IPv6-ACCESS-LIST-NAME>|mac-access-list in <MAC-ACCESS-LIST-NAME>]

<table>
<thead>
<tr>
<th>ip-access-list in &lt;IP-ACCESS-LIST-NAME&gt;</th>
<th>Uses an IPv4 access list</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>in</strong> – Applies an IPv4 ACL on incoming packets on this interface</td>
</tr>
<tr>
<td></td>
<td><strong>&lt;IP-ACCESS-LIST-NAME&gt;</strong> – Specify the IPv4 access list name (it should be an existing and configured).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ipv6-access-list in &lt;IPv6-ACCESS-LIST-NAME&gt;</th>
<th>Uses an IPv6 access list</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>in</strong> – Applies an IPv6 ACL on incoming packets on this interface</td>
</tr>
<tr>
<td></td>
<td><strong>&lt;IPv6-ACCESS-LIST-NAME&gt;</strong> – Specify the IPv6 access list name (it should be an existing and configured).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>mac-access-list in &lt;MAC-ACCESS-LIST-NAME&gt;</th>
<th>Uses a MAC access list</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>in</strong> – Applies a MAC ACL on incoming packets on this interface</td>
</tr>
<tr>
<td></td>
<td><strong>&lt;MAC-ACCESS-LIST-NAME&gt;</strong> – Specify the MAC access list name (it should be an existing and configured).</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000-if-ge1)#use mac-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 access
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
  spanning-tree guard root
  spanning-tree mst 2 port-priority 10
  dot1x supplicant username Bob password 0 motorolasolutions@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       | Disassociates the IP access list or MAC access list from the interface |
7.1.30.3 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-rfs7000<DEVICE-RPFILEPROFILE-NAME>)#interface 
[<INTERFACE-NAME>|fe <1-4>|ge <1-8>|me1|port-channel <1-4>|pppoe1|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-relay-incoming: Allows an onboard DHCP server to respond to relayed DHCP packets on this interface
- ip: Interface Internet Protocol config commands
- ipv6: Internet Protocol version 6 (IPv6)
- no: Negates a command or sets 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)#
```

Table 7.16 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</td>
<td>page 7-194</td>
</tr>
<tr>
<td>description</td>
<td>Defines the VLAN interface description</td>
<td>page 7-195</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 7-196</td>
</tr>
<tr>
<td>ip</td>
<td>Configures the VLAN interface Internet Protocol (IP) settings</td>
<td>page 7-197</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures the VLAN interface’s IPv6 settings</td>
<td>page 7-200</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 7-205</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down an interface</td>
<td>page 7-209</td>
</tr>
<tr>
<td>use</td>
<td>Defines the settings used with this command</td>
<td>page 7-210</td>
</tr>
<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>
</tbody>
</table>
### Table 7.16  Interface-VLAN-Config-Mode Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>end</code></td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td><code>exit</code></td>
<td>Ends the current mode and moves to the previous mode</td>
<td>page 5-5</td>
</tr>
<tr>
<td><code>help</code></td>
<td>Displays the interactive help system</td>
<td>page 5-6</td>
</tr>
<tr>
<td><code>revert</code></td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td><code>service</code></td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td><code>show</code></td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td><code>write</code></td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
7.1.30.3.1 crypto

Sets encryption module for this VLAN interface. The encryption module (crypto map) is configured using the crypto map command. For more information, see crypto.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
     crypto map map1
rfs7000-37FABE(config-profile-default-rfs7000-if-vlan8)#

Related Commands

no Disables or reverts interface VLAN settings to their default
### 7.1.30.3.2 description

#### interface-config-vlan-instance

Defines a VLAN interface description. Use this command to provide additional information about the VLAN.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### 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
```

#### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes the VLAN interface description</td>
</tr>
</tbody>
</table>
### 7.1.30.3.3 dhcp-relay-incoming

*interface-config-vlan-instance*

Allows an onboard DHCP server to respond to relayed DHCP packets

**Supported in the following platforms:**

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>no</td>
<td>Disables or reverts interface VLAN settings to their default</td>
</tr>
</tbody>
</table>
7.1.30.3.4 ip

Configure the VLAN interface’s IP settings.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

ip [address|dhcp|helper-address|nat|ospf]

ip helper-address <IP>

ip address [<IP/M>|dhcp|zerconf]

ip address [<IP/M> {secondary}|zeroconf {secondary}]

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 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. 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> {secondary}|dhcp|zerconf {secondary}]

  address 
  Sets the VLAN interface IP address

  <IP/M> {secondary}
  Specifies the interface IP address in the A.B.C.D/M format

  - secondary – Optional. Sets the specified IP address as a secondary address

  dhcp
  Uses a DHCP client to obtain an IP address for this interface

  zerconf {secondary}
  Uses Zero Configuration Networking (zerconf) to generate an IP address for this interface

  - secondary – Optional. Sets the generated IP address as a secondary address

- 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
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>all</code></td>
<td>Configures all DHCP client request options</td>
</tr>
<tr>
<td>`ip nat [inside</td>
<td>outside]`</td>
</tr>
<tr>
<td><code>inside</code></td>
<td>Sets the NAT inside interface</td>
</tr>
<tr>
<td><code>outside</code></td>
<td>Sets the NAT outside interface</td>
</tr>
<tr>
<td>`ip ospf authentication [message-digest</td>
<td>null</td>
</tr>
<tr>
<td><code>message-digest</code></td>
<td>Configures md5 based authentication</td>
</tr>
<tr>
<td><code>null</code></td>
<td>No authentication required</td>
</tr>
<tr>
<td><code>simple-password</code></td>
<td>Configures simple password based authentication</td>
</tr>
<tr>
<td>`ip ospf authentication-key simple-password [0 &lt;WORD&gt;</td>
<td>2 &lt;WORD&gt;]`</td>
</tr>
<tr>
<td><code>0 &lt;WORD&gt;</code></td>
<td>Configures clear text key</td>
</tr>
<tr>
<td><code>2 &lt;WORD&gt;</code></td>
<td>Configures encrypted key</td>
</tr>
<tr>
<td>`ip ospf [bandwidth &lt;1-10000000]</td>
<td>cost &lt;1-65535]</td>
</tr>
<tr>
<td><code>bandwidth &lt;1-10000000&gt;</code></td>
<td>Specify the bandwidth from 1 -10000000.</td>
</tr>
<tr>
<td><code>cost &lt;1-65535&gt;</code></td>
<td>Configures OSPF cost</td>
</tr>
<tr>
<td><code>priority &lt;0-255&gt;</code></td>
<td>Configures OSPF priority</td>
</tr>
<tr>
<td>`ip ospf message-digest-key key-id &lt;1-255&gt; md5 [0 &lt;WORD&gt;</td>
<td>2 &lt;WORD&gt;]`</td>
</tr>
<tr>
<td><code>key-id &lt;1-255&gt;</code></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>
<tr>
<td><code>0 &lt;WORD&gt;</code></td>
<td>Configures clear text key</td>
</tr>
<tr>
<td><code>2 &lt;WORD&gt;</code></td>
<td>Configures encrypted key</td>
</tr>
</tbody>
</table>
Examples
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes or resets IP settings on this interface</td>
</tr>
</tbody>
</table>
### 7.1.30.3.5 ipv6

`interface-config-vlan-instance`

Configures the VLAN interface’s IPv6 settings

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```
ipv6 [accept|address|dhcp|enable|enforce-dad|mtu|redirects|request-dhcpv6-options|router-adv]
```

```
ipv6 accept ra {no-default-router|no-hop-limit|no-mtu}
```

```
ipv6 address [<IPv6/M]|autoconfig|eui-64|general-prefix|link-local|prefix-from-provider]
```

```
ipv6 address [<IPv6/M]|autoconfig]
```

```
ipv6 address eui-64 [<IPv6/M]|general-prefix <WORD> <IPv6-PREFIX/PREFIX-LENGTH>|prefix-from-provider <WORD> <IPv6-PREFIX/PREFIX-LENGTH>]
```

```
ipv6 address [general-prefix|prefix-from-provider] <WORD> <HOST-PORTION/LENGTH>
```

```
ipv6 address link-local <LINK-LOCAL-ADD>
```

```
ipv6 dhcp [client [information|prefix-from-provider]|relay destination <DEST-IPv6-ADD>]
```

```
ipv6 [enable|enforce-dad|mtu <1280-1500>|redirects|request-dhcp-options]
```

```
ipv6 router-adv [general-prefix <WORD>|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}**
  - Enables processing of *router advertisements* (RAs) on this VLAN interface. This option is enabled by default.

- **no-default-router**
  - Optional. Disables inclusion of routers on this interface in the default router selection process. This option is disabled by default.

- **no-hop-limit**
  - Optional. Disables the use of RA advertised hop-count value on this interface. This option is disabled by default.

- **no-mtu**
  - Optional. Disables the use of RA advertised MTU value on this interface. This option is disabled by default.

- **ipv6 address [<IPv6/M]|autoconfig**
  - Configures IPv6 address related settings on this VLAN interface
    - `<IPv6>` — Specify the non-link local static IPv6 address and prefix length of the interface in the `X:XX:XX/MM` format.
    - `autoconfig` — Enables/disables stateless auto-configuration of IPv6 address, based on the prefixes received from RAs (with auto-config flag set) 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. This option is enabled by default.
### ipv6 address eui-64

**ipv6 address eui-64** 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.

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.

**Note:** In the EUI-64 IPv6 address the prefix and host portions are each 64 bits in length.

**<IPv6/M>** 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.

**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.

For example:

Prefix portion provided using this command: `ipv6 > address > eui-64 > ipv6 > address `2004:b055:15:dead::1111/64.

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: `2004:b055:15:dead:215:70ff:fe37:fb5e/64`

In this example, the host part “::1111” is ignored and replaced with the modified eui-64 formatted host address.

### general-prefix <WORD> <IPv6-PREFIX/PREFIX-LENGTH>

**general-prefix <WORD> <IPv6-PREFIX/PREFIX-LENGTH>** Configures the “general-prefix” 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.

- **<WORD>** – Specify the IPv6 “general-prefix” object’s name
- **<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 > general-prefix > gp1 > ipv6 > address `2008::/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: `2008::215:70ff:fe37:fb5e/64`
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| **ipv6 address [general-prefix|prefix-from-provider] <WORD> <HOST-PORTION/LENGTH>** | Configures the IPv6 address related settings on this VLAN interface. The prefix derived from the specified “general-prefix” and the host portion (second parameter) are combined together (using the prefix-length of the specified “general-prefix”) to generate the interface's IPv6 address.  
- `<WORD>` – Provide the “general-prefix” object’s name.  
- `<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 “general-prefix” 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]|relay destination <DEST-IPv6-ADD>]

| ipv6 dhcp client [information|prefix-from-provider <WORD>] | Configures DHCPv6 client-related settings on this VLAN interface |
|------------------------------------------------------------|---------------------------------------------------------------|
| • information – Configures stateless 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. |

<table>
<thead>
<tr>
<th>relay destination &lt;DEST-IPv6-ADD&gt;</th>
<th>Enables DHCPv6 packet forwarding on this VLAN interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>• destination – Forwards DHCPv6 packets to a specified DHCPv6 relay</td>
<td></td>
</tr>
<tr>
<td>• &lt;DEST-IPv6-ADD&gt; – Specify the destination DHCPv6 relay’s address.</td>
<td></td>
</tr>
</tbody>
</table>

**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]

<table>
<thead>
<tr>
<th>ipv6</th>
<th>Configures IPv6 settings on this VLAN interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>enable</td>
<td>Enables IPv6 on this interface. This option is disabled by default.</td>
</tr>
<tr>
<td>enforce-dad</td>
<td>Enforces Duplicate Address Detection (DAD) on wired ports. This option is enabled by default.</td>
</tr>
<tr>
<td>mtu &lt;1280-1500&gt;</td>
<td>Configures the Maximum Transmission Unit (MTU) for IPv6 packets on this interface</td>
</tr>
<tr>
<td>• &lt;1280-1500&gt; – Specify a value from 1280 - 1500. The default is 1500.</td>
<td></td>
</tr>
<tr>
<td>redirects</td>
<td>Enables/disables 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>
</tbody>
</table>

### ipv6 router-adv (general-prefix <WORD>|prefix <IPv6-PREFIX>|prefix-from-provider <WORD>) [no-autoconfig|off-link|site-prefix <SITE-PREFIX>|valid-lifetime]

<table>
<thead>
<tr>
<th>ipv6 router-adv</th>
<th>Configures IPv6 RA related settings on this VLAN interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>general-prefix &lt;WORD&gt;</td>
<td>Configures a static “general-prefix” named object and its related parameters on this VLAN interface. The configured value is advertised on RAs.</td>
</tr>
<tr>
<td>• &lt;WORD&gt; – Specify the “general-prefix” named object’s name</td>
<td></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>• &lt;IPv6-PREFIX&gt; – Specify the IPv6 prefix.</td>
<td></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)#ipv6 address eui-64 general-prefix gpl 2008::/64
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 general-prefix gpl 2008::/64
  ipv6 address eui-64 prefix-from-provider ISP1-prefix 2002::/64
rfs7000-6DCD4B(config-profile-test-if-vlan4)#
```
7.1.30.3.6 no interface-config-vlan-instance

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
no [crypto|description|dhcp-relay-incoming|ip|ipv6|shutdown|use]
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}|dhcp|zerconf {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-advertisements]
no ipv6 [accept ra|enable|enforce-dad|mtu|redirects|request-dhcpv6-options]
no ipv6 address [<IP/M> autoconfig|eui-64|general-prefix|link-local|prefix-from-provider]
no ipv6 dhcp [client|relay]
no use [Bonjour-gw-discovery-policy>|ip-access-list in|ipv6-access-list in|ipv6-router-advertisement-policy]

Parameters
- no [crypto map|description|dhcp-relay-incoming|shutdown]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no crypto map</td>
<td>Disassociates a crypto map from an interface</td>
</tr>
<tr>
<td>no description</td>
<td>Removes the VLAN interface description</td>
</tr>
<tr>
<td>no dhcp-relay-incoming</td>
<td>Prevents an onboard DHCP server from responding to relayed DHCP packets</td>
</tr>
<tr>
<td>no shutdown</td>
<td>Enables an interface</td>
</tr>
<tr>
<td></td>
<td>If an interface has been shutdown, use the no shutdown command to enable the interface. Use this command to troubleshoot new interfaces.</td>
</tr>
</tbody>
</table>

- no ip address [<IP/M> {secondary}|dhcp|zerconf {secondary}]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no ip address</td>
<td>Removes or reverts interface IP settings</td>
</tr>
<tr>
<td></td>
<td>• address – Removes IP addresses configured for this interface</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP/M&gt; {secondary}</td>
<td>Specify the interface IP address in the A.B.C.D/M format.</td>
</tr>
<tr>
<td></td>
<td>• secondary – Optional. Removes the secondary IP address</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>dhcp</td>
<td>Removes the IP address obtained using the DHCP client</td>
</tr>
<tr>
<td>zerconf {secondary}</td>
<td>Removes the IP address generated using a zerconf</td>
</tr>
<tr>
<td></td>
<td>• secondary – Optional. Removes the secondary IP address</td>
</tr>
<tr>
<td>no ip address [helper-address &lt;IP&gt;</td>
<td>nat]</td>
</tr>
<tr>
<td></td>
<td>• address – Removes IP addresses configured for this interface, depending on the options used while setting the address</td>
</tr>
<tr>
<td>helper-address &lt;IP&gt;</td>
<td>Disables the forwarding of DHCP and BOOTP packets to the configured helper IP address</td>
</tr>
<tr>
<td></td>
<td>• &lt;IP&gt; – Specify the IP address of the DHCP or BOOTP server.</td>
</tr>
<tr>
<td>nat</td>
<td>Disables NAT for this interface</td>
</tr>
<tr>
<td>no ip address dhcp client request options all</td>
<td>Removes or reverts interface IP settings</td>
</tr>
<tr>
<td></td>
<td>• address – Removes IP addresses configured for this interface, depending on the options used while setting the address</td>
</tr>
<tr>
<td>dhcp</td>
<td>Removes DHCP client request configured for this interface</td>
</tr>
<tr>
<td>client</td>
<td>Removes a DHCP client</td>
</tr>
<tr>
<td>request</td>
<td>Removes DHCP client request</td>
</tr>
<tr>
<td>options</td>
<td>Removes DHCP client request options</td>
</tr>
<tr>
<td>all</td>
<td>Removes all DHCP client request options</td>
</tr>
<tr>
<td>no ip ospf [authentication</td>
<td>authentication-key</td>
</tr>
<tr>
<td></td>
<td>• ospf – Removes OSPF settings</td>
</tr>
<tr>
<td>authentication</td>
<td>Removes OSPF authentication scheme</td>
</tr>
<tr>
<td>authentication-key</td>
<td>Removes the authentication key associated with this layer 3 interface</td>
</tr>
<tr>
<td>bandwidth</td>
<td>Removes the bandwidth configured for the physical port mapped to this layer 3 interface</td>
</tr>
<tr>
<td>cost</td>
<td>Removes the OSPF cost configured for this layer 3 interface</td>
</tr>
<tr>
<td>message-digest-key &lt;KEY-ID&gt;</td>
<td>Removes the message digest authentication key identified by the &lt;KEY-ID&gt; keyword.</td>
</tr>
<tr>
<td>priority</td>
<td>Removes the OSPF priority configured for this layer 3 interface</td>
</tr>
<tr>
<td>no ipv6 [accept ra</td>
<td>enable</td>
</tr>
<tr>
<td>accept ra</td>
<td>Disables processing of RAs on this VLAN interface</td>
</tr>
<tr>
<td>enable</td>
<td>Disables IPv6 on this VLAN interface</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>enforce-dad</td>
<td>Disables enforcement of DAD on wired ports</td>
</tr>
<tr>
<td>mtu</td>
<td>Reverts the MTU value to default (1500)</td>
</tr>
<tr>
<td>redirects</td>
<td>Disables ICMPv6 redirect message sending on this VLAN interface</td>
</tr>
<tr>
<td>request-dhcpv6-options</td>
<td>Disables the requesting of options from the DHCPv6 server on this VLAN interface</td>
</tr>
<tr>
<td>no ipv6 address [&lt;IPv6/M&gt;</td>
<td>autoconfig</td>
</tr>
<tr>
<td>&lt;IPv6/M&gt;</td>
<td>Removes the statically assigned IPv6 address. Specify the IPv6 address.</td>
</tr>
<tr>
<td>autoconfig</td>
<td>Disables stateless auto-configuration of IPv6 address. Prefixes received from RAs (with auto-config flag set) are NOT used to auto-configure the IPv6 address.</td>
</tr>
<tr>
<td>eui-64</td>
<td>Removes the configured IPv6 prefix and prefix length, using one of the following options: &lt;IPv6/M&gt;, general-prefix, and prefix-from-provider. This prefix is used to auto-generate the static IPv6 address (for this interface) in the modified EUI-64 format.</td>
</tr>
<tr>
<td>general-prefix &lt;WORD&gt; &lt;IPv6-PREFIX/PREFIX-LENGTH&gt;</td>
<td>Removes the configured the “general-prefix” named object and the host portion of the IPv6 interface address.</td>
</tr>
<tr>
<td>link-local</td>
<td>Removes the configured IPv6 link-local address on this interface. The default link-local address derived from the interface’s MAC address is restored.</td>
</tr>
<tr>
<td>prefix-from-provider &lt;WORD&gt; &lt;IPv6-PREFIX/PREFIX-LENGTH&gt;</td>
<td>Removes the configured “prefix-from-provider” named object and the host portion of the IPv6 interface address.</td>
</tr>
<tr>
<td>no ipv6 dhcp [client</td>
<td>relay]</td>
</tr>
<tr>
<td>no ipv6 dhcp client</td>
<td>Removes configured DHCPv6 client-related settings on this VLAN interface</td>
</tr>
<tr>
<td>no ipv6 dhcp relay</td>
<td>Disables DHCPv6 packet forwarding on this interface</td>
</tr>
<tr>
<td>no use [bonjour-gw-discovery-policy</td>
<td>ip-access-list in</td>
</tr>
<tr>
<td>no use bonjour-gw-discovery-policy</td>
<td>Removes the bonjour-gw-discovery-policy applied to this VLAN interface</td>
</tr>
<tr>
<td>no use ip-access-list in</td>
<td>Removes the IP access list applied to incoming packets on this VLAN interface</td>
</tr>
<tr>
<td>no use ipv6-access-list in</td>
<td>Removes the IPv6 access list applied to incoming packets on this VLAN interface</td>
</tr>
<tr>
<td>no use ipv6-router-advertisement-policy</td>
<td>Removes the IPv6 router advertisement policy applied to this VLAN interface</td>
</tr>
</tbody>
</table>
**Examples**

The following example shows the VLAN interface settings before the ‘no’ commands are executed:

```plaintext
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)#
```

```plaintext
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:

```plaintext
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)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>crypto</td>
<td>Defines the encryption module</td>
</tr>
<tr>
<td>description</td>
<td>Defines the VLAN description</td>
</tr>
<tr>
<td>dhcp-relay-incoming</td>
<td>Allows an onboard DHCP server to respond to relayed DHCP packets on this interface</td>
</tr>
<tr>
<td>ip</td>
<td>Configures IP config commands</td>
</tr>
<tr>
<td>shutdown</td>
<td>Disables an interface</td>
</tr>
<tr>
<td>use</td>
<td>Defines the settings used with this command</td>
</tr>
</tbody>
</table>
7.1.30.3.7 shutdown

*interface-config-vlan-instance*

Shuts down the selected interface. Use the no shutdown command to enable an interface.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
shutdown
```

**Parameters**
None

**Examples**

```plaintext
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**

```
no
```
Disables or reverts interface VLAN settings to their default
7.1.30.3.8 use

Specifies an IP access list to use with this VLAN interface

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

geneval: use \[bonjour-gw-discovery-policy <POLICY-NAME>|ip-access-list in <IP-ACL-NAME>|ipv6-access-list in <IPv6-ACL-NAME>|ipv6-route-advertisement-policy <POLICY-NAME>\]

Parameters
- use \[bonjour-gw-discovery-policy <POLICY-NAME>|ip-access-list in <IP-ACL-NAME>|ipv6-access-list in <IPv6-ACL-NAME>|ipv6-route-advertisement-policy <POLICY-NAME>\]

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bonjour-gw-discovery-policy &lt;POLICY-NAME&gt;</td>
<td>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.</td>
</tr>
<tr>
<td>ip-access-list in &lt;IP-ACCESS-LIST-NAME&gt;</td>
<td>Uses a specified IPv4 access list with this interface</td>
</tr>
<tr>
<td>ipv6-access-list in &lt;IPv6-ACCESS-LIST-NAME&gt;</td>
<td>Uses a specified IPv6 access list with this interface</td>
</tr>
<tr>
<td>ipv6-router-advertisement-policy &lt;POLICY-NAME&gt;</td>
<td>Uses an existing IPv6 router advertisement policy with this VLAN interface.</td>
</tr>
</tbody>
</table>

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
geneval: 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>no</td>
<td>Disables or reverts interface VLAN settings to their default</td>
</tr>
</tbody>
</table>
7.1.30.4 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:

```plaintext
<DEVICE>(config)#profile RFS4000 <RFS4000-PROFILE-NAME>
<DEVICE>(config)#profile <AP-TYPE> <PROFILE-NAME>
```

```plaintext
rfs7000-37FABE(config)#profile ap71xx 71xxTestProfile
rfs7000-37FABE(config-profile-71xxTestProfile)#
```

```plaintext
rfs7000-37FABE(config-profile-71xxTestProfile)#interface radio 1
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

Radio Mode commands:

- **aeroscout**: Aeroscout Multicast MAC/Enable
- **aggregation**: Configure 802.11n aggregation related parameters on their usage of airtime
- **airtime-fairness**: Enable fair access to medium for clients based on their usage of airtime
- **antenna-diversity**: Transmit antenna diversity for non-11n transmit rates
- **antenna-downtilt**: Enable ADEPT antenna mode
- **antenna-gain**: Specifies the antenna gain of this radio
- **antenna-mode**: Configure the antenna mode (number of transmit and receive antennas) on the radio
- **association-list**: Configure the association list for the radio
- **beacon**: Configure beacon parameters
- **channel**: Configure the channel of operation for this radio
- **data-rates**: Specify the 802.11 rates to be supported on this radio
- **description**: Configure a description for this radio
- **dfs-rehome**: Revert to configured home channel once dfs evacuation period expires
- **dynamic-chain-selection**: Automatic antenna-mode selection (single antenna for non-11n transmit rates)
- **ekahau**: Ekahau Multicast MAC/Enable
- **extended-range**: Configure extended range
- **guard-interval**: Configure the 802.11n guard interval
- **ldpc**: Configure support for Low Density Parity Check Code
- **lock-rf-mode**: Retain user configured rf-mode setting for this radio
- **max-clients**: Maximum number of wireless clients allowed to associate subject to AP limit
- **mesh**: Configure radio mesh parameters
- **meshpoint**: Enable meshpoints on this radio
- **no**: Negate a command or set its defaults
- **non-unicast**: Configure handling of non-unicast frames
- **off-channel-scan**: Enable off-channel scanning on the radio
- **placement**: Configure the location where this radio is operating
- **power**: Configure the transmit power of the radio
- **preamble-short**: Use short preambles on this radio
- **probe-response**: Configure transmission parameters for Probe Response frames
- **radio-resource-measurement**: Configure support for 802.11k Radio Resource Measurement
- **radio-share-mode**: Configure the radio-share mode of operation for
This radio

Default or Opportunistic rate selection

Negate a command or set its defaults

Configure the rf-mode of operation for this radio

Configure Reduced Interframe Spacing (RIFS) parameters

Configure the RTS threshold

Shutdown the selected radio interface

Capture packets and redirect to an IP address running a packet capture/analysis tool

Configure Space-Time Block Coding (STBC) parameters

Set setting to use

Configure wireless client related parameters

Enable wltans on this radio

Clears the display screen

Commit all changes made in this session

Run commands from Exec mode

End current mode and change to EXEC mode

End current mode and down to previous mode

Description of the interactive help system

Revert changes

Service Commands

Show running system information

Write running configuration to memory or terminal

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Table 7.17 summarizes the radio interface configuration commands.

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>aeroscout</td>
<td>Enables Aeroscout multicast packet forwarding</td>
<td>page 7-215</td>
</tr>
<tr>
<td>aggregation</td>
<td>Configures 802.11n aggregation parameters</td>
<td>page 7-216</td>
</tr>
<tr>
<td>airtime-fairness</td>
<td>Enables fair access for clients based on airtime usage</td>
<td>page 7-219</td>
</tr>
<tr>
<td>antenna-diversity</td>
<td>Transmits antenna diversity for non-11n transmit rates</td>
<td>page 7-220</td>
</tr>
<tr>
<td>antenna-downtilt</td>
<td>Enables Advanced Element Panel Technology (ADEPT) antenna mode</td>
<td>page 7-221</td>
</tr>
<tr>
<td>antenna-gain</td>
<td>Specifies the antenna gain for the selected radio</td>
<td>page 7-222</td>
</tr>
<tr>
<td>antenna-mode</td>
<td>Configures the radio antenna mode</td>
<td>page 7-223</td>
</tr>
<tr>
<td>association-list</td>
<td>Associates an existing global association list with this radio interface</td>
<td>page 7-224</td>
</tr>
<tr>
<td>beacon</td>
<td>Configures beacon parameters</td>
<td>page 7-225</td>
</tr>
<tr>
<td>channel</td>
<td>Configures a radio’s channel of operation</td>
<td>page 7-226</td>
</tr>
<tr>
<td>data-rates</td>
<td>Specifies the 802.11 rates supported on a radio</td>
<td>page 7-227</td>
</tr>
<tr>
<td>description</td>
<td>Configures the selected radio’s description</td>
<td>page 7-231</td>
</tr>
<tr>
<td>dfs-rehome</td>
<td>Reverts to configured home channel once Dynamic Frequency Selection (DFS) evacuation period expires</td>
<td>page 7-232</td>
</tr>
<tr>
<td>dynamic-chain-selection</td>
<td>Enables automatic antenna mode selection</td>
<td>page 7-233</td>
</tr>
</tbody>
</table>
### Table 7.17  Interface-Radio-Config-Mode Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ekahau</code></td>
<td>Enables Ekahau multicast packet forwarding</td>
<td>page 7-234</td>
</tr>
<tr>
<td><code>extended-range</code></td>
<td>Configures extended range</td>
<td>page 7-235</td>
</tr>
<tr>
<td><code>guard-interval</code></td>
<td>Configures the 802.11n guard interval</td>
<td>page 7-236</td>
</tr>
<tr>
<td><code>ldpc</code></td>
<td>Enables support for Low Density Parity Check (LDPC) on the radio interface</td>
<td>page 7-237</td>
</tr>
<tr>
<td><code>lock-rf-mode</code></td>
<td>Retains user configured RF mode settings for the selected radio</td>
<td>page 7-238</td>
</tr>
<tr>
<td><code>max-clients</code></td>
<td>Configures the maximum number of wireless clients allowed to associate with this radio</td>
<td>page 7-239</td>
</tr>
<tr>
<td><code>mesh</code></td>
<td>Configures radio mesh parameters</td>
<td>page 7-240</td>
</tr>
<tr>
<td><code>meshpoint</code></td>
<td>Maps an existing meshpoint to this radio interface</td>
<td>page 7-242</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Negates or resets radio interface settings configures on a profile or a device</td>
<td>page 7-243</td>
</tr>
<tr>
<td><code>non-unicast</code></td>
<td>Configures the handling of non unicast frames on this radio</td>
<td>page 7-246</td>
</tr>
<tr>
<td><code>off-channel-scan</code></td>
<td>Enables selected radio’s off channel scanning parameters</td>
<td>page 7-248</td>
</tr>
<tr>
<td><code>placement</code></td>
<td>Defines selected radio’s deployment location</td>
<td>page 7-250</td>
</tr>
<tr>
<td><code>power</code></td>
<td>Configures the transmit power on this radio</td>
<td>page 7-251</td>
</tr>
<tr>
<td><code>preamble-short</code></td>
<td>Enables the use of short preamble on this radio</td>
<td>page 7-252</td>
</tr>
<tr>
<td><code>probe-response</code></td>
<td>Configures transmission parameters for probe response frames</td>
<td>page 7-253</td>
</tr>
<tr>
<td><code>radio-resource-measurement</code></td>
<td>Enables 802.11k radio resource measurement</td>
<td>page 7-254</td>
</tr>
<tr>
<td><code>radio-share-mode</code></td>
<td>Configures the mode of operation, for this radio, as radio-share</td>
<td>page 7-255</td>
</tr>
<tr>
<td><code>rate-selection</code></td>
<td>Sets the rate selection method to standard or opportunistic</td>
<td>page 7-256</td>
</tr>
<tr>
<td><code>remove-override</code></td>
<td>Removes the radio’s channel of operation</td>
<td>page 7-257</td>
</tr>
<tr>
<td><code>rf-mode</code></td>
<td>Configures the radio’s RF mode</td>
<td>page 7-258</td>
</tr>
<tr>
<td><code>rifs</code></td>
<td>Configures Reduced Interframe Spacing (RIFS) parameters on this radio</td>
<td>page 7-260</td>
</tr>
<tr>
<td><code>rts-threshold</code></td>
<td>Configures the Request to Send (RTS) threshold value on this radio</td>
<td>page 7-261</td>
</tr>
<tr>
<td><code>shutdown</code></td>
<td>Terminates or shuts down selected radio interface</td>
<td>page 7-262</td>
</tr>
<tr>
<td><code>sniffer-redirect</code></td>
<td>Captures and redirects packets to an IP address running a packet capture/analysis tool</td>
<td>page 7-263</td>
</tr>
<tr>
<td><code>stbc</code></td>
<td>Configures radio’s Space Time Block Coding (STBC) mode</td>
<td>page 7-265</td>
</tr>
<tr>
<td><code>use</code></td>
<td>Enables use of an association ACL policy and a radio QoS policy by selected radio interface</td>
<td>page 7-266</td>
</tr>
</tbody>
</table>
### Table 7.17 Interface-Radio-Config-Mode Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>wireless-client</td>
<td>Configures wireless client parameters on selected radio</td>
<td>page 7-267</td>
</tr>
<tr>
<td>wlan</td>
<td>Enables a WLAN on selected radio</td>
<td>page 7-268</td>
</tr>
</tbody>
</table>
7.1.30.4.1 aeroscout

```
interface-config-radio-instance
```

Enables Aeroscout multicast packet forwarding. This feature is disabled by default.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**

```
aeroscout [forward|mac <MAC>]
```

**Parameters**

- aeroscout [forward|mac <MAC>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>forward</td>
<td>Enables Aeroscout multicast packet forwarding</td>
</tr>
<tr>
<td>mac &lt;MAC&gt;</td>
<td>Configures the multicast MAC address to forward the packets</td>
</tr>
</tbody>
</table>

- `<MAC>` – Specify the MAC address in the AA-BB-CC-DD-EE-FF format.

**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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables Aeroscout Multicast packet forwarding</td>
</tr>
</tbody>
</table>
### 7.1.30.4.2 aggregation

**interface-config-radio-instance**

Configures 802.11n frame aggregation. 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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**

```
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]**

<table>
<thead>
<tr>
<th>Parameter</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 (AMPDU)</em> frame aggregation parameters</td>
</tr>
<tr>
<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>
<td></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>
<tr>
<td>**aggregation ampdu max-aggr-size rx [8191</td>
<td>16383</td>
</tr>
<tr>
<td>max-aggr-size</td>
<td>Configures AMPDU packet size limits. Configure the packet size limit on packets both transmitted and received.</td>
</tr>
</tbody>
</table>
### Aggregation Parameters

**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.

**mn-spacing [0|1|2|4|8|16]**

Configures the minimum gap, in microseconds, between AMPDU frames.

- `0` – Configures the minimum gap as 0 microseconds.
- `1` – Configures the minimum gap as 1 microseconds.
- `2` – Configures the minimum gap as 2 microseconds.
- `4` – Configures the minimum gap as 4 microseconds (default setting).
- `8` – Configures the minimum gap as 8 microseconds.
- `16` – Configures the minimum gap as 16 microseconds.

**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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables 802.11n aggregation parameters</td>
</tr>
</tbody>
</table>
7.1.30.4.3 airtime-fairness

Enables equal access for wireless clients based on their airtime usage.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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>prefer-ht</td>
<td>Optional. Gives preference to high throughput (802.11n) clients over 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>• &lt;1-10&gt; — 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
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands
- no

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables fair access for wireless clients (provides access on a round-robin mode)</td>
</tr>
</tbody>
</table>
7.1.30.4.4 antenna-diversity

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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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

no | Uses single antenna for non-11n transmit rates
7.1.30.4.5 **antenna-downtilt**

```plaintext
interface-config-radio-instance
```

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 — AP71XX

---

**NOTE:** This feature is not supported on AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, and RFS4011.

---

**Syntax**

```plaintext
antenna-downtilt
```

**Parameters**

None

**Examples**

```plaintext
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**
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>Disables the ADEPT antenna mode</td>
</tr>
</tbody>
</table>
7.1.30.4.6 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. Only a professional installer should set the antenna gain.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

Syntax
antenna-gain <0.0-15.0>

Parameters
- antenna-gain <0.0-15.0>

Examples
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#antenna-gain 12.0

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
  interface radio1
    antenna-gain 12.0
    aggregation amdup tx-only
    aeroscout forward
    antenna-diversity
    airtame-fairness prefer-ht weight 6
    antenna-downtilt

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands

no
  Resets the radio’s antenna gain parameter
7.1.30.4.7 antenna-mode

Configure antenna mode (the number of transmit and receive antennas) on the radio.

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. The default setting is dynamic based on the access point model deployed and its transmit power settings.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

Syntax
antenna-mode [1*1|1*ALL|2*2|default]

Parameters
- antenna-mode [1*1|1*ALL|2*2|default]

<table>
<thead>
<tr>
<th>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 antenna A 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 1x1.

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.
### 7.1.30.4.8 association-list

**interface-config-radio-instance**

Associates an existing global association list with this radio interface

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**

`association-list global <GLOBAL-ASSOC-LIST-NAME>`

**Parameters**

- `association-list global <GLOBAL-ASSOC-LIST-NAME>`

| association-list global <GLOBAL-ASSOC-LIST-NAME> | Associates an existing global association list with this radio interface |

**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)#
```

**Related Commands**

- `no`
  Removes the global association list associated with this radio interface
7.1.30.4.9 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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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 <1-8> <1-50>`

  Configures radio beacon parameters

- `dtim-period` Configures the radio DTIM interval. A DTIM is a message that informs wireless clients about the presence of buffered multicast or broadcast data. The message is generated within the periodic beacon at a frequency specified by the DTIM interval.

- `<1-50>` Configures a single value to use on the radio. Specify a value between 1 and 50.

- `bss <1-16> <1-50>` Configures a separate DTIM for a Basic Service Set (BSS) on a radio

  - `<1-16>` — Sets the BSS number from 1 - 16
  - `<1-50>` — Sets the BSS DTIM from 1 - 50

- `period [50|100|200]` Configures the beacon period (the interval between consecutive radio beacons)

  - 50 — Configures 50 K-uSec interval between beacons
  - 100 — Configures 100 K-uSec interval between beacons (default)
  - 200 — Configures 200 K-uSec interval between beacons

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#beacon dtim-period bss 2 20
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#beacon period 50
```

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio
beacon period 50
beacon dtim-period bss 1 2
beacon dtim-period bss 2 20
beacon dtim-period bss 3 2
--More--
```

**Related Commands**

- `no` Removes the configured beacon parameters
7.130.4.10 channel

Configure 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 AP8232, and are unique to the 80 MHz band.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**

channel [smart|acs|1|2|3|4|-------]

**Parameters**

- channel [smart|acs|1|2|3|4|-------]

  | smart[acs]| 1|2|3|4|------- | Configures a radio’s channel of operation. The options are:
  | smart – Uses Smart RF to assign a channel (uses uniform spectrum spreading if Smart RF is not enabled). This is the default setting.
  | acs – Uses *automatic channel selection* (ACS) to assign a channel
  | 1 – Channel 1 in 20 MHz
  | 2 – Channel 1 in 20 MHz

**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 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 |
## 7.1.30.4.11 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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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**

- **b-only** Supports operation in the 802.11b mode only (applicable for 2.4 and 4.9 GHz bands)
- **g-only** Uses rates that support operation in the 802.11g mode only (applicable for 2.4 and 4.9 GHz bands)
- **a-only** Uses rates that support operation in the 802.11a mode only (applicable for 5.0 GHz band only)
- **bg** Uses rates that support 802.11b and 802.11g wireless clients (applicable for 2.4 and 4.9 GHz bands)
- **bgn** Uses rates that support 802.11b, 802.11g, and 802.11n wireless clients (applicable for 2.4 and 4.9 GHz bands)
- **gn** Uses rates that support 802.11g and 802.11n wireless clients (applicable for 2.4 and 4.9 GHz bands)
<table>
<thead>
<tr>
<th>data-rates</th>
<th>Uses rates that support 802.11a and 802.11n wireless clients (applicable for 5.0 GHz band only)</th>
</tr>
</thead>
<tbody>
<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**
  - `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` – Modulation and Coding Scheme data rates for 1 Spatial Stream
  - `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

- **data-rates mcs qam-only**
  - Configures support for MCS QAM data rates only

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).
### 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>
</tr>
<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 No 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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets the 802.11 data rates on a radio</td>
</tr>
<tr>
<td>rf-mode</td>
<td>Configures the radio’s RF mode of operation</td>
</tr>
</tbody>
</table>
7.1.30.4.12 description

```markdown
interface-config-radio-instance
```

Configures the selected radio’s description

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**
description <WORD>

**Parameters**
- description <WORD>

<table>
<thead>
<tr>
<th>&lt;WORD&gt;</th>
<th>Defines 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 |
### 7.1.30.4.13 dfs-rehome

```plaintext
- interface-config-radio-instance

Reverts to configured home channel once the *Dynamic Frequency Selection* (DFS) evacuation period expires.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011
```

**Syntax**

dfs-rehome

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#dfs-rehome
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>Stays on DFS elected channel after evacuation period expires</td>
</tr>
</tbody>
</table>
7.1.30.4.14 dynamic-chain-selection

*interface-config-radio-instance*

Enables automatic antenna mode selection (single antenna for non-11n transmit rates). This option is enabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**

dynamic-chain-selection

**Parameters**

None

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#dynamic-chain-selection
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Uses the configured transmit antenna mode for all clients</td>
</tr>
</tbody>
</table>
### 7.1.30.4.15 ekahau

#### interface-config-radio-instance

Enables Ekahau multicast packet forwarding

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

#### Syntax

```
ekahau [forward|mac <MAC>]
```

```
ekahau forward ip <IP> port <0-65535>
```

#### Parameters

- `ekahau [forward|mac <MAC>]`
- `forward ip <IP> port <0-65535>`
  - Enables multicast packet forwarding to the Ekahau engine
  - `ip <IP>` — Configures the IP address of the Ekahau engine in the A.B.C.D format
  - `port <0-65535>` — Specifies the TaZman Sniffer Protocol (TZSP) port on Ekahau engine from 0 - 65535
  - TZSP is an encapsulation protocol, which is generally used to wrap 802.11 wireless packets.

- `mac <MAC>`
  - Configures the multicast MAC address to forward the packets
  - `<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 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
  --More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

#### Related Commands

- `no`
  - Uses default Ekahau multicast MAC address
### 7.1.30.4.16 extended-range

#### Interface-Configuration

Configures the extended range capability for AP71XX model devices

Supported in the following platforms:

- Access Point — AP71XX, AP81XX

**Syntax**

`extended-range <1-25>`

**Parameters**

- `extended-range <1-25>`

#### Examples

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#extended-range
```

```
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
  aerocout 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>
7.1.30.4.17 guard-interval

Configure 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 — AP300, AP621, AP622, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

Syntax:
guard-interval [any|long]

Parameters:
- guard-interval [any|long]

<table>
<thead>
<tr>
<th>Parameter</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
  guard-interval long
  --More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands:
- no
  Resets the 802.11n guard interval to default (long: 800nSec)
### 7.1.30.4.18 ldpc

*interface-config-radio-instance*

Enables support for *Low Density Parity Check* (LDPC) on the radio interface.

LDPC consists of forward error correcting codes that enable error control in data transmission.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4011

**Syntax**

```
ldpc
```

**Parameters**

None

**Examples**

```
rfs4000-229D58 (config-profile-Test81XX-if-radio1)#ldpc
rfs4000-229D58 (config-profile-Test81XX-if-radio1)#
```

```
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>
7.1.30.4.19 lock-rf-mode

Retains user configured RF mode settings for the selected radio

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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 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 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
lock-rf-mode
extended-range 15
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands

| no | Allows Smart RF to change a radio’s RF mode settings |
7.1.30.4.20 max-clients

Configure the maximum number of wireless clients allowed to associate with this radio

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

Syntax
max-clients <0-256>

Parameters
- max-clients <0-256>

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 ampdu 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
7.1.30.4.21 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.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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 <1-6>|portal|preferred-peer <1-6> <MAC>|psk [0 <LINE>|2 <LINE>]<LINE>]]**
  - **mesh** Configures radio mesh parameters, such as maximum number of mesh links, preferred peer device, client operations etc.
  - **client** Enables operation as a client (scans for mesh portals or nodes that have connectivity to portals and connects through them)
  - 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 3.
  - **portal** Enables operation as a portal (begins beaconing immediately, accepting connections from other mesh nodes, typically the node with a connection to the wired network)
  - 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.
  - **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
    - `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
\textbf{mesh client}
beacon period 50
--More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands

| **no** | Disables mesh mode operation of the selected radio |
### 7.1.30.4.22 meshpoint

**interface-config-radio-instance**

Maps an existing meshpoint to this radio

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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
7.1.30.4.23 no

`interface-config-radio-instance`

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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**

`no <PARAMETER>`

**Parameters**

None

**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
rfs7000-37FABE(config-profile-ap71xxTest-if-radio1)#no ?
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-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
association-list            Configure the association list for the radio
beacon                      Configure beacon parameters
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
guard-interval              Configure default value of 802.11n guard interval (long: 800nSec)
lpc                         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
off-channel-scan            Disable off-channel scanning on the radio
placement                   Reset the placement of the radio to its default
power                       Reset the transmit power of this radio to default
preamble-short              Disable the use of short-preamble on this radio
probe-response              Configure transmission parameters for Probe Response frames
radio-resource-measurement  Configure support for 802.11k Radio Resource Measurement
radio-share-mode            Configure the radio-share mode of operation for
```
rate-selection
rf-mode
rifs
rts-threshold
shutdown
sniffer-redirect
stbc
use
wireless-client
wlan

Monotonic rate selection
Reset the RF mode of operation for this radio to default (2.4GHz on radio1, 5GHz on radio2, sensor on radio3)
Configure Reduced Interframe Spacing (RIFS) parameters
Reset the RTS threshold to its default (65536)
Re-enable the selected interface
Disable capture and redirection of packets
Configure Space-Time Block Coding (STBC) parameters
Set setting to use
Configure wireless client related parameters
Disable a wlan from this radio

Service Commands

rfs7000-37FABE(config-profile-ap71xxTest-if-radio1)#

The following example shows radio interface settings before the 'no' commands are executed:

rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context interface radio
  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 ampdu 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)#
```
### 7.1.30.4.24 non-unicast

This command configures the support for non-unicast frames on this radio. Enables the forwarding of multicast and broadcast frames by this radio.

**Supported in the following platforms:**
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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 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.
  - **bss <1-16> <1-200>**: Overrides the default on a specified BSS.
    - **<1-16>**: Select the BSS to override the default.
    - **<1-200>**: Specify the number of broadcast packets queued for the selected BSS.

- **non-unicast tx-rate [bss <1-16]|dynamic-all|dynamic-basic|highest-basic|lowest-basic]**
  - **bss <1-16>**
    - **<1-16>**: Select the BSS to override the default.
  - **dynamic-all**: Dynamically selects a rate from all supported rates based on current traffic conditions.
  - **dynamic-basic**: Dynamically selects a rate from all supported basic rates based on current traffic conditions.
<table>
<thead>
<tr>
<th>highest-basic</th>
<th>Uses the highest configured basic rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>lowest-basic</td>
<td>Uses the lowest configured basic rate</td>
</tr>
</tbody>
</table>

**Examples**

```
  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 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
  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
  airt ime-fairness prefer-ht weight 6
  lock-rf-mode
  extended-range 15
  antenna-downtilt
```

**Related Commands**

| no            | Resets the handling of non unicast frames to its default |
### 7.1.30.4.25 off-channel-scan

*interface-config-radio-instance*

Enables selected radio’s off channel scanning parameters. This option is disabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

#### Syntax

```
off-channel-scan {channel-list|max-multicast|scan-interval|sniffer-redirect}
off-channel-scan {channel-list [2.4Ghz|5Ghz]} {<CHANNEL-LIST>}
off-channel-scan {max-multicast <0-100>|scan-interval <2-100>}
off-channel-scan {sniffer-redirect tzsp <IP>}
```

#### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
</tr>
</thead>
</table>
| **off-channel-scan** {channel-list [2.4GHz|5GHz]} {<CHANNEL-LIST>}
| Enables off channel scanning parameters. These parameters are optional, and the system configures default settings if no values are specified. |
| **channel-list [2.4GHz|5GHz]** | Optional. Specifies the channel list to scan |
| • 2.4GHz – Selects the 2.4 GHz band |
| • 5GHz – Selects the 5.0 GHz band |
| **<CHANNEL-LIST>** | Optional. Specifies a list of 20 MHz or 40 MHz channels for the selected band (the channels are separated by commas or hyphens) |
| **max-multicast <0-100>|scan-interval <2-100>** |
| Enables off-channel scanning on this radio. These parameters are optional, and the system configures default settings if no values are specified. |
| **max-multicast <0-100>|scan-interval <2-100>** | Optional. Configures the maximum multicast/broadcast messages 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 10 dtims. |
| **sniffer-redirect tzsp <IP>** |
| Enables off channel scanning parameters. These parameters are optional, and the system configures default settings if no values are specified. |
| **sniffer-redirect tzsp <IP>** | Optional. Captures and redirects packets to an IP address running a packet capture analysis tool |
| • tzsp – Encapsulates captured packets in TZSP before redirecting |
| • <IP> – Specify the destination device IP address. |
Examples

```bash
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>
### 7.1.30.4.26 placement

*interface-config-radio-instance*

Defines the location where the radio is deployed. 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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**

placement [indoor|outdoor]

**Parameters**

- placement [indoor|outdoor]

<table>
<thead>
<tr>
<th>indoor</th>
<th>Radio is deployed indoors (uses indoor regulatory rules). This is the default setting.</th>
</tr>
</thead>
<tbody>
<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**

<table>
<thead>
<tr>
<th>no</th>
<th>Resets a radio’s deployment location</th>
</tr>
</thead>
</table>
7.1.30.4.27 power

Configure a 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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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>&lt;1-30&gt;</td>
<td>Transmits power in dBm (actual power could be lower based on regulatory restrictions)</td>
</tr>
<tr>
<td>smart</td>
<td>Smart RF determines the optimum transmit power needed</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
    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
--More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#

Related Commands
- no
  Resets a radio’s transmit power
7.1.30.4.28 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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables the use of short preamble on a radio</td>
</tr>
</tbody>
</table>
7.1.30.4.29 probe-response

Configure transmission parameters for probe response frames

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

Syntax

```
probe-response [rate|retry]
probe-response rate [follow-probe-request|highest-basic|lowest-basic]
```

Parameters

- probe-response retry
  - Repeats probe response if no acknowledgement is received from the client. This option is enabled by default.

- probe-response rate [follow-probe-request|highest-basic|lowest-basic]

<table>
<thead>
<tr>
<th>probe-response</th>
<th>Configures transmission parameters for probe response frames</th>
</tr>
</thead>
<tbody>
<tr>
<td>retry</td>
<td>Retransmits probe response if no acknowledgement is received from the client. This option is enabled by default.</td>
</tr>
<tr>
<td>rate</td>
<td>Configures data transmission rates used for the transmission of probe responses</td>
</tr>
<tr>
<td>follow-probe-request</td>
<td>Transmits probe responses at the same rate as the received request (default setting)</td>
</tr>
<tr>
<td>highest-basic</td>
<td>Uses the highest configured basic rate</td>
</tr>
<tr>
<td>lowest-basic</td>
<td>Uses the lowest configured basic rate</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#probe-response rate follow-probe-request
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

Related Commands

```
no
```

Resets transmission parameters for probe response frames
7.1.30.4.30 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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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>attenuation-threshold &lt;1-199&gt;</td>
<td>Configures the neighbor attenuation threshold, considered when generating channel and neighbor reports</td>
</tr>
<tr>
<td>max-entries &lt;1-12&gt;</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-587-if-radiol)#radio-resource-measurement attenuation-threshold 20
rfs4000-229D58 (config-device-00-23-68-22-9D-587-if-radiol)#
```

```
rfs4000-229D58 (config-device-00-23-68-22-9D-587-if-radiol)#radio-resource-measurement max-entries 10
rfs4000-229D58 (config-device-00-23-68-22-9D-587-if-radiol)#
```

```
rfs4000-229D58 (config-device-00-23-68-22-9D-587-if-radiol)#show context interface radiol
radio-resource-measurement max-entries 10
radio-resource-measurement attenuation-threshold 20
rfs4000-229D58 (config-device-00-23-68-22-9D-587-if-radiol)#
```

**Related Commands**

- `no` Disables 802.11k radio resource measurement support
7.1.30.4.31 radio-share-mode

*interface-config-radio-instance*

Configures a 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).

![Checkmark] **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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**

`radio-share-mode [inline|off|promiscuous]`

**Parameters**

- `radio-share-mode [inline|off|promiscuous]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>radio-share-mode</code></td>
<td>Configures the Radio Share mode of operation. The options are: inline, off, and promiscuous</td>
</tr>
<tr>
<td><code>inline</code></td>
<td>Enables sharing of all WLAN packets (matching the BSSID of the radio) serviced by the radio. In the inline mode, all packets are shared with the WIPS sensor module.</td>
</tr>
<tr>
<td><code>off</code></td>
<td>Disables Radio Share (no packets shared with WIPS sensor module)</td>
</tr>
<tr>
<td><code>promiscuous</code></td>
<td>Enables the sharing of packets received in the promiscuous mode (i.e. without filtering based on BSSI). In the promiscuous mode, the radio captures every frame it sees on the channel it is set for.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#radio-share-mode promiscuous
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
  non-unicast queue bss 16 50
  antenna-diversity
  max-clients 100
  radio-share-mode promiscuous
  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 radio share mode for this radio to its default.
7.1.30.4.32 rate-selection

Sets the rate selection method to standard or opportunistic

**NOTE:** This feature is not supported on RFS4011 wireless controller.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX

**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 (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**

```
rfs4000-880DA7(config-profile-default-rfs4000-if-radiol)#rate-selection opportunistic
%% Error: Rate selection cannot be changed for device [rfs4000]
rfs4000-880DA7(config-profile-default-rfs4000-if-radiol)#[
```

**Related Commands**

- `no` Resets the rate selection mode to standard (monotonic)
7.1.30.4.33 remove-override

- **interface-config-radio-instance**

Removes the radio’s channel of operation

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**

`remove-override channel`

**Parameters**

- `remove-override channel`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>remove-override</td>
<td>Removes the radio’s channel of operation</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config-profile-testRFS4000-if-radio1)#show context
    interface radio1
    channel 9
rfs4000-229D58(config-profile-testRFS4000-if-radio1)#
```

```
rfs4000-229D58(config-profile-testRFS4000-if-radio1)#remove-override channel
rfs4000-229D58(config-profile-testRFS4000-if-radio1)#
```

```
rfs4000-229D58(config-profile-testRFS4000-if-radio1)#show context
    interface radio1
rfs4000-229D58(config-profile-testRFS4000-if-radio1)#
```
7.1.30.4.34 rf-mode

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 radio.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**

rf-mode [2.4GHz-wlan|4.9GHz-wlan|5GHz-wlan|client-bridge|scan-ahead|sensor]

**Parameters**

- rf-mode [2.4GHz-wlan|4.9GHz-wlan|5GHz-wlan|client-bridge|scan-ahead|sensor]

<table>
<thead>
<tr>
<th>rf-mode</th>
<th>Configures the radio’s RF mode of operation</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>client-bridge</td>
<td>Enables this radio to operate as a client bridge radio</td>
</tr>
</tbody>
</table>

- scan-ahead

<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.</td>
<td></td>
</tr>
</tbody>
</table>

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.

- sensor

| 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>no</td>
<td>Resets the radio’s RF mode of operation</td>
</tr>
<tr>
<td>data-rates</td>
<td>Configures the 802.11 data rates on this radio</td>
</tr>
</tbody>
</table>
### 7.1.30.4.35 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. Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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
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
--More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

#### Related Commands

- `no` Disables radio's RIFS parameters
### 7.1.30.4.36 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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

### Syntax

```
rts-threshold <0-65536>
```

### Parameters

- `rts-threshold <0-65536>`

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Specify the RTS threshold value from 0-65536 bytes.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Examples</strong></td>
<td></td>
</tr>
<tr>
<td><code>rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#rts-threshold 100</code></td>
<td></td>
</tr>
<tr>
<td><code>rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context</code></td>
<td></td>
</tr>
<tr>
<td><code>interface radio1</code></td>
<td></td>
</tr>
<tr>
<td><code>rf-mode sensor</code></td>
<td></td>
</tr>
<tr>
<td><code>placement outdoor</code></td>
<td></td>
</tr>
<tr>
<td><code>mesh client</code></td>
<td></td>
</tr>
<tr>
<td><code>rts-threshold 100</code></td>
<td></td>
</tr>
<tr>
<td><code>off-channel-scan channel-list 2.4GHz 1</code></td>
<td></td>
</tr>
<tr>
<td><code>guard-interval long</code></td>
<td></td>
</tr>
<tr>
<td><code>aggregation ampdu tx-only</code></td>
<td></td>
</tr>
<tr>
<td><code>rifs tx-only</code></td>
<td></td>
</tr>
<tr>
<td><code>ekahau forward ip 172.16.10.1 port 3</code></td>
<td></td>
</tr>
<tr>
<td><code>non-unicast tx-rate bss 1 dynamic-all</code></td>
<td></td>
</tr>
<tr>
<td><code>non-unicast tx-rate bss 2 highest-basic</code></td>
<td></td>
</tr>
<tr>
<td><code>non-unicast tx-rate bss 3 highest-basic</code></td>
<td></td>
</tr>
<tr>
<td><code>non-unicast tx-rate bss 4 highest-basic</code></td>
<td></td>
</tr>
<tr>
<td><code>non-unicast tx-rate bss 5 highest-basic</code></td>
<td></td>
</tr>
<tr>
<td><code>--More--</code></td>
<td></td>
</tr>
<tr>
<td><code>rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#</code></td>
<td></td>
</tr>
</tbody>
</table>

### Related Commands

- `no` Resets a radio’s RTS threshold to its default
7.1.30.4.37 shutdown

Terminates or shuts down selected radio interface

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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>
7.1.30.4.38 sniffer-redirect

Captures and redirects packets to an IP address running a packet capture/analysis tool

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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>sniffer-redirect</th>
<th>Captures and redirects packets to an IP address running a packet capture/analysis tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>omnipeek</td>
<td>Encapsulates captured packets in proprietary header (use 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-radio1)#sniffer-redirect omnipeek 172.16.10.1 channel 1
```

```
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
radiol 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--
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 packet capture and redirection</td>
</tr>
</tbody>
</table>
7.1.30.4.39 stbc

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 — AP300, AP621, AP622, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**
```
stbc [none|tx-only]
```

**Parameters**
- **none** Disables STBC support (default setting)
- **tx-only** Configures the AP radio to format and broadcast the special stream (enables STBC support for transmit only)

**Examples**
```
rfs7000-37FABE(config-profile-81xxTestProfile-if-radio1)#stbc tx-only
rfs7000-37FABE(config-profile-81xxTestProfile-if-radio1)#
```
```
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
7.1.30.4.40 use

Enables an association ACL policy and a radio QoS policy for 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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- 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>]`

  - `association-acl-policy` Uses a specified association ACL policy with this radio interface.
    - `<ASSOC-ACL-POLICY-NAME>` — Specify the association ACL policy name (should be existing and fully configured).
  
  - `radio-qos-policy` Uses a specified radio QoS policy with this radio interface.
    - `<RADIO-QoS-POLICY-NAME>` — Specify the radio QoS policy name (should be existing and fully configured).

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#use association-acl-policy test
```

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#show context
interface radio1
  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
  non-unicast tx-rate bss 1 dynamic-all
  non-unicast tx-rate bss 2 highest-basic
  non-unicast tx-rate bss 3 highest-basic
  --More--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

**Related Commands**

- `no` Dissociates the specified association ACL policy and radio QoS policy.
### 7.1.30.4.41 wireless-client

- **interface-config-radio-instance**

   Configures wireless client parameters on this radio

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**

```plaintext
wireless-client tx-power [<0-20>|mode]
```

```plaintext
wireless-client tx-power mode [802.11d {symbol-ie}|symbol-ie {802.11d}]
```

**Parameters**

- **wireless-client tx-power <0-20>**

<table>
<thead>
<tr>
<th>wireless-client</th>
<th>Configures wireless client parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>tx-power &lt;0-20&gt;</td>
<td>Configures the transmit power indicated to wireless clients</td>
</tr>
<tr>
<td>- &lt;0-20&gt;</td>
<td>Specify transmit power from 0 - 20 dBm</td>
</tr>
</tbody>
</table>

- **wireless-client tx-power mode [802.11d {symbol-ie}|symbol-ie {802.11d}]**

<table>
<thead>
<tr>
<th>wireless-client</th>
<th>Configures wireless client parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>tx-power [802.11d</td>
<td>symbol-ie]</td>
</tr>
<tr>
<td>- 802.11d</td>
<td>Advertises in the IEEE 802.11d country information element</td>
</tr>
<tr>
<td>- symbol-ie</td>
<td>Optional. Advertises in the Symbol/Motorola information element (176)</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#wireless-client tx-power 20
```

```plaintext
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
  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
  --More--
```

**Related Commands**

| no | Resets the transmit power indicated to wireless clients |
**7.1.30.4.42 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 — AP300, AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4011

**Syntax**

```
wlan <WLAN-NAME> {bss|primary}
wlan <WLAN-NAME> {bss <1-8> {primary}}
```

**Parameters**

- `wlan <WLAN-NAME> {bss <1-8> {primary}}`

  - `<WLAN-NAME>`
    - Specify the WLAN name (it must have been already created and configured)
    - `<bss <1-8> |primary>`
    - `bss <1-8>` — Optional. Specifies a BSS for the radio to map the WLAN
    - `<1-8>` — Specify the BSS number from 1 - 8.
    - `primary` — Optional. Uses the specified WLAN as the primary WLAN, when multiple WLANs exist on the BSS

**Examples**

```
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#wlan TestWLAN primary
```

```
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--
rfs7000-37FABE(config-profile-71xxTestProfile-if-radio1)#
```

**Related Commands**

| no | Disables a WLAN on a radio |
7.1.30.5 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, 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:**

- **apn** Enter the access point name provided by the service provider
- **auth-type** Type of authentication, Eg chap, pap
- **crypto** Encryption Module
- **description** Port description
- **ip** Internet Protocol (IP)
- **no** Negate a command or set its defaults
- **password** Enter password provided by the service provider
- **shutdown** Disable wireless wan feature
- **use** Set setting to use
- **username** Enter username provided by the service provider
- **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-<PROFILE-NAME>-if-wwan1)#
```

---

**NOTE:** The WWAN interface is supported only on the AP7131, RFS4000, RFS6000 platforms.

---

**Table 7.18** summarizes WWAN interface configuration commands.

<table>
<thead>
<tr>
<th><strong>Table 7.18</strong> Interface-Config-WWAN1-Interface Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commands</strong></td>
</tr>
<tr>
<td><strong>apn</strong></td>
</tr>
<tr>
<td><strong>auth-type</strong></td>
</tr>
<tr>
<td><strong>crypto</strong></td>
</tr>
</tbody>
</table>
### Table 7.18 Interface-Config-WWAN1-Interface Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td>Configures a unique description for this interface</td>
<td>page 7-274</td>
</tr>
<tr>
<td>ip</td>
<td>Associates an IP ACL with this interface</td>
<td>page 7-275</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts the WWAN interface settings</td>
<td>page 7-276</td>
</tr>
<tr>
<td>password</td>
<td>Configures a password for this WWAN interface</td>
<td>page 7-277</td>
</tr>
<tr>
<td>use</td>
<td>Associates an IP ACL with this interface</td>
<td>page 7-278</td>
</tr>
<tr>
<td>username</td>
<td>Configures the names of users accessing this interface</td>
<td>page 7-279</td>
</tr>
</tbody>
</table>
7.1.30.5.1 apn

> interface-config-wwan-instance

Configures the access point’s name provided by the service provider. 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 service provided given access point name.</th>
</tr>
</thead>
</table>

**Examples**
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#apn TechPubs
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#

rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#show context
interface wwan1
    apn TechPubs
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#

**Related Commands**

| no | Removes the configured access point name. |
### 7.1.30.5.2 auth-type

`interface-config-wwan-instance`

Configures the authentication types used on this interface

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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>chap</td>
<td>Configures <strong>Challenge-Handshake Authentication Protocol</strong> (CHAP). This is the default value.</td>
</tr>
<tr>
<td>mschap</td>
<td>Configures <strong>Microsoft Challenge-Handshake Authentication Protocol</strong> (MSCHAP)</td>
</tr>
<tr>
<td>mschapv2</td>
<td>Configures <strong>Microsoft Challenge-Handshake Authentication Protocol</strong> (MSCHAP) version 2</td>
</tr>
<tr>
<td>pap</td>
<td>Configures <strong>Password Authentication Protocol</strong> (PAP)</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#auth-type mschap-v2
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#
```

```
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#show context
interface wwan1
   apn TechPubs
       auth-type mschap-v2
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#
```

**Related Commands**

`no` Removes the authentication protocol configured on this interface
7.1.30.5.3 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**

rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#crypto map test
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#

rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#show context
interface wwan1
  apn TechPubs
  auth-type mschap-v2
crypto map test
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#

**Related Commands**

- no
  Removes the crypto map associated with this interface
### 7.1.30.5.4 description

*interface-config-wwan-instance*

Configures a unique description for this interface

Supported in the following platforms:
- Access Points — AP7131
- Wireless Controllers — RFS4000, RFS6000

**Syntax**

description <WORD>

**Parameters**

- description <WORD>

<table>
<thead>
<tr>
<th>description &lt;WORD&gt;</th>
<th>Configures a unique description for this WWAN interface</th>
</tr>
</thead>
</table>

**Examples**

```plaintext
ap7131-11B6C4(config-device-00-23-68-11-E6-C4-if-wwan1)#description "This interface is reserved for the ISP Airtel"
% Error: Unknown config-item (id:description)
ap7131-11B6C4(config-device-00-23-68-11-E6-C4-if-wwan1)#

rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#description "This interface is reserved for the ISP Airtel"
% Error: Unknown config-item (id:description)
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#
```

**Related Commands**

- **no** | Removes the description configured for this WWAN interface |
7.1.30.5.5 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>**
  - Configures the default-gateway's priority. The default is 3000.
  - `<1-8000>` — Specify a value from 1 - 8000. The default is 3000.

- **ip nat [inside|outside]**
  - Configures the NAT settings
  - `inside` — Marks this WWAN interface as NAT inside
  - `outside` — Marks this WWAN interface as NAT outside

**Examples**

```
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#ip default-gateway priority 1
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#ip nat inside
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#show context
interface wwan1
  apn TechPubs
  auth-type mschap-v2
  crypto map test
  ip nat inside
  ip default-gateway priority 1
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#
```

**Related Commands**

- **no**
  - Removes IP related settings on this interface
7.1.30.5.6 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]

Parameters
None

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

Examples

rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#no apn
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#no auth-type

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>apn</td>
<td>Configures the access point's name provided by the service provider</td>
</tr>
<tr>
<td>auth-type</td>
<td>Configures the authentication types used on this interface</td>
</tr>
<tr>
<td>crypto</td>
<td>Associates a crypto map with this interface</td>
</tr>
<tr>
<td>description</td>
<td>Configures a unique description for this interface</td>
</tr>
<tr>
<td>ip</td>
<td>Configures IP related settings on this interface</td>
</tr>
<tr>
<td>password</td>
<td>Configures a password for this WWAN interface</td>
</tr>
<tr>
<td>use</td>
<td>Associates an IP ACL with this interface</td>
</tr>
<tr>
<td>username</td>
<td>Configures the names of users accessing this interface</td>
</tr>
</tbody>
</table>
7.1.30.5.7 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>2 &lt;WORD&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;WORD&gt;</td>
<td>Enter the password string (should not exceed 32 characters in length).</td>
</tr>
</tbody>
</table>

Examples

rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#password TechPubsTesting@123
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#

rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#show context
interface wwan1
  password TechPubsTesting@123
  crypto map test
  ip nat inside
  ip default-gateway priority 1
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#

Related Commands

| no | Removes the configured password |
## 7.1.30.5.8 use

 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

```bash
use ip-access-list in <ACCESS-LIST-NAME>
```

### Parameters

- `use ip-access-list in <ACCESS-LIST-NAME>`

<table>
<thead>
<tr>
<th>use ip-access-list in &lt;ACCESS-LIST-NAME&gt;</th>
<th>Associates an IP ACL with this interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>- <code>&lt;ACCESS-LIST-NAME&gt;</code> — Specify the IP ACL name.</td>
<td></td>
</tr>
</tbody>
</table>

### Examples

```bash
rfs4000-229D58 (config-profile-testRFS4000-if-wwan1)#use ip-access-list in test

rfs4000-229D58 (config-profile-testRFS4000-if-wwan1)#show context
interface wwan1
    password TechPubsTesting123
    crypto map test
    ip nat inside
    use ip-access-list in test
    ip default-gateway priority 1
rfs4000-229D58 (config-profile-testRFS4000-if-wwan1)#
```

### Related Commands

```bash
no
```

Removes the IP ACL associated with this interface
7.1.30.5.9 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>`

**Examples**

```
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#username TechPubsUser1
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#show context
interface wwan1
username TechPubsUser1
password TechPubsTesting123
crypto map test
ip nat inside
use ip-access-list in test
ip default-gateway priority 1
rfs4000-229D58(config-profile-testRFS4000-if-wwan1)#
```

**Related Commands**

```
no
```

Removes the configured username
7.1.30.6 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-nx4500 instance to configure a serial interface:

```
x4500-5CFA2B(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 radioss
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)
vmif          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-1/1:1

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#?

Interface configuration commands:

- authentication: Type of authentication, Eg chap, pap
- description: Enter description provided by the service provider
- encapsulation: The type of traffic that this group handles.
- ip: Internet Protocol (IP)
- local-ip-address: IP address assigned to the local system
- no: Negate a command or set its defaults
- password: Enter password provided by the service provider
- remote-ip-subnet: IP subnet assigned to the remote system along with subnet in CIDR notation
- remove-override: Remove override from the device
- shutdown: Disable serial interface
- use: Set setting to use
- username: Enter username provided by the service provider
- 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-default-nx45xx-if-serial-1/1:1)#
Table 7.19 summarizes serial interface 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 the authentication type on the serial interface</td>
<td>page 7-282</td>
</tr>
<tr>
<td><code>description</code></td>
<td>Configures a description of the serial interface</td>
<td>page 7-283</td>
</tr>
<tr>
<td><code>encapsulation</code></td>
<td>Defines the type of traffic handled by the serial interface</td>
<td>page 7-284</td>
</tr>
<tr>
<td><code>ip</code></td>
<td>Configures serial interface IP to use NAT</td>
<td>page 7-285</td>
</tr>
<tr>
<td><code>local-ip-address</code></td>
<td>Assigns a local IP address for this serial interface</td>
<td>page 7-286</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Disables or reverts serial interface settings to their defaults</td>
<td>page 7-287</td>
</tr>
<tr>
<td><code>password</code></td>
<td>Configures the serial interface’s password</td>
<td>page 7-288</td>
</tr>
<tr>
<td><code>remote-ip-subnet</code></td>
<td>Configures the remote system’s IP address and subnet</td>
<td>page 7-289</td>
</tr>
<tr>
<td><code>remove-override</code></td>
<td>Removes device overrides</td>
<td>page 7-290</td>
</tr>
<tr>
<td><code>shutdown</code></td>
<td>Shuts down the serial interface</td>
<td>page 7-291</td>
</tr>
<tr>
<td><code>use</code></td>
<td>Applies an IP access list on this serial interface</td>
<td>page 7-292</td>
</tr>
<tr>
<td><code>username</code></td>
<td>Configures the serial interface’s user names</td>
<td>page 7-293</td>
</tr>
</tbody>
</table>
7.1.30.6.1 authentication

Configure 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]

Examples
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#authentication pap

Related Commands
- no Disables or reverts serial interface settings to their default
### 7.1.30.6.2 description

**interface-config-serial-instance**

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>Configure the serial interface's description</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;WORD&gt;</td>
<td>— Provide a unique description for this serial interface (should not exceed 32 characters in length)</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
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 |
### 7.1.30.6.3 encapsulation

<table>
<thead>
<tr>
<th><strong>interface-config-serial-instance</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Defines the data encapsulation protocol used on this serial interface</td>
</tr>
</tbody>
</table>

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

#### Syntax

encapsulation [chdlc|ppp]

#### Parameters

- encapsulation [chdlc|ppp]

<table>
<thead>
<tr>
<th>encapsulation</th>
<th>Configures the data encapsulation protocol used</th>
</tr>
</thead>
<tbody>
<tr>
<td>chdlc – Configures the encapsulation type as <em>Cisco High-Level Data Link Control</em> (CHDLC). CHDLC is a CISCO proprietary protocol that uses HDLC to send data over synchronous serial links.</td>
<td></td>
</tr>
<tr>
<td>ppp – Configures the encapsulation type as <em>Point-to-Point Protocol</em> (PPP)</td>
<td></td>
</tr>
</tbody>
</table>

#### Examples

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"

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#

#### Related Commands

| no | Disables or reverts serial interface settings to their default |

---


7.1.30.6.4 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>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
7.1.30.6.5 local-ip-address

- interface-config-serial-instance

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>

| local-ip-address <IP> | Specify the IP address in the A.B.C.D format |

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
7.1.30.6.6 no

- interface-config-serial-instance

Negates a command or sets its defaults

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax

no <PARAMETER>

Parameters

None

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)#

Related Commands

- authentication Configures the type of authentication used with this serial interface
- description Configures the serial interface's description
- ip Configures serial interface IP to use NAT
- local-ip-address Assigns a local IP address for this serial interface
- password Configures the serial interface's password
- remote-ip-subnet Configures the remote system's IP address and subnet
- shutdown Shuts down the serial interface
- use Applies an IP access list on this serial interface
- username Configures the names of users accessing this serial interface
7.1.30.6.7 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
  description "This interface is for the Sales Team"

Related Commands

no | Disables or reverts serial interface settings to their default
7.1.30.6.8 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>`

| remote-ip-subnet <A.B.C.D/M> | 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. |

Examples

```
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`  
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.
7.1.30.6.9 remove-override

*interface-config-serial-instance*

Removes device overrides

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**
remove-override <PARAMETERS>

**Parameters**
None

**Examples**
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                 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

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#remove-override

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)#

nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#remove-override encapsulation

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"
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#

**Related Commands**

| no | Disables or reverts serial interface settings to their default |
7.1.30.6.10 shutdown

*interface-config-serial-instance*

Shuts down the serial interface. Use the no shutdown command to re-start a serial interface.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>
7.1.30.6.11 use

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>

Examples
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
### 7.1.30.6.12 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"
nx4500-5CFA2B(config-profile-default-nx45xx-if-serial-1/1:1)#
```

**Related Commands**

- `no` Disables or reverts serial interface settings to their default
### 7.1.30.7 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:

- **channel-group**: Channel group for this interface
- **clock-mode**: The mode for the clock
- **description**: Description for this interface
- **high-impedance**: High impedance
- **line-build-out**: Line build out in decibels (dB) or feet (ft)
- **line-encoding**: Line encoding type
- **media**: The media type for the physical interface
- **no**: Negate a command or sets its defaults
- **remove-override**: Remove override from the device
- **rx-sensitivity-level**: Receive sensitivity level in decibels (dB)
- **shutdown**: Disable t1 interface
- **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

```
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#
```

Table 7.19 summarizes serial interface configuration 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 7-296</td>
</tr>
<tr>
<td>clock-mode</td>
<td>Configures the selected T1E1 interface's clock mode</td>
<td>page 7-297</td>
</tr>
<tr>
<td>description</td>
<td>Configures the selected T1E1 interface's description</td>
<td>page 7-298</td>
</tr>
<tr>
<td>high-impedance</td>
<td>Enables or disables high-impedance monitoring on the selected T1E1 interface</td>
<td>page 7-299</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 7-300</td>
</tr>
<tr>
<td>line-encoding</td>
<td>Configures the selected T1E1 interface's encoding type</td>
<td>page 7-301</td>
</tr>
<tr>
<td>media</td>
<td>Configures the media type for the physical interface</td>
<td>page 7-302</td>
</tr>
<tr>
<td>no</td>
<td>Removes or reverts T1E1 interface settings to default</td>
<td>page 7-303</td>
</tr>
</tbody>
</table>
### Table 7.20 Interface-Config-Serial-Interface Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>remove-override</td>
<td>Removes device overrides on the selected T1E1 interface</td>
<td>page 7-305</td>
</tr>
<tr>
<td>rx-sensitivity-level</td>
<td>Configures the receive sensitivity level in decibels (dB)</td>
<td>page 7-306</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down the selected T1E1 interface</td>
<td>page 7-307</td>
</tr>
</tbody>
</table>
7.1.30.7.1 channel-group

Syntax
channel-group <1-1>

Parameters
- channel-group <1-1>

Example
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#channel-group

Related Commands
- no

   Removes the channel group configured on the T1E1 interface
7.1.30.7.2 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]

| clock-mode [master|normal] | Sets the mode for the clock on this T1E1 interface |
|----------------------------|---------------------------------------------------|
|                            | • master – Use for one end when connected via a T1 crossover cable |
|                            | • normal – Use when connected to a carrier network. This is the default setting. |

**Examples**
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#clock-mode normal

**Related Commands**

- no Reverts the T1E1 interface clock mode to default (normal)
7.1.30.7.3 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>

<table>
<thead>
<tr>
<th>Description</th>
<th>Provide a unique description for this T1E1 interface. The description should not exceed 64 characters in length and should help identify the interface.</th>
</tr>
</thead>
</table>

Examples

```bash
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)description t1 interface slot 1
NX4524 Main Office
```

Related Commands

- **no**  
  Removes or resets the T1E1 interface description
7.1.30.7.4 high-impedance

- **interface-config-t1e1-instance**

  Enables or disables 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**

```
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)high-impedance disable
```

**Related Commands**

- `no` resets the high impedance setting to either enable or disable
7.1.30.7.5 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**

```
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 | 110-120ft | 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 – 20-330 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 |

**Examples**

```
nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B-if-t1e1-1/1)#line-build-out 120OH
```

```
nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B-if-t1e1-1/1)#show context
interface t1e1-1/1
    line-build-out 120OH
nx4500-5CFA2B(config-device-B4-C7-99-5C-FA-2B-if-t1e1-1/1)*#```

**Related Commands**

```
no
```

Resets the T1E1 interface line-build-out setting
### 7.1.30.7.6 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**

```bash
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**

```bash
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#line-encoding ami
```

**Related Commands**

```bash
no
```

Resets the T1E1 interface line-encoding setting
7.1.30.7.7 media

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) |

Examples
rfs7000-37FABE(config-profile-default-nx6500-if-t1e1-1/1)#media t1

Related Commands
- no | Resets the T1E1 interface media type setting |
7.1.30.7.8 no

- interface-config-t1e1-instance

Negates or reverts settings to default

Supported in the following platforms:
  - Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

no <PARAMETER>

**Parameters**

None

**Examples**

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#no ?
channel-group      Channel group for this interface
clock-mode         The mode for the clock
description        Description for this interface
high-impedance     High impedance
line-build-out     Line build out in decibels (dB) or feet (ft)
line-encoding      Line encoding type
media              The media type for the physical interface
no                 Negate a command or sets its defaults
remove-override    Remove override from the device
rx-sensitivity-level Receive sensitivity level in decibels (dB)
shutdown           Disable t1 interface
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
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#no use ip-access-list in
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#no allow-management
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#no crypto map
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#no description
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#no dhcp-relay-incoming
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#no ip dhcp client request options all
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#show context
```

```plaintext
interface vlan8
  ip address 10.0.0.1/8
  ip helper-address 172.16.10.3
```

```plaintext
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#
```
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-group</td>
<td>Configures the channel group index for this interface</td>
</tr>
<tr>
<td>clock-mode</td>
<td>Configures the mode for the clock on the selected T1E1 interface</td>
</tr>
<tr>
<td>description</td>
<td>Configures the selected T1E1 interface’s description</td>
</tr>
<tr>
<td>high-impedance</td>
<td>Enables or disables high impedance on the selected T1E1 interface</td>
</tr>
<tr>
<td>line-build-out</td>
<td>Defines the line build out in decibels (dB), ohms (OH), or feet (ft)</td>
</tr>
<tr>
<td>line-encoding</td>
<td>Configures the line encoding type on the selected T1E1 interface</td>
</tr>
<tr>
<td>media</td>
<td>Configures the media type for the physical interface</td>
</tr>
<tr>
<td>remove-override</td>
<td>Removes device overrides on the selected T1E1 interface</td>
</tr>
<tr>
<td>rx-sensitivity-level</td>
<td>Configures the receive sensitivity level, in decibels (dB), on the selected T1E1 interface</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down the selected T1E1 interface</td>
</tr>
</tbody>
</table>
7.1.30.7.9 remove-override

- `interface-config-t1e1-instance`

Removes device overrides on the selected T1E1 interface

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**

`remove-override <PARAMETERS>`

**Parameters**

None

**Examples**

```
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#remove-override ?
```

channel-group Channel group for this interface
clock-mode The mode for the clock
description Description for this interface
high-impedance High impedance
line-build-out Line build out in decibels (dB) or feet (ft)
line-encoding Line encoding type
media The media type for the physical interface
no Negate a command or sets its defaults
rx-sensitivity-level Receive sensitivity level in decibels (dB)
shutdown Disable t1 interface

```
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Reverts the removal of overrides</td>
</tr>
</tbody>
</table>
7.1.30.7.10 rx-sensitivity-level

```interface-config-t1e1-instance
```

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 <DB>
```

**Parameters**
- `rx-sensitivity-level <DB>`

<table>
<thead>
<tr>
<th>rx-sensitivity-level &lt;DB&gt;</th>
<th>Sets the receive sensitivity level in decibels (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0dB – 0 decibels</td>
</tr>
<tr>
<td></td>
<td>12dB – 12 decibels</td>
</tr>
<tr>
<td></td>
<td>17.5dB – 17.5 decibels</td>
</tr>
<tr>
<td></td>
<td>18dB – 18 decibels</td>
</tr>
<tr>
<td></td>
<td>22.5dB – 22.5 decibels</td>
</tr>
<tr>
<td></td>
<td>30dB – 30 decibels</td>
</tr>
<tr>
<td></td>
<td>36dB – 36 decibels</td>
</tr>
<tr>
<td></td>
<td>43dB – 43 decibels</td>
</tr>
</tbody>
</table>

**Examples**

```
nx6500-31FABE(config-profile-default-nx6500-if-t1e1-1/1)#rx-sensitivity 36dB
```

**Related Commands**

```no
```

Removes or resets rx sensitivity settings
### 7.1.30.7.11 shutdown

**Syntax**

```plaintext
shutdown
```

**Parameters**

None

**Examples**

```plaintext
nx6500-31FABE(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><strong>no</strong></td>
<td>Re-starts the T1E1 interface</td>
</tr>
</tbody>
</table>
7.1.30.8 interface-config-vm-instance

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 sixteen VMIF ports 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
```

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#
nx9500-6C8809(config-profile-default-nx9000)#interface vmif ?
<1-12> Interface index
nx9500-6C8809(config-profile-default-nx9000)#
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)#

Table 7.21 summarizes VM interface configuration commands.

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>description</strong></td>
<td>Configures a short description of this VM interface</td>
<td>page 7-310</td>
</tr>
<tr>
<td><strong>ip</strong></td>
<td>Configures settings related to ARP and DHCP responses</td>
<td>page 7-311</td>
</tr>
<tr>
<td><strong>ipv6</strong></td>
<td>Configures the DHCPv6 and ICMPv6 neighbor discovery (ND) components for this VM interface</td>
<td>page 7-312</td>
</tr>
<tr>
<td><strong>no</strong></td>
<td>Removes or reverts the VM interface settings</td>
<td>page 7-313</td>
</tr>
<tr>
<td><strong>qos</strong></td>
<td>Configures the Quality of Service (QoS) settings on this VM interface</td>
<td>page 7-314</td>
</tr>
<tr>
<td><strong>switchport</strong></td>
<td>Defines the switching mode settings for this VM interface</td>
<td>page 7-315</td>
</tr>
<tr>
<td><strong>use</strong></td>
<td>Configures inbound IP and MAC address firewall rules for this VM interface</td>
<td>page 7-317</td>
</tr>
</tbody>
</table>
7.1.30.8.1 description

Configure a short description of this VM interface

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

**Syntax**
description <WORD>

**Parameters**
- description <WORD>

| <WORD> | Provide a short description (64 characters maximum) that uniquely describes this VM interface and differentiates it from others with similar configurations. |

**Examples**
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)#

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
### 7.1.30.8.2 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

#### Syntax

```
ip [arp|dhcp]
ip arp [header-mismatch-validation|trust]
ip dhcp trust
```

#### Parameters

- `ip arp [header-mismatch-validation|trust]`
- `ip dhcp trust`

```
arp [header-mismatch-validation|trust]  
  Configures ARP related settings
  - header-mismatch-validation – Enables a source MAC mismatch check in both the ARP and Ethernet header. 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
  Configures DHCP related settings
  - trust – Enables DHCP trust on this VM interface. When enabled, only DHCP responses are trusted and forwarded on this VM interface, and a DHCP server can be connected only to a DHCP trusted port. The option is enabled by default.
```

#### 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
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#
```

#### Related Commands

```
no Disables ARP response trust and source MAC mismatch check on this VM interface. Also disables DHCP response trust setting.
```
7.1.30.8.3 ipv6

Sets the DHCPv6 and ICMPv6 neighbor discovery (ND) components for this VM interface.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- 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]

- ipv6 dhcpv6 trust
  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.

- 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 neighbor discovery (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
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
7.1.30.8.4 no

interface-config-vm-instance

Removes or reverts the VM interface settings

Supported in the following platforms:
- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax

`no [description|ip|ipv6|qos|switchport|use]`

Parameters

- `no [description|ip|ipv6|qos|switchport|use]`

<table>
<thead>
<tr>
<th>no description</th>
<th>Removes the description configured for this VM interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>no ip</td>
<td>Removes the ARP and DHCP trust related settings for this VM interface</td>
</tr>
<tr>
<td>no ipv6</td>
<td>Removes the DHCPv6 and ICMPv6 ND components for this VM interface</td>
</tr>
<tr>
<td>no qos</td>
<td>Removes the QoS settings configured for this VM interface</td>
</tr>
<tr>
<td>no switchport</td>
<td>Removes the switching mode settings configured for this VM interface</td>
</tr>
<tr>
<td>no use</td>
<td>Removes the IP or MAC access list associated with this VM interface</td>
</tr>
</tbody>
</table>

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
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#
```

The following example displays the VM interface settings after the ‘no’ commands have been executed:

```
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#no description
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#no use ip-access-list in
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#no ip arp trust
nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#no ip arp header-mismatch-validation
```

```
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
```

```
7.1.30.8.5 qos

`interface-config-vm-instance`

Configures the Quality of Service (QoS) settings on this VM interface.

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524

**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>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

nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#

**Related Commands**

- `no` | Removes QoS settings on this VM interface |
### 7.1.30.8.6 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

**Syntax**

```
switchport [access|mode|trunk]
switchport access vlan <1-4094>
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>]
```

**Parameters**

- **switchport access vlan <1-4094>**

  Specifies the native VLAN used when the switching mode is set to access. 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 native VLAN.

  - **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 > 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.

  - **vlan [<1-4094>|add|none|remove]**
    - Creates a list of allowed VLANs and also modifies an existing VLAN list
    - **<1-4094>** — Configures the list of VLAN IDs
    - **add <VLAN-ID>** — Adds the VLAN ID, identified by the `<VLAN-ID>` keyword, to an existing list. Add VLANs that exclusively send packets over the VM interface. The available range is from 1 - 4094. The maximum number of entries is 256.
    - **none** — Removes all VLANs from an existing list
    - **remove <VLAN-ID>** — Removes the VLAN ID, identified by the `<VLAN-ID>` keyword, from an existing list
- `switchport trunk native [tagged|vlan <1-4094>]`

<table>
<thead>
<tr>
<th>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.</td>
</tr>
<tr>
<td></td>
<td>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>Select this option for untagged native VLAN. An untagged 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 will be directed over when using trunk mode. The default value is 1.</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
7.1.30.8.7 use

> interface-config-vm-instance

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

Syntax

use [ip-access-list|ipv6-access-list|mac-access-list] in <IP/MAC-ACCESS-LIST-NAME>

Parameters

- use [ip-access-list|ipv6-access-list|mac-access-list] in <IP/MAC-ACCESS-LIST-NAME>

<table>
<thead>
<tr>
<th>use ip-access-list in &lt;IP-ACCESS-LIST-NAME&gt;</th>
<th>Applies a IPv4 ACL to the inbound traffic on this VM interface. The IP ACL should be existing and configured.</th>
</tr>
</thead>
<tbody>
<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

nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#use ip-access-list in BROADCAST-MULTICAST-CONTROL

nx4500-5CFA2B(config-profile-default-nx45xx-if-vmif2)#s

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
## 7.1.31 ip

*Profile Config Commands*

Table 7.22 summarizes NAT pool configuration commands.

Table 7.22  NAT-Pool-Config-Mode 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 forwarding, name server, domain name, routing standards etc.</td>
<td>page 7-319</td>
</tr>
<tr>
<td><em>nat-pool-config-instance</em></td>
<td>Invokes NAT pool configuration parameters</td>
<td>page 7-325</td>
</tr>
</tbody>
</table>
7.1.31.1 ip

`ip`

Configures IP components, such as default gateway, DHCP, DNS server forwarding, name server, domain name, routing standards etc.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
ip [default-gateway|dhcp|dns-server-forward|domain-lookup|domain-name|igmp|name-server|nat|route|routing]
ip default-gateway [<IP>|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 {forward-unknown-multicast|querier}
ip igmp snooping {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>}
```

**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

```
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 route <IP/M> <IP>
```
### Parameters

#### default-gateway

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip default-gateway [&lt;IP&gt;</td>
<td>failover</td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
<td>Configures default gateway’s IP address</td>
</tr>
<tr>
<td>failover</td>
<td>Configures failover to the gateway (with next higher priority) when the current default gateway is unreachable (In case of multiple default gateways)</td>
</tr>
<tr>
<td>priority [dhcp-client &lt;1-1800&gt;</td>
<td>static-route &lt;1-1800&gt;]</td>
</tr>
<tr>
<td>dhcp-client &lt;1-1800&gt;</td>
<td>Defines a priority for the default gateway acquired by the DHCP client on the VLAN interface</td>
</tr>
<tr>
<td>static-route &lt;1-1800&gt;</td>
<td>Defines a priority for the statically configured default gateway</td>
</tr>
<tr>
<td>The following keyword is common to ‘dhcp-client’ and ‘static-route’ parameters:</td>
<td></td>
</tr>
<tr>
<td>&lt;1-1800&gt;</td>
<td>Specify the priority from 1 - 18000 (lower the value higher is the priority).</td>
</tr>
</tbody>
</table>

#### dns-server-forward

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip [dns-server-forward</td>
<td>domain-lookup</td>
</tr>
<tr>
<td>domain-lookup</td>
<td>Enables domain lookup</td>
</tr>
<tr>
<td>domain-name &lt;DOMAIN-NAME&gt;</td>
<td>Configures a default domain name</td>
</tr>
<tr>
<td>name-server &lt;IP&gt;</td>
<td>Configures the name server’s IP address</td>
</tr>
<tr>
<td>routing</td>
<td>Enables IP routing of logically addressed packets from their source to their destination</td>
</tr>
</tbody>
</table>

#### dhcp

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip dhcp client [hostname</td>
<td>persistent-lease]</td>
</tr>
<tr>
<td>dhcp client</td>
<td>Sets the DHCP client</td>
</tr>
<tr>
<td>hostname</td>
<td>Includes the hostname in the DHCP request</td>
</tr>
<tr>
<td>persistent-lease</td>
<td>Retains the last lease across reboot if the DHCP server is unreachable.</td>
</tr>
</tbody>
</table>

#### igmp snooping

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip igmp snooping [forward-unknown-multicast]</td>
<td>Optional. Enables/disables unknown multicast data packets to be flooded in the specified VLAN. By default this feature is disabled.</td>
</tr>
<tr>
<td>igmp snooping querier</td>
<td>Optional. Enables/disables the IGMP querier functionality for the specified VLAN. By default IGMP snooping querier is disabled.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>max-response-time &lt;1-25&gt;</td>
<td>Configures the IGMP maximum query response interval used in IGMP V2/V3 queries for the given VLAN. The default is 10 seconds.</td>
</tr>
<tr>
<td>query-interval &lt;1-18000&gt;</td>
<td>Configures the IGMP querier query interval in seconds. Specify a value from 1 - 18000 seconds.</td>
</tr>
<tr>
<td>robustness-variable &lt;1-7&gt;</td>
<td>Configures the IGMP robustness variable from 1 - 7</td>
</tr>
<tr>
<td>timer expiry &lt;60-300&gt;</td>
<td>Configures the other querier time out value for the given VLAN. The default is 60 seconds.</td>
</tr>
<tr>
<td>version &lt;1-3&gt;</td>
<td>Configures the IGMP query version for the given VLAN. The default is 3.</td>
</tr>
</tbody>
</table>

* ip nat [crypto source pool| pool <NAT-POOL-NAME>]*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nat</td>
<td>Configures the NAT parameters</td>
</tr>
</tbody>
</table>
| crypto source pool <NAT-POOL-NAME> | Configures the NAT source address translation settings for IPSec tunnels  
  • <NAT-POOL-NAME> – Specify a NAT pool name.                                                                                          |
| pool <NAT-POOL-NAME>            | Configures a pool of IP addresses for NAT  
  • <NAT-POOL-NAME> – Specify a name for the NAT pool.                                                                                 |

* ip nat [inside|outside] destination static <ACTUAL-IP> <1-65535> [tcp|udp] [{<NATTED-IP> {<1-65535>}}]*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nat</td>
<td>Configures the NAT parameters</td>
</tr>
</tbody>
</table>
| [inside|outside]                   | Configures inside and outside address translation for the destination  
  • inside – Configures inside address translation  
  • outside – Configures outside address translation                                                                                     |
| destination static <ACTUAL-IP>  | The following keywords are common to the ‘inside’ and ‘outside’ parameters:  
  • destination – Specifies destination address translation parameters  
  • static – Specifies static NAT local to global mapping  
  • <ACTUAL-IP> – Specify the actual outside IP address to map.                                                                           |
| <1-65535> [tcp|udp]             |  
  • <1-65535> – Configures the actual outside port. Specify a value from 1 - 65535.  
    • tcp – Configures Transmission Control Protocol (TCP) port  
    • udp – Configures User Datagram Protocol (UDP) port                                                                                 |
| <NATTED-IP> <1-65535>           | Enables configuration of the outside natted IP address  
  • <NATTED-IP> – Specify the outside natted IP address.  
  • <1-65535> – Optional. Configures the outside natted port. Specify a value from 1 - 65535.                                           |

* ip nat [inside|outside] source static <ACTUAL-IP> <1-65535> [tcp|udp] [{<NATTED-IP> {<1-65535>}}]*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nat</td>
<td>Configures the NAT parameters</td>
</tr>
</tbody>
</table>
| [inside|outside]                   | Configures inside and outside address translation for the source  
  • inside – Configures inside address translation  
  • outside – Configures outside address translation                                                                                     |
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| source static `<ACTUAL-IP>` | The following keywords are common to the 'inside' and 'outside' parameters:  
  - source – Specifies source address translation parameters  
  - static – Specifies static NAT local to global mapping  
  - `<ACTUAL-IP>` – Specify the actual inside IP address to map. |
| `<1-65535>` [tcp|udp] | `<1-65535>` – Configures the actual outside port. Specify a value from 1 - 65535.  
  - tcp – Configures Transmission Control Protocol (TCP) port  
  - udp – Configures User Datagram Protocol (UDP) port |
| `<NATTED-IP>` `<1-65535>` | Enables configuration of the outside natted IP address  
  - `<NATTED-IP>` – Specify the outside natted IP address.  
  - `<1-65535>` – Optional. Configures the outside natted port. Specify a value from 1 - 65535. |
| **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>`)]  
  Configures inside and outside IP access list |
| nat | Configures the NAT parameters |
| [inside|outside] | Configures inside and outside IP access list |
| 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>` |  
  pppoe1|vlan `<1-4094>`|wwan1] | 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>`

<table>
<thead>
<tr>
<th>Route Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ip route</code></td>
<td>Configures the static routes.</td>
</tr>
<tr>
<td><code>&lt;IP/M&gt;</code></td>
<td>Specify the IP destination prefix in the A.B.C.D/M format.</td>
</tr>
<tr>
<td><code>&lt;IP&gt;</code></td>
<td>Specify the IP address of the gateway.</td>
</tr>
</tbody>
</table>

**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
    crypto ikev1 remote-vpn
    crypto ikev2 remote-vpn
    crypto auto-ipsec-secure
  interface me1
    ip dhcp trust
    qos trust dscp
    qos trust 802.1p
  interface ge1
    ip dhcp trust
    qos trust dscp
    qos trust 802.1p
  interface ge2
    ip dhcp trust
    qos trust dscp
    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
```

```
ap300 00-15-70-63-4F-86 adopt
ap300 00-15-70-63-4F-97 adopt
ap300 00-A0-F8-CF-1E-DA adopt
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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables or reverts settings to their default</td>
</tr>
</tbody>
</table>
7.1.31.2 nat-pool-config-instance

Use the config-profile-<DEVICE-PROFILE-NAME> instance to configure Network Address Translation (NAT) pool settings.

<DEVICE>(config-profile-default-<PROFILE-NAME>)#ip nat pool pool1

The following example uses the config-profile-default-rfs7000 instance to configure NAT pool settings:

<DEVICE>(config-profile-default-<PROFILE-NAME>)#ip nat pool pool1
rfs7000-37FABE(config-profile-default-rfs7000)#ip nat pool pool1
rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)#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

rfs7000-37FABE(config-profile-default-rfs7000-nat-pool-pool1)

Table 7.23 summarizes NAT pool configuration commands.

Table 7.23 NAT-Pool 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 7-326</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 7-327</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
7.1.31.2.1 address

Configures 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

address [<IP>|range]
address 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

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 |
7.1.31.2.2 no

- nat-pool-config-instance

Removes address(es) configured with this NAT pool

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
no address

Parameters
None

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)#

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

<table>
<thead>
<tr>
<th>address</th>
<th>Configures NAT pool IP address(es)</th>
</tr>
</thead>
</table>

### 7.1.32 ipv6

*Profile Config Commands*

Configures IPv6 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

---

**NOTE:** The IPv6 settings configured at the profile/device level are global configuration settings and not interface-specific.

---

#### Syntax

ipv6 [default-gateway|dns-server-forward|hop-limit|mld|name-server|nd-reachable-time|neighbor|ns-interval|ra-convert|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>|
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|
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>|
unicast-routing]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>default-gateway &lt;IPv6&gt; {vlan &lt;VLAN-ID&gt;}</td>
<td>Configures IPv6 default gateway's address in the ::/0 format</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>name-server &lt;IPv6&gt;</td>
<td>Configures the IPv6 name server's address</td>
</tr>
</tbody>
</table>

- **<IPv6>** – Specify a value between 1 - 255. The default is 64.

- **<IPv6>** – Specify the address of the IPv6 name server.
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nd-reachable-time</td>
<td>Configures the time, in milliseconds, that a neighbor is assumed to be reachable after having received <em>neighbor discovery</em> (ND) confirmation for their reachability.</td>
</tr>
<tr>
<td>&lt;5000-3600000&gt;</td>
<td>- &lt;5000-3600000&gt; – Specify a value from 5000 - 3600000 milliseconds. The default is 30,000 milliseconds.</td>
</tr>
<tr>
<td>ns-interval</td>
<td>Configures the interval, in milliseconds, between two consecutive retransmitted <em>neighbor solicitation</em> (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.</td>
</tr>
<tr>
<td>&lt;1000-3600000&gt;</td>
<td>- &lt;1000-3600000&gt; – Specify a value from 1000 - 3600000. The default is 1000 milliseconds.</td>
</tr>
<tr>
<td>unicast-routing</td>
<td>Enables/disables IPv6 unicast routing. This feature is enabled by default.</td>
</tr>
</tbody>
</table>

- **ipv6 ra-convert** {throttle interval <3-1800> max-RAs <1-256>}

- **ipv6 mld snooping** {forward-unknown-multicast}

- **ipv6 mld snooping querier** {querier} {max-response-time <1-25000>|query-interval <1-18000>|robustness-variable <1-7>|timer expiry <60-300>|version <1-2>}

- **mld snooping querier** Enables/disables 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.

- **max-response-time** <1-25000> 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.

- **query-interval** <1-18000> 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.

- **Robustness variable** <1-7> 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.

- **Timer expiry** <60-300> Specifies the time period during which MLD messages are accepted before they are discarded.

- **Version** <1-2> Specifies the version of the MLD protocol supported by the device.
### ipv6 neighbor

```
neighbor <IPv6> <MAC> [INTF-NAME|pppoel|vlan <1-4094>|wwan1] {dhcp-server|router}
```

- **timeout <15-86400>**
  - Configures the MLD other querier (any external querier) timeout
  - <15-86400> – Specify a value from 15 - 86400 seconds. The default is 3600 seconds.

- **route <DEST-IPv6-PREFIX/PREFIX-LENGTH> <IPv6-GATEWAY-ADDRESS> {vlan <VLAN-ID>}**
  - **route**
    - Configures the static routes
      - These routes are maintained in the IPv6 Forwarding Information Base (FIB).
      - **Note:** To view FIB6 routing entries, use the `service > show fib6 > <TABLE-ID>` command.
  - **<DEST-IPv6-PREFIX/PREFIX-LENGTH>**
    - Specify the IPv6 destination prefix (IPv6 network) and the prefix length.
  - **<IPv6-GATEWAY-ADDRESS>**
    - Specify the IPv6 gateway’s address.
  - **<VLAN-ID>**
    - Optional. Specify the VLAN interface’s ID (through which the default gateway is accessible)
    - **Note:** This parameter is needed only if the gateway address is a link local address.
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 |
### 7.1.33 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax
```
l2tpv3 [hostname <HOSTNAME>|inter-tunnel-bridging|manual-session|router-id [<1-4294967295>|<IP>]|tunnel|udp-listen-port <1024-65535>]
```

#### Parameters
- **hostname <HOSTNAME>**
  Configures the host name sent in the L2TPv3 signalling messages. Tunnel establishment involves exchanging 3 message types (SCCRQ, SCCRP 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-POLICY](#).
- **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)
Examples

```bash
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Negates a L2TPv3 tunnel settings on this profile</td>
</tr>
</tbody>
</table>
7.1.34 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:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
l3e-lite-table aging-time <10-1000000>

Parameters
- l3e-lite-table aging-time <10-1000000>

<table>
<thead>
<tr>
<th>aging-time</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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10-1000000&gt;</td>
<td></td>
</tr>
</tbody>
</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
**7.1.35 led**

*Profile Config Commands*

Turns on and off access point LEDs

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
led {flash-pattern}
```

**Parameters**

- `led {flash-pattern}`

<table>
<thead>
<tr>
<th>flash-pattern</th>
<th>Optional. Enables LED flashing on the device using this profile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-profile-RFS7000Test)#led flash-pattern
rfs7000-37FABE(config-profile-RFS7000Test)#

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--
```

**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>
7.1.36 led-timeout

Profile Config Commands

Configures the LED-timeout timer in the device or profile configuration mode

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

Syntax

`led-timeout [<15-1440>|shutdown]`

Parameters
- `led-timeout [<15-1440>|shutdown]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>led-timeout</td>
<td>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.</td>
</tr>
<tr>
<td>&lt;15-1440&gt;</td>
<td>Specify a value from 15 - 1400 minutes.</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down the LED-timeout timer. The device LEDs are not turned off.</td>
</tr>
</tbody>
</table>

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
  66069c24b3bb1259eb36826cab3cc83999dd408f0ff891e74b62b2d3594f0b3dde7967f30e49e497
  no autogen-uniqueid
  ip default-gateway 192.168.13.2
  led-timeout 25
  --More--

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
  66069c24b3bb1259eb36826cab3cc83999dd408f0ff891e74b62b2d3594f0b3dde7967f30e49e497
  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

- `no` - Disables LED-timeout timer
7.1.37 legacy-auto-downgrade

Profile Config Commands

Enables device firmware to auto downgrade when legacy devices are detected

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

legacy-auto-downgrade

Parameters

None

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#legacy-auto-downgrade

default

Prevents device firmware from auto downgrading when legacy devices are detected
### 7.1.38 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>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>legacy-auto-update</code></td>
<td>Updates a legacy AP650 or AP7131 access point firmware</td>
</tr>
<tr>
<td><code>ap650</code></td>
<td>Auto updates legacy AP650 firmware</td>
</tr>
<tr>
<td><code>ap71xx image &lt;FILE&gt;</code></td>
<td>Auto updates legacy AP7131 firmware</td>
</tr>
<tr>
<td><code>image &lt;FILE&gt;</code></td>
<td>• <code>image</code> — Sets the path to the firmware image</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;FILE&gt;</code> — Specify the path and filename in the flash:/ap.img format.</td>
</tr>
</tbody>
</table>

#### Examples

```bash
rfs7000-37FABE(config-profile-default-rfs7000)#legacy-auto-update ap71xx image flash:/ap47d.img
```

#### Related Commands

- `no` Disables automatic legacy firmware upgrade
### 7.1.39 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
lldp [holdtime|med-tlv-select|run|timer]
lldp [holdtime <10-1800>|run|timer <5-900>]
lldp med-tlv-select [inventory-management|power-management]
```

**Parameters**

- `lldp [holdtime <10-1800>|run|timer <5-900>]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| **holdtime <10-1800>** | Sets the holdtime for transmitted LLDP PDUs. This command specifies the time a receiving device holds information before discarding it.  
  - `<10-1800>` – Specify a holdtime from 10 - 1800 seconds. |
| **run** | Enables LLDP on this profile |
| **timer <5-900>** | Sets the transmit interval. This command specifies the transmission frequency of LLDP updates in seconds.  
  - `<5-900>` – Specify transmit interval from 5 - 900 seconds. |

- `lldp med-tlv-select [inventory-management|power-management]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| **med-tlv-select [inventory-management|power-management]** | 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.  
  - power-management – Enables extended power via MDI discovery. Allows endpoints to convey power information, such as how the device is powered, power priority etc. |
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>
### 7.1.40 load-balancing

**Profile Config Commands**

Configures load balancing parameters

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
load-balancing [advanced-params|balance-ap-loads|balance-band-loads|balance-channel-loads|band-control-strategy|band-ratio|group-id|neighbor-selection-strategy]
```

```
```

```
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 [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|use-wips]
```

**Parameters**

- load-balancing advanced-params [2.4GHz-load|5GHz-load|ap-load] [client-weightage|throughput-weightage] <0-100>

<table>
<thead>
<tr>
<th>advanced-params</th>
<th>Configures advanced load balancing parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.4GHz-load</td>
<td>Configures 2.4 GHz load calculation weightages</td>
</tr>
<tr>
<td>[client-weightage</td>
<td>throughput-weightage]</td>
</tr>
<tr>
<td>&lt;0-100&gt;</td>
<td>_peer_count – Specifies weightage assigned to the client-count when calculating the 2.4 GHz load</td>
</tr>
<tr>
<td></td>
<td>throughput-weightage – Specifies weightage assigned to throughput, when calculating the 2.4 GHz band, channel, or radio load</td>
</tr>
<tr>
<td></td>
<td>The following keyword is common to the ‘client-weightage’ and ‘throughput-weightage’ parameters:</td>
</tr>
<tr>
<td></td>
<td>&lt;0-100&gt; – Sets the margin as a load percentage from 1 - 100</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| 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 band, channel or radio 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 |
| 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 |
| advanced-params Configures advanced load balancing parameters |
| 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, AP, 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 |
| hiwater-threshold [ap|channel-2.4GHz|channel-5GHz] <0-100> | Configures the load beyond which load balancing is invoked |
Select one of the following options:

- 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)
- channel-5GHz – Configures the AP load beyond which load balancing begins for (APs on 5.0 GHz channel)

The following keyword is common for the ‘AP’, ‘channel-2.4GHz’, and ‘channel-5GHz’ parameters:

- <0-100> – Sets the load threshold as a number from 1 - 100

This option distributes the access point’s radio load amongst other controller managed access point radios. This option is enabled by default.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>balance-band-loads</strong></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 enabled by default.</td>
</tr>
<tr>
<td>**balance-channel-loads [2.4GHz</td>
<td>5GHz]**</td>
</tr>
<tr>
<td></td>
<td>• 2.4GHz – Channel load balancing on 2.4 GHz band</td>
</tr>
<tr>
<td></td>
<td>Balances the access point's 2.4 GHz radio load across channels supported within the country of deployment. This can prevent congestion on the 2.4 GHz radio if a channel is over utilized.</td>
</tr>
<tr>
<td></td>
<td>• 5GHz – Channel load balancing on 5.0 GHz band</td>
</tr>
<tr>
<td></td>
<td>Balances the access point's 5.0 GHz radio load across channels supported within the country of deployment. This can prevent congestion on the 5.0 GHz radio if a channel is over utilized.</td>
</tr>
<tr>
<td><strong>band-control-strategy</strong></td>
<td>Configures a band control strategy</td>
</tr>
<tr>
<td><strong>distribute-by-ratio</strong></td>
<td>Distributes clients to either band according to the band-ratio</td>
</tr>
<tr>
<td><strong>prefer-2.4GHz</strong></td>
<td>Nudges all dual-band clients to 2.4 GHz band</td>
</tr>
<tr>
<td><strong>prefer-5GHz</strong></td>
<td>Nudges all dual-band clients to 5.0 GHz band</td>
</tr>
<tr>
<td><strong>band-ratio</strong> [2.4GHz</td>
<td>5GHz] [0</td>
</tr>
<tr>
<td>2.4GHz [0</td>
<td>&lt;1-10&gt;]</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-10&gt; – Configures a relative load as a number from 0 - 10. The default is 1.</td>
</tr>
<tr>
<td>5ghz [0</td>
<td>&lt;1-10&gt;]</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-10&gt; – Configures a relative load as a number from 0 - 10. The default is 1.</td>
</tr>
<tr>
<td><strong>group-id &lt;GROUP-ID&gt;</strong></td>
<td>Configures group ID to facilitate load balancing</td>
</tr>
<tr>
<td></td>
<td>• &lt;GROUP-ID&gt; – Specify the group ID.</td>
</tr>
<tr>
<td><strong>neighbor-selection-strategy</strong></td>
<td>Configures a neighbor selection strategy. The options are: use-common-clients, use-roam-notification, and use-smart-rf</td>
</tr>
<tr>
<td><strong>use-common-clients</strong></td>
<td>Selects neighbors based on probes from clients common to neighbors</td>
</tr>
<tr>
<td><strong>use-roam-notification</strong></td>
<td>Selects neighbors based on roam notifications from roamed clients</td>
</tr>
<tr>
<td><strong>use-smart-rf</strong></td>
<td>Selects neighbors detected by Smart RF</td>
</tr>
</tbody>
</table>
Examples

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--

Related Commands

| no | Enables load balancing on this profile | Disables load balancing on this profile |
7.1.41 logging

Profile Config Commands

Enables message logging and configures logging settings. This command can also be executed in the device configuration mode.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

logging [aggregation-time|buffered|console|facility|forward|host|on|syslog]

logging [aggregation-time <1-60>|host <IP>|on]

logging [buffered|console|syslog|forward] [<0-7>|emergencies|alerts|critical|errors|warnings|notifications|informational|debugging]

logging facility [local0|local1|local2|local3|local4|local5|local6|local7]

Parameters

- logging [aggregation-time <1-60>|host <IP>|on]

  aggregation-time <1-60>

  Sets the number of seconds for aggregating repeated messages
  - <1-60> – Specify a value from 1 - 60 seconds.

- host <IP>

  Configures a remote host to receive log messages. Defines numerical (non DNS) IP addresses for external resources where logged system events can be sent on behalf of the controller profile.
  - <IP> – Specify the IP address of the remote host.

- on

  Enables the logging of system messages

- logging [buffered|console|syslog|forward] [<0-7>|emergencies|alerts|critical|errors|warnings|notifications|informational|debugging]

  buffered

  Sets the buffered logging level

  console

  Sets the console logging level

  syslog

  Sets the syslog server’s logging level

  forward

  Forwards system debug messages to the wireless controller or service platform

  [<0-7]|alerts|critical|debugging|emergencies|errors|informational|notifications|warnings]

  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)

Contd..
• logging 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
  ......................................................
  logging facility local4
  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
  1lldp timer 20
  ap300 00-15-70-63-4F-86 adopt
  ap300 00-15-70-63-4F-97 adopt
  ap300 00-A0-F8-CF-1E-DA adopt
  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
7.1.42 mac-address-table

Profile Config Commands

Configures the MAC address table. Use this command to assign a static address to the MAC address table.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

mac-address-table [aging-time|static]
mac-address-table aging-time [0|<10-1000000>]
mac-address-table static <MAC> vlan <1-4094> interface [L2-INTERFACE|ge <1-4]|port-channel <1-2>

Parameters
- 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 - 100000 seconds

- 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
  - 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

- Example:
  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 gel
  ip nat pool pool1
  --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>
7.1.43 mac-auth

Profile Config Commands

Enables or disables 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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mac-auth</td>
<td>Enables 802.1X authentication of MAC addresses on this profile. Use the device configuration mode to enable this feature on a device.</td>
</tr>
<tr>
<td>use aaa-policy &lt;AAA-POLICY-NAME&gt;</td>
<td>Associates an existing AAA policy with this profile (or device)</td>
</tr>
<tr>
<td>&lt;AAA-POLICY NAME&gt;</td>
<td>Specify the AAA policy name. The AAA policy used should be created especially for MAC authentication.</td>
</tr>
</tbody>
</table>

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
```

```
radius vlan 11
rfs4000-229D58 (config-radius-group-RG)#
```

```
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
```

```
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
```

```
dot1x authenticator port-control auto
```

```
dot1x authenticator port-control auto
```

```
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>no</td>
<td>Disables authentication of MAC addresses on wired ports settings on this profile (or device)</td>
</tr>
</tbody>
</table>
### 7.1.44 memory-profile

**Profile Config Commands**

Configures memory profile used on the device

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`memory-profile [adopted|standalone]`

**Parameters**

- `memory-profile [adopted|standalone]`

<table>
<thead>
<tr>
<th>adopted</th>
<th>Configures adopted mode (no GUI and higher MiNT routes, firewall flows)</th>
</tr>
</thead>
<tbody>
<tr>
<td>standalone</td>
<td>Configures standalone mode (GUI and fewer MiNT routes, firewall flows)</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs7000-37FABE(config-profile-default-rfs7000)#memory-profile adopted
% Error on default-rfs7000: memory-profile is not supported on this device
rfs7000-37FABE(config-profile-default-rfs7000)#
```

**Related Commands**

- `no`
  
  Resets device’s memory profile configuration
7.1.45 meshpoint-device

Configuration commands can be used to configure meshpoint device parameters. This feature is configurable in the profile and device configuration modes.

Supported on the following platforms:
- Access Points — AP71XX

**Syntax**

meshpoint-device <MESHPOINT-NAME>

**Parameters**

- meshpoint-device <MESHPOINT-NAME>

| meshpoint-device <MESHPOINT-NAME> | Configures meshpoint device parameters
|-----------------------------------|----------------------------------|
| <MESHPOINT-NAME>                  | <MESHPOINT-NAME> — Specify meshpoint name.

**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)#

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
- 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.
7.1.46 meshpoint-monitor-interval

Profile Config Commands

Configures the meshpoint monitoring interval. This is the interval, in seconds, the up/down status of a meshpoint is checked.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
meshpoint-monitor-interval <1-65535>

Parameters
- meshpoint-monitor-interval <1-65535>

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)
7.1.47 min-misconfiguration-recovery-time

**Profile Config Commands**

Configures the minimum device connectivity verification time

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
min-misconfiguration-recovery-time <60-3600>
```

**Parameters**

- `min-misconfiguration-recovery-time <60-3600>`
  - Configures the minimum connectivity (with the associated device) verification interval
  - `<60-3600>` — Specify a value from 1 - 3600 seconds (default is 60 seconds).

**Examples**

```
rfs7000-37FABE(config-profile-default-rfs7000)#min-misconfiguration-recovery-time 200
% Error on default-rfs7000: Unknown config-item (id:min_misconf_recovery_time)
rfs7000-37FABE(config-profile-default-rfs7000)#
```

**Related Commands**

- `no` Reset setting to default (60 seconds)
7.1.48 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. Prior to WiNG 5.6 MiNT link creation and adoption could be configured only on VLAN and/or IP. WiNG 5.6 also supports MiNT link creation and adoption on ipv6 addresses.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP8132
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

mint [dis|level|link|mlcp|spf-latency|tunnel-controller-load-balancing]
mint dis [priority-adjustment <-255-255>|strict-evis-reachability]
mint level 1 area-id <1-16777215>
mint link [force|ip|listen|vlan]

mint link force ip [<IPv4>/<IPv6> [level 2] [<1-65535>|level] {adjacency-hold-time <2-600>|cost <1-10000>|hello-interval <1-120>|ipsec-secure {gw}}]

mint link [listen ip <IPv4|<IPv6>|vlan <1-4094> {adjacency-hold-time <2-600>|cost <1-10000>|hello-interval <1-120}|ipsec-security {gw}|level [1|2]}

mint link ip [IPv4|<IPv6] {<1-65535>|adjacency-hold-time <2-600>|cost <1-10000>|hello-interval <1-120}|ipsec-security {gw}|level [1|2]}

mint mlcp [ip|ipv6|vlan]
mint spf-latency <0-60>
mint tunnel-controller-load-balancing level1

Parameters
- mint dis [priority-adjustment <-255-255>|strict-evis-reachability]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| dis priority-adjustment <-255-255> | Sets the relative priority for the router to become DIS (designated router)
| | • priority-adjustment — Sets priority adjustment added to base priority
| | 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.
| | • <-255-255> — Specify a value from -255 - 255. The default is 0.
| strict-evis-reachability | Enables reaching EVIS election winners through MiNT |
### mint level 1 area-id <1-16777215>

<table>
<thead>
<tr>
<th>level 1</th>
<th>Configures local MiNT routing settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 1</td>
<td>Configures local MiNT routing level</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>area-id &lt;1-16777215&gt;</th>
<th>Specifies the level 1 routing area identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;1-16777215&gt;</td>
<td>Specify a value from 1 - 16777215.</td>
</tr>
</tbody>
</table>

### mint link force ip [{IPv4}|{IPv6}] [1-65535] level 2 {adjacency-hold-time <2-600>|cost <1-10000>|hello-interval <1-120>|ipsec-security {gw}]

<table>
<thead>
<tr>
<th>link force</th>
<th>Creates a MiNT routing link as a forced link</th>
</tr>
</thead>
<tbody>
<tr>
<td>• force</td>
<td>Forces a MiNT routing link to be created even if not necessary</td>
</tr>
</tbody>
</table>

| ip [{IPv4}|{IPv6}] | Creates a MiNT tunnel over UDP/IP or IPv6 |
|----------------|----------------------------------------|
| Use this keyword to specify the IP address (IPv4 or IPv6) used by peers for inter-operation when supporting the MiNT protocol. |
| • <IPv4> | Specify the IPv4 address used by peers. |
| • <IPv6> | Specify the IPv6 address used by peers. |

<table>
<thead>
<tr>
<th>&lt;1-65535&gt; level 2</th>
<th>Specifies a peer's UDP port to link with the specified IP address</th>
</tr>
</thead>
<tbody>
<tr>
<td>• level</td>
<td>Specifies routing level</td>
</tr>
<tr>
<td>• 2</td>
<td>Configures inter-site MiNT routing level</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>adjacency-hold-time &lt;2-600&gt;</th>
<th>Optional. Specifies the adjacency lifetime after hello packets cease</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;2-600&gt;</td>
<td>Specify a value from 2 - 600 seconds. The default is 46 seconds.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>cost &lt;1-100000&gt;</th>
<th>Optional. Specifies the link cost in arbitrary units</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;1-100000&gt;</td>
<td>Specify a value from 1 - 100000. The default is 100.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>hello-interval &lt;1-120&gt;</th>
<th>Optional. Specifies the hello-interval between packets</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;1-120&gt;</td>
<td>Specify a value from 1 - 120 seconds. The default is 15 seconds.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ipsec-security {gw}</th>
<th>Optional. Enables IPSec secure peer authentication on the MiNT connection (link). This option is disabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• gw [IP</td>
<td>&lt;HOSTNAME&gt;]</td>
</tr>
</tbody>
</table>

### mint link [listen ip [{IPv4}|{IPv6}]|vlan <1-4094>] {adjacency-hold-time <2-600>|cost <1-100000>|hello-interval <1-120>|level [1|2]|ipsec-security {gw}]

<table>
<thead>
<tr>
<th>link listen</th>
<th>Creates a MiNT routing link</th>
</tr>
</thead>
<tbody>
<tr>
<td>• listen</td>
<td>Creates a MiNT listening link</td>
</tr>
<tr>
<td>• ip</td>
<td>Creates a MiNT listening link over UDP/IP or IPv6</td>
</tr>
<tr>
<td>• &lt;IPv4&gt;</td>
<td>Specify the IPv4 address of the listening UDP/IP link.</td>
</tr>
<tr>
<td>• &lt;IPv6&gt;</td>
<td>Specify the IPv6 address of the listening UDP/IP link.</td>
</tr>
</tbody>
</table>

UDP/IP links can be created by configuring a matching pair of links, one on each end point. However, that is error prone and does not scale. So UDP/IP links can also listen (in the TCP sense), and dynamically create connected UDP/IP links when contacted. The typical configuration is to have a listening UDP/IP link on the IP address S.S.S.S, and for all the APs to have a regular UDP/IP link to S.S.S.S.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>vlan &lt;1-4094&gt;</strong></td>
<td>Enables MiNT routing on VLAN. Defines a VLAN ID used by peers for inter-operation when supporting the MiNT protocol.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4094&gt; – Select VLAN ID from 1 - 4094.</td>
</tr>
<tr>
<td><strong>adjacency-hold-time &lt;2-600&gt;</strong></td>
<td>This parameter is common to the ‘listen’ and ‘vlan’ parameters:</td>
</tr>
<tr>
<td></td>
<td>• adjacency-hold-time &lt;2-600&gt; – Optional. Specifies the adjacency lifetime after hello packets cease</td>
</tr>
<tr>
<td></td>
<td>• &lt;2-600&gt; – Specify a value from 2 - 600 seconds. The default is 46 seconds.</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>For MiNT VLAN routing the default is 13 seconds.</td>
</tr>
<tr>
<td><strong>cost &lt;1-10000&gt;</strong></td>
<td>This parameter is common to the ‘listen’ and ‘vlan’ parameters:</td>
</tr>
<tr>
<td></td>
<td>• cost &lt;1-10000&gt; – Optional. Specifies the link cost in arbitrary units</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-100000&gt; – Specify a value from 1 - 100000. The default is 100.</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>For MiNT VLAN routing the default is 10.</td>
</tr>
<tr>
<td><strong>hello-interval &lt;1-120&gt;</strong></td>
<td>This parameter is common to the ‘listen’ and ‘vlan’ parameters:</td>
</tr>
<tr>
<td></td>
<td>• hello-interval &lt;1-120&gt; – Optional. Specifies the interval between hello packets</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-120&gt; – Specify a value from 1 - 120. The default is 15 seconds.</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>For MiNT VLAN routing the default is 4 seconds.</td>
</tr>
<tr>
<td>**level [1</td>
<td>2]**</td>
</tr>
<tr>
<td></td>
<td>Optional. Specifies the routing levels for this routing link. The options are:</td>
</tr>
<tr>
<td></td>
<td>• 1 – Configures local routing</td>
</tr>
<tr>
<td></td>
<td>• 2 – Configures inter-site routing</td>
</tr>
<tr>
<td><strong>ipsec-security {gw}</strong></td>
<td>This parameter is common to the ‘listen’ and ‘vlan’ parameters:</td>
</tr>
<tr>
<td></td>
<td>• ipsec-security – Optional. Enables IPSec secure peer authentication on the MiNT connection (link). This option is disabled by default.</td>
</tr>
<tr>
<td></td>
<td>• gw [&lt;IP&gt;</td>
</tr>
</tbody>
</table>

```
• mint link ip [<IPv4>|<IPv6>] {<1-65535>|adjacency-hold-time <2-600>|cost <1-10000>|hello-interval <1-120>|level [1|2]|ipsec-security {gw}}
```

| **link ip [<IPv4>|<IPv6>]** | 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 inter-operation when supporting the MiNT protocol. |
| | • <IPv4> – Specify the IPv4 address used by peers. |
| | • <IPv6> – Specify the IPv6 address used by peers. |
| **<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. |
| **cost <1-10000>** | Optional. Specifies the link cost in arbitrary units |
| | • <1-100000> – Specify a value from 1 - 100000. The default is 100. |
### hello-interval <1-120>
Optional. Specifies the hello interval between 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}
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.

### mlcp [ip|ipv6|vlan]
Configures the MiNT Link Creation Protocol (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 IPv6 address.
- `ipv6` – Enables MLCP over layer 3 (UDP/IPv6) links

### spf-latency <0-60>
Specifies the latency of SPF routing recalculation.
- `<0-60>` – Specify the latency from 0 - 60 seconds.

### 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 1
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
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#
```

### Related Commands
- `no` Disables or reverts settings to their default
7.1.49 misconfiguration-recovery-time

Profile Config Commands

Verifies connectivity after a configuration is received

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

misconfiguration-recovery-time [0|<60-300>]

Parameters

- misconfiguration-recovery-time [0|<60-300>]

| <60-300> | Sets the recovery time from 60 - 300 seconds (default is 180 seconds) |
| 0        | Disables recovery from misconfiguration |

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
ap300 00-15-70-63-4F-86 adopt
ap300 00-15-70-63-4F-97 adopt
ap300 00-A0-F8-CF-1E-DA adopt
service pm sys-restart
router ospf
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

no
Reverts to default (180 seconds)
7.1.50 **neighbor-inactivity-timeout**

Profile Config Commands

Configures neighbor inactivity timeout

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`neighbor-inactivity-timeout <1-1000>`

**Parameters**

- `neighbor-inactivity-timeout <1-1000>`

<table>
<thead>
<tr>
<th>&lt;1-1000&gt;</th>
<th>Sets neighbor inactivity timeout</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-1000&gt;</td>
<td>Specify a value from 1 - 1000 seconds.</td>
</tr>
</tbody>
</table>

**Examples**

```bash
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 ge1 ip dhcp trust qos trust dscp qos trust 802.1p --More--
rfs7000-37FABE(config-profile-default-rfs7000)#
```
7.1.51 neighbor-info-interval

 Profile Config Commands

Configures the neighbor information exchange interval

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
neighbor-info-interval <1-100>

Parameters

- neighbor-info-interval <1-100>

| <1-100> | Sets interval in seconds from 1 - 100 |

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
  ip dhcp trust
  qos trust dscp
--More--
rfs7000-37FABE(config-profile-default-rfs7000)#


### 7.1.52 no

**Profile Config Commands**

Negates a command or resets values to their default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
no [adopter-auto-provisioning-policy-lookup|alias|analytics|ap300|area|arp|
    auto-learn-staging-config|autogen-uniqueid|autoinstall|bridge|cdp|cluster|
    configuration-persistence|controller|critical-resource|crypto|device-upgrade|dot1x|
    dscp-mapping|email-notification|environmental-sensor|events|export|floor|gre|
    http-analyze|interface|ip|ipv6|l2tpv3|l3e-lite-table|led|led-timeout|
    legacy-auto-downgrade|legacy-auto-update|lldp|load-balancing|logging|
    mac-address-table|mac-auth|memory-profile|meshpoint-device|
    meshpoint-monitor-interval|misconfiguration-recovery-time|mint|
    misconfiguration-recovery-time|noc|ntp|offline-duration|power-config|
    preferred-controller-group|preferred-tunnel-controller|radius|rf-domain-manager|
    router|spanning-tree|traffic-class-mapping|tunnel-controller|
    use|vrrp|vrrp-state-check|wep-shared-key-auth|service]
```

**Parameters**

None

**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)#no cluster
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>adopter-auto-provisioning-policy-lookup</td>
<td>Enables the use of a centralized auto provisioning policy on this profile</td>
</tr>
<tr>
<td>alias</td>
<td>Configures network, VLAN, and service aliases on this profile</td>
</tr>
<tr>
<td>analytics</td>
<td>Enables analytics on a NX9000 profile or device</td>
</tr>
<tr>
<td>ap300</td>
<td>Enables adoption of AP300s</td>
</tr>
<tr>
<td>area</td>
<td>Sets the area name where the system is located</td>
</tr>
<tr>
<td>arp</td>
<td>Configures static address resolution protocol</td>
</tr>
<tr>
<td>auto-learn-staging-config</td>
<td>Enables network configuration device learning</td>
</tr>
<tr>
<td>autogen-uniqueid</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>
</tr>
<tr>
<td>autoinstall</td>
<td>Configures the autoinstall feature</td>
</tr>
<tr>
<td>bridge</td>
<td>Configures bridge specific commands</td>
</tr>
<tr>
<td>captive-portal</td>
<td>Configures captive portal advanced Web page uploads on a profile or device</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>cdp</td>
<td>Enables CDP on a device</td>
</tr>
<tr>
<td>cluster</td>
<td>Configures a cluster name</td>
</tr>
<tr>
<td>configuration-persistence</td>
<td>Enables configuration persistence across reloads</td>
</tr>
<tr>
<td>controller</td>
<td>Configures a wireless controller or service platform settings</td>
</tr>
<tr>
<td>critical-resource</td>
<td>Monitors user configured IP addresses and logs their status</td>
</tr>
<tr>
<td>crypto</td>
<td>Configures crypto settings</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>Configures device firmware upgrade settings on this profile</td>
</tr>
<tr>
<td>dot1x</td>
<td>Configures 802.1x standard authentication controls</td>
</tr>
<tr>
<td>dscp-mapping</td>
<td>Configures an IP DSCP to 802.1p priority mapping for untagged frames</td>
</tr>
<tr>
<td>email-notification</td>
<td>Configures e-mail notification</td>
</tr>
<tr>
<td>enforce-version</td>
<td>Enables checking of a device’s firmware version before attempting adoption or clustering</td>
</tr>
<tr>
<td>environmental-sensor</td>
<td>Configures the environmental sensor device settings</td>
</tr>
<tr>
<td>events</td>
<td>Displays system event messages</td>
</tr>
<tr>
<td>export</td>
<td>Enables the export of the startup.log file after every boot</td>
</tr>
<tr>
<td>floor</td>
<td>Sets the floor name where the system is located</td>
</tr>
<tr>
<td>gre</td>
<td>Enables GRE tunneling on this device</td>
</tr>
<tr>
<td>http-analyze</td>
<td>Configures HTTP analysis settings</td>
</tr>
<tr>
<td>interface</td>
<td>Configures an interface</td>
</tr>
<tr>
<td>ip</td>
<td>Configures IP components</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures IPv6 components</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>Defines the Layer 2 Tunnel Protocol (L2TP) protocol for tunneling layer 2 payloads using VPNs</td>
</tr>
<tr>
<td>l3e-lite-table</td>
<td>Configures L3e Lite Table with this profile</td>
</tr>
<tr>
<td>led</td>
<td>Turns device LEDs on or off</td>
</tr>
<tr>
<td>led-timeout</td>
<td>Configures LED-timeout timer. This command is specific to the NX9000 series service platforms.</td>
</tr>
<tr>
<td>legacy-auto-downgrade</td>
<td>Auto downgrades a legacy device firmware</td>
</tr>
<tr>
<td>legacy-auto-update</td>
<td>Auto upgrades a legacy device firmware</td>
</tr>
<tr>
<td>lldp</td>
<td>Configures Link Layer Discovery Protocol (LLDP)</td>
</tr>
<tr>
<td>load-balancing</td>
<td>Configures load balancing parameters</td>
</tr>
<tr>
<td>logging</td>
<td>Modifies message logging</td>
</tr>
<tr>
<td>mac-address-table</td>
<td>Configures the MAC address table</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>mac-auth</td>
<td>Enables 802.1x port-based user authentication on this device</td>
</tr>
<tr>
<td>memory-profile</td>
<td>Configures the memory profile used on the device</td>
</tr>
<tr>
<td>meshpoint-device</td>
<td>Configures the meshpoint device parameters</td>
</tr>
<tr>
<td>meshpoint-monitor-interval</td>
<td>Configures the meshpoint monitoring interval</td>
</tr>
<tr>
<td>min-misconfiguration-recovery-time</td>
<td>Configures the minimum connectivity (with connected device) verification time</td>
</tr>
<tr>
<td>mint</td>
<td>Configures the MiNT protocol settings</td>
</tr>
<tr>
<td>misconfiguration-recovery-time</td>
<td>Verifies connectivity after a device configuration file is received</td>
</tr>
<tr>
<td>neighbor-inactivity-timeout</td>
<td>Configures neighbor inactivity timeout</td>
</tr>
<tr>
<td>neighbor-info-interval</td>
<td>Configures the neighbor information exchange interval</td>
</tr>
<tr>
<td>noc</td>
<td>Configures NOC settings</td>
</tr>
<tr>
<td>ntp</td>
<td>Configures an NTP server</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>
</tr>
<tr>
<td>power-config</td>
<td>Configures the power option mode. Sets the amount of power that the access point draws.</td>
</tr>
<tr>
<td>preferred-controller-group</td>
<td>Specifies the wireless controller or service platform's group preferred for adoption</td>
</tr>
<tr>
<td>preferred-tunnel-controller</td>
<td>Configures the tunnel wireless controller or service platform's name preferred for tunneling extended VLAN traffic</td>
</tr>
<tr>
<td>radius</td>
<td>Configures device-level RADIUS authentication parameters</td>
</tr>
<tr>
<td>rf-domain-manager</td>
<td>Enables RF Domain manager</td>
</tr>
<tr>
<td>router</td>
<td>Configures dynamic router protocol settings</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Enables automatic AP firmware upgrade</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>
</tr>
<tr>
<td>tunnel-controller</td>
<td>Configures the tunneled WLAN (extended-VLAN) wireless controller’s name</td>
</tr>
<tr>
<td>use</td>
<td>Defines the settings used by this feature</td>
</tr>
<tr>
<td>vrrp</td>
<td>Configures VRRP group settings</td>
</tr>
<tr>
<td>vrrp-state-check</td>
<td>Publishes interface via OSPF or BGP based on Virtual Router Redundancy Protocol (VRRP) status</td>
</tr>
<tr>
<td>wep-shared-key-auth</td>
<td>Enables support for 802.11 WEP shared key authentication</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
</tr>
<tr>
<td>commit</td>
<td>Commits (saves) changes made in the current session</td>
</tr>
<tr>
<td>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><code>exit</code></td>
<td>Ends the current mode and moves to the previous mode</td>
</tr>
<tr>
<td><code>help</code></td>
<td>Displays the interactive help system</td>
</tr>
<tr>
<td><code>revert</code></td>
<td>Reverts changes to their last saved configuration</td>
</tr>
<tr>
<td><code>service</code></td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
</tr>
<tr>
<td><code>show</code></td>
<td>Displays running system information</td>
</tr>
<tr>
<td><code>write</code></td>
<td>Writes information to memory or terminal</td>
</tr>
</tbody>
</table>
7.1.53 noc

Profile Config Commands

Configures Network Operations Center (NOC) settings, such as NOC statistics update interval

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

noc update-interval [<5-3600>|auto]

Parameters

- noc update-interval [<5-3600>|auto]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>update-interval</td>
<td>Configures NOC statistics update interval</td>
</tr>
<tr>
<td>[&lt;5-3600&gt;</td>
<td>auto]</td>
</tr>
<tr>
<td></td>
<td>- auto – The NOC statistics update interval is automatically adjusted by the</td>
</tr>
<tr>
<td></td>
<td>wireless controller or service platform based on load</td>
</tr>
</tbody>
</table>

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
ap300 00-15-70-63-4F-86 adopt
ap300 00-15-70-63-4F-97 adopt
ap300 00-A0-F8-CF-1E-DA adopt
service pm sys-restart
router ospf

Related Commands

- no resets NOC related parameters
7.1.54 ntp

Profile Config Commands

Configures the Network Time Protocol (NTP) server settings

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
ntp server <PEER-IP> {autokey|key|maxpoll|minpoll|prefer|version}
ntp server <PEER-IP> {autokey} {prefer version <1-4>|version <1-4>}
ntp server <PEER-IP> {maxpoll [1024|2048|4096|8192]}
ntp server <PEER-IP> {minpoll [1024|128|256|512|64]}
ntp server <PEER-IP> {key <1-65534> md5 [0 <WORD>|2<WORD>|<WORD>]}
   {prefer version <1-4>|version <1-4>}
ntp server <PEER-IP> {prefer version <1-4>|version <1-4> prefer}
```

Parameters

- **autokey {prefer version <1-4>|version <1-4>}**
  Optional. Configures an autokey peer authentication scheme
  
  - prefer – Optional. Prefers this peer when possible
  - version – Optional. Configures the NTP version
  - <1-4> – Select the NTP version from 1 - 4.

- **maxpoll [1024|2048|4096|8192]**
  Optional. Configures the maximum polling interval. Once set, the NTP resource is polled no later than the defined interval. Select one of the following options:
  
  - 1024 – Configures the maximum polling interval as 1024 seconds. This is the default setting.
  - 2048 – Configures the maximum polling interval as 2048 seconds
  - 4096 – Configures the maximum polling interval as 4096 seconds
  - 8192 – Configures the maximum polling interval as 8192 seconds
**ntp server <PEER-IP> {minpoll [1024|128|256|512|64]}**

server <PEER-IP> | Configures a NTP server association
---|---
minpoll | Optional. Configures the minimum polling interval. Once set, the NTP resource is polled no sooner than the defined interval. Select one of the following options:
- 1024 – Configures the minimum polling interval as 1024 seconds
- 128 – Configures the minimum polling interval as 128 seconds
- 256 – Configures the minimum polling interval as 256 seconds
- 512 – Configures the minimum polling interval as 512 seconds
- 64 – Configures the minimum polling interval as 64 seconds. This is the default setting.

**ntp server <IP> {key <1-65534> md5 [0 <WORD>|2<WORD>|<WORD>] | prefer version <1-4> | version <1-4> prefer**

server <PEER-IP> | Configures a NTP server association
---|---
key | Optional. Defines the authentication key for trusted time sources
- <1-65534> – Specify the peer key number.
- md5 – Sets MD5 authentication
  - 0 <WORD> – Configures a clear text password
  - 2 <WORD> – Configures an encrypted password
  - <WORD> – Sets an authentication key
prefer version | Optional. Prefers this peer when possible
- version | Optional. Configures the NTP version
- <1-4> – Select the NTP version from 1 - 4.

Examples

rfs7000-37FABE(config-profile-default-rfs7000)#ntp server 172.16.10.10
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
  ...............................................
  ip dhcp trust
gos trust dscp
gos trust 802.1p
interface ge3
ip dhcp trust
gos trust dscp
gos trust 802.1p
interface ge4
ip dhcp trust
gos trust dscp
gos trust 802.1p
interface pppoe1
use firewall-policy default
ntp server 172.16.10.10 prefer version 1
misconfiguration-recovery-time 65
noc update-interval 25
ap300 00-15-70-63-4F-86 adopt
ap300 00-15-70-63-4F-97 adopt
ap300 00-A0-F8-CF-1E-DA adopt
service pm sys-restart
router ospf
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

| no          | Disables or reverts settings to their default |
7.1.55 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
offline-duration <5-43200>
```

**Parameters**

- `offline-duration <5-43200>`

**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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets the offline-duration to default (10 minutes)</td>
</tr>
</tbody>
</table>
7.1.56  power-config

Profile Config Commands

Configures the power option mode. Sets the amount of power that the access point draws.

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX

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]

| af-option [range|throughput] | Configures the 802.3.af power mode option. The options are:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• range – Configures the af power range mode. This mode provides higher power but fewer transmission (tx) chains. 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.</td>
<td></td>
</tr>
<tr>
<td>• 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.</td>
<td></td>
</tr>
</tbody>
</table>

| at-option [range|throughput] | Configures the 802.3 at power mode option. The options are:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• range – Configures the at power range mode. This mode provides higher power but fewer tx chains. 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.</td>
<td></td>
</tr>
<tr>
<td>• 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.</td>
<td></td>
</tr>
</tbody>
</table>
### power-config mode \[\text{auto}|3af\]

| mode \[\text{auto}|3af\] | 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.

### Examples

- `rfs7000-37FABE(config-profile-default-rfs7000)#power-config af-option range` % Warning: AP must be restarted for power-management change to take effect.
  - `rfs7000-37FABE(config-profile-default-rfs7000)#power-config at-option throughput` % Warning: AP must be restarted for power-management change to take effect.

- `rfs7000-37FABE(config-profile-default-rfs7000)#power-config af-option range` % Error on default-rfs7000: AP power configuration not available for rfs7000 platform
  - `rfs7000-37FABE(config-profile-default-rfs7000)#power-config af-option range`

### Related Commands

- `no` Reverts the power mode setting on this profile to default
7.1.57 preferred-controller-group

Profile Config Commands

Specifies the controller group preferred for adoption

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
preferred-controller-group <WORD>

Parameters
- preferred-controller-group <WORD>

<WORD>
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.

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 pppoel
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
ap300 00-15-70-63-4F-86 adopt
ap300 00-15-70-63-4F-97 adopt
ap300 00-A0-F8-CF-1E-DA adopt
service pm sys-restart
router ospf
rfs7000-37FABE(config-profile-default-rfs7000)#

Related Commands

no
Removes the preferred controller group configuration
7.1.58 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
preferred-tunnel-controller <NAME>

Parameters
- preferred-tunnel-controller <NAME>

Examples
rfs7000-37FABE(config-profile-default-rfs7000)#preferred-tunnel-controller testtunnel

Related Commands
- no
  Removes the preferred tunnel configuration
7.1.59 radius

.Profile Config Commands

Configures device level RADIUS authentication parameters

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

.Syntax

radius [nas-identifier|nas-port-id] <WORD>

.Parameters

- radius [nas-identifier|nas-port-id] <WORD>

<table>
<thead>
<tr>
<th>nas-identifier &lt;WORD&gt;</th>
<th>Specifies the RADIUS Network Access Server (NAS) identifier attribute used by this device</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WORD&gt;</td>
<td>&lt;WORD&gt; — Specifies the NAS identifier</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>nas-port-id &lt;WORD&gt;</th>
<th>Specifies the RADIUS NAS port ID attribute used by this device</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WORD&gt;</td>
<td>&lt;WORD&gt; — 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
    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

| no                     | Disables or reverts settings to their default |
7.1.60 rf-domain-manager

Profile Config Commands

Enables the RF Domain manager

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

rf-domain-manager [capable|priority <1-255>]

Parameters

- rf-domain-manager [capable|priority <1-255>]

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>capable</td>
<td>Enables a device to become a site manager</td>
</tr>
<tr>
<td>priority &lt;1-255&gt;</td>
<td>Assigns a priority value for site manager selection</td>
</tr>
<tr>
<td>&lt;1-255&gt;</td>
<td>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
ap300 00-15-70-63-4F-86 adopt
ap300 00-15-70-63-4F-97 adopt
ap300 00-A0-F8-CF-1E-DA adopt
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
### 7.1.61 router

*Profile Config Commands*

Configures dynamic router protocol settings

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524

---

**Syntax**

```
router [bgp|ospf]
```

**Parameters**

- `router [bgp|ospf]`

---

**bgp**

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*.

---

**ospf**

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*.

---

**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
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>passive</td>
<td>Make OSPF Interface as passive</td>
</tr>
<tr>
<td>redistribute</td>
<td>Route types redistributed by OSPF</td>
</tr>
<tr>
<td>route-limit</td>
<td>Limit for number of routes handled OSPF process</td>
</tr>
<tr>
<td>router-id</td>
<td>Router ID</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-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>
### 7.1.62 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>Parameter</th>
<th>Description</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</td>
</tr>
<tr>
<td>cause bpduguard</td>
<td>Specifies the reason for errdisable</td>
</tr>
<tr>
<td>interval &lt;10-1000000&gt;</td>
<td>Specifies the interval after which a port is enabled</td>
</tr>
</tbody>
</table>

- **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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mst</td>
<td>Configures Multiple Spanning Tree (MST) commands</td>
</tr>
<tr>
<td>&lt;0-15&gt; priority</td>
<td>Specifies the number of instances required to configure MST. Select a value from 0-15.</td>
</tr>
<tr>
<td>&lt;0-61440&gt;</td>
<td>• priority – Sets the bridge priority to the specified value. Use the no parameter with this command to restore the default bridge priority value.</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-61440&gt; – Sets the bridge priority in increments (Lower priority indicates greater likelihood of becoming root)</td>
</tr>
<tr>
<td>cisco interoperability [enable</td>
<td>disable]</td>
</tr>
<tr>
<td>enable</td>
<td>Enables MST protocol</td>
</tr>
</tbody>
</table>
### 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 bpdu-guard
  autoinstall configuration
--More--

Related Commands

| no | Disables or reverts settings to their default |
### 7.1.63 traffic-class-mapping

#### Profile Config Commands

Maps the IPv6 traffic class value of incoming IPv6 untagged packets to 802.1p priority. This mapping 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.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### 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>

**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

```bash
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes mapping between IPv6 traffic class value (of incoming IPv6 untagged packets) and 802.1p priority</td>
</tr>
</tbody>
</table>
### 7.1.64 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
tunnel-controller <NAME>
```

**Parameters**

- **tunnel-controller** `<NAME>`

**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.
### 7.1.65 use

> **Profile Config Commands**

Associates existing policies with this profile

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax Profiles Mode

```
use [auto-provisioning-policy|bonjour-gw-forwarding-policy|captive-portal|
    client-identity-group|crypto-cmp-policy|dhcp-server-policy|dhcpv6-server-policy|
    event-system-policy|firewall-policy|global-assoc-list|management-policy|
    radius-server-policy|role-policy|routing-policy]
```

#### Syntax Device Mode

```
use [auto-provisioning-policy|bonjour-gw-forwarding-policy|captive-portal|
    client-identity-group|dhcp-server-policy|dhcpv6-server-policy|event-system-policy|
    firewall-policy|global-assoc-list|management-policy|profile|radius-server-policy|
    rf-domain|role-policy|routing-policy|wips-policy|smart-cache-policy]
```

---

**NOTE:** The following tables contain the ‘use’ command parameters for the Profile and Device configuration modes.

### Parameters Profiles Mode

<table>
<thead>
<tr>
<th>use</th>
<th>Associates the specified policies with this profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>auto-provisioning-policy &lt;POLICY-NAME&gt;</td>
<td>Associates an auto provisioning policy</td>
</tr>
<tr>
<td>bonjour-gw-forwarding-policy &lt;POLICY-NAME&gt;</td>
<td>Uses an existing Bonjour GW Forwarding policy with a profile or device</td>
</tr>
<tr>
<td>captive-portal server &lt;CAPTIVE-PORTAL&gt;</td>
<td>Configures access to a specified captive portal with this profile</td>
</tr>
<tr>
<td>client-identity &lt;CLIENT-IDENTITY-GROUP-NAME&gt;</td>
<td>Associates an existing client identity group with this profile</td>
</tr>
</tbody>
</table>

- <POLICY-NAME> – Specify the auto provisioning policy name.
- <POLICY-NAME> – Specify the Bonjour GW Forwarding policy name (should be existing and configured).
- <CAPTIVE-PORTAL> – Specify the captive portal name.
- <CLIENT-IDENTITY-GROUP-NAME> – Specify the client identity group name.

For more information on the ‘client-identity’ and ‘client-identity-group’ commands, see `client-identity` and `client-identity-group`.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| crypto-cmp-policy <POLICY-NAME>  | Associates an existing crypto certificate management protocol (CMP) policy with this profile  
|                                 |   • <POLICY-NAME> – Specify the CMP policy name.                        |
|                                 |   For more information on configuring a crypto CMP policy, see **CRYPTO-CMP-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.            |
| 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-assoc-list server <GLOBAL-ASSOC-LIST-NAME> | Associates the specified global association list with the controller profile |
|                                 |   • <GLOBAL-ASSOC-LIST-NAME> – Specify the global association list name.  |
|                                 | 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**. |
| management-policy <MNGT-POLICY>  | Associates a management policy                                           |
|                                 |   • <MNGT-POLICY> – Specify the management policy name.                |
| radius-server-policy <RADIUS-POLICY> | Associates a device onboard RADIUS policy                               |
|                                 |   • <RADIUS-POLICY> – Specify the RADIUS policy name.                  |
| role-policy <ROLE-POLICY>       | Associates a role policy                                                 |
|                                 |   • <ROLE-POLICY> – Specify the role policy name.                      |
| routing-policy <ROUTING-POLICY>  | Associates a routing policy                                              |
|                                 |   • <ROUTING-POLICY> – Specify the routing policy name.                |
|                                 |   This is not applicable to the NX45XX and NX65XX series profiles.     |

**Parameters Device Mode**


- **use**: Associates the following policies with this device:

  **auto-provisioning-policy <POLICY-NAME>**
  Associates an auto provisioning policy
  • <POLICY-NAME> – Specify the auto provisioning policy name.

  **captive-portal server <CAPTIVE-PORTAL>**
  Configures access to a specified captive portal
  • <CAPTIVE-PORTAL> – Specify the captive portal name.
### Profiles Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>client-identity</strong></td>
<td>Associates an existing client identity group with this device&lt;br&gt;• <code>&lt;CLIENT-IDENTITY-GROUP-NAME&gt;</code> – Specify the client identity group name. &lt;br&gt;For more information on the 'client-identity' and 'client-identity-group' commands, see <a href="#">client-identity</a> and <a href="#">client-identity-group</a>.</td>
</tr>
<tr>
<td><strong>dhcp-server-policy</strong></td>
<td>Associates a DHCP server policy&lt;br&gt;• <code>&lt;DHCP-POLICY&gt;</code> – Specify the DHCP server policy name.</td>
</tr>
<tr>
<td><strong>dhcpv6-server-policy</strong></td>
<td>Associates a DHCPv6 server policy&lt;br&gt;• <code>&lt;DHCPv6-POLICY&gt;</code> – Specify the DHCPv6 server policy name.</td>
</tr>
<tr>
<td><strong>event-system-policy</strong></td>
<td>Associates an event system policy&lt;br&gt;• <code>&lt;EVENT-SYSTEM-POLICY&gt;</code> – Specify the event system policy name.</td>
</tr>
<tr>
<td><strong>firewall-policy</strong></td>
<td>Associates a firewall policy&lt;br&gt;• <code>&lt;FW-POLICY&gt;</code> – Specify the firewall policy name.</td>
</tr>
<tr>
<td><strong>global-assoc-list server</strong></td>
<td>Associates the specified global association list with the device (controller)&lt;br&gt;• <code>&lt;GLOBAL-ASSOC-LIST-NAME&gt;</code> – Specify the global association list name. &lt;br&gt;Once associated, the controller applies this association list to requests received from all adopted APs. For more information on global association list, see <a href="#">global-association-list</a>.</td>
</tr>
<tr>
<td><strong>igmp-snoop-policy</strong></td>
<td>Associates an IGMP snoop policy&lt;br&gt;• <code>&lt;IGMP-POLICY&gt;</code> – Specify the IGMP snoop policy name.</td>
</tr>
<tr>
<td><strong>management-policy</strong></td>
<td>Associates a management policy&lt;br&gt;• <code>&lt;MNGT-POLICY&gt;</code> – Specify the management policy name.</td>
</tr>
<tr>
<td><strong>profile</strong></td>
<td>Associates a profile with this device&lt;br&gt;• <code>&lt;PROFILE-NAME&gt;</code> – Specify the profile name.</td>
</tr>
<tr>
<td><strong>radius-server-policy</strong></td>
<td>Associates a device onboard RADIUS policy&lt;br&gt;• <code>&lt;RADIUS-POLICY&gt;</code> – Specify the RADIUS policy name.</td>
</tr>
<tr>
<td><strong>rf-domain</strong></td>
<td>Associates an RF Domain&lt;br&gt;• <code>&lt;RF-DOMAIN-NAME&gt;</code> – Specify the RF Domain name.</td>
</tr>
<tr>
<td><strong>role-policy</strong></td>
<td>Associates a role policy&lt;br&gt;• <code>&lt;ROLE-POLICY&gt;</code> – Specify the role policy name.</td>
</tr>
<tr>
<td><strong>routing-policy</strong></td>
<td>Associates a routing policy&lt;br&gt;• <code>&lt;ROUTING-POLICY&gt;</code> – Specify the routing policy name. This is not applicable to the NX45XX and NX65XX series devices.</td>
</tr>
<tr>
<td><strong>wips-policy</strong></td>
<td>Associates a WIPS policy&lt;br&gt;• <code>&lt;WIPS-POLICY&gt;</code> – Specify the WIPS policy name.</td>
</tr>
</tbody>
</table>
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
gos trust 802.1p
interface ge4
dp 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--

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disassociates a specified policy from this profile</td>
</tr>
</tbody>
</table>
7.1.66 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 [<INTERFACE-NAME>|ge <1-4]|me1|port-channel <1-2>|pppoel|
vlan <1-4094>|wwan1]

vrrp <1-255> monitor [<IP-NAME>|critical-resource|pppoel|vlan|wwan1]

vrrp <1-255> monitor [ <IP-NAME>|critical-resource|pppoel|vlan|wwan1] {(<IP-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]} {<IP-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]

<table>
<thead>
<tr>
<th>vrrp &lt;1-255&gt;</th>
<th>Configures the virtual router ID from 1-255. Identifies the virtual router the packet is reporting status for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<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 [&lt;INTERFACE-NAME&gt;]</td>
<td>Enables VRRP on the selected SVI interface</td>
</tr>
<tr>
<td>ge &lt;1-4&gt;</td>
<td>• &lt;INTERFACE-NAME&gt; – Enables VRRP on the VLAN interface specified by the &lt;INTERFACE-NAME&gt; parameter</td>
</tr>
<tr>
<td>me1</td>
<td>• ge &lt;1-4&gt; – Enables VRRP on the specified GigabitEthernet interface</td>
</tr>
<tr>
<td>port-channel &lt;1-2&gt;</td>
<td>• me1 – Enables VRRP on the FastEthernet interface</td>
</tr>
<tr>
<td>pppoe1</td>
<td>• port-channel &lt;1-2&gt; – Enables VRRP on the port channel interface</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>• pppoe1 – Enables VRRP on the PPP over Ethernet interface</td>
</tr>
<tr>
<td>wwan1</td>
<td>• vlan &lt;1-4094&gt; – Enables VRRP on the specified VLAN interface</td>
</tr>
<tr>
<td>vrrp-monitor &lt;1-255&gt;</td>
<td>Enables link monitoring or Critical Resource Monitoring (CRM)</td>
</tr>
</tbody>
</table>

**delta-priority <1-253>**

- Configures the priority to decrement (local link monitoring and critical resource monitoring) or increment (critical resource monitoring)
  - <1-253> – Specify the delta priority level from 1-253.

**description <LINE>**

- Configures a text description for the virtual router to further distinguish it from other routers with similar configuration
  - <LINE> – Provide a description (a string from 1-64 characters in length)

**ip <IP-ADDRESSES>**

- 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.
  - <IP-ADDRESSES> – Specify the IP address(es) in the A.B.C.D format.
  - This configuration triggers VRRP operation.

**preempt {delay <1-65535>**

- 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 enabled by default.
  - 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.

**priority <1-254>**

- 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).

**sync-group**

- 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.
<table>
<thead>
<tr>
<th><strong>critical-resource</strong> &lt;CRM-NAME1&gt;</th>
<th>Specifies the name of the critical resource to monitor. VRRP can be configured to monitor a 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. By default VRRP is configured to monitor all critical resources on the device.</th>
</tr>
</thead>
</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 |
| **pppoe1** | 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>] | |
| **vrrp <1-255>** | Configures the virtual router ID from 1- 255. Identifies the virtual router the packet is reporting status for. |
| **timers** | Configures the timer that runs every interval |
| **advertise** [<1-255>|centiseconds <25-4095>|msec <250-999>] | Configures the VRRP advertisements time interval. This is the interval 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] | |
| **vrrp version [2|3]** | Configures one of the following VRRP versions:  
• 2 – VRRP version 2 (RFC 3768)  
• 3 – VRRP version 3 (RFC 5798 only IPV4) (default setting)  
The VRRP version determines the router redundancy. Version 3 supports sub-second (centisecond) 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>Revert VRRP settings</td>
</tr>
</tbody>
</table>
7.1.67 vrrp-state-check

- **Profile Config Commands**

Publishes interface via OSPF or BGP based on Virtual Router Redundancy Protocol (VRRP) status.

VRRP provides automatic assignments 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
```

Disable and enable OSPF/BGP feature for this command to take effect:

```
% Error on B4-C7-99-6C-88-09: Unknown config-item (id:vrrp_check_state)
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><strong>no</strong></td>
<td>Disables the publishing of an interface via OSPF/BGP based on VRRP status</td>
</tr>
</tbody>
</table>
7.1.68 **wep-shared-key-auth**

*Profile Config Commands*

Enables support for 802.11 WEP shared key authentication

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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 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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disable support for 802.11 WEP shared key authentication</td>
</tr>
</tbody>
</table>
7.1.69 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
service [critical-resource|fast-switching|enable|global-association-list|meshpoint|pm|power-config|radius|rss-timeout|watchdog|wireless|show]

service critical-resource port-mode-source-ip <IP>

service enable [l2tpv3|pppoe|aduisd]

service global-association-list blacklist-interval <1-65535>

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 rss-timeout <0-86400>

service watchdog

service wireless [anqp-frag-size|ap300|ap650|client|cred-cache-sync|test|wispe-controller-port]

service wireless anqp-frag-size <100-1500>

service wireless ap300 [image <FILE>|version]

service wireless ap650 legacy-auto-update-image <FILE>

service wireless client tx-deauth on-radar-detect

service wireless cred-cache-sync [full|interval <30-86400>|never|partial]

service wireless test [max-rate|max-retries|min-rate]

service show cli

The following command is specific to the NX45XX and NX65XX series service platform:

service fast-switching

Parameters

- service critical-resource port-mode-source-ip <IP>

| critical-resource port-mode-source-ip <IP> | Hard codes a source IP for critical resource management |
• service enable [l2tpv3|pppoe|radiusd]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>service enable l2tpv3</td>
<td>Enables/disables L2TPv3 on this profile. This feature is not supported on AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX, RFS4000, RFS6000, and RFS7000. It is supported only on AP621, AP6511, and AP6521.</td>
</tr>
<tr>
<td>service enable pppoe</td>
<td>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.</td>
</tr>
<tr>
<td>service enable radiusd</td>
<td>Enables RADIUSD features. When executed on a device, enables RADIUSD on the logged device. When executed on a profile, enables RADIUSD on all devices using that profile.</td>
</tr>
</tbody>
</table>

• service global-association-list blacklist-interval <1-65535>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>service global-association-list</td>
<td>Configures global association list related parameters</td>
</tr>
<tr>
<td>blacklist-interval</td>
<td>Configures the period for which a client is blacklisted. A client is considered blacklisted after being denied access by the server.</td>
</tr>
<tr>
<td>&lt;1-65535&gt;</td>
<td>Specify a value from 1 -65535 seconds.</td>
</tr>
</tbody>
</table>

• service meshpoint loop-prevention-port [L2-INTERFACE-NAME]|ge <1-4]|port-channel <1-2>|

<table>
<thead>
<tr>
<th>Command</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>• &lt;L2-INTERFACE-NAME&gt;</td>
<td>Specify the layer 2 Ethernet interface name.</td>
</tr>
<tr>
<td>ge &lt;1-4&gt;</td>
<td>Limits meshpoint loop prevention on a specified GigabitEthernet interface</td>
</tr>
<tr>
<td>• ge &lt;1-4&gt;</td>
<td>Specify the GigabitEthernet interface index from 1 - 4.</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>• port-channel &lt;1-2&gt;</td>
<td>Specify the port-channel interface index from 1 - 2.</td>
</tr>
</tbody>
</table>

• service pm sys-restart

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pm sys-restart</td>
<td>Enables the process monitor (PM) to restart the system when a process fails</td>
</tr>
</tbody>
</table>

• service power-config [3af-out|force-3at]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>power-config 3af-out</td>
<td>Enables LLDP power negotiation, but uses 3af power</td>
</tr>
<tr>
<td>power-config force-3at</td>
<td>Disables LLDP negotiation and force 802.3at power configuration</td>
</tr>
</tbody>
</table>

• service radius dynamic-authorization additional-port <1-65535>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>radius dynamic-authorization additional-port</td>
<td>Configures an additional UDP port used by the device to listen for dynamic authorization messages</td>
</tr>
<tr>
<td>&lt;1-65535&gt;</td>
<td>Specify a value from 1 - 65535.</td>
</tr>
<tr>
<td>The Cisco Identity Services Engine (ISE) server uses port 1700.</td>
<td></td>
</tr>
</tbody>
</table>
**service rss-timeout <0-86400>**

<table>
<thead>
<tr>
<th>rss-timeout</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0-86400&gt;</td>
</tr>
<tr>
<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>• &lt;0-86400&gt; – Specify a value from 0 - 86400 seconds.</td>
</tr>
</tbody>
</table>

**service watchdog**

<table>
<thead>
<tr>
<th>watchdog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables/disables the watchdog. This feature is enabled by default.</td>
</tr>
<tr>
<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-size <100-1500>**

<table>
<thead>
<tr>
<th>wireless anqp-frag-size</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;100-1500&gt;</td>
</tr>
<tr>
<td>Configures the ANQP packet fragment size</td>
</tr>
<tr>
<td>• &lt;100-1500&gt; – Specify a value from 100 - 1500.</td>
</tr>
</tbody>
</table>

**service wireless ap300 [image <FILE>|version]**

<table>
<thead>
<tr>
<th>wireless ap300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invokes AP300 related service commands</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>image &lt;FILE&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures the AP300 image file details, such as location and file name</td>
</tr>
<tr>
<td>• &lt;FILE&gt; – Provides the path and name of the AP300 image file (for example, flash:/ap.img)</td>
</tr>
</tbody>
</table>

**service wireless ap650 legacy-auto-update-image <FILE>**

<table>
<thead>
<tr>
<th>wireless ap650</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invokes AP650 related service commands</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>legacy-auto-update-image &lt;FILE&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures the AP650 image file details, such as location and file name</td>
</tr>
<tr>
<td>• &lt;FILE&gt; – Provides the path and name of the AP650 image file (for example, flash:/ap.img)</td>
</tr>
</tbody>
</table>

**service wireless client tx-deauth on-radar-detection**

<table>
<thead>
<tr>
<th>wireless client</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures wireless client and stations related settings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>tx-deauth on-radar-detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables/disables access points to transmit deauth to clients when changing channels on radar detection</td>
</tr>
</tbody>
</table>

**service wireless cred-cache-sync [full|interval <30-864000>|never|partial]**

<table>
<thead>
<tr>
<th>wireless cred-cache-sync</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures the credential cache’s synchronization parameters. The parameters are: full, interval, never, and partial.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>full</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables synchronization of all credential cache entries</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>interval &lt;30-864000&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sets the interval, in seconds, at which the credential cache is synchronized</td>
</tr>
<tr>
<td>• &lt;30-864000&gt; – Specify a value from 30 - 864000 seconds.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>partial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables partial synchronization of parameters for associated clients, with credential cache close to aging out</td>
</tr>
</tbody>
</table>
- service wireless test [max-rate|min-rate] [1,2,5.5,6,11,12,18,24,36,48,54,mcs0, mcs1,............mcs23]

<table>
<thead>
<tr>
<th>wireless test</th>
<th>Configures the serviceability parameters used for testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>[max-rate</td>
<td>min-rate]</td>
</tr>
<tr>
<td>[1,2,5.5,mcs23]</td>
<td>Select the maximum and minimum data rates applicable.</td>
</tr>
</tbody>
</table>

- service wireless test max-retries <0-15>

<table>
<thead>
<tr>
<th>wireless test</th>
<th>Configures the serviceability parameters used for testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>max-retries &lt;0-15&gt;</td>
<td>Configures the maximum number of retries per packet</td>
</tr>
</tbody>
</table>

- service wireless wispe-controller-port <1-65535>

<table>
<thead>
<tr>
<th>wispe-controller-port &lt;1-65535&gt;</th>
<th>Resets the Wireless Switch Protocol Enhanced (WISPe) controller port. This is the UDP port used to listen for WISPe.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-65535&gt;</td>
<td>Specify a value from 1-65535.</td>
</tr>
</tbody>
</table>

- service show cli

<table>
<thead>
<tr>
<th>show cli</th>
<th>Displays running system configuration details</th>
</tr>
</thead>
<tbody>
<tr>
<td>cli</td>
<td>Displays the CLI tree of the current mode</td>
</tr>
</tbody>
</table>

- service fast-switching

<table>
<thead>
<tr>
<th>fast-switching</th>
<th>Enables fast switching of packets in the hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use the no &gt; service &gt; fast-switching to disable this feature.</td>
</tr>
<tr>
<td></td>
<td>Fast switching can be enabled and disabled on the NX45XX and NX65XX series service platform.</td>
</tr>
</tbody>
</table>

**Examples**

rfs7000-37FABE(config-profile-testrfs71xx)#service radius dynamic-authorization additional-port 1700
rfs7000-37FABE(config-profile-testrfs71xx)#

rfs7000-37FABE(config-profile-testrfs71xx)#show context
profile rfs7000 test
  service radius dynamic-authorization additional-port 1700
  no autoinstall configuration
  no autoinstall firmware
crypto ikev1 policy ikev1-default
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-testrfs71xx)#

**Related Commands**

| no                              | Removes or resets service command parameters |
7.1.70 slot

Profile Config Commands

Assigns a Peripheral Component Interconnect (PCI) expansion slot for Team-URC VM or WiNG support

Supported in the following platforms:

- Service Platforms — NX4500, NX4524, NX6500, NX6524

Syntax

slot <1-4>

Parameters

- slot <1-4>

<table>
<thead>
<tr>
<th>slot &lt;1-4&gt;</th>
<th>Enables assignment of PCIe slots for TEAM-Centro or WiNG support.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-4&gt;</td>
<td>Select the slot from 1 - 4. The command selects the slot and enters its configuration mode.</td>
</tr>
</tbody>
</table>

In the slot configuration mode, do the following:

- assign — Assigns the selected slot to either TEAM-URC VM or WiNG support
- team-centro — Assigns the selected slot to TEAM-URC VM (IP PBX)
- wing — Assigns the selected slot to WiNG

Note: The show > slot command displays slots and their assignment details (type and status).

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

clearsc Clear the display screen
commit Commit all changes made in this session
do Run commands from Exec mode
disconnect Disconnect from EXEC mode
exit Exit 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

nx4500-5CFA2B(config-profile testNX45XX-slot-1)#

nx4500-5CFA2B(config-profile testNX45XX-slot-1)#assign team-centro

nx4500-5CFA2B(config-profile testNX45XX-slot-1)#

nx4500-5CFA2B(config-profile testNX45XX-slot-1)#show context

slot 1
assign team-centro

nx4500-5CFA2B(config-profile testNX45XX-slot-1)#
nx4500-5CFA2B(config-device B4-C7-99-5C-FA-2B-slot-1)#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>team-centro</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(config-device B4-C7-99-5C-FA-2B-slot-1)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>no</em></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:

```
<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-site**: Set system's adoption site
- **alias**: Alias
- **analytics**: Enable WiNG Onboard Analytics Data
- **ap300**: Adopt/unadopt AP300 device to this profile/device
- **area**: Set name of area where the system is located
- **arp**: Address Resolution Protocol (ARP)
- **auto-learn-staging-config**: Enable learning network configuration of the devices that come for adoption
- **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 reboots (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
- **device-upgrade**: Device firmware upgrade
- **dot1x**: 802.1X
- **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
- **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
legacy-auto-downgrade
legacy-auto-update
license
lldp
load-balancing
location
logging
mac-address-table
mac-auth
mac-name
memory-profile
meshpoint-device
meshpoint-monitor-interval
min-misconfiguration-recovery-time
mint
mirror
misconfiguration-recovery-time
neighbor-inactivity-timeout
neighbor-info-interval
no
noc
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
traffic-class-mapping
stats
timezone
trustpoint
tunnel-controller
use
vrrp
vrrp-state-check

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

Configure MAC address to name
mappings

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

Configure neighbor information
exchange interval

Negate a command or set its
defaults

Configure the noc related setting

Ntp server A.B.C.D

Set duration for which a device
remains unadopted before it
generates offline event

Configure RF Domain level overrides
for wlan

Configure power mode

Controller group this system will
prefer for adoption

Tunnel Controller Name this system
will prefer for tunneling extended
vlan traffic

Configure device-level radius
authentication parameters

RAID

Remove configuration item override
from the device (so profile value
takes effect)

RF Domain Manager

Dynamic routing

Assign a RSA key to a service

Motorola AirDefense sensor server

configuration

PCI expansion Slot

Spanning tree

Configure IPv6 traffic class to
802.1p priority mapping for
untagged frames

Configure the stats related setting

Configure the timezone

Assign a trustpoint to a service

Tunnel Controller group this
controller belongs to

Set setting to use

VRP configuration

Publish interface via OSPF/BGP only
if the interface VRRP state is not
Table 7.24 summarizes device configuration mode commands.

Table 7.24 Device-Configuration-Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>adopter-auto-provisioning-policy-lookup</td>
<td>Enables the use of a centralized auto provisioning policy on this device</td>
<td>page 7-10</td>
</tr>
<tr>
<td>adoption-site</td>
<td>Sets the device’s adoption site name</td>
<td>page 7-410</td>
</tr>
<tr>
<td>alias</td>
<td>Configures network, VLAN, and service aliases on a device</td>
<td>page 7-11</td>
</tr>
<tr>
<td>analytics</td>
<td>Enables analytics in the NX9000 profile/device configuration context</td>
<td>page 7-17</td>
</tr>
<tr>
<td>ap300</td>
<td>Enables adoption of AP300s by a wireless controller or service platform</td>
<td>page 7-18</td>
</tr>
<tr>
<td>area</td>
<td>Sets the name of area where the system is deployed</td>
<td>page 7-411</td>
</tr>
<tr>
<td>arp</td>
<td>Configures ARP parameters</td>
<td>page 7-20</td>
</tr>
<tr>
<td>auto-learn-staging-config</td>
<td>Enables the automatic recognition of devices pending adoption</td>
<td>page 7-22</td>
</tr>
<tr>
<td>autogen-uniqueid</td>
<td>When executed in the device configuration mode, this command generates a unique ID for the logged device.</td>
<td>page 7-23</td>
</tr>
<tr>
<td>autoinstall</td>
<td>Autoinstalls firmware image and configuration setup parameters</td>
<td>page 7-25</td>
</tr>
<tr>
<td>bridge</td>
<td>Configures Ethernet Bridging parameters</td>
<td>page 7-26</td>
</tr>
<tr>
<td>captive-portal</td>
<td>Configures captive portal advanced Web page upload on this profile</td>
<td>page 7-55</td>
</tr>
<tr>
<td>cdp</td>
<td>Operates CDP on the device</td>
<td>page 7-56</td>
</tr>
<tr>
<td>channel-list</td>
<td>Configures channel list advertised to wireless clients</td>
<td>page 7-412</td>
</tr>
<tr>
<td>cluster</td>
<td>Sets cluster configuration</td>
<td>page 7-57</td>
</tr>
<tr>
<td>configuration-persistence</td>
<td>Enables configuration persistence across reloads</td>
<td>page 7-60</td>
</tr>
</tbody>
</table>
### Table 7.24 Device-Configuration-Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>contact</td>
<td>Sets contact information</td>
<td>page 7-413</td>
</tr>
<tr>
<td>controller</td>
<td>Configures a WLAN's wireless controller or service platform</td>
<td>page 7-61</td>
</tr>
<tr>
<td>country-code</td>
<td>Configures wireless controller or service platform’s country code</td>
<td>page 7-414</td>
</tr>
<tr>
<td>critical-resource</td>
<td>Monitors user configured IP addresses and logs their status</td>
<td>page 7-65</td>
</tr>
<tr>
<td>crypto</td>
<td>Configures data encryption protocols and settings</td>
<td>page 7-69</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>Configures device firmware upgrade settings on this device</td>
<td>page 7-131</td>
</tr>
<tr>
<td>dot1x</td>
<td>Configures 802.1x standard authentication controls</td>
<td>page 7-134</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 7-136</td>
</tr>
<tr>
<td>email-notification</td>
<td>Configures e-mail notification</td>
<td>page 7-137</td>
</tr>
<tr>
<td>enforce-version</td>
<td>Checks the device firmware version before attempting connection</td>
<td>page 7-139</td>
</tr>
<tr>
<td>environmental-sensor</td>
<td>Configures the environmental sensor device settings. If the device is an environmental sensor, use this command to configures its settings,</td>
<td>page 7-140</td>
</tr>
<tr>
<td>events</td>
<td>Displays system event messages</td>
<td>page 7-142</td>
</tr>
<tr>
<td>export</td>
<td>Enables export of startup.log file after every boot</td>
<td>page 7-143</td>
</tr>
<tr>
<td>floor</td>
<td>Sets the building floor where the system is deployed</td>
<td>page 7-415</td>
</tr>
<tr>
<td>geo-coordinates</td>
<td>Configures the geographic coordinates for this device</td>
<td>page 7-416</td>
</tr>
<tr>
<td>gre</td>
<td>Enables GRE tunneling on this device</td>
<td>page 7-146</td>
</tr>
<tr>
<td>hostname</td>
<td>Sets a system's network name</td>
<td>page 7-417</td>
</tr>
<tr>
<td>http-analyze</td>
<td>Enables HTTP analysis on this device</td>
<td>page 7-155</td>
</tr>
<tr>
<td>interface</td>
<td>Selects an interface to configure</td>
<td>page 7-161</td>
</tr>
<tr>
<td>ip</td>
<td>Configures IP components</td>
<td>page 7-319</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures IPv6 components</td>
<td>page 7-328</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 7-332</td>
</tr>
<tr>
<td>l3e-lite-table</td>
<td>Configures L3e Lite Table with this profile</td>
<td>page 7-334</td>
</tr>
<tr>
<td>layout-coordinates</td>
<td>Configures layout coordinates</td>
<td>page 7-418</td>
</tr>
<tr>
<td>led</td>
<td>Turns LEDs on or off</td>
<td>page 7-335</td>
</tr>
<tr>
<td>led-timeout</td>
<td>Configures the LED-timeout timer in the device or profile configuration mode</td>
<td>page 7-336</td>
</tr>
<tr>
<td>legacy-auto-downgrade</td>
<td>Enables legacy device firmware to auto downgrade</td>
<td>page 7-337</td>
</tr>
</tbody>
</table>
### Table 7.24 Device-Configuration-Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>legacy-auto-update</td>
<td>Auto updates AP650 and AP71XX legacy device firmware</td>
<td>page 7-338</td>
</tr>
<tr>
<td>license</td>
<td>Adds a license for a device’s features</td>
<td>page 7-419</td>
</tr>
<tr>
<td>lldp</td>
<td>Configures <em>Link Layer Discovery Protocol (LLDP)</em> settings for this profile</td>
<td>page 7-339</td>
</tr>
<tr>
<td>load-balancing</td>
<td>Configures load balancing parameters.</td>
<td>page 7-341</td>
</tr>
<tr>
<td>location</td>
<td>Configures the location the system is deployed</td>
<td>page 7-421</td>
</tr>
<tr>
<td>logging</td>
<td>Enables message logging</td>
<td>page 7-346</td>
</tr>
<tr>
<td>mac-address-table</td>
<td>Configures the MAC address table</td>
<td>page 7-348</td>
</tr>
<tr>
<td>mac-auth</td>
<td>Enables 802.1x authentication of hosts on this device</td>
<td>page 7-350</td>
</tr>
<tr>
<td>mac-name</td>
<td>Configures MAC name to name mappings</td>
<td>page 7-422</td>
</tr>
<tr>
<td>memory-profile</td>
<td>Configures memory profile used on the device</td>
<td>page 7-353</td>
</tr>
<tr>
<td>meshpoint-device</td>
<td>Configures meshpoint device parameters</td>
<td>page 7-354</td>
</tr>
<tr>
<td>meshpoint-monitor-interval</td>
<td>Configures meshpoint monitoring interval</td>
<td>page 7-355</td>
</tr>
<tr>
<td>min-misconfiguration-recovery-time</td>
<td>Configures the minimum device connectivity verification time</td>
<td>page 7-356</td>
</tr>
<tr>
<td>mint</td>
<td>Configures MiNT protocol commands</td>
<td>page 7-357</td>
</tr>
<tr>
<td>misconfiguration-recovery-time</td>
<td>Verifies device connectivity after a configuration is received</td>
<td>page 7-361</td>
</tr>
<tr>
<td>neighbor-inactivity-timeout</td>
<td>Configures a neighbor inactivity timeout</td>
<td>page 7-362</td>
</tr>
<tr>
<td>neighbor-info-interval</td>
<td>Configures the neighbor information exchange interval</td>
<td>page 7-423</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or resets values to their default settings</td>
<td>page 7-424</td>
</tr>
<tr>
<td>noc</td>
<td>Configures NOC settings</td>
<td>page 7-368</td>
</tr>
<tr>
<td>ntp</td>
<td>Configure the NTP server settings</td>
<td>page 7-369</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 7-372</td>
</tr>
<tr>
<td>override-wlan</td>
<td>Configures WLAN RF Domain level overrides</td>
<td>page 7-428</td>
</tr>
<tr>
<td>power-config</td>
<td>Configures power mode features</td>
<td>page 7-373</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 7-375</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>-----------</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 7-376</td>
</tr>
<tr>
<td>radius</td>
<td>Configures device-level RADIUS authentication parameters</td>
<td>page 7-377</td>
</tr>
<tr>
<td>remove-override</td>
<td>Removes device overrides</td>
<td>page 7-430</td>
</tr>
<tr>
<td>rf-domain-manager</td>
<td>Enables the RF Domain manager</td>
<td>page 7-378</td>
</tr>
<tr>
<td>router</td>
<td>Configures dynamic router protocol settings.</td>
<td>page 7-379</td>
</tr>
<tr>
<td>rsa-key</td>
<td>Assigns a RSA key to SSH</td>
<td>page 7-432</td>
</tr>
<tr>
<td>sensor-server</td>
<td>Configures an AirDefense sensor server</td>
<td>page 7-433</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Enables spanning tree commands</td>
<td>page 7-381</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 7-384</td>
</tr>
<tr>
<td>timezone</td>
<td>Configures wireless controller or service platform’s time zone settings</td>
<td>page 7-434</td>
</tr>
<tr>
<td>trustpoint</td>
<td>Assigns a trustpoint to a service</td>
<td>page 7-435</td>
</tr>
<tr>
<td>tunnel-controller</td>
<td>Configures the tunneled WLAN (extended VLAN) wireless controller or service platform’s name</td>
<td>page 7-386</td>
</tr>
<tr>
<td>use</td>
<td>Defines the settings used with this command</td>
<td>page 7-387</td>
</tr>
<tr>
<td>vrrp</td>
<td>Configures VRRP group settings</td>
<td>page 7-391</td>
</tr>
<tr>
<td>vrrp-state-check</td>
<td>Publishes interface via OSPF or BGP based on Virtual Router Redundancy Protocol (VRRP) status</td>
<td>page 7-395</td>
</tr>
<tr>
<td>wep-shared-key-auth</td>
<td>Enables support for 802.11 WEP shared key authentication</td>
<td>page 7-396</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 7-436</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 7-438</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 7-401</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>

Table 7.24 Device-Configuration-Mode Commands
7.2.1 adoption-site

Sets the device’s adoption site name

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

adoption-site <SITE-NAME>

Parameters

- adoption-site <SITE-NAME>

Examples

rfs4000-229D58(config-device-00-23-68-22-9D-58)#adoption-site MotoEcoSpace3B
rfs4000-229D58(config-device-00-23-68-22-9D-58)#

Related Commands

no

Disables or reverts settings to their default
### 7.2.2 area

**Device Config Commands**

Sets the area where the system is deployed

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
area <AREA-NAME>
```

**Parameters**

- `area <AREA-NAME>`

<table>
<thead>
<tr>
<th>area &lt;AREA-NAME&gt;</th>
<th>Sets the area where the system is deployed</th>
</tr>
</thead>
</table>

**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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
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>2.4GHz &lt;CHANNEL-LIST&gt;</th>
<th>Configures the channel list advertised by radios operating in 2.4 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;CHANNEL-LIST&gt;</td>
<td>• &lt;CHANNEL-LIST&gt; — Specify a list of channels separated by commas or hyphens.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5GHz &lt;CHANNEL-LIST&gt;</th>
<th>Configures the channel list advertised by radios operating in 5.0 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;CHANNEL-LIST&gt;</td>
<td>• &lt;CHANNEL-LIST&gt; — Specify a list of channels separated by commas or hyphens.</td>
</tr>
</tbody>
</table>

| dynamic | Enables dynamic (neighboring access point based) update of configured channel list |

**Examples**

```plaintext
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**

- `no` Resets the channel list configuration
7.2.4 contact

- **Device Config Commands**

Defines an administrative contact for a deployed device

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

contact <WORD>

**Parameters**

- contact <WORD>

**Examples**

rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#contact motorolasolutions

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 motorolasolutions
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

Defines the two digit country code for legal device deployment

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

country-code <WORD>

Parameters
- country-code <COUNTRY-CODE>

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 RMZEsanspace
contact motorolasolutions
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 where the device is deployed

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

floor <FLOOR-NAME>

**Parameters**

- floor <FLOOR-NAME>

**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 motorolasolutions
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
geographic coordinates <-90.0000-90.0000> <-180.0000-180.0000>
```

**Parameters**

- **geographic coordinates <-90.0000-90.0000> <-180.0000-180.0000>**

**Examples**

```
rfs4000-229D58(config-device-00-23-68-22-9D-58)#geo-coordinates -90.0000 166
rfs4000-229D58(config-device-00-23-68-22-9D-58)#
```

```
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 | 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```
hostname <WORD>
```

#### Parameters

- `hostname <WORD>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>hostname &lt;WORD&gt;</td>
<td>Sets the name of the managing wireless controller, service platform, or access point. This name is displayed when accessed from any network.</td>
</tr>
</tbody>
</table>

#### 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 motorolasolutions
country-code us
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><code>no</code></td>
<td>Removes device's hostname</td>
</tr>
</tbody>
</table>
7.2.9 layout-coordinates

Configures X and Y layout coordinates for the device

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
layout-coordinates <-4096.0-4096.0> <-4096.0-4096.0>
```

Parameters

- `layout-coordinates <-4096.0-4096.0> <-4096.0-4096.0>`

| `<-4096.0-4096.0>` | Specify the X coordinate from -4096 - 4096.0 |
| `<-4096.0-4096.0>` | Specify the Y coordinate from -4096 - 4096.0 |

Examples

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#layout-coordinates 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 TechPubAP7131
area RMZEcospace
floor 5thfloor
layout-coordinates 1.0 2.0
contact motorolasolutions
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)

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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
license <WORD> <LICENSE-KEY>
```

**Parameters**

- **license** `<WORD>` `<LICENSE-KEY>`
  - `<WORD>` Specify the feature name (AP/AAP/ADSEC/HOTSPOT-ANALYTICS/SMART-CACHE) for which license is added
  - `<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
  no contact
  country-code us
  channel-list 2.4GHz 1,2
  mac-name 00-04-96-4A-A7-08 5.4TestAP
  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) for which
        license is to be added

nx6524-858126(config-device-5C-0E-8B-85-81-26)#license SMART-CACHE
29bedfa30cf4a5bcd20cd8815e00c948ddf26814e8346ef6f9e884832a7a49b349e6938f63ecf653

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 : 11185520500065

Device Licenses:
  AP-LICENSE
    String : 29bedfa30cf4a5bce0c732a20e39f728ddf26814e8346ef6739f3ee2b1691d10246de8a11e439131
    ...  HOTSPOT-ANALYTICS
    String : 29bedfa30cf4a5bcdf83ad26e814f39d4df26814e8346ef6f42938a6d51ac549e6938f63ecf653
  SMART-CACHE
    String : 29bedfa30cf4a5bcde20cd8815e00c948ddf26814e8346ef6f9e884832a7a49b349e6938f63ecf653

--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 is deployed

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
location <WORD>
```

**Parameters**

- `location <WORD>`

**Examples**

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#location Block3B
```
```
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 Block3B
  contact motorolasolutions
  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 MAC name for mappings

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

### Syntax

```
mac-name <MAC> <NAME>
```

### Parameters

- `mac-name <MAC> <NAME>`

### Examples

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#mac-name 00-04-96-4A-A7-08 5.4TestAP
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 RMZEcospase
floor 5thfloor
layout-coordinates 1.0 2.0
location Block3B
contact motorolasolutions
country-code us
channel-list 2.4GHz 1,2
mac-name 00-04-96-4A-A7-08 5.4TestAP
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 `neighbor-info-interval`

**Device Config Commands**

Configures neighbor information exchange interval

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
neighbor-info-interval <1-100>
```

**Parameters**

- `neighbor-info-interval <1-100>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>neighbor-info-interval</code></td>
<td>Sets neighbor information exchange interval</td>
</tr>
<tr>
<td><code>&lt;1-100&gt;</code></td>
<td>- <code>&lt;1-100&gt;</code> – Specify a value from 1 - 100 seconds.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#neighbor-info-interval 50
```

```
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 Block3B
    contact motorolasolutions
    country-code us
    channel-list 2.4GHz 1,2
    mac-name 00-04-96-4A-A7-08 5.4TestAP
    neighbor-info-interval 50
```

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#
```

**Related Commands**

- `no` Removes or reverts the device's settings
7.2.14 no

**Device Config Commands**

Negates a command or resets values to their default

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
no [adopter-auto-provisioning-policy-lookup|adoption-site|alias|analytics|ap300|area|arp|auto-learn-staging-config|autoinstall|bridge|captive-portal|cdp|
channel-list|cluster|configuration-persistence|contact|controller|country-code|
critical-resource|crypto|device-upgrade|dot1x|dscp-mapping|email-notification|
environmental-sensor|events|export|floor|geo-coordinates|gre|hostname|
http-analyze|interface|ip|l2tpv3|13-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|memory-profile|meshpoint-device|
meshpoint-monitor-interval|min-misconfiguration-recovery-time|mint|mirror|
misconfiguration-recovery-time|noc|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|
trustpoint|tunnel-controller|use|vrrp|wep-shared-key-auth|service]
```

**Parameters**

None

**Usage Guidelines**

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

**Examples**

```plaintext
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#no area
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#no contact
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>adopter-auto-provisioning-policy-lookup</td>
<td>Enables the use of a centralized auto provisioning policy on this profile or device</td>
</tr>
<tr>
<td>adoption-site</td>
<td>Sets the device’s adoption site name</td>
</tr>
<tr>
<td>alias</td>
<td>Creates a network, VLAN, and service alias and enters its configuration mode</td>
</tr>
<tr>
<td>ap300</td>
<td>Enables adoption of AP300s by a profile</td>
</tr>
<tr>
<td>area</td>
<td>Sets the name of area where the system is deployed</td>
</tr>
<tr>
<td>arp</td>
<td>Configures ARP parameters</td>
</tr>
<tr>
<td>auto-learn-staging-config</td>
<td>Enables the automatic recognition of devices pending adoption</td>
</tr>
<tr>
<td>autoinstall</td>
<td>Autinstalls firmware image and configuration setup parameters</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>bridge</td>
<td>Configures Ethernet Bridging parameters</td>
</tr>
<tr>
<td>cdp</td>
<td>Operates CDP on the device</td>
</tr>
<tr>
<td>channel-list</td>
<td>Configures channel list advertised to wireless clients</td>
</tr>
<tr>
<td>cluster</td>
<td>Sets cluster configuration</td>
</tr>
<tr>
<td>configuration-persistence</td>
<td>Enables configuration persistence across reloads</td>
</tr>
<tr>
<td>contact</td>
<td>Sets contact information</td>
</tr>
<tr>
<td>controller</td>
<td>Configures controller WLAN settings</td>
</tr>
<tr>
<td>country-code</td>
<td>Configures the two digit country code for legal operation</td>
</tr>
<tr>
<td>crypto</td>
<td>Configures crypto settings</td>
</tr>
<tr>
<td>device-upgrade</td>
<td>Configures device firmware upgrade settings on this device</td>
</tr>
<tr>
<td>dot1x</td>
<td>Configures 802.1x standard authentication controls</td>
</tr>
<tr>
<td>dscp-mapping</td>
<td>Configures IP <em>Differentiated Services Code Point</em> (DSCP) to 802.1p priority mapping for untagged frames</td>
</tr>
<tr>
<td>email-notification</td>
<td>Configures e-mail notification</td>
</tr>
<tr>
<td>enforce-version</td>
<td>Checks the device firmware version before attempting connection</td>
</tr>
<tr>
<td>environmental-sensor</td>
<td>Configures the environmental sensor device settings. If the device is an environmental sensor, use this command to configures its settings,</td>
</tr>
<tr>
<td>events</td>
<td>Displays system event messages</td>
</tr>
<tr>
<td>export</td>
<td>Enables export of startup.log file after every boot</td>
</tr>
<tr>
<td>floor</td>
<td>Sets the building floor where the system is deployed</td>
</tr>
<tr>
<td>geo-coordinates</td>
<td>Configures the geographic coordinates for this device</td>
</tr>
<tr>
<td>gre</td>
<td>Enables GRE tunneling on this profile</td>
</tr>
<tr>
<td>hostname</td>
<td>Sets a system’s network name</td>
</tr>
<tr>
<td>http-analyze</td>
<td>Enables HTTP analysis on this device</td>
</tr>
<tr>
<td>interface</td>
<td>Selects an interface to configure</td>
</tr>
<tr>
<td>ip</td>
<td>Configures IP components</td>
</tr>
<tr>
<td>l2tpv3</td>
<td>Defines the L2TP protocol for tunneling layer 2 payloads using VPNs</td>
</tr>
<tr>
<td>l3e-lite-table</td>
<td>Configures L3e lite table aging time</td>
</tr>
<tr>
<td>layout-coordinates</td>
<td>Configures layout coordinates</td>
</tr>
<tr>
<td>led</td>
<td>Turns LEDs on or off</td>
</tr>
<tr>
<td>legacy-auto-downgrade</td>
<td>Enables legacy device firmware to auto downgrade</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>legacy-auto-update</code></td>
<td>Auto updates AP650 and AP71XX legacy device firmware</td>
</tr>
<tr>
<td><code>lldp</code></td>
<td>Configures LLDP settings for this profile</td>
</tr>
<tr>
<td><code>load-balancing</code></td>
<td>Configures load balancing parameters</td>
</tr>
<tr>
<td><code>location</code></td>
<td>Configures the location the system is deployed</td>
</tr>
<tr>
<td><code>logging</code></td>
<td>Enables message logging</td>
</tr>
<tr>
<td><code>mac-address-table</code></td>
<td>Configures the MAC address table</td>
</tr>
<tr>
<td><code>mac-auth</code></td>
<td>Enables 802.1x authentication of hosts on this device</td>
</tr>
<tr>
<td><code>mac-name</code></td>
<td>Configures MAC name to name mappings</td>
</tr>
<tr>
<td><code>memory-profile</code></td>
<td>Configures device’s memory profile</td>
</tr>
<tr>
<td><code>meshpoint-device</code></td>
<td>Configures device’s meshpoint parameters</td>
</tr>
<tr>
<td><code>meshpoint-monitor-interval</code></td>
<td>Configures meshpoint monitoring interval on the device</td>
</tr>
<tr>
<td><code>min-misconfiguration-recovery-time</code></td>
<td>Configures the minimum connectivity verification time</td>
</tr>
<tr>
<td><code>mint</code></td>
<td>Configures MiNT protocol commands</td>
</tr>
<tr>
<td><code>mirror</code></td>
<td>Enables port mirroring on a device</td>
</tr>
<tr>
<td><code>misconfiguration-recovery-time</code></td>
<td>Verifies connectivity after a device configuration is received</td>
</tr>
<tr>
<td><code>neighbor-inactivity-timeout</code></td>
<td>Configures a neighbor inactivity timeout</td>
</tr>
<tr>
<td><code>neighbor-info-interval</code></td>
<td>Configures the neighbor information exchange interval</td>
</tr>
<tr>
<td><code>noc</code></td>
<td>Configures NOC settings</td>
</tr>
<tr>
<td><code>ntp</code></td>
<td>Configure the NTP server settings</td>
</tr>
<tr>
<td><code>override-wlan</code></td>
<td>Configures WLAN RF Domain level overrides</td>
</tr>
<tr>
<td><code>power-config</code></td>
<td>Configures power mode features</td>
</tr>
<tr>
<td><code>preferred-controller-group</code></td>
<td>Specifies the group the system prefers for adoption</td>
</tr>
<tr>
<td><code>preferred-tunnel-controller</code></td>
<td>Configures the tunnel preferred by the system for tunneling extended VLAN traffic</td>
</tr>
<tr>
<td><code>radius</code></td>
<td>Configures device-level RADIUS authentication parameters</td>
</tr>
<tr>
<td><code>remove-override</code></td>
<td>Removes device overrides</td>
</tr>
<tr>
<td><code>rf-domain-manager</code></td>
<td>Enables the RF Domain manager</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>router</td>
<td>Configures dynamic router protocol settings</td>
</tr>
<tr>
<td>rsa-key</td>
<td>Assigns a RSA key to SSH</td>
</tr>
<tr>
<td>sensor-server</td>
<td>Configures an AirDefense sensor server</td>
</tr>
<tr>
<td>spanning-tree</td>
<td>Enables spanning tree commands</td>
</tr>
<tr>
<td>timezone</td>
<td>Configures time zone settings</td>
</tr>
<tr>
<td>trustpoint</td>
<td>Assigns a trustpoint to a service</td>
</tr>
<tr>
<td>tunnel-controller</td>
<td>Configures the tunneled WLAN (extended VLAN) wireless controller or service platform’s name</td>
</tr>
<tr>
<td>use</td>
<td>Defines the settings used by this feature</td>
</tr>
<tr>
<td>vrrp</td>
<td>Configures VRRP group settings</td>
</tr>
<tr>
<td>wep-shared-key-auth</td>
<td>Enables support for 802.11 WEP shared key authentication</td>
</tr>
<tr>
<td>clrscr</td>
<td>Clears the display screen</td>
</tr>
<tr>
<td>commit</td>
<td>Commits (saves) changes made in the current session</td>
</tr>
<tr>
<td>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous mode</td>
</tr>
<tr>
<td>help</td>
<td>Displays the interactive help system</td>
</tr>
<tr>
<td>revert</td>
<td>Reverts changes to their last saved configuration</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
</tr>
</tbody>
</table>
7.2.15 **override-wlan**

- **Device Config Commands**

Configures this WLAN’s RF Domain level overrides

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```text
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>]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WLAN&gt;</td>
<td>Specify the WLAN name. Configure the following WLAN parameters: SSID, VLAN pool, and WPA-WPA2 key.</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down the WLAN’s (identified by the &lt;WLAN&gt; keyword) operations on all mapped radios</td>
</tr>
</tbody>
</table>
| 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>]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;WLAN&gt;</td>
<td>Specify the WLAN name.</td>
</tr>
</tbody>
</table>
| wep128 [key <1-4> hex [0<WORD>|2 <WORD>]|transmit-key <1-4>]] | 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.  
  - Contd...  
  - 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. |
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 Block3B
  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 5.4TestAP
  neighbor-info-interval 50
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#

Related Commands

| no | Removes RF Domain level WLAN overrides |
7.2.16 remove-override

Device Config Commands

Removes device overrides

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
remove-override <PARAMETERS>
```

Parameters

None

Examples

```
rfs4000-229D58 (config-device-00-23-68-22-9D-58)#remove-override ?
adaptor-auto-provisioning-policy-lookup  Use centralized auto-provisioning policy when adopted by another controller
	alias  Alias
	all  Remove all overrides for the device

table
	none  None

disclosure

to  To
	untrusted-trusted   Untrusted to trusted
```

```
adopter-auto-provisioning-policy-lookup
```

```
Use centralized auto-provisioning policy when adopted by another controller
```

```
alias
```

```
Alias
```

```
all
```

```
Remove all overrides for the device
```

```
area
```

```
Reset name of area where the system is located
```

```
arph
```

```
Address Resolution Protocol (ARP)
```

```
auto-learn-staging-config
```

```
Enable learning network configuration of the devices that come for adoption
```

```
autoinstall
```

```
Autoinstall 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
```

```
configuration-persistence
```

```
Automatic write of startup configuration file
```

```
contact
```

```
The contact
```

```
controller
```

```
WLAN controller configuration
```

```
country-code
```

```
The country of operation
```

```
crypto
```

```
Encryption related commands
```

```
device-upgrade
```

```
Device firmware upgrade
```

```
dot1x
```

```
802.1X
```

```
dscp-mapping
```

```
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
```

```
firewall
```

```
Enable/Disable firewall
```

```
floor
```

```
Reset name of floor where the system is located
```

```
global
```

```
Remove global overrides for the device but keeps per-interface overrides
```

```
gre
```

```
GRE protocol
```

```
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
```

```
LED on the device
```
lldp                                      Link Layer Discovery Protocol
location                                  The location
logging                                   Modify message logging facilities
mac-address-table                        MAC Address Table
mac-auth                                   802.1X
memory-profile                            Memory-profile
mint                                      MiNT protocol
noc                                       Noc related configuration
ntp                                       Configure NTP
override-wlan                             Overrides for wlans
offline-duration                           Duration to mark adopted device as offline
override-wlan                             Overrides for wlans
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
rf-domain-manager                         RF Domain Manager
router                                    Dynamic routing
routing-policy                            Policy Based Routing Configuration
sensor-server                             Motorola AirDefense WIPS sensor server configuration
spanning-tree                              Spanning tree
timezone                                  The timezone
traffic-class-mapping                     IPv6 traffic-class to 802.1p priority mapping for untagged frames
tunnel-controller                         Tunnel Controller group this controller belongs to
use                                       Set setting to use
vrrp                                      VRRP configuration
service                                   Service Commands

rfs4000-229D58(config-device-00-23-68-22-9D-58)#
### 7.2.17 rsa-key

**Device Config Commands**

Assigns a RSA key to a device

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
rsa-key ssh <RSA-KEY-NAME>
```

**Parameters**

- `rsa-key ssh <RSA-KEY-NAME>`

**Examples**

```
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 Block3B
  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 5.4TestAP
  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 RSA key from service</td>
</tr>
</tbody>
</table>
7.2.18 sensor-server

- **Device Config Commands**

Configures an AirDefense sensor server

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
sensor-server <1-3> ip <IP> {port [443|<1-65535>]}  
```

**Parameters**

- `sensor-server <1-3> ip <IP> {port [443|<1-65535>]}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sensor-server &lt;1-3&gt;</td>
<td>Selects a sensor server to configure</td>
</tr>
<tr>
<td>ip &lt;IP&gt;</td>
<td>Configures sensor server’s IP address</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;IP&gt;</code> — Specify the IP address</td>
</tr>
<tr>
<td>port [443</td>
<td>&lt;1-65535&gt;]</td>
</tr>
<tr>
<td></td>
<td>- 443 — The default port used by the AirDefense server</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;1-65535&gt;</code> — Manually sets the port number of the AirDefense server</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)#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 Block3B
  no contact
  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 5.4TestAP
  neighbor-info-interval 50
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#
```

**Related Commands**

- `no` Removes configured sensor server
### 7.2.19 timezone

*Device Config Commands*

Configures device’s timezone

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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 Block3B
  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 5.4TestAP
  neighbor-info-interval 50
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#
```

**Related Commands**

```
no
```

Removes device’s configured timezone
7.2.20 trustpoint

**Device Config Commands**

Assigns a trustpoint

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
trustpoint [https|radius-ca|radius-server] <TRUSTPOINT>
```

Parameters

- `trustpoint [https|radius-ca|radius-server] <TRUSTPOINT>`

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>https &lt;TRUSTPOINT&gt;</td>
<td>Assigns a specified trustpoint to HTTPS</td>
</tr>
<tr>
<td></td>
<td>- &lt;TRUSTPOINT&gt; — Specify the trustpoint name.</td>
</tr>
<tr>
<td>radius-ca &lt;TRUSTPOINT&gt;</td>
<td>Assigns a trustpoint as a certificate authority for validating client certificates in EAP</td>
</tr>
<tr>
<td></td>
<td>- &lt;TRUSTPOINT&gt; — Specify the trustpoint name.</td>
</tr>
<tr>
<td>radius-server &lt;TRUSTPOINT&gt;</td>
<td>Specifies the name of the trustpoint. Install the trustpoint using PKI commands in the enable mode.</td>
</tr>
<tr>
<td></td>
<td>- &lt;TRUSTPOINT&gt; — Specify the trustpoint name.</td>
</tr>
</tbody>
</table>

Examples

```
rfs7000-37FABE(config-device-00-04-96-4A-A7-08)#trustpoint radius-ca trust2
```

```
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
  trustpoint radius-ca trust2
  rsa-key ssh rsa-key1
  location Block3B
  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 5.4TestAP
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 configured trustpoint from service</td>
</tr>
</tbody>
</table>
7.2.21 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 — NX4524, NX6524

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

---

**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.
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
-------------------------------------------------------------------------------
<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#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables data packets mirroring on GE ports</td>
</tr>
</tbody>
</table>
7.2.22 raid

Device Config Commands

Enables/disables RAID alarms

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. With the WiNG 5.6 release, an administrator can 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 — NX9000, NX9500, NX9510

Syntax

raid alarm enable

Parameters

- raid alarm enable

| alarm enable | Enables audible alarm, which is triggered a RAID drives fails. When triggered the alarm can be disabled by executing the raid > silence command in the device’s Priv Exec mode. |

Examples

nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#raid alarm enable
nx9500-6C8809(config-device-B4-C7-99-6C-88-09)#
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 g1
  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

- no Disables RAID alarm
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 Digital Subscriber Line (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:**

- `interface` Select an interface to configure
- `ip` Internet Protocol (IP)
- `no` Negate a command or set its defaults
- `ntp` Configure NTP
- `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-<PROFILE-NAME>)#
```

Table 7.25 summarizes 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>Configures the T5 controller's interfaces</td>
<td>page 7-440</td>
</tr>
<tr>
<td><code>ip</code></td>
<td>Configures the default gateway's IP address</td>
<td>page 7-442</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Removes or reverts this T5 controller profile settings</td>
<td>page 7-443</td>
</tr>
<tr>
<td><code>ntp</code></td>
<td>Configures the Network Time Protocol (NTP) server associated with this T5 profile</td>
<td>page 7-444</td>
</tr>
<tr>
<td><code>use</code></td>
<td>Defines this T5 profile's management settings</td>
<td>page 7-445</td>
</tr>
</tbody>
</table>
### 7.3.1 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

```
interface [<WORD>|dsl|fe|ge|radio|vlan]
```

#### Parameters

- `interface [<WORD>|dsl|fe|ge|radio|vlan]`

<table>
<thead>
<tr>
<th>&lt;WORD&gt;</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dsl &lt;1-24&gt;</td>
<td>Configures the specified Digital Subscriber Line (DSL) interface</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-24&gt; — Specify the DSL port index from 1 - 24.</td>
</tr>
<tr>
<td>fe &lt;1-24&gt; &lt;1-2&gt;</td>
<td>Configures the specified FastEthernet interface</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-24&gt; — Specify the DSL port index from 1 - 24.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-2&gt; — Specify the FastEthernet interface to configure.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> In the FastEthernet interface configuration mode, specify the interface settings.</td>
</tr>
<tr>
<td>ge &lt;1-2&gt;</td>
<td>Configures the specified GigabitEthernet interface</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-2&gt; — Specify the interface index from 1 - 2.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> In the GigabitEthernet interface configuration mode, specify the interface settings.</td>
</tr>
<tr>
<td>radio &lt;1-24&gt;</td>
<td>Configures the specified radio interface</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-2&gt; — Specify the radio interface index from 1 - 24.</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>Configures the specified VLAN interface</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-2&gt; — Specify the VLAN interface index from 1 - 4094.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> In the VLAN configuration mode, specify the interface's primary IP address in the A.B.C.D/M format. Optionally specify the secondary IP address.</td>
</tr>
</tbody>
</table>

#### 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
us-target-margin   Configure the desired upstream signal-to-noise (SNR) ratio
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the VLAN interface configuration</td>
</tr>
</tbody>
</table>
7.3.2 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**

```
ip default-gateway <IP>
```

**Parameters**

- `ip default-gateway <IP>`

  | `ip default-gateway <IP>` | Enter the default gateway’s IP address in the A.B.C.D format.

**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
 interface vlan1
 interface vlan4090
 interface fe 5 2
 interface ge 2
 interface ge 1
 interface fe 5 1
--More--
nx9500-6C8809(config-profile-t5Profile)#
```
7.3.3 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 [interface|ntp|use]

no interface vlan <2-4094>

no ntp server <IP>

no use management-policy

Parameters

- no [interface|ntp|use]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no interface</td>
<td>Removes the VLAN interface configured on the T5 profile</td>
</tr>
<tr>
<td>no ntp</td>
<td>Removes the NTP server associated with this T5 profile</td>
</tr>
<tr>
<td>no use</td>
<td>Removes the management policy used with this T5 profile</td>
</tr>
</tbody>
</table>

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)#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)#
7.3.4 ntp

**T5 Profile Config Commands**

Configures the *Network Time Protocol* (NTP) server associated with this T5 profile. This is necessary to obtain the system time.

Supported in the following platforms:

- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`ntp server <IP>`

**Parameters**

- `ntp server <IP>`

**Examples**

```
x9500-6C8809(config-profile-t5Profile)#ntp server 192.168.13.2
```

```
x9500-6C8809(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
7.3.5 use

▶ T5 Profile Config Commands

Defines this T5 profile’s management settings

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>

<table>
<thead>
<tr>
<th>use management-policy &lt;POLICY-NAME&gt;</th>
<th>Associates a management policy with this T5 profile (should be existing and configured)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;POLICY-NAME&gt; – Specify the management policy’s name.</td>
</tr>
</tbody>
</table>

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 |
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:

```plaintext
<DEVICE>(config)#aaa-policy <POLICY-NAME>
```

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

```plaintext
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

- **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

```
```
# 8.1 aaa-policy

Table 8.1 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 8-22</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 8-23</td>
</tr>
<tr>
<td>use</td>
<td>Defines the AAA command settings</td>
<td>page 8-24</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>|<SECRET>]
accounting server <1-6> host <IP/HOSTNAME/HOST-ALIAS> secret {port <1-65535>}
accounting server <1-6> nai-routing realm-type [prefix|suffix] realm <REALM-TEXT> {strip}
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 |
| 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 a accounting server, from the pool, based on the preference mode selected. |
| auth-server-host | Sets the authentication server as the accounting server |
| auth-server-number | Sets the authentication server as the accounting server |
| none | Indicates the accounting server is independent of the authentication server |
### Accounting Server Configuration

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>server &lt;1-6&gt;</td>
<td>Configures an accounting server. Up to 6 accounting servers can be configured.</td>
</tr>
<tr>
<td>dscp &lt;0-63&gt;</td>
<td>Sets the Differentiated Services Code Point (DSCP) value for Quality of Service (QOS) monitoring. This value is used in generated RADIUS packets.</td>
</tr>
<tr>
<td>retry-timeout-factor &lt;50-200&gt;</td>
<td>Sets the scaling factor for retransmission timeouts. The timeout at each attempt is a function of this retry-timeout factor and the attempt number.</td>
</tr>
<tr>
<td>host &lt;IP/HOSTNAME/HOST-ALIAS&gt;</td>
<td>Configures the accounting server's hostname, IP address, or host-alias. Note: The host alias should be existing and configured.</td>
</tr>
<tr>
<td>secret [0 &lt;SECRET&gt;</td>
<td>2 &lt;SECRET&gt;</td>
</tr>
<tr>
<td>port &lt;1-65535&gt;</td>
<td>Optional. Configures the accounting server's UDP port (the port used to connect to the accounting server).</td>
</tr>
</tbody>
</table>

### NAI Routing

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nai-routing realm-type [prefix</td>
<td>suffix] realm &lt;REALM-TEXT&gt;</td>
</tr>
</tbody>
</table>

### Additional Notes

- **dscp**: Sets the DSCP value from 0 - 63.
- **retry-timeout-factor**: 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.
| prefix|suffix | Select one of the following options:  
|---|---|---|---|---|
| prefix – Matches the prefix of the username (For example, username is of type DOMAIN/user1, DOMAIN/user2). This is the default setting.  
| suffix – Matches the suffix of the username (For example, user1@DOMAIN, user2@DOMAIN) | realm | 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.  
| <REALM-TEXT> – Specifies the matching text including the delimiter (a delimiter is typically '' or '@') | strip | Optional. Strips the realm from the username before forwarding the request to the RADIUS server |  

- 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  

- 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

<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

```
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 motorola 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
```

#### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes or resets accounting server parameters</td>
</tr>
</tbody>
</table>
## 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX6500, NX9000, NX9500, NX9510

### Syntax

```
tag { 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 }
```

#### Parameters

- **acct-delay-time**
  - **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.
  
  **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.

- **acct-multi-session-id**
  - **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.

- **chargeable-user-identity**
  - **chargeable-user-identity** Enables support for chargeable-user-identity attribute
### attribute cisco-vsa audit-session-id

| cisco-vsa audit-session-id | 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).  
- audit-session-id – Includes the audit session ID attribute in access requests  
Note: The audit session ID is included in access requests when Cisco ISE is configured as an authentication server.  
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 service. |

### attribute framed-ip-address

| framed-ip-address | Enables inclusion of framed IP address attribute in access requests |

### attribute framed-mtu <100-1500>

| framed-mtu <100-1500> | Configures Framed-MTU attribute used in access requests  
- <100-1500> – Specify the Framed-MTU attribute from 100 - 1500. |

### attribute location-information [include-always|none|server-requested]

| location-information [include-always|none|server-requested] | Enables/disables support for RFC5580 location information attribute, based on the option selected. The various options are:  
- include-always – Always includes location information in RADIUS authentication and accounting messages  
- none – Disables sending of location information in RADIUS authentication and accounting messages  
- server-requested – Includes location information in RADIUS authentication and accounting messages only when requested by the server  
Note: When enabled, location information is exchanged in authentication and accounting messages. |

### attribute nas-ipv6-address

| nas-ipv6-address | Enables support for NAS IPv6 address  
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. |

### attribute operator-name <OPERATOR-NAME>

| 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.  
- <OPERATOR-NAME> – Specify the network operator’s name. |
attribute service-type [framed|login]

<table>
<thead>
<tr>
<th>service-type</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>framed</td>
<td>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.</td>
</tr>
<tr>
<td>login</td>
<td>Sets service-type to login (1) in the authentication packets. When enabled, the client is connected to the host.</td>
</tr>
</tbody>
</table>

Examples

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 motorola 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-test)#

Related Commands

no | Resets values or disables commands
### 8.1.3 authentication

**aaa-policy**

Configures user authentication parameters

Supported in the following platforms:
- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>|<SECRET>]
- `authentication server <1-6> nac
- `authentication server <1-6> nai-routing realm-type [prefix|suffix] realm <REALM-NAME>
- `authentication server <1-6> onboard [centralized-controller|controller|self]
- `authentication server <1-6> proxy-mode [none|through-centralized-controller|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**
- **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>]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>eap</strong></td>
<td>Configures EAP authentication parameters</td>
</tr>
<tr>
<td><strong>wireless-client</strong></td>
<td>Configures wireless client's EAP parameters</td>
</tr>
<tr>
<td><strong>attempts &lt;1-10&gt;</strong></td>
<td>Configures the maximum number of attempts allowed to authenticate a wireless client</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-10&gt; – Specify a value from 1 - 10. The default is 3.</td>
</tr>
<tr>
<td><strong>identity-request-retry-timeout &lt;10-5000&gt;</strong></td>
<td>Configures the interval, in milliseconds, after which an EAP-identity request to the wireless client is retried</td>
</tr>
<tr>
<td></td>
<td>• &lt;10-5000&gt; – Specify a value from 10 - 5000 milliseconds.</td>
</tr>
<tr>
<td><strong>identity-request-timeout &lt;1-60&gt;</strong></td>
<td>Configures the timeout, in seconds, after the last EAP-identity request message retry attempt (to allow time to manually enter user credentials)</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-60&gt; – Specify a value from 1 - 60 seconds. The default is 3 seconds.</td>
</tr>
</tbody>
</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>

- **<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.

### authentication protocol [chap|mschap|mschapv2|pap]

- **protocol**
  - 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> dscp <0-63>

- **server**
  - Configures a RADIUS authentication server. Up to 6 RADIUS servers can be configured.
    - **<1-6>** – Specify the RADIUS server index from 1 - 6.

- **dscp**
  - 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. The default is 46.

### authentication server <1-6> host <IP/HOSTNAME/HOST-ALIAS> secret [0 <SECRET>|2 <SECRET>|<SECRET>] {port <1-65535>}

- **server**
  - Configures a RADIUS authentication server. Up to 6 RADIUS servers can be configured.
    - **<1-6>** – Specify the RADIUS server index from 1 - 6.

- **host**
  - Sets the RADIUS authentication server’s IP address, hostname, or host-alias
    - **<IP/HOSTNAME/HOST-ALIAS>**
      - **Note:** The host alias should be existing and configured.

- **secret**
  - Configures the RADIUS authentication server’s secret. This key is used to authenticate with the RADIUS server.
    - **[0 <SECRET>|2 <SECRET>|<SECRET>]**
      - **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**
  - 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.
### AAA-POLICY 8 - 13

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
</table>
| `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. |
| `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>` | Configures a RADIUS authentication server. Up to 6 RADIUS servers can be configured.  
  • `<1-6>` – Specifies the RADIUS server index from 1 - 6. |
| `nai-routing` | Enables NAI routing. When enabled, AAA servers identify clients using NAI.  
  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|suffix]` | Configures the realm-type used for NAI authentication  
  • 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`. |
| `realm <REALM-NAME>` | Sets the realm information used for RADIUS authentication. The realm name should not exceed 50 characters. 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.  
  • `<REALM-NAME>` – Sets the realm used for authentication. This value is matched against the user name provided for RADIUS authentication.  
  Example:  
  Prefix - AC\JohnTalbot  
  Suffix - JohnTalbot@AC.org |
| `strip` | 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. |
### authentication server <1-6> onboard [centralized-controller|controller|self]

| 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. |

| onboard [centralized-controller|controller|self] | Selects the onboard RADIUS server for authentication instead of an external host  
| centralized-controller – Configures the server on the centralized controller managing the network  
| controller – Configures the wireless controller, to which the AP is adopted, as the onboard wireless controller  
| self – Configures the onboard server on the device (AP or wireless controller) where the client is associated as the onboard wireless controller |

### authentication 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 a RADIUS authentication server. Up to 6 RADIUS servers can be configured.  
| <1-6> – Sets the RADIUS server index between 1 - 6 |

| proxy-mode [none|through-centralized-controller|through-controller|through-mint-host <HOSTNAME/MINT-ID>|through-rf-domain-manager] | Configures the mode for proxying a request  
| none – Proxying is not done. The packets are sent directly using the IP address of the device.  
| through-centralized-controller – Traffic is proxied through the centralized controller that is configuring and managing the network  
| through-controller – Traffic is proxied through the wireless controller configuring this device  
| through-mint-host <HOSTNAME/MINT-ID> – Traffic is proxied through a neighboring MiNT device. Provide the device's hostname or MiNT ID.  
| through-rf-domain-manager – Traffic is proxied through the local RF Domain manager |

### authentication server <1-6> retry-timeout-factor <50-200>

| 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. |

| retry-timeout-factor <50-200> | Configures the scaling of timeouts between two consecutive RADIUS authentication retries  
| <50-200> – Specify the scaling factor from 50 - 200.  
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. |

### authentication server <1-6> timeout <1-60> {attempts <1-10>}

| server <1-6> | Configures a RADIUS authentication server. Up to 6 RADIUS servers can be configured.  
<p>| &lt;1-6&gt; – Specify the RADIUS server index from 1 - 6. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>timeout &lt;1-60&gt;</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-60&gt; – Specify a value from 1 - 60 seconds. The default is 3 seconds.</td>
</tr>
<tr>
<td>attempts &lt;1-10&gt;</td>
<td>Optional. Indicates the number of retry attempts to make before giving up</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-10&gt; – Specify a value from 1 -10. The default is 3.</td>
</tr>
</tbody>
</table>

**Examples**

```
[rfs7000-37FABE(config-aaa-policy-test)](config-aaa-policy-test)#authentication server 5 host 172.16.10.10 secret motorola port 1009
[rfs7000-37FABE(config-aaa-policy-test)](config-aaa-policy-test)#authentication server 5 timeout 10 attempts 3
[rfs7000-37FABE(config-aaa-policy-test)](config-aaa-policy-test)#authentication protocol chap
```

```
[rfs7000-37FABE(config-aaa-policy-test)](config-aaa-policy-test)#show context
aaa-policy test
  authentication server 5 host 172.16.10.10 secret 0 motorola port 1009
  authentication server 5 timeout 10
  accounting server 2 host 172.16.10.10 secret 0 motorola 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`health-check interval <60-86400>`

**Parameters**

- `health-check interval <60-86400>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>interval &lt;60-86400&gt;</td>
<td>Configures an interval (in seconds) after which a down server is checked to see if it is reachable again</td>
</tr>
<tr>
<td></td>
<td><code>&lt;60-86400&gt;</code> — Specify a value from 60 - 86400 seconds.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
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 motorola port 1009
  authentication server 5 timeout 10
  accounting server 2 host 172.16.10.10 secret 0 motorola 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**

- `no` Resets the health-check interval for AAA servers
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

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]

| middle-hyphen | Configures the MAC address format as AABBCC-DDEEFF |
| no-delim | Configures the MAC address format as AABBCCDDEEFF (without delimiters) |
| pair-colon | Configures the MAC address format as AA:BB:CC:DD:EE:FF |
| pair-hyphen | Configures the MAC address display format as AA-BB-CC-DD-EE-FF (default setting) |
| quad-dot | Configures the MAC address display format as AABB.CCDD.EEFF |
| case [lower|upper] | Indicates the case the MAC address is formatted |
| attributes [all] username-password | Configures RADIUS attributes to which this MAC format is applicable |

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 motorola port 1009
  authentication server 5 timeout 10
  accounting server 2 host 172.16.10.10 secret 0 motorola 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 accounting interim interval

  no accounting interim interval | Disables the periodic submission of accounting information

- no accounting server preference

  no accounting server preference | Resets the accounting server’s preference to default

- no accounting server <1-6> {dscp|nai-routing|proxy-mode|retry-timeout-factor|timeout}

  no accounting server <1-6> | Resets the RADIUS accounting server’s (identified by its index number) settings

dscp | Optional. Resets the DSCP value for RADIUS accounting
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nai-routing</td>
<td>Optional. Disables NAI forwarding requests</td>
</tr>
<tr>
<td>proxy-mode</td>
<td>Optional. Resets proxy mode to the default of “no proxying”</td>
</tr>
<tr>
<td>retry-timeout-factor</td>
<td>Optional. Resets retry timeout to its default of 100</td>
</tr>
<tr>
<td>timeout</td>
<td>Optional. Resets access parameters, such as timeout values and retry attempts to their default</td>
</tr>
<tr>
<td>no accounting type</td>
<td>Resets the type of RADIUS accounting packets generated, to its default (start/stop)</td>
</tr>
<tr>
<td>no attribute acct-delay-time</td>
<td>Disables support for accounting-delay-time attribute in accounting requests</td>
</tr>
<tr>
<td>no attribute acct-multi-session-id</td>
<td>Disables support for accounting-multi-session-id attribute</td>
</tr>
<tr>
<td>no attribute chargeable-user-identity</td>
<td>Disables support for chargeable-user-identity attribute</td>
</tr>
<tr>
<td>no attribute cisco-vsa audit-session-id</td>
<td>Removes the configured CISCO VSA audit session ID</td>
</tr>
<tr>
<td>no attribute framed-ip-address</td>
<td>Disable sthe inclusion of framed IP address attribute in access requests</td>
</tr>
<tr>
<td>no attribute framed-mtu</td>
<td>Resets Framed-MTU RADIUS server attribute in access and accounting requests</td>
</tr>
<tr>
<td>no attribute location-information</td>
<td>Disables support for RFC5580 location information attribute</td>
</tr>
<tr>
<td>no attribute nas-ipv6-address</td>
<td>Disables support for the NAS IPv6 address attribute</td>
</tr>
<tr>
<td>no attribute service-type</td>
<td>Disables support for the service-type (6) attribute</td>
</tr>
<tr>
<td>no authentication eap wireless-client</td>
<td>Resets EAP parameters for wireless clients</td>
</tr>
<tr>
<td>attempts</td>
<td>Resets the number of times a RADIUS request is sent to a wireless client to default (3)</td>
</tr>
<tr>
<td>identity-request-timeout-factor</td>
<td>Resets the interval after which an EAP-identity request to the wireless client is retried</td>
</tr>
<tr>
<td>timeout</td>
<td>Resets EAP identity request timeout to its default</td>
</tr>
<tr>
<td>retry-timeout-factor</td>
<td>Resets EAP retry timeout to its default of 100</td>
</tr>
<tr>
<td>timeout</td>
<td>Resets EAP timeout to its default</td>
</tr>
</tbody>
</table>
- no authentication protocol
  
<table>
<thead>
<tr>
<th>authentication protocol</th>
<th>Resets the authentication protocol used for non-EAP authentication to its default (PAP authentication)</th>
</tr>
</thead>
</table>

- no authentication server <1-6> \{dscp|nac|nai-routing|proxy-mode|retry-timeout-factor|timeout\}
  
<table>
<thead>
<tr>
<th>no authentication server &lt;1-6&gt;</th>
<th>Resets the RADIUS authentication server’s (identified by its index number) settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>dscp</td>
<td>Optional. Resets the DSCP value for RADIUS authentication</td>
</tr>
<tr>
<td>nac</td>
<td>Optional. Disables NAC on the selected RADIUS authentication server</td>
</tr>
<tr>
<td>nai-routing</td>
<td>Optional. Disables NAI forwarding requests</td>
</tr>
<tr>
<td>proxy-mode</td>
<td>Optional. Resets proxy mode to the default of “no proxying”</td>
</tr>
<tr>
<td>retry-timeout-factor</td>
<td>Optional. Resets retry timeout to its default of 100</td>
</tr>
<tr>
<td>timeout</td>
<td>Optional. Resets all access parameters, such as timeout and retry attempts to their default</td>
</tr>
</tbody>
</table>

- no health-check interval
  
<table>
<thead>
<tr>
<th>no health-check interval</th>
<th>Resets all RADIUS servers’ health check interval to its default</th>
</tr>
</thead>
</table>

- no mac-address-format
  
<table>
<thead>
<tr>
<th>no mac-address format</th>
<th>Resets the MAC address format used in RADIUS request frames</th>
</tr>
</thead>
</table>

- no proxy-attribute \[nas-identifier|nas-ip-address\]
  
  | no proxy-attribute [nas-identifier|nas-ip-address] | Resets RADIUS attribute behavior when proxying through a controller or RF Domain manager          |
|---------------|--------------------------------------------------------------------------------------------------|

- no server-pooling-mode
  
<table>
<thead>
<tr>
<th>no server-pooling-mode</th>
<th>Resets the mode used to select a AAA server from a pool of configured servers</th>
</tr>
</thead>
</table>

- no use nac-list
  
<table>
<thead>
<tr>
<th>no use nac-list</th>
<th>Detaches the current NAC list from this AAA policy</th>
</tr>
</thead>
</table>

**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 motorola port 1009
 authentication server 5 timeout 10
 accounting server 2 host 172.16.10.10 secret 0 motorola 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)#
```
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 motorola port 1009
  authentication server 5 timeout 10
  accounting server 2 host 172.16.10.10 secret 0 motorola port 1
  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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>accounting</td>
<td>Configures RADIUS accounting parameters</td>
</tr>
<tr>
<td>attribute</td>
<td>Configures RADIUS Framed-MTU attribute used in access and accounting requests.</td>
</tr>
<tr>
<td>authentication</td>
<td>Configures RADIUS authentication parameters</td>
</tr>
<tr>
<td>health-check</td>
<td>Configures health-check parameters</td>
</tr>
<tr>
<td>mac-address-format</td>
<td>Configures the MAC address format used in RADIUS packets</td>
</tr>
<tr>
<td>proxy-attribute</td>
<td>Configures RADIUS server’s attribute behavior when proxying through a wireless controller or a RF Domain Manager</td>
</tr>
<tr>
<td>server-pooling-mode</td>
<td>Configures the RADIUS server pooling mode</td>
</tr>
<tr>
<td>use</td>
<td>Permits the use of NAC access lists</td>
</tr>
</tbody>
</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>nas-identifier</th>
<th>Uses NAS identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>originator</td>
<td>originator – Configures the NAS identifier as the originator of the RADIUS request. The originator could be an AP, or a wireless controller with radio.</td>
</tr>
<tr>
<td>proxier</td>
<td>proxier – Configures the proxying device as the NAS identifier. The device could be a controller or a RF Domain manager.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>nas-ip-address</th>
<th>Uses NAS IP address</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>none – NAS IP address attribute is not filled</td>
</tr>
<tr>
<td>proxier</td>
<td>proxier – NAS IP address is filled by the proxying device. The device could be a controller or a RF Domain manager.</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

server-pooling-mode [failover|load-balance]

Parameters

- server-pooling-mode [failover|load-balance]

| failover | 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. |
| load-balance | 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. |

Examples

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 motorola port 1009
  authentication server 5 timeout 10
  accounting server 2 host 172.16.10.10 secret 0 motorola 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

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

use nac-list <NAC-LIST-NAME>

Parameters
- use nac-list <NAC-LIST-NAME>

<table>
<thead>
<tr>
<th>nac-list &lt;NAC-LIST-NAME&gt;</th>
<th>Associates a NAC list with this AAA policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;NAC-LIST-NAME&gt;</td>
<td>&lt;NAC-LIST-NAME&gt;</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 motorola port 1009
  authentication server 5 timeout 10
  accounting server 2 host 172.16.10.10 secret 0 motorola 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

no | Resets set values or disables commands
nac-list | Creates a NAC list
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 Vendor specific 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 controller.

### NOTE:
The adoption capabilities of a controller depend 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>NX9000</td>
<td>-</td>
</tr>
<tr>
<td>NX9XXX</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:

```bash
<DEVICE>(config)#auto-provisioning-policy <POLICY-NAME>
```

```bash
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

- **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-auto-provisioning-policy-test)#
```
## 9.1 auto-provisioning-policy

AUTO-PROVISIONING-POLICY

Table 9.1 summarizes auto provisioning policy configuration commands.

**Table 9.1 Auto-Provisioning-Policy-Config 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>default-adoption</td>
<td>Adopts devices even when no matching rules are found. Assigns default profile and default RF Domain</td>
<td>page 9-11</td>
</tr>
<tr>
<td>deny</td>
<td>Adds a deny adoption rule</td>
<td>page 9-12</td>
</tr>
<tr>
<td>evaluate-always</td>
<td>Runs this policy everytime a device is adopted</td>
<td>page 9-15</td>
</tr>
<tr>
<td>redirect</td>
<td>Adds a rule redirecting device adoption to a specified controller within the system</td>
<td>page 9-16</td>
</tr>
<tr>
<td>upgrade</td>
<td>Adds a device upgrade rule to this auto provisioning policy</td>
<td>page 9-19</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 9-22</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
### 9.1.1 adopt

- **auto-provisioning-policy**

Adds device adoption rules

Supported in the following platforms:

- **Access Points** — ES6510, AP6511, AP6521, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```bash
adopt [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|
    rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000] precedence <1-10000>
[profile rf-domain]
```

```bash
adopt [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|
    rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000|vx9000] precedence <1-10000>
[profile <DEVICE-PROFILE-NAME> rf-domain <RF-DOMAIN-NAME>] any
```

```bash
adopt [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|
    rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000>
[profile <DEVICE-PROFILE-NAME> rf-domain <RF-DOMAIN-NAME>] any
```

#### Parameters

- **adopt [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|
    rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000>
    [profile <DEVICE-PROFILE-NAME> rf-domain <RF-DOMAIN-NAME>] any**

- **adoption**

  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: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX, RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, and NX9000.

- **precedence <1-10000>**

  Sets the rule precedence from 1 - 10000. A rule with a lower value has a higher precedence.
| profile | 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. Or a template with appropriate substitution tokens, such as 'campus-$MODEL[1:6]', 'FQDN[1:4]-indoor'
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Available tokens:</td>
<td></td>
</tr>
<tr>
<td>$FQDN</td>
<td>references FQDN of adopting device</td>
</tr>
<tr>
<td>$CDP</td>
<td>references CDP Device Id of wired switch to which adopting device is connected</td>
</tr>
<tr>
<td>$LLDP</td>
<td>references LLDP System Name of wired switch to which adopting device is connected</td>
</tr>
<tr>
<td>$DHCP</td>
<td>references DHCP Option Value received by the adopting device</td>
</tr>
<tr>
<td>$SN</td>
<td>references SERIAL NUMBER of adopting device</td>
</tr>
<tr>
<td>$MODEL</td>
<td>references MODEL NUMBER of adopting device</td>
</tr>
<tr>
<td>$DNS-SUFFIX</td>
<td>references FQDN excluding the hostname of the adopting device</td>
</tr>
</tbody>
</table>
| rf-domain | 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.
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide the full RF Domain name or an alias. Or a template with appropriate substitution tokens, such as '$CDP[1:7]', '$DNS-SUFFIX[1:5]'</td>
<td></td>
</tr>
<tr>
<td>Available tokens:</td>
<td></td>
</tr>
<tr>
<td>$FQDN</td>
<td>references FQDN of adopting device</td>
</tr>
<tr>
<td>$CDP</td>
<td>references CDP Device Id of wired switch to which adopting device is connected</td>
</tr>
<tr>
<td>$LLDP</td>
<td>references LLDP System Name of wired switch to which adopting device is connected</td>
</tr>
<tr>
<td>$DHCP</td>
<td>references DHCP Option Value received by the adopting device</td>
</tr>
<tr>
<td>$SN</td>
<td>references SERIAL NUMBER of adopting device</td>
</tr>
<tr>
<td>$MODEL</td>
<td>references MODEL NUMBER of adopting device</td>
</tr>
<tr>
<td>$DNS-SUFFIX</td>
<td>references FQDN excluding the hostname of the adopting device</td>
</tr>
<tr>
<td>Available built-in aliases:</td>
<td></td>
</tr>
<tr>
<td><code>_builtin_rf-domain</code></td>
<td>rf-domain of adopting device</td>
</tr>
<tr>
<td><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.zebra.com'. In this example, the string-alias $DOMAIN is mapped to the string: test.zebra.com. For more information, see alias.</td>
<td></td>
</tr>
<tr>
<td>any</td>
<td>Indicates any device. Any device seeking adoption is adopted.</td>
</tr>
</tbody>
</table>
- **adopt** \[ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|
  rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000\] precedence <1-10000>  
  profile <DEVICE-PROFILE-NAME>|rf-domain <RF-DOMAIN-NAME>  
  [area <AREA-NAME>|cdp-match <LOCATION-SUBSTRING>|dhcp-option <DHCP-OPTION>|  

| 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: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX, RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, and NX9000. |

| precedence <1-10000> | Sets the rule precedence. A rule with a lower value has a higher precedence. |

| profile <DEVICE-PROFILE-NAME> | 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. Or a template with appropriate substitution tokens, such as 'campus-$MODEL[1:6]', 'FQDN[1:4]-indoor'  
  Available tokens:  
  
<p>| $FQDN | references FQDN of adopting device |
| $CDP | references CDP Device Id of wired switch 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 |
| $DNS-SUFFIX | references FQDN excluding the hostname of the adopting device |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rf-domain</td>
<td>Sets the RF Domain for this auto provisioning policy. The provisioning policy is only applicable to devices that try to become a part of the specified RF Domain. Provide the full RF Domain name or an alias. Or a template with appropriate substitution tokens, such as <code>$CDP[1:7]</code>, <code>$DNS-SUFFIX[1:5]</code></td>
</tr>
<tr>
<td></td>
<td>Available tokens:&lt;br&gt;- <code>$FQDN</code> - references FQDN of adopting device&lt;br&gt;- <code>$CDP</code> - references CDP Device Id of wired switch to which adopting device is connected&lt;br&gt;- <code>$LLDP</code> - references LLDP System Name of wired switch to which adopting device is connected&lt;br&gt;- <code>$DHCP</code> - references DHCP Option Value received by the adopting device&lt;br&gt;- <code>$SN</code> - references SERIAL NUMBER of adopting device&lt;br&gt;- <code>$MODEL</code> - references MODEL NUMBER of adopting device&lt;br&gt;- <code>$DNS-SUFFIX</code> - references FQDN excluding the hostname of the adopting device&lt;br&gt;Available built-in aliases:&lt;br&gt;- <code>_builtin_rf-domain</code> - rf-domain of adopting device&lt;br&gt;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, <code>alias string $DOMAIN test.zebra.com</code>. In this example, the string-alias <code>$DOMAIN</code> is mapped to the string: <code>test.zebra.com</code>. For more information, see <code>alias</code>.</td>
</tr>
<tr>
<td>area &lt;AREA-NAME&gt;</td>
<td>Matches the area of deployment&lt;br&gt;- <code>&lt;AREA-NAME&gt;</code> – 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, <code>controller1</code>, <code>example</code>, <code>example.com</code>, are examples of the substrings that will match.&lt;br&gt;- <code>&lt;LOCATION-SUBSTRING&gt;</code> – 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 <code>tag=value</code> separated by a semicolon, for example <code>tag1=value1;tag2=value2;tag3=value3</code>. The access point includes the value of tag <code>rf-domain</code>, if present.&lt;br&gt;- <code>&lt;DHCP-OPTION&gt;</code> – 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&lt;br&gt;- <code>&lt;FLOOR-NAME&gt;</code> – Enter a 32 character maximum deployment floor name assigned to this policy. Devices with matching floor names are adopted.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| **fqdn <FQDN>** | Matches a substring to the Fully Qualified Domain Name (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.  
  - `<FQDN>` – Specify the FQDN. Devices matching the specified value are adopted. |
| **ip [<START-IP> <END-IP> | Adopts a device if its IP address matches the specified IP 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 IP address in the range. 
  - `<END-IP>` – Specify the last IP address in the range. 
  - `<IP/MASK>` – Specify the IP subnet and mask to match against the device’s IP 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. |
Examples

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

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>

Related Commands

no

Removes an adopt rule
9.1.2 default-adoption

Adopts devices, even when no matching rules are defined. Assigns a default profile and default RF Domain.

Supported in the following platforms:
- Access Points — ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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><code>no</code></td>
<td>Disables adoption of devices when matching rules are not found</td>
</tr>
</tbody>
</table>
### 9.1.3 deny

* auto-provisioning-policy

Defines a deny device adoption rule

Supported in the following platforms:

- Access Points — ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

deny [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000]  
deny [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000> any  
deny [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000>  

**Parameters**

- deny [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000> any

**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: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX, RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, and NX9000 series.

**precedence** 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.

**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: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX, RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, and NX9000.

**precedence** 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 IP address or is within the specified IP address range

- `<START-IP>` – Specify the first IP address in the range.
- `<END-IP>` – Specify the last IP address in the range.
- `<IP/MASK>` – Specify the IP subnet and mask to match against the device’s IP address.

### lldp-match

*<LLDP-STRING>*

Matches a substring in a list of 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 used to advertise a network device’s identity, capabilities, and neighbors on a local area network.

- `<LLDP-STRING>` – Specify the LLDP string. Devices matching the specified values are denied adoption.

### mac

*<START-MAC>({<END-MAC>})* Denies adoption if a device’s 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>*

Denies adoption if a device’s model number matches `<MODEL-NUMBER>`

- `<MODEL-NUMBER>` – Specify the model number.

### serial-number

*<SERIAL-NUMBER>*

Denies adoption if a device’s serial number matches `<SERIAL-NUMBER>`

- `<SERIAL-NUMBER>` – Specify the serial number.

### vlan <VLAN-ID>

Denies adoption if a device’s VLAN matches `<VLAN-ID>`

- `<VLAN-ID>` – Specify the VLAN ID.
Examples

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
  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
rfs4000-229D58(config-auto-provisioning-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a deny adoption rule</td>
</tr>
</tbody>
</table>
9.1.4 **evaluate-always**

Sets flag to run the 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 — ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables the running of this policy every time an AP is adopted</td>
</tr>
</tbody>
</table>
9.1.5 redirect

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 — ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```plaintext
redirect [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000]
redirect [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000>
controller [<CONTROLLER-IP>|<CONTROLLER-HOSTNAME>] [any|cdp-match|dhcp-option|fqdn|ip|lldp-match|mac|model-number|serial-number|vlan]
redirect [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000>
controller [<CONTROLLER-IP>|<CONTROLLER-HOSTNAME>] any
redirect [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000>
controller [<CONTROLLER-IP>|<CONTROLLER-HOSTNAME>] [cdp-match <LOCATION-SUBSTRING>|dhcp-option <DHCP-OPTION>|fqdn <FQDN>|ip [<START-IP> <END-IP>|<IP/MASK>]|lldp-match <LLDP-STRING>|mac <START-MAC>{<END-MAC>}|model-number <MODEL-NUMBER>|serial-number <SERIAL-NUMBER>|vlan <VLAN-ID>
```

Parameters

- **redirect [ap621|ap622|ap650|ap6511|ap6521|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000> controller [<CONTROLLER-IP>|<CONTROLLER-HOSTNAME>] any**
  
  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 types are: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX, RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, and NX9000 series.
  
  **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**.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>precedence</strong></td>
<td>&lt;1-10000&gt;</td>
</tr>
<tr>
<td><strong>controller</strong></td>
<td>[&lt;CONTROLLER-IP&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>any</strong></td>
<td>Indicates any device. Any device seeking adoption is redirected.</td>
</tr>
</tbody>
</table>
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: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX, RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, and NX9000.

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.

controller

Configures 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

After specifying the rule precedence and the controller, specify the match criteria.

cdp-match

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

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

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.

ip

Configures a range of IP addresses and subnet address. Devices having IP addresses within the specified range or are part of the specified subnet are redirected.

- `<START-IP>` – Specify the first IP address in the range.
- `<END-IP>` – Specify the last IP address in the range.
- `<IP/MASK>` – Specify the IP 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 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.

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.

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
default-adoption
deny ap71xx 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)#

Related Commands

no

Removes a redirect rule
9.1.6 upgrade

- auto-provisioning-policy

Adds 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 — ES6510, AP6511, AP6522, AP6532, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
upgrade [ap621|ap622|ap650|ap6511|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|
    rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000]
```

```
upgrade [ap621|ap622|ap650|ap6511|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|
    rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000> any
```

```
upgrade [ap621|ap622|ap650|ap6511|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|
    rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000> any
```

```
upgrade [ap621|ap622|ap650|ap6511|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|
    rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000>
```

Parameters

- upgrade [ap621|ap622|ap650|ap6511|ap6522|ap6532|ap6562|ap71xx|ap81xx|ap82xx|
    rfs4000|rfs6000|rfs7000|nx45xx|nx65xx|nx9000] precedence <1-10000> any

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>upgrade</td>
<td>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: AP621, AP622, AP650, AP6511, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX, RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, and NX9000 series.</td>
</tr>
<tr>
<td>precedence</td>
<td>Sets the rule precedence. Rules with lower values get precedence over rules with higher values.</td>
</tr>
<tr>
<td>any</td>
<td>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.</td>
</tr>
</tbody>
</table>
redirect 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: AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX, RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, and NX9000 series.

<table>
<thead>
<tr>
<th>precedence &lt;1-10000&gt;</th>
<th>Sets the rule precedence. Rules with lower values get precedence over rules with higher values.</th>
</tr>
</thead>
</table>
| 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 upgraded. |
| 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 upgraded. |
| 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 upgraded. |
| ip [<START-IP> <END-IP>] | Configures a range of IP addresses and subnet address. Devices having IP addresses within the specified range or are part of the specified subnet are upgraded.  
  • <START-IP> – Specify the first IP address in the range.  
  • <END-IP> – Specify the last IP address in the range.  
  • <IP/MASK> – Specify the IP 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 upgraded. |
| mac <START-MAC> {<END-MAC>} | Configures a single or a range of MAC addresses. Devices matching the specified values are upgraded.  
  • <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 upgraded. |
serial-number
  <SERIAL-NUMBER>  
  Configures the device’s serial number  
  •  <SERIAL-NUMBER> – Specify the serial number. Devices matching the specified serial number are upgraded.

vlan <VLAN-ID>  
  Configures the VLAN ID  
  •  <VLAN-ID> – Specify the VLAN ID. Devices assigned to the specified VLAN are upgraded.

Examples

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

rfs4000-229D58(config-auto-provisioning-policy-test)#show context
auto-provisioning-policy test
  upgrade ap621 precedence 1 any
  upgrade rfs4000 precedence 2 ip 192.168.13.1 192.168.13.5

rfs4000-229D58(config-auto-provisioning-policy-test)#

Related Commands

no
  Removes an upgrade rule
9.1.7 no

> auto-provisioning-policy

Removes a deny, permit, or redirect rule from the specified auto provisioning policy.

Supported in the following platforms:
- Access Points — ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```bash
no [adopt|default-adoption|deny|evaluate-always|redirect|upgrade]
```

- `no adopt precedence <1-10000>`
- `no deny precedence <1-10000>`
- `no evaluate-always`
- `no default-adoption`
- `no redirect precedence <1-10000>`
- `no upgrade precedence <1-10000>`

Parameters

- `no adopt precedence <1-10000>`
  
  Removes the adoption rule identified by the specified precedence.
  
  - precedence `<1-10000>` — Specify the rule precedence.

- `no deny precedence <1-10000>`
  
  Removes the deny adoption rule identified by the specified precedence.
  
  - precedence `<1-10000>` — Specify the rule precedence.

- `no evaluate-always`
  
  Removes the ‘evaluate-always’ flag. Once removed this auto provisioning policy is not run each time an access point is adopted.

- `no default-adoption`
  
  Removes the default adoption rule. When the default adoption rule is absent, devices not matching any of the configured deny or permit criteria are denied adoption.

- `no redirect precedence <1-10000>`
  
  Removes the redirect adoption rule identified by the specified precedence.
  
  - precedence `<1-10000>` — Specify the rule precedence.

- `no upgrade precedence <1-10000>`
  
  Removes the device upgrade rule identified by the specified precedence.
  
  - precedence `<1-10000>` — Specify the rule precedence.
Examples

The following example shows the auto-provisioning-policy ‘test’ settings before the ‘no’ commands are executed:

```plaintext
rfs4000-229D58 (config-auto-provisioning-policy-test)#show context
auto-provisioning-policy test
  default-adoption
  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)#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
```

The following example shows the auto-provisioning-policy ‘test’ settings after the ‘no’ commands are executed:

```plaintext
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)#

rfs4000-229D58 (config-auto-provisioning-policy-test)#show context
auto-provisioning-policy test
  upgrade ap621 precedence 1 any
  upgrade rfs4000 precedence 2 ip 192.168.13.1 192.168.13.5
rfs4000-229D58 (config-auto-provisioning-policy-test)#

rfs4000-229D58 (config-auto-provisioning-policy-test)#no upgrade precedence 1
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>adopt</code></td>
<td>Configures an adoption rule</td>
</tr>
<tr>
<td><code>default-adoption</code></td>
<td>Configures the rule for adopting devices when adopt or deny rules are not defined</td>
</tr>
<tr>
<td><code>deny</code></td>
<td>Configures a deny adoption rule</td>
</tr>
<tr>
<td><code>redirect</code></td>
<td>Configures a rule redirecting devices seeking adoption to another controller</td>
</tr>
<tr>
<td><code>upgrade</code></td>
<td>Configures a rule for upgrade of adopted devices</td>
</tr>
</tbody>
</table>
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)#
```

```
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.
### 10.1 association-acl-policy

Table 10.1 summarizes association ACL policy configuration commands.

<table>
<thead>
<tr>
<th><strong>Command</strong></th>
<th><strong>Description</strong></th>
<th><strong>Reference</strong></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 10-8</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>show</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
### 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>`
  - `<STARTING-MAC>`: To add a single device, enter its MAC address in the `<STARTING-MAC>` parameter.
  - `precedence <1-1000>`: Sets a precedence rule. Rules are applied in an increasing order of precedence.
    - `<1-1000>` – Specify a value from 1 - 1000.

- `deny <STARTING-MAC> <ENDING-MAC> precedence <1-1000>`
  - `<STARTING-MAC>`: Specify the first MAC address in the range.
  - `<ENDING-MAC>`: Specify the last MAC address in the range.
  - `precedence <1-1000>`: Sets a precedence rule. 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 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
rfs7000-37FABE(config-assoc-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 deny rule based on its precedence value</td>
</tr>
</tbody>
</table>
10.1.2 no

- **association-acl-policy**
  
  Removes a deny or permit rule from this association ACL policy

  Supported in the following platforms:
  - Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

no [deny|permit]

no deny <STARTING-MAC> precedence <1-1000>
no deny <STARTING-MAC> <ENDING-MAC> precedence <1-1000>

no permit <STARTING-MAC> precedence <1-1000>
no permit <STARTING-MAC> <ENDING-MAC> precedence <1-1000>

**Parameters**

- **deny <STARTING-MAC> precedence <1-1000>**
  
  - **no deny** Removes a single device or a set of devices from the deny list
  
  - **<STARTING-MAC>** To remove a single device, enter its MAC address in the <STARTING-MAC> parameter.
  
  - **precedence <1-1000>** Specifies the rule precedence
    
    - <1-1000> – Specify the value from 1 - 1000.

- **deny <STARTING-MAC> <ENDING-MAC> precedence <1-1000>**
  
  - **no deny** Removes a single device or a set of devices from the deny list
  
  - **<STARTING-MAC>** To remove a set of devices, enter the MAC address range.
  
  - **<ENDING-MAC>** Specify the last MAC address in the range.
  
  - **precedence <1-1000>** Specifies the rule precedence
    
    - <1-1000> – Specify a value from 1 - 1000.

- **no permit <STARTING-MAC> precedence <1-1000>**
  
  - **no permit** Removes a single device or a set of devices from the permit list
  
  - **<STARTING-MAC>** To remove a single device, enter its MAC address in the <STARTING-MAC> parameter.
  
  - **precedence <1-1000>** Specifies the rule precedence
    
    - <1-1000> – Specify a value from 1 - 1000.

- **no permit <STARTING-MAC> <ENDING-MAC> precedence <1-1000>**
  
  - **no permit** Removes a single device or a set of devices from the permit list
  
  - **<STARTING-MAC>** To remove a set of devices, enter the MAC address range.
  
  - **<ENDING-MAC>** Specify the first MAC address in the range.
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
rfs7000-37FABE(config-assoc-acl-test)#
```

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)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>deny</strong></td>
<td>Adds a device or a set of devices to the deny list</td>
</tr>
<tr>
<td><strong>permit</strong></td>
<td>Adds a device or a set of devices to the permit list</td>
</tr>
</tbody>
</table>
10.1.3 permit

```
association-acl-policy
```

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>
- permit <STARTING-MAC> <ENDING-MAC> precedence <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**

```bash
rfs7000-37FABE(config-assoc-acl-test)# permit 11-22-33-44-66-01 11-22-33-44-66-FF precedence 170
```

```bash
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)#

<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 from 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.

MAC ACLs are firewalls that filter or mark packets based on the MAC address from 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 5.6 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`

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:

```text
<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>
```

**NOTE:** If creating a new ACL policy, provide a name that uniquely identifies its purpose. The name cannot exceed 32 characters.

**ip-access-list**

```text
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

```text
rfs7000-37FABE(config-ip-acl-test)#
```

**mac-access-list**

```text
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
- `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
- `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

```text
rfs7000-37FABE(config-mac-acl-test)#
```
ipv6-access-list

rfs7000-37FABE(config-ipv6-acl-test)#?
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

rfs7000-37FABE(config-ipv6-acl-test)#

ip-snmp-access-list

nx9500-6C8809(config-ip-snmp-acl-test)#?
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

nx9500-6C8809(config-ip-snmp-acl-test)#
11.1 ip-access-list

Table 11.1 summarizes 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 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 11-15</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 11-18</td>
</tr>
<tr>
<td>no</td>
<td>Removes a deny and/or a permit access rule from a IP ACL</td>
<td>page 11-20</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>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
### 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**


{(rule-description <LINE> )}

deny icmp [ <SOURCE-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any|from-vlan <VLAN-ID>|host <SOURCE-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any] (log,rule-precedence <1-5000>)

{(rule-description <LINE> )}

deny ip [ <SOURCE-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any|from-vlan <VLAN-ID>|host <SOURCE-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any] (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-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any] (log,rule-precedence <1-5000>)

{(rule-description <LINE> )}

deny [tcp|udp] [ <SOURCE-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any|from-vlan <VLAN-ID>|host <SOURCE-IP/MASK>|<NETWORK-GROUP-ALIAS-NAME>|any] (log,rule-precedence <1-5000>)

{(rule-description <LINE> )}

**Parameters**

- **deny <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*.
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</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. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified network are dropped.</td>
</tr>
<tr>
<td>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</td>
<td>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.</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></td>
<td>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).</td>
</tr>
<tr>
<td>any</td>
<td>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.</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. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified VLAN(s) are dropped.</td>
</tr>
<tr>
<td></td>
<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).</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. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified host are dropped.</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. Packets, matching the service protocols and ports specified in the network-service alias, addressed to the specified network are dropped.</td>
</tr>
<tr>
<td>any</td>
<td>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.</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. Packets, matching the service protocols and ports specified in the network-service alias, addressed to the specified host are dropped.</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. 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.</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 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.</td>
</tr>
</tbody>
</table>
**ACCESS-LIST 11 - 7**

| mark [8021p <0-7> | dscp <0-63>] | Specifies packets to mark  
|  |  | • 8021p <0-7> – Marks packets by modifying 802.1p 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).  
| icmp | 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).  
|  | **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. 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.  

**Example:**

```
deny 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>)}
```
| **<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). |

```plaintext
• 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>`]}
```

| **ip** | Applies this deny rule to IP packets only |
| **<SOURCE-IP/MASK>** | Specifies the source IP address and mask (A.B.C.D/M) to match. IP packets received from the specified networks are dropped. |
| **<NETWORK-GROUP-ALIAS-NAME>** | 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.  
- `<NETWORK-GROUP-ALIAS-NAME>` – Specify the network-group alias name (should be existing and configured). |
| any | Specifies the source as any IP address. IP packets received from any source are dropped. |
| from-vlan `<VLAN-ID>` | Specifies a single VLAN or a range of VLANs as the match criteria. IP packets received from the specified VLANs are dropped.  
- `<VLAN-ID>` – 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).  
**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. IP 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. IP packets addressed to the specified networks are dropped. |
| any | Specifies the destination as any IP address. IP packets addressed to any destination are dropped. |
| host `<DEST-HOST-IP>` | Identifies a specific host (as the destination to match) by its IP address. IP 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. |
<NETWORK-GROUP-ALIAS-NAME> Applies a network-group alias to identify the source IP addresses. IP 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).

**log**
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.

**rule-precedence**

- `<1-5000>`
  - Specify a value from 1 - 5000.

**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).

Note: Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.

**proto**
Configures the ACL for additional protocols
Additional protocols (other than IP, ICMP, TCP, and UDP) must be configured using this parameter

- `<PROTOCOL-NUMBER>`
  - Specify the protocol number.

- `<PROTOCOL-NAME>`
  - Specify the protocol name.

- `eigrp`
  - 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.

- `gre`
  - 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.

- `igmp`
  - 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.
### Table of IGP Protocols

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>igp</strong></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><strong>ospf</strong></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><strong>vrrp</strong></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>
</tbody>
</table>

### Syntax Table

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Description</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. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from the specified sources 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. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from the sources defined in the network-group alias are dropped.</td>
</tr>
<tr>
<td><code>&lt;SOURCE-HOST-IP&gt;</code></td>
<td>Specifies the source as any IP address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from any source 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. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to the specified destinations are dropped.</td>
</tr>
<tr>
<td><code>any</code></td>
<td>Specifies the destination as any IP address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to any destination are dropped.</td>
</tr>
<tr>
<td><code>&lt;SOURCE-HOST-IP&gt;</code></td>
<td>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.</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. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to the specified destinations are dropped.</td>
</tr>
<tr>
<td><code>any</code></td>
<td>Specifies the destination as any IP address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to any destination are dropped.</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. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addresses to the specified host are dropped.</td>
</tr>
</tbody>
</table>

**Note:** Use this option with VLANs and port ACLs.
### <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-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 <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 get 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).


### tcp
Applies this deny rule to TCP packets only

### udp
Applies this deny rule to UDP packets only

### <SOURCE-IP/MASK>
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.

### <NETWORK-GROUP-ALIAS-NAME>
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.
- `<NETWORK-ALIAS-GROUP-NAME>` – Specify the network-group alias name (should be existing and configured).

After specifying the source and destination IP address(es), specify the action taken in case of a match.

### any
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.

### from-vlan <VLAN-ID>
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.
- `<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. TCP/UDP 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>** | 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. |
| **any** | 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 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 IP address. TCP/UDP 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. |
| **<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 <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** | 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)  
• groper – The designated GROPER 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)  
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:

- 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.

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).

**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
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
rfs7000-37FABE(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
rfs7000-37FABE(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

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```
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.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;NETWORK-SERVICE-ALIAS-NAME&gt;</code></td>
<td>Specifies the network-service alias, identified by the <code>&lt;NETWORK-SERVICE-ALIAS-NAME&gt;</code> keyword, associated with the deny/permit rule</td>
</tr>
<tr>
<td>icmp</td>
<td>Disables a rule applicable to ICMP packets only</td>
</tr>
<tr>
<td>ip</td>
<td>Disables a rule applicable to IP packets only</td>
</tr>
<tr>
<td>proto <code>&lt;PROTOCOL-OPTIONS&gt;</code></td>
<td>Disables a rule applicable to any Internet protocol other than TCP, UDP, or ICMP packets</td>
</tr>
<tr>
<td>tcp</td>
<td>Disables a rule applicable to TCP packets only</td>
</tr>
<tr>
<td>udp</td>
<td>Disables a rule applicable to UDP packets only</td>
</tr>
<tr>
<td><code>&lt;SOURCE-IP/MASK&gt;</code></td>
<td>Specify the source IP address and mask in the A.B.C.D/M format.</td>
</tr>
<tr>
<td><code>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</code></td>
<td>Specifies the network-group alias, identified by the <code>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</code> keyword, associated with this deny/permit rule</td>
</tr>
</tbody>
</table>
Examples

The following example shows the ‘auto-tunnel-acl’ settings before the disable command is executed:

```bash
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
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#

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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list 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:

```bash
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#show context
ip access-list auto-tunnel-acl
  disable permit ip host 200.200.200.99 any rule-precedence 3
rfs7000-37FABE(config-ip-acl-auto-tunnel-acl)#
```
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>no</td>
<td>Enables a disabled deny or permit rule</td>
</tr>
<tr>
<td>deny</td>
<td>Creates a new deny access rule or modifies an existing rule</td>
</tr>
<tr>
<td>permit</td>
<td>Creates a new permit access rule or modifies an existing rule</td>
</tr>
<tr>
<td>alias</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>>}

| [deny|permit] | Inserts a deny or a permit rule within an IP ACL |
|---------------|-----------------------------------------------|
| `<PARAMETERS>`| 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 `deny`. For more information on the permit rule, see `permit`. |
| `log`         | After specifying the match rule, 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. |
| `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 <LINE>` | `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). |
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

no [deny|disable|permit]

no [deny|permit] [ NETWORK-SERVICE-ALIAS-NAME | icmp | ip | proto | tcp | udp ]

<RULE-PARAMETERS>

no disable [deny|permit] [ NETWORK-SERVICE-ALIAS-NAME | icmp | ip | proto | tcp | udp ]

<RULE-PARAMETERS>

**Parameters**

- no [deny|permit] [ NETWORK-SERVICE-ALIAS-NAME | icmp | ip | proto | tcp | udp ] <RULE-PARAMETERS>

| no [deny|permit] | Removes a deny or permit rule from the selected IP access list |
|---|---|
| <NETWORK-SERVICE-ALIAS-NAME> | Removes a deny or permit rule applicable to the specified network-service alias |
| • <NETWORK-SERVICE-ALIAS-NAME> – Specify the network-service alias name (should be existing and configured). |
| icmp | Removes a deny or permit rule applicable to ICMP packets only |
| ip | Removes a deny or permit rule applicable to IP packets only |
| proto | Removes a deny or permit rule applicable to protocols (other than IP, ICMP, TCP, and UDP) |
| [tcp|udp] | Removes a deny or permit rule applicable to TCP/UDP packets |
| <RULE-PARAMETERS> | Enter the exact parameters used when configuring the rule. |
| rule-precedence <1-5000> | Specify the precedence assigned to this deny/permit rule. |
| • rule-description – Optional. Specify the rule description. |
| Note: The system removes the rule from the selected ACL. |

- no disable [deny|permit] [ NETWORK-SERVICE-ALIAS-NAME | icmp | ip | proto | tcp | udp ] <RULE-PARAMETERS>

| no disabled [deny|permit] | Removes a disabled deny or permit rule from the selected IP access list |
|---|---|
| <NETWORK-SERVICE-ALIAS-NAME> | Removes a disabled deny or permit rule applicable to the specified network-service alias |
| • <NETWORK-SERVICE-ALIAS-NAME> – Specify the network-service alias name (should be existing and configured). |
| icmp | Removes a disabled deny or permit rule applicable to ICMP packets only |
| ip | Removes a disabled deny or permit rule applicable to IP packets only |
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)#
```

Related Commands
- **deny**: Creates a deny access rule
- **disable**: Disables a deny or permit rule within an IP ACL
- **permit**: Creates a permit access rule
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```

permit 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] (log,rule-precedence <1-5000>) {(rule-description <LINE>)}

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>)}


```

Parameters


| 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`.
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</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. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified network are permitted.</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. 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.</td>
</tr>
<tr>
<td>• <code>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</code></td>
<td>Specify the network-group alias name (should be existing and configured).</td>
</tr>
<tr>
<td>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).</td>
<td></td>
</tr>
<tr>
<td><code>any</code></td>
<td>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.</td>
</tr>
<tr>
<td><code>from-vlan &lt;VLAN-ID&gt;</code></td>
<td>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.</td>
</tr>
<tr>
<td>• <code>&lt;VLAN-ID&gt;</code></td>
<td>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).</td>
</tr>
<tr>
<td><strong>Note</strong>: Use this option with WLANs and port ACLs.</td>
<td></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. Packets, matching the service protocols and ports specified in the network-service alias, received from the specified host are permitted.</td>
</tr>
<tr>
<td>• <code>&lt;SOURCE-HOST-IP&gt;</code></td>
<td>Specify the source host’s exact IP address in the A.B.C.D format.</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. Packets, matching the service protocols and ports specified in the network-service alias, addressed to the specified network are permitted.</td>
</tr>
<tr>
<td><code>any</code></td>
<td>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.</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. Packets, matching the service protocols and ports specified in the network-service alias, addressed to the specified host are permitted.</td>
</tr>
<tr>
<td>• <code>&lt;DEST-HOST-IP&gt;</code></td>
<td>Specify the destination host’s exact IP address in the A.B.C.D format.</td>
</tr>
<tr>
<td><code>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</code></td>
<td>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.</td>
</tr>
<tr>
<td>• <code>&lt;NETWORK-GROUP-ALIAS-NAME&gt;</code></td>
<td>Specify the network-group alias name (should be existing and configured).</td>
</tr>
<tr>
<td><code>log</code></td>
<td>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.</td>
</tr>
<tr>
<td>action</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| mark         | Specifies packets to mark  
| mark [8021p <0-7> | 8021p <0-7> – Marks packets by modifying 802.1.p VLAN user priority  
| dscp <0-63>] | dscp <0-63> – Marks packets by modifying DSCP TOS bits in the header |
| rule-precedence | The following keywords are recursive and common to all of the above parameters:  
| <1-5000>     | rule-precedence – Assigns a precedence for this permit rule  
| rule-description | <1-5000> – Specify a value from 1 - 5000.  
| <LINE>       | 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 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>action</th>
<th>Description</th>
</tr>
</thead>
</table>
| icmp         | Applies this permit rule to 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 permitted.  
| <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 permitted.  
| <NETWORK-GROUP-ALIAS-NAME> | – Specify the network-group alias name (should be existing and configured).  
| any          | Specifies the source as any source IP address. ICMP packets received from any source are permitted.  
| 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 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         | Identifies a specific host (as the source to match) by its IP address. ICMP packets 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. ICMP packets addressed to specified destinations are permitted.  
| <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 permitted.  
| <NETWORK-GROUP-ALIAS-NAME> | – Specify the network-group alias name (should be existing and configured).  
| any          | Specifies the destination as any destination IP address. ICMP packets addressed to any destination are permitted.  
| 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 permitted.  
| <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 permit events matching this entry. If a source and/or destination IP address is matched (i.e. an ICMP 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 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). |

```plaintext
 permitting 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] (log, rule-precedence <1-5000>) (rule-description <LINE>)
```

| **ip** | Applies this permit rule to IP packets only |
| **<SOURCE-IP/MASK>** | Specifies the source IP address and mask (A.B.C.D/M) to match. IP packets received from the specified networks are permitted. |
| **<NETWORK-GROUP-ALIAS-NAME>** | 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.  
- **<NETWORK-GROUP-ALIAS-NAME>** – Specify the network-group alias name (should be existing and configured). |
| **any** | Specifies the source as any source IP address. IP packets received from any source are permitted. |
| **from-vlan <VLAN-ID>** | Specifies a single VLAN or a range of VLANs as the match criteria. IP packets received from the specified VLANs are permitted.  
- **<VLAN-ID>** – 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).  
**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. IP packets 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. |
<p>| <strong>&lt;DEST-IP/MASK&gt;</strong> | Specifies the destination IP address and mask (A.B.C.D/M) to match. IP packets addressed to the specified networks are permitted. |
| <strong>any</strong> | Specifies the destination as any destination IP address. IP packets addressed to any destination are permitted. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| host <DEST-HOST-IP> | Identifies a specific host (as the destination to match) by its IP address. IP packets 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. |
| <NETWORK-GROUP-ALIAS-NAME> | Applies a network-group alias to identify the source IP addresses. IP packets destined for 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. a IP 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 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). |
| 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 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. |
| igmp              | Identifies the 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. |
<table>
<thead>
<tr>
<th>Protocol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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 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>
</tbody>
</table>

**<SOURCE-IP/MASK>** 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.

**<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, IGRP, OSPF, or VRRP] addressed to the destinations identified in the network-group alias are permitted.  
  - <NETWORK-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. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>log</td>
<td>Logs all deny events matching this entry. If a source and/or destination IP address is matched (i.e., a packet [EIGRP, GRE, IGRP, OSPF, or VRRP] is received from a specified IP address and/or is destined for a specified IP address), an event is logged.</td>
</tr>
</tbody>
</table>
| 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). |
| tcp                         | Applies this permit rule to TCP packets only |
| udp                         | Applies this deny rule to UDP packets only |
| <SOURCE-IP/MASK>            | 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. |
| <NETWORK-GROUP-ALIAS-NAME>  | 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.  
  - <NETWORK-ALIAS-GROUP-NAME> – Specify the network-group alias name (should be existing and configured).  
  After specifying the source and destination IP address(es), specify the action taken in case of a match. |
<p>| any                         | 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. |</p>
<table>
<thead>
<tr>
<th>Keyword</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>from-vlan &lt;VLAN-ID&gt;</td>
<td>Specifies a single VLAN or a range of VLANs as the match criteria. TCP/UDP packets received from</td>
</tr>
<tr>
<td></td>
<td>the VLANs identified here are permitted.</td>
</tr>
<tr>
<td></td>
<td>• &lt;VLAN-ID&gt; – Specify the VLAN ID. To configure a range of VLANs, enter the start and end VLAN</td>
</tr>
<tr>
<td></td>
<td>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. TCP/UDP packets received</td>
</tr>
<tr>
<td></td>
<td>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>This keyword is common to the ‘tcp’ and ‘udp’ parameters.</td>
</tr>
<tr>
<td></td>
<td>Sets the destination IP address and mask (A.B.C.D/M) to match. TCP/UDP packets addressed to</td>
</tr>
<tr>
<td></td>
<td>the specified destinations are permitted.</td>
</tr>
<tr>
<td>any</td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters.</td>
</tr>
<tr>
<td></td>
<td>Specifies the destination as any destination IP address. TCP/UDP packets received from any</td>
</tr>
<tr>
<td></td>
<td>destination are permitted.</td>
</tr>
<tr>
<td>eq &lt;SOURCE-PORT&gt;</td>
<td>Identifies a specific source port</td>
</tr>
<tr>
<td></td>
<td>• &lt;SOURCE-PORT&gt; – Specify the exact source port.</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. TCP/UDP packets</td>
</tr>
<tr>
<td></td>
<td>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>This keyword is common to the ‘tcp’ and ‘udp’ parameters.</td>
</tr>
<tr>
<td></td>
<td>Applies a network-group alias to identify the destination IP addresses. TCP/UDP packets destined</td>
</tr>
<tr>
<td></td>
<td>to the addresses identified in the network-group alias are permitted.</td>
</tr>
<tr>
<td></td>
<td>• &lt;NETWORK-ALIAS-GROUP-NAME&gt; – Specify the network-group alias name (should be existing and</td>
</tr>
<tr>
<td></td>
<td>configured).</td>
</tr>
<tr>
<td>range &lt;START-PORT&gt; &lt;END-PORT&gt;</td>
<td>Specifies a range of source ports</td>
</tr>
<tr>
<td></td>
<td>• &lt;START-PORT&gt; – Specify the first port in the range.</td>
</tr>
<tr>
<td></td>
<td>• &lt;END-PORT&gt; – Specify the last port in the range.</td>
</tr>
</tbody>
</table>
| eq \[<1-65535>\] <SERVICE-NAME> | Identifies a specific destination or protocol port to match
| 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 GROPER 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 <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 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.

| rule-precedence <1-5000> | The following keywords are recursive and common to all of the above:
| rule-description <LINE> | - 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
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.

NOTE: The log option is functional only for router ACL’s. The log option displays an informational logging message about the packet matching the entry sent to the console.

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>no</td>
<td>Removes a specified IP permit access rule</td>
</tr>
<tr>
<td>alias</td>
<td>Creates and configures aliases (network, VLAN, and service)</td>
</tr>
</tbody>
</table>
11.2 mac-access-list

Table 11.2 summarizes MAC 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 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>disable</td>
<td>Disables a MAC deny or permit rule without removing it from the ACL</td>
<td>page 11-36</td>
</tr>
<tr>
<td>insert</td>
<td>Inserts a rule in an MAC ACL without overwriting or replacing an existing rule having the same precedence</td>
<td>page 11-38</td>
</tr>
<tr>
<td>no</td>
<td>Removes a deny and/or a permit access rule from a MAC ACL</td>
<td>page 11-40</td>
</tr>
<tr>
<td>permit</td>
<td>Creates a new permit access rule or modifies an existing rule. A deny access rule marks packets for forwarding.</td>
<td>page 11-42</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
deny [<SOURCE-MAC> <SOURCE-MAC-MASK>|any|host <SOURCE-HOST-MAC>] [<DEST-MAC> <DEST-MAC-MASK>|any|host <DEST-HOST-MAC>] (dot1p 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>]**

```
(dot1p 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>) }
```

<table>
<thead>
<tr>
<th>&lt;SOURCE-MAC&gt;</th>
<th>&lt;SOURCE-MAC-MASK&gt;</th>
<th>Configures the source MAC address and mask to match</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• &lt;SOURCE-MAC&gt; – Specify the source MAC address to match.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• &lt;SOURCE-MAC-MASK&gt; – Specify the source MAC address mask.</td>
</tr>
<tr>
<td>any</td>
<td></td>
<td>Packets received from the specified MAC addresses are dropped.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&lt;DEST-MAC&gt;</th>
<th>&lt;DEST-MAC-MASK&gt;</th>
<th>Configures the destination MAC address and mask to match</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• &lt;DEST-MAC&gt; – Specify the destination MAC address to match.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• &lt;DEST-MAC-MASK&gt; – Specify the destination MAC address mask to match.</td>
</tr>
<tr>
<td>any</td>
<td></td>
<td>Packets addressed to the specified MAC addresses are dropped.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>host</th>
<th>&lt;SOURCE-HOST-MAC&gt;</th>
<th>Identifies a specific host as the source to deny access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• &lt;SOURCE-HOST-MAC&gt; – Specify the source host's exact MAC address to match. Packets received from the specified host are dropped.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>host</th>
<th>&lt;DEST-HOST-MAC&gt;</th>
<th>Identifies a specific host as the destination to deny access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• &lt;DEST-HOST-MAC&gt; – Specify the destination host's exact MAC address to match. Packets addressed to the specified host are dropped.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>host</th>
<th>&lt;SOURCE-HOST-MAC&gt;</th>
<th>Identifies a specific host as the source to deny access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• &lt;SOURCE-HOST-MAC&gt; – Specify the source host's exact MAC address to match. Packets received from the specified host are dropped.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>host</th>
<th>&lt;DEST-HOST-MAC&gt;</th>
<th>Identifies a specific host as the destination to deny access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• &lt;DEST-HOST-MAC&gt; – Specify the destination host's exact MAC address to match. Packets addressed to the specified host are dropped.</td>
</tr>
</tbody>
</table>

---
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**

```plaintext
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)#

rfs4000-229D58(config-mac-acl-test)#deny host 00-01-ae-00-22-11 any rule-precedence 2
rfs4000-229D58(config-mac-acl-test)#

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:

```plaintext
rfs7000-37FABE(config-mac-acl-test)#deny any host 00:01:ae:00:22:11
rfs7000-37FABE(config-mac-acl-test)#
```

The following example denies traffic between two hosts based on MAC addresses:

```plaintext
rfs7000-37FABE(config-mac-acl-test)#deny host 01:02:fe:45:76:89 host 01:02:89:78:78:45
rfs7000-37FABE(config-mac-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 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

disable [deny|permit|insert]
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|permit] | Disables a deny 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.
### Examples

The following example shows the MAC access list ‘test’ settings before the ‘disable’ command is executed:

```plaintext
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
```

The following example shows the MAC access list ‘test’ settings after the ‘disable’ command is executed:

```plaintext
rfs4000-229D58(config-mac-acl-test)#disable deny host 00-01-AE-00-22-11 any rule-precedence 2
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Enables a disabled deny or permit rule</td>
</tr>
<tr>
<td>deny</td>
<td>Creates a new deny access rule or modifies an existing rule</td>
</tr>
<tr>
<td>permit</td>
<td>Creates a new permit access rule or modifies an existing rule</td>
</tr>
</tbody>
</table>
11.2.3 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
insert [deny|permit] <PARAMETERS> (dotlp <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> (log,mark [8021p <0-7]|dscp <0-63>],
    rule-precedence <1-5000>) {((rule-description <LINE>))}`

<table>
<thead>
<tr>
<th><code>&lt;PARAMETERS&gt;</code></th>
<th>Inserts a deny or permit rule within an MAC ACL</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>dotlp &lt;0-7&gt;</code></td>
<td>Provides 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 <code>deny</code>. For more information on the permit rule, see <code>permit</code>.</td>
</tr>
<tr>
<td>`mark [8021p &lt;0-7]</td>
<td>dscp &lt;0-63&gt;]`,</td>
</tr>
<tr>
<td><code>&lt;0-7&gt;</code></td>
<td>Configure 802.1p priority from 0 - 7.</td>
</tr>
</tbody>
</table>

Mark/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 insert > permit MAC ACL rule.
**type**

- [8021q]<1-65535> arp|appletalk|arp|ip|ipv6|ipx|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 ARP payload (0x80f3)
- appletalk – Indicates the Appletalk Protocol payload (0x809b)
- arp – Indicates the ARP payload (0x0806)
- ip – Indicates the IPv4 payload (0x0800)
- ipv6 – Indicates the IPv6 payload (0x086dd)
- ipx – Indicates the Novell's IPX payload (0x8137)
- mint – Indicates the MiNT protocol payload (0x8783)
- rarp – Indicates the reverse ARP payload (0x8035)
- wisp – Indicates the WISP payload (0x8783)

**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.

**rule-description**

- <LINE>

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**

```plaintext
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)#
```
11.2.4 no

Negates a command or sets its default

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>}

Parameters

- 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>

| no [deny|permit] | Removes a deny or permit rule from the MAC ACL |
|-----------------|------------------------------------------------|
| <SOURCE-MAC> | Specify the source MAC address and mask |
| <SOURCE-MAC-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> | Specify the destination MAC address and mask |
| <DEST-MAC-MASK> | |
| any | Identifies all devices as the destination to deny/permit access |
| host <DEST-HOST-MAC> | Specify the destination host's exact MAC address. |
| dot1p <0-7> | Specify the 802.1p priority value from 0-7. |
| mark [8021p <0-7]|dscp <0-63>] | Specify the mark packets specified |
| type [8021q|<1-65535]|aarp|appletalk|arp|ip|ipv6|ipx|mint|rarp|wisp] | Specify the EtherType value. |
| vlan <1-4095> | Specify the VLAN ID. |

Note: This option is applicable only to the no > permit MAC ACL rule.
### Examples

```plaintext
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 33-44-55-66-77-88 log rule-precedence 700

rfs7000-37FABE(config-mac-acl-test)#no deny any host 33-44-55-66-77-88 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
```

### Related Commands

- **deny**
  - Creates a MAC deny ACL

- **permit**
  - Creates a MAC permit ACL
11.2.5 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]

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>) log (rule-precedence <1-5000>) {<rule-description <LINE>}}`

**Parameters**

- `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>}}`

<table>
<thead>
<tr>
<th><strong>&lt;SOURCE-MAC&gt;</strong></th>
<th>Configures the source MAC address and mask to match</th>
</tr>
</thead>
</table>
| **<SOURCE-MAC-MASK>** | • `<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** | Identifies a specific host as the source to permit access |
| **<SOURCE-HOST-MAC>** | • `<SOURCE-HOST-MAC>` – Specify the source host’s exact MAC address to match. Packets addressed to the specified host are forwarded. |
| **<DEST-MAC>** | Configures the destination MAC address and mask to match |
| **<DEST-MAC-MASK>** | • `<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. |
### 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).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>host &lt;DEST-HOST-MAC&gt;</td>
<td>Identifies a specific host as the destination to permit access</td>
</tr>
<tr>
<td></td>
<td>• &lt;DEST-HOST-MAC&gt; – Specify the destination host’s exact MAC address to match. Packets</td>
</tr>
<tr>
<td></td>
<td>addressed to the specified host are forwarded.</td>
</tr>
<tr>
<td>dotp1p &lt;0-7&gt;</td>
<td>Configures the 802.1p priority value. Sets the service classes for traffic handling</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-7&gt; – Specify 802.1p priority from 0 - 7.</td>
</tr>
<tr>
<td>mark [8021p &lt;0-7&gt;,</td>
<td>Marks/modifies packets that match the criteria specified here</td>
</tr>
<tr>
<td>dscp &lt;0-63&gt;]</td>
<td>• 8021p &lt;0-7&gt; – Modifies 802.1p VLAN user priority from 0 - 7</td>
</tr>
<tr>
<td></td>
<td>• dscp &lt;0-63&gt; – Modifies DSCP TOS bits in the IP header from 0 - 63</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> This option is applicable only to the MAC ACL permit rule.</td>
</tr>
<tr>
<td>type [8021q</td>
<td>&lt;1-65535&gt;</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-65535&gt; – Indicates the EtherType protocol number</td>
</tr>
<tr>
<td></td>
<td>• aarp – Indicates the Appletalk Address Resolution Protocol (ARP) payload (0x80F3)</td>
</tr>
<tr>
<td></td>
<td>• appletalk – Indicates the Appletalk Protocol payload (0x809B)</td>
</tr>
<tr>
<td></td>
<td>• arp – Indicates the ARP payload (0x0806)</td>
</tr>
<tr>
<td></td>
<td>• ip – Indicates the Internet Protocol, Version 4 (IPv4) payload (0x0800)</td>
</tr>
<tr>
<td></td>
<td>• ipv6 – Indicates the Internet Protocol, Version 6 (IPv6) payload (0x86DD)</td>
</tr>
<tr>
<td></td>
<td>• ipx – Indicates the Novell’s IPX payload (0x8137)</td>
</tr>
<tr>
<td></td>
<td>• mint – Indicates the MiNT protocol payload (0x8783)</td>
</tr>
<tr>
<td></td>
<td>• rarp – Indicates the reverse Address Resolution Protocol (ARP) payload (0x8035)</td>
</tr>
<tr>
<td></td>
<td>• wisp – Indicates the Wireless Internet Service Provider (WISP) payload (0x8783)</td>
</tr>
<tr>
<td>vlan &lt;1-4095&gt;</td>
<td>Configures the VLAN ID</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-4095&gt; – Specify the VLAN ID from 1 - 4095.</td>
</tr>
<tr>
<td>log</td>
<td>Logs all permit events matching this entry. If a source and/or destination MAC address is</td>
</tr>
<tr>
<td></td>
<td>matched (i.e. a packet is addressed to a specified MAC address or is destined for a</td>
</tr>
<tr>
<td></td>
<td>specified MAC address), an event is logged.</td>
</tr>
<tr>
<td>rule-precedence &lt;1-5000&gt;</td>
<td>The following keywords are recursive and common to all of the above parameters:</td>
</tr>
<tr>
<td>rule-description &lt;LINE&gt;</td>
<td>• rule-precedence – Assigns a precedence for this permit rule</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-5000&gt; – Specify a value from 1 - 5000.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Lower the precedence higher is the priority. A rule with precedence 3 gets</td>
</tr>
<tr>
<td></td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>description that uniquely identifies the purpose of this rule (should not exceed 128</td>
</tr>
<tr>
<td></td>
<td>characters in length).</td>
</tr>
</tbody>
</table>
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

```plaintext
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes or resets a specified MAC ACL permit rule</td>
</tr>
</tbody>
</table>
### 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 5.6 implementation supports IPv6 only on VLAN interfaces. Therefore, IPv6 ACLs can be applied only on the VLAN interface.

Table 11.3 summarizes IPv6 access list configuration commands.

**Table 11.3 IPv6-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 IPv6 packets from specified address(es) and/or destined for specified address(es).</td>
<td>page 11-46</td>
</tr>
<tr>
<td>no</td>
<td>Removes a deny and/or a access rule from a IPv6 ACL</td>
<td>page 11-52</td>
</tr>
<tr>
<td>permit</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 11-53</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```cli
deny [icmpv6|ipv6|proto|tcp|udp]

deny icmpv6 [<SOURCE-IPv6/MASK>|any|host <SOURCE-HOST-IPv6>] [<DEST-IPv6/MASK>|any|host <DEST-HOST-IPv6>] [code [eq <ICMPv6-CODE>|range <STARTING-ICMPv6-CODE> <ENDING-ICMPv6-CODE>]] [type [eq <ICMPv6-TYPE>|range <STARTING-ICMPv6-TYPE> <ENDING-ICMPv6-TYPE>]] (log|rule-precedence <1-5000>) {rule-description <LINE>}

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 [tcp|udp] [<SOURCE-IPv6/MASK>|any|host <SOURCE-HOST-IPv6>] [<DEST-IPv6/MASK>|any|host <DEST-HOST-IPv6>] [eq <SOURCE-PORT>|eq <END-PORT>]
[eq <1-65535>|<SERVICE-NAME>|bgp|dns|ftp|ftp-data|gopher|https|ldap|ntpd|ntp|pop3|sip|smtp|ssh|telnet|tftp|www|range <START-PORT> <END-PORT>]
(log,rule-precedence <1-5000>) {rule-description <LINE>}
```

#### Parameters

- **deny icmpv6**
  - `<SOURCE-IPv6/MASK>`: Specifies a range of IPv6 source address (network) to match. ICMPv6 packets received from any source in the specified network are dropped.
  - `<DEST-IPv6/MASK>`: Specifies a range of IPv6 destination address (network) to match. ICMPv6 packets addressed to any destination within the specified network are dropped.
  - `any`: Specifies the source as any IPv6 address. ICMPv6 packets received from any source are dropped.
  - `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 dropped.
  - `<SOURCE-HOST-IPv6>` – Specify the source host’s exact IPv6 address.
  - `code [eq <ICMPv6-CODE>|range <STARTING-ICMPv6-CODE> <ENDING-ICMPv6-CODE>]]`: ICMPv6 code to match.
  - `type [eq <ICMPv6-TYPE>|range <STARTING-ICMPv6-TYPE> <ENDING-ICMPv6-TYPE>]]`: ICMPv6 type to match.
  - `log`: Log the packets.
  - `rule-precedence <1-5000>`: Set the rule precedence (1-5000).
  - `rule-description <LINE>`: Add a description to the rule.

- **deny ipv6**
  - `<SOURCE-IPv6/MASK>`: Specifies a range of IPv6 source address (network) to match. ICMPv6 packets received from any source in the specified network are dropped.
  - `<DEST-IPv6/MASK>`: Specifies a range of IPv6 destination address (network) to match. ICMPv6 packets addressed to any destination within the specified network are dropped.
  - `any`: Specifies the destination as any IPv6 address. ICMPv6 packets addressed to any destination are dropped.
  - `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 dropped.
  - `<DEST-HOST-IPv6>` – Specify the destination host’s exact IPv6 address.

- **deny proto**
  - `<PROTOCOL-NUMBER>|<PROTOCOL-NAME>`: Protocol name or number to match.
  - `<SOURCE-IPv6/MASK>`: Specifies a range of IPv6 source address (network) to match. ICMPv6 packets received from any source in the specified network are dropped.
  - `<DEST-IPv6/MASK>`: Specifies a range of IPv6 destination address (network) to match. ICMPv6 packets addressed to any destination within the specified network are dropped.
  - `any`: Specifies the source as any IPv6 address. ICMPv6 packets received from any source are dropped.
  - `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 dropped.
  - `<SOURCE-HOST-IPv6>` – Specify the source host’s exact IPv6 address.
  - `<PROTOCOL-NUMBER>|<PROTOCOL-NAME>`: Protocol name or number to match.
  - `eq <SOURCE-PORT>|eq <END-PORT>`: Source port number or range.
  - `eq <1-65535>|<SERVICE-NAME>`: Port number or service name.
  - `log`: Log the packets.
  - `rule-precedence <1-5000>`: Set the rule precedence (1-5000).
  - `rule-description <LINE>`: Add a description to the rule.

- **deny [tcp|udp]**
  - `<SOURCE-IPv6/MASK>`: Specifies a range of IPv6 source address (network) to match. ICMPv6 packets received from any source in the specified network are dropped.
  - `<DEST-IPv6/MASK>`: Specifies a range of IPv6 destination address (network) to match. ICMPv6 packets addressed to any destination within the specified network are dropped.
  - `any`: Specifies the source as any IPv6 address. ICMPv6 packets received from any source are dropped.
  - `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 dropped.
  - `<SOURCE-HOST-IPv6>` – Specify the source host’s exact IPv6 address.
  - `eq <SOURCE-PORT>|eq <END-PORT>`: Source port number or range.
  - `eq <1-65535>|<SERVICE-NAME>`: Port number or service name.
  - `log`: Log the packets.
  - `rule-precedence <1-5000>`: Set the rule precedence (1-5000).
  - `rule-description <LINE>`: Add a description to the rule.
| `<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>` | • `<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 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>`)}`

| `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.  
| | • `<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 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.  
| | • `<DEST-HOST-IPv6>` – Specify the destination host’s exact IPv6 address. |
| `log` | Logs all deny events matching this entry |
| `rule-precedence` | Assigns a precedence for this deny 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. |
- `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>rule-description</th>
<th>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).</th>
</tr>
</thead>
<tbody>
<tr>
<td>proto</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>&lt;PROTOCOL-NUMBER&gt;</td>
<td>Filters protocols using their Internet Assigned Numbers Authority (IANA) protocol number.</td>
</tr>
<tr>
<td>&lt;PROTOCOL-NAME&gt;</td>
<td>Filters protocols using their IANA protocol name.</td>
</tr>
<tr>
<td>eigrp</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>gre</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>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 IGP protocols are: RIP and OSPF.</td>
</tr>
<tr>
<td>ospf</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>vrrp</td>
<td>Identifies the VRRP protocol (number 112). VRRP allows a pool of routers to be advertized 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>&lt;SOURCE-IPv6/MASK&gt;</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 dropped.</td>
</tr>
<tr>
<td>any</td>
<td>Specifies the source as any IPv6 address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) received from any source are dropped.</td>
</tr>
<tr>
<td>Keyword</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>access-list</td>
<td>Specifies the access-list identifier. This is used to group a series of rules.</td>
</tr>
<tr>
<td>host</td>
<td>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.</td>
</tr>
<tr>
<td>&lt;SOURCE-HOST-IP&gt;</td>
<td>Specify the source host’s exact IPv6 address.</td>
</tr>
<tr>
<td>&lt;SOURCE-HOST-IPv6&gt;</td>
<td>Specifies a range of IPv6 source address (network) to match. TCP/UDP 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. TCP/UDP packets received from any source are dropped.</td>
</tr>
<tr>
<td>host</td>
<td>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.</td>
</tr>
<tr>
<td>&lt;SOURCE-HOST-IP&gt;</td>
<td>Specify the destination host’s exact IPv6 address.</td>
</tr>
<tr>
<td>log</td>
<td>Logs all deny events matching this entry</td>
</tr>
<tr>
<td>rule-precedence</td>
<td>Assigns a precedence for this deny rule</td>
</tr>
<tr>
<td>&lt;1-5000&gt;</td>
<td>Specify a value from 1 - 5000.</td>
</tr>
<tr>
<td>Note:</td>
<td>Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.</td>
</tr>
<tr>
<td>rule-description</td>
<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>
</tr>
<tr>
<td>deny</td>
<td>Applies this deny rule to TCP packets only</td>
</tr>
<tr>
<td>tcp</td>
<td>Applies this deny rule to UDP packets only</td>
</tr>
<tr>
<td>&lt;SOURCE-IPv6/MASK&gt;</td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters. Spefies a range of IPv6 source address (network) to match. TCP/UDP packets received from any source in the specified network are dropped.</td>
</tr>
<tr>
<td>any</td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters. Spefies the source as any IPv6 address. TCP/UDP packets received from any source are dropped.</td>
</tr>
<tr>
<td>host</td>
<td>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.</td>
</tr>
<tr>
<td>&lt;SOURCE-HOST-IP&gt;</td>
<td>Specify the source host’s exact IPv6 address.</td>
</tr>
<tr>
<td>&lt;DEST-IPv6/MASK&gt;</td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters. Spefies a range of IPv6 destination address (network) to match. TCP/UDP packets addressed to any destination within the specified network are dropped.</td>
</tr>
<tr>
<td>any</td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters. Spefies the destination as any destination IPv6 address. TCP/UDP packets received from any destination are dropped.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 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| ftp| ftp-data| gopher| https| ldap| nntp| ntp| 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)  
  • gopher – 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 <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
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)#
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a specified deny access rule</td>
</tr>
</tbody>
</table>
11.3.2 no

- ipv6-access-list

Removes a deny or permit rule

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [deny|permit]

no [deny|permit] [icmpv6|ipv6|proto|tcp|udp] <RULE-PARAMETERS>

Parameters

- no [deny|permit] [icmpv6|ipv6|proto|tcp|udp] <RULE-PARAMETERS>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no [deny</td>
<td>permit]</td>
</tr>
<tr>
<td>icmpv6</td>
<td>Removes a deny or permit rule applicable to ICMPv6 packets only</td>
</tr>
<tr>
<td>ipv6</td>
<td>Removes a deny or permit rule applicable to IPv6 packets only</td>
</tr>
<tr>
<td>proto</td>
<td>Removes a deny or permit rule applicable to protocols (other than IP, ICMP, TCP, and UDP)</td>
</tr>
<tr>
<td>[tcp</td>
<td>udp]</td>
</tr>
<tr>
<td>&lt;RULE-PARAMETERS&gt;</td>
<td>Enter the exact parameters used when configuring the rule.</td>
</tr>
<tr>
<td>rule-precedence</td>
<td>Specify the precedence assigned to this deny/permit rule.</td>
</tr>
<tr>
<td>&lt;1-5000&gt;</td>
<td></td>
</tr>
<tr>
<td>rule-description</td>
<td>Optional. Specify the rule description.</td>
</tr>
<tr>
<td>&lt;LINE&gt;</td>
<td></td>
</tr>
</tbody>
</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)#

Related Commands

- deny
  Creates a deny access rule
- permit
  Creates a permit access rule
**11.3.3 permit**

Create 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
permit [icmpv6|ipv6|proto|tcp|udp]
permit [tcp|udp] [<SOURCE-IPv6/MASK>|any|host <SOURCE-HOST-IPv6>] [<DEST-IPv6/MASK>|any|host <DEST-HOST-IPv6>] [eq <SOURCE-PORT>|<DEST-PORT>|range <START-PORT> <ENDPORT>] [(log,rule-precedence <1-5000>) {(rule-description <LINE>)}]
```

**Parameters**

- `permit icmpv6`:
  - `<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> [eq|range] | 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 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).  

```
```

| 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 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.  
| • <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 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.  
| • <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.
### ACCESS-LIST 11 - 55

<table>
<thead>
<tr>
<th>rule-description</th>
<th>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).</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;LINE&gt;</td>
<td></td>
</tr>
</tbody>
</table>


<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>
</table>
| <NUMBER> | Filters protocols using their Internet Assigned Numbers Authority (IANA) protocol number.  
- **<NUMBER>** – Specify the protocol number. |
| <PROTOCOL-NAMESPACE> | Filters protocols using their IANA protocol name.  
- **<PROTOCOL-NAMESPACE>** – 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. |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Parameters

- **<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.  

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>host</td>
<td>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.</td>
</tr>
<tr>
<td>&lt;SOURCE-HOST-IPv6&gt;</td>
<td>• &lt;SOURCE-HOST-IP&gt; – Specify the source host’s exact IPv6 address.</td>
</tr>
<tr>
<td>&lt;DEST-IPv6/MASK&gt;</td>
<td>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.</td>
</tr>
<tr>
<td>any</td>
<td>Specifies the destination as any IPv6 address. Packets (EIGRP, GRE, IGMP, IGP, OSPF, or VRRP) addressed to any destination are dropped.</td>
</tr>
<tr>
<td>host</td>
<td>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.</td>
</tr>
<tr>
<td>&lt;SOURCE-HOST-IPv6&gt;</td>
<td>• &lt;SOURCE-HOST-IP&gt; – Specify the destination host’s exact IPv6 address.</td>
</tr>
<tr>
<td>log</td>
<td>Logs all permit events matching this entry</td>
</tr>
<tr>
<td>rule-precedence</td>
<td>Assigns a precedence for this permit rule</td>
</tr>
<tr>
<td>&lt;1-5000&gt;</td>
<td>• &lt;1-5000&gt; – Specify a value from 1 - 5000.</td>
</tr>
<tr>
<td>Note:</td>
<td>Lower the precedence higher is the priority. A rule with precedence 3 gets priority over a rule with precedence 10.</td>
</tr>
<tr>
<td>rule-description</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>tcp</td>
<td>Applies this permit rule to TCP packets only</td>
</tr>
<tr>
<td>udp</td>
<td>Applies this permit rule to UDP packets only</td>
</tr>
<tr>
<td>&lt;SOURCE-IPv6/MASK&gt;</td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters.</td>
</tr>
<tr>
<td></td>
<td>Specifies a range of IPv6 source address (network) to match. TCP/UDP packets received from any source in the specified network are dropped.</td>
</tr>
<tr>
<td>any</td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters.</td>
</tr>
<tr>
<td></td>
<td>Specifies the source as any IPv6 address. TCP/UDP packets received from any source are dropped.</td>
</tr>
<tr>
<td>host</td>
<td>Identifies a specific host (as the source to match) by its IPv6 address. TCP/UDP packets received from the specified host are dropped.</td>
</tr>
<tr>
<td>&lt;SOURCE-HOST-IPv6&gt;</td>
<td>• &lt;SOURCE-HOST-IP&gt; – Specify the source host’s exact IPv6 address.</td>
</tr>
<tr>
<td>&lt;DEST-IPv6/MASK&gt;</td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters.</td>
</tr>
<tr>
<td></td>
<td>Specifies a range of IPv6 destination address (network) to match. TCP/UDP packets addressed to any destination within the specified network are dropped.</td>
</tr>
<tr>
<td>any</td>
<td>This keyword is common to the ‘tcp’ and ‘udp’ parameters.</td>
</tr>
<tr>
<td></td>
<td>Specifies the destination as any destination IPv6 address. TCP/UDP packets received from any destination are dropped.</td>
</tr>
</tbody>
</table>
| 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|ftp|ftp-data|gopher|https|ldap|nntp|ntp|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)  
| | • gopher – 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 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). |
Examples

rfs7000-6DCD4B(config-ipv6-acl-test)# permit proto gre any any log rule-precedence 2
rfs7000-6DCD4B(config-ipv6-acl-test)#

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)#

Related Commands

| no | Removes a specified permit access rule |
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). Table 11.4 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>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

deny [<IP/M>|any|host <IP>]

**Parameters**

- deny [<IP/M>|any|host <IP>]

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>deny [&lt;IP/M&gt;]</td>
<td>Configures the match criteria for this deny rule</td>
</tr>
<tr>
<td>any</td>
<td>- <code>&lt;IP/M&gt;</code> – Specifies a network address and mask in the A.B.C.D/M format.</td>
</tr>
<tr>
<td></td>
<td>Packets received or destined for this network are dropped.</td>
</tr>
<tr>
<td>host &lt;IP&gt;</td>
<td>- any – Specifies the match criteria as any. Packets received or destined</td>
</tr>
<tr>
<td></td>
<td>from any address are dropped.</td>
</tr>
<tr>
<td></td>
<td>- host &lt;IP&gt; – Identifies a host by its IP address. Packets received or</td>
</tr>
<tr>
<td></td>
<td>destined for this host are dropped.</td>
</tr>
</tbody>
</table>

**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

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
permit [<IP/M>|any|host <IP>]
```

Parameters

- `permit [<IP/M>|any|host <IP>]`

| permit [<IP/M>|any|host <IP>] | Configures the match criteria for this permit 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 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

```
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 form 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
no [deny|permit] [<IP/M>|any|host <IP>]
```

**Parameters**
- `no [deny|permit] [<IP/M>|any|host <IP>]`

| no [deny|permit] [<IP/M>|any|host <IP>] | Removes deny and/or permit access rule from this IP SNMP ACL. Specify the following parameters: |
|----------------------------------------|------------------------------------------------------------------------------------------|
|                                        | • deny – Removes a deny rule                                                             |
|                                        | • permit – Removes a permit rule                                                         |
|                                        | The following keywords are common to the ‘deny’ and ‘permit’ keywords:                    |
|                                        | • <IP/M> – Specifies a network address and mask in the A.B.C.D/M format                   |
|                                        | • any – Specifies the match criteria as any                                             |
|                                        | • host <IP> – Identifies a host by its IP address                                        |

**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)#
```
This chapter summarizes Dynamic Host Control Protocol (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:

<DEVICE>(config)#dhcp-server-policy <POLICY-NAME>

rfs7000-37FABE(config)#dhcp-server-policy test
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

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:

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
12.1 dhcp-server-policy

Table 12.1 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 12-58</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 12-60</td>
</tr>
<tr>
<td>option</td>
<td>Defines the DHCP option used in DHCP pools</td>
<td>page 12-62</td>
</tr>
<tr>
<td>ping</td>
<td>Specifies ping parameters used by a DHCP server</td>
<td>page 12-63</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
12.1.1 bootp

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
bootp ignore
```

Parameters

- `bootp ignore`

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

```
no
```

Disables the ignore BOOTP requests option
12.1.2 dhcp-class

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.

Table 12.2 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 commands</td>
<td>Invokes DHCP class configuration commands</td>
<td>page 12-7</td>
</tr>
</tbody>
</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

Use DHCP class mode commands to configure the parameters of the DHCP user class. Table 12.3 summarizes DHCP user class configuration commands.

Table 12.3 DHCP-Class-Config-Mode Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>multiple-user-class</td>
<td>Enables or disables multiple user class option for this DHCP user class policy</td>
<td>page 12-8</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 DHCP user class options for this DHCP user class policy</td>
<td>page 12-10</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-15</td>
</tr>
</tbody>
</table>
12.1.2.2.1 multiple-user-class

- **dhcp-class-mode commands**

  Enables or disables 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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**

```
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables the multiple user class option for the selected DHCP user class policy</td>
</tr>
</tbody>
</table>
```
12.1.2.2 no

- dhcp-class-mode commands

Removes this DHCP user class policy’s settings

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [multiple-user-class|option]
no option user-class <VALUE>

Parameters

- no multiple-user-class
- no option user-class <VALUE>

<table>
<thead>
<tr>
<th>no multiple-user-class</th>
<th>Disables multiple user class options on this DHCP user class policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>no option user-class &lt;VALUE&gt;</td>
<td>Removes the DHCP user class option identified by the &lt;VALUE&gt; keyword</td>
</tr>
</tbody>
</table>

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)#
```

Related Commands

<table>
<thead>
<tr>
<th>multiple-user-class</th>
<th>Enables or disables multiple user class option for this DHCP user class policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>option</td>
<td>Configures DHCP user class options for this DHCP user class policy</td>
</tr>
</tbody>
</table>
**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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
option user-class <VALUE>
```

**Parameters**

- ```plaintext
`option user-class <VALUE>`
```

<table>
<thead>
<tr>
<th>user-class &lt;VALUE&gt;</th>
<th>Configures DHCP user class options</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;VALUE&gt;</td>
<td>Specify the DHCP user class option’s ASCII value.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
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**

<table>
<thead>
<tr>
<th>no</th>
<th>Removes the configured DHCP user class option</th>
</tr>
</thead>
</table>

**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. Table 12.4 summarizes DHCP pool configuration mode commands.

**Table 12.4 DHCP-Pool-Config 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</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```dhcp-pool <POOL-NAME>```

**Parameters**

- dhcp-pool <POOL-NAME>

**Examples**

- `rfs7000-37FABE(config-dhcp-policy-test)#dhcp-pool pool1`

  DHCP pool Mode commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>address</td>
<td>Configure network pool's included addresses</td>
</tr>
<tr>
<td>bootfile</td>
<td>Boot file name</td>
</tr>
<tr>
<td>ddns</td>
<td>Dynamic DNS Configuration</td>
</tr>
<tr>
<td>default-router</td>
<td>Default routers</td>
</tr>
<tr>
<td>dns-server</td>
<td>DNS Servers</td>
</tr>
<tr>
<td>domain-name</td>
<td>Configure domain-name</td>
</tr>
<tr>
<td>excluded-address</td>
<td>Prevent DHCP Server from assigning certain addresses</td>
</tr>
<tr>
<td>lease</td>
<td>Address lease time</td>
</tr>
<tr>
<td>netbios-name-server</td>
<td>NetBIOS (WINS) name servers</td>
</tr>
<tr>
<td>netbios-node-type</td>
<td>NetBIOS node type</td>
</tr>
<tr>
<td>network</td>
<td>Network on which DHCP server will be deployed</td>
</tr>
<tr>
<td>next-server</td>
<td>Next server in boot process</td>
</tr>
<tr>
<td>no</td>
<td>Negate a command or set its defaults</td>
</tr>
<tr>
<td>option</td>
<td>Raw DHCP options</td>
</tr>
<tr>
<td>respond-via-unicast</td>
<td>Send DHCP offer and DHCP Ack as unicast messages</td>
</tr>
<tr>
<td>static-binding</td>
<td>Configure static address bindings</td>
</tr>
<tr>
<td>static-route</td>
<td>Add static routes to be installed on dhcp clients</td>
</tr>
<tr>
<td>update</td>
<td>Control the usage of DDNS service</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>
</tbody>
</table>
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

Table 12.5 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 12-37</td>
</tr>
<tr>
<td>static-route</td>
<td>Configures a static route for a DHCP pool</td>
<td>page 12-36</td>
</tr>
<tr>
<td>update</td>
<td>Controls the usage of the DDNS service</td>
<td>page 12-38</td>
</tr>
<tr>
<td>static-binding</td>
<td>Configures static address bindings</td>
<td>page 12-39</td>
</tr>
</tbody>
</table>
12.1.3.2.1 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 [<START-IP>|<START-HOST-ALIAS-NAME>] [<END-IP>|<END-HOST-ALIAS-NAME>] {class <DHCP-CLASS-NAME>}

<table>
<thead>
<tr>
<th>&lt;IP&gt;</th>
<th>Adds a single IP address to the DHCP address pool</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;HOST-ALIAS-NAME&gt;</td>
<td>Adds a single host mapped to the specified host alias. The host alias should be existing and configured.</td>
</tr>
<tr>
<td>Note:</td>
<td>A network host alias maps a name to a single network host. For example, 'alias host $HOST 1.1.1.100'. In this example the host alias is &quot;$HOST&quot; and it maps to a single host '1.1.1.100'. For more information, see alias.</td>
</tr>
<tr>
<td>range [&lt;START-IP&gt;</td>
<td>&lt;START-HOST-ALIAS-NAME&gt;] [&lt;END-IP&gt;</td>
</tr>
<tr>
<td></td>
<td>• &lt;START-IP&gt; — Specifies the first IP address in the range</td>
</tr>
<tr>
<td></td>
<td>• &lt;START-HOST-ALIAS-NAME&gt; — Specifies a host alias, mapped to the first IP address in the range</td>
</tr>
<tr>
<td>Use one of the following options to provide the last IP address in the range:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• &lt;END-IP&gt; — Specifies the last IP address in the range</td>
</tr>
<tr>
<td></td>
<td>• &lt;END-HOST-ALIAS-NAME&gt; — Specifies a host alias, mapped to the last IP address in the range</td>
</tr>
<tr>
<td>Note:</td>
<td>The host alises should be existing and configured.</td>
</tr>
<tr>
<td>class &lt;DHCP-CLASS-NAME&gt;</td>
<td>Optional. Applies additional DHCP options, or a modified set of options to those available to wireless clients. For more information, see dhcp-class.</td>
</tr>
<tr>
<td>• &lt;DHCP-CLASS-NAME&gt;</td>
<td>Sets the DHCP class.</td>
</tr>
</tbody>
</table>

Examples
rfs4000-229D58 (config-dhcp-policy-test-pool-testPool)#address 192.168.13.4 class dhcpclass1

rfs4000-229D58 (config-dhcp-policy-test-pool-testPool)#show context
dhcp-pool testPool
  address 192.168.13.4 class dhcpclass1
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>
12.1.3.2.2 bootfile

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

```
no
bootp
```

Resets the boot image path for BOOTP clients

Configures BOOTP protocol parameters
12.1.3.2.3 ddns

- **dhcp-pool-mode commands**

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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**

- **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`.

- **multiple-user-class**

  Enables the multiple user class options with this DDNS domain.

- **server**

  ```
  [<IP>|<HOST-ALIAS-NAME>]
  ```

  Configures the primary DDNS server used by this DHCP profile.

  Configures the primary DDNS server. This is the default server. Use one of the following options to specify the primary DDNS server:

  - `<IP>` — Specifies the primary DDNS server's IP address.
  - `<HOST-ALIAS-NAME>` — Specifies a host alias, mapped to 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`.

- **ttl**

  ```
  <1-864000>
  ```

  Specifies the time to live (in seconds) for DNS updates.
### dhcp-server-policy

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| `{<IP1>|<HOST-ALIAS-NAME1>}` | Optional. Configures the secondary DDNS server. If the primary server is not reachable, this server is used. Use one of the following options to identify the secondary DDNS server:  
  - `<IP>` – Specifies the secondary DDNS server’s IP address  
  - `<HOST-ALIAS-NAME>` – Specifies a host alias, mapped to the secondary DDNS server’s IP address. The host alias should be existing and configured. |
| `ttl <1-864000>`      | Configures the *Time To Live* (TTL) value for DDNS updates  
  - `<1-86400>` – Specify a value from 1-864000 seconds. |

#### Examples

```
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

- `no` | Resets or disables a DHCP pool’s DDNS settings
12.1.3.2.4 default-router

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 |

| `{<IP1>|<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.

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

### 12.1.3.2.5 dns-server

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**
```plaintext
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 |

**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 |

**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**
```plaintext
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
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>
12.1.3.2.6 domain-name

Sets the domain name for the DHCP pool
Provides 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, computename.domain.com.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
```
domain-name <DOMAIN-NAME>
```

Parameters
- domain-name <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
ddns 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
12.1.3.2.7 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>`
  - `<IP>` Adds a single IP address to the excluded address list.

- `excluded-address <HOST-ALIAS-NAME>`
  - `<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>]`
  - `range` 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><code>no</code></td>
<td>Removes the exclude IP addresses settings</td>
</tr>
</tbody>
</table>
12.1.3.2.8 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
lease [<0-365>|infinite]
lease infinite
lease <0-365> {0-23} {0-59} {0-59}
```

**Parameters**

- **lease infinite**
- **lease <0-365> {0-23} {0-59} {0-59}**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>infinite</td>
<td>The lease never expires (equal to a static IP address assignment)</td>
</tr>
<tr>
<td>&lt;0-365&gt;</td>
<td>Configures the lease duration in days</td>
</tr>
<tr>
<td>&lt;0-23&gt;</td>
<td>Optional. Sets the lease duration in hours</td>
</tr>
<tr>
<td>&lt;0-59&gt;</td>
<td>Optional. Sets the lease duration in minutes</td>
</tr>
<tr>
<td>&lt;0-59&gt;</td>
<td>Optional. Sets the lease duration in seconds</td>
</tr>
</tbody>
</table>

**Note:** Days may be 0 only when hours and/or minutes are greater than 0.

**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
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
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#
```

**Related Commands**

- **no** Resets values or disables the DHCP pool lease settings
12.1.3.2.9 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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 name 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**

```
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
    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
    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
12.1.3.2.10 netbios-node-type

Defines the predefined NetBIOS node type. The NetBIOS node type resolves NetBIOS names to IP addresses.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

netbios-node-type [b-node|h-node|m-node|p-node]

Parameters

- netbios-node-type [b-node|h-node|m-node|p-node]

| [b-node|h-node] | m-node|p-node] | Defines the netbios node type |
|-----------------|--------|-----------------------------|
| 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 – Sets the node type as hybrid. Uses a combination of two or more nodes. |
| m-node – Sets the node type as mixed. A mixed node uses broadcasted queries to find a node, and failing that, queries a known p-node name server for the address. |
| 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

rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#netbios-node-type b-node

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
12.1.3.2.11 network

- **dhcp-pool-mode commands**

  Configures the DHCP server’s network settings.

  Supported in the following platforms:
  - Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

  **Syntax**

  `network [<IP/M>|<NETWORK-ALIAS-NAME>]`

  **Parameters**

  - `network [<IP/M>|<NETWORK-ALIAS-NAME>]`

  **Examples**

  ```
  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

  **Note:** A network alias defines a single network address. For example, ‘alias network $NET 1.1.1.0/24’. In this example, the network alias name is: `$NET` and the network it is mapped to is: `1.1.1.0/24`. For more information see, alias.
12.1.3.2.12 next-server

* dhcp-pool-mode commands

Configures the next server in the boot process

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>
</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
  dns dns_server 192.168.13.9
dns domainname WID
dns multiple-user-class
dns 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 |
12.1.3.2.13 no

- **dhcp-pool-mode commands**
  - Removes or resets this DHCP user pool’s settings

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
no [address|bootfile|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 [bootfile|default-router|dns-server|domain-name|lease|netbios-name-server|netbios-node-type|next-server|network|respond-via-unicast]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no bootfile</td>
<td>Removes a BOOTP bootfile configuration</td>
</tr>
<tr>
<td>no default-router</td>
<td>Removes the configured default router for the DHCP pool</td>
</tr>
<tr>
<td>no dns-server</td>
<td>Removes the configured DNS server for the DHCP pool</td>
</tr>
<tr>
<td>no domain-name</td>
<td>Removes the configured DNS domain name</td>
</tr>
<tr>
<td>no lease</td>
<td>Resets the lease to its default (24 hours)</td>
</tr>
<tr>
<td>no netbios-name-server</td>
<td>Removes the configured NetBIOS name server</td>
</tr>
<tr>
<td>no netbios-node-type</td>
<td>Removes the NetBIOS node type</td>
</tr>
<tr>
<td>no next-server</td>
<td>Removes the next server utilized in the boot process</td>
</tr>
<tr>
<td>no network</td>
<td>Removes the DHCP server network information</td>
</tr>
<tr>
<td>no respond-via-unicast</td>
<td>Sets the DHCP offer and ACK as broadcast instead of unicast</td>
</tr>
</tbody>
</table>
- **no address** [<IP>|<HOST-ALIAS-NAME>|all]

  **no address**
  Resets configured DHCP pool addresses

  **<IP>**
  Removes an IP address from the list of addresses

  **<HOST-ALIAS-NAME>**
  Removes the host alias (used to identify a single host) associated with this DHCP pool's address list

  **all**
  Removes configured DHCP IP addresses

- **no address range** [<START-IP>|<START-HOST-ALIAS-NAME>] [<END-IP>|<END-HOST-ALIAS-NAME>]

  **no address range**
  Resets the DHCP pool addresses

  **range** [<START-IP>|<START-HOST-ALIAS-NAME>]
  Removes a range of IP addresses and host aliases associated with this DHCP pool’s address list.
  - **<START-IP>** – Specify the first IP address in the range.
  - **<START-HOST-ALIAS-NAME>** – Specify the host alias, mapped to the first IP address in the range.
  - **<END-IP>** – Specify the last IP address in the range.
  - **<END-HOST-ALIAS-NAME>** – Specify the host alias, mapped to the last IP address in the range.

  **Note:** The specified IP addresses and host aliases are removed from the DHCP pool’s address list.

- **no ddns** [domainname|multiple-user-class|server|ttl]

  **no ddns**
  Resets DDNS parameters

  **domainname**
  Removes DDNS domain name information

  **multiple-user-class**
  Resets the use of a multiple user class with the DDNS

  **server**
  Removes configured DDNS servers

  **ttl**
  Resets the TTL information for DDNS updates

- **no excluded-address** [<IP>|<HOST-ALIAS-NAME>]

  **no excluded-address**
  Removes an excluded IP address from the list of addresses that cannot be issued by the DHCP server
  - **<IP>** – Specify the IP address.

  **<HOST-ALIAS-NAME>**
  Removes the host alias (used to identify a single host) associated with this DHCP pool's excluded-address list

- **no excluded-address range** [<START-IP>|<START-HOST-ALIAS-NAME>] [<END-IP>|<END-HOST-ALIAS-NAME>]

  **no excluded-address range**
  Removes a range of excluded IP addresses from the list of addresses that cannot be issued by the DHCP server
no option <OPTION-NAME>

Removes a range of IP addresses and host aliases associated with this DHCP pool’s excluded address list.

- <START-IP> – Specify the first IP address in the range.
- <START-HOST ALIAS-NAME> – Specify the host alias, mapped to the first IP address in the range.
- <END-IP> – Specify the last IP address in the range.
- <END-HOST ALIAS-NAME> – Specify the host alias, mapped to the last IP address in the range.

**Note:** The specified IP addresses and host aliases are removed from the DHCP pool’s excluded address list.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no option</td>
<td>Resets DHCP option information</td>
</tr>
<tr>
<td>&lt;OPTION-NAME&gt;</td>
<td>Defines the DHCP option</td>
</tr>
</tbody>
</table>

no static-binding <client-identifier <CLIENT-IDENTIFIER>

Removes static bindings for DHCP client

- <CLIENT-IDENTIFIER> – Specify the client identifier.

no static-binding hardware-address <MAC>

Removes static bindings for a DHCP client

- <MAC> – Specify the hardware MAC address.

no static-route <IP/MASK> <GATEWAY-IP>

Removes static routes for this DHCP pool

- <IP/MASK> – Removes routing information for a particular subnet
- <GATEWAY-IP> – Removes the gateway information from a particular subnet’s routing information

no update dns {override}

Removes DDNS settings

- override – Optional. Removes DDNS updates from an onboard DHCP server

**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)#
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#no bootfile
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#no network
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#no default-router
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#no next-server
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#no domain-name
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#no ddns domainname
rfs4000-229D58(config-dhcp-policy-test-pool-testPool)#no lease

The following example shows the DHCP pool settings after the ‘no’ commands are executed:

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)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>address</td>
<td>Configures the DHCP server's IP address pool</td>
</tr>
<tr>
<td>bootfile</td>
<td>Configures the BOOTP boot file path</td>
</tr>
<tr>
<td>ddns</td>
<td>Configures DDNS for use with this DHCP pool</td>
</tr>
<tr>
<td>default-router</td>
<td>Configures default routers for this DHCP pool</td>
</tr>
<tr>
<td>dns-server</td>
<td>Configures default DNS servers for this DHCP pool</td>
</tr>
<tr>
<td>domain-name</td>
<td>Configures the DDNS domain name for this DHCP pool</td>
</tr>
<tr>
<td>excluded-address</td>
<td>Configures IP addresses assigned as static addresses</td>
</tr>
<tr>
<td>lease</td>
<td>Configures the DHCP lease settings</td>
</tr>
<tr>
<td>netbios-name-server</td>
<td>Configures the NetBIOS name server</td>
</tr>
<tr>
<td>netbios-node-type</td>
<td>Configures the NetBIOS node type</td>
</tr>
<tr>
<td>network</td>
<td>Configures the DHCP server's network settings</td>
</tr>
<tr>
<td>next-server</td>
<td>Configures the next server in the BOOTP boot process</td>
</tr>
<tr>
<td>option</td>
<td>Configures the DHCP option</td>
</tr>
<tr>
<td>respond-via-unicast</td>
<td>Configures how a DHCP request and ACK are sent</td>
</tr>
<tr>
<td>static-binding</td>
<td>Configure static binding information</td>
</tr>
<tr>
<td>static-route</td>
<td>Configures static routes installed on DHCP clients</td>
</tr>
<tr>
<td>update</td>
<td>Controls DDNS service usage</td>
</tr>
</tbody>
</table>
12.1.3.2.14 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
option <OPTION-NAME> [ <DHCP-OPTION-IP> | <DHCP-OPTION-ASCII> ]
```

Parameters

- **option <OPTION-NAME> [ <DHCP-OPTION-IP> | <DHCP-OPTION-ASCII> ]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;OPTION-NAME&gt;</td>
<td>Sets the name of the DHCP option</td>
</tr>
<tr>
<td>&lt;DHCP-OPTION-IP&gt;</td>
<td>Sets DHCP option as an IP address</td>
</tr>
<tr>
<td>&lt;DHCP-OPTION-ASCII&gt;</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

```
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
12.1.3.2.15 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**
```
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**
```
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**
```
no
```
Removes static route settings
12.1.3.2.16 respond-via-unicast

 dhcp-pool-mode commands

Sends DHCP offer and acknowledgement as unicast messages

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
dns server 192.168.13.9
dns 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
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>
12.1.3.2.17 update

dhcp-pool-mode commands

Controls the use of the DDNS service

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
update dns {override}

Parameters
- update dns {override}

<table>
<thead>
<tr>
<th>dns {override}</th>
<th>Configures DDNS parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>override</td>
<td>Optional. Enables DDNS 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.

Table 12.6 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 12-40</td>
</tr>
<tr>
<td>static-binding-mode commands</td>
<td>Invokes static binding configuration commands</td>
<td>page 12-42</td>
</tr>
</tbody>
</table>
12.1.3.3.1 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
static-binding [client-identifier <CLIENT>|hardware-address <MAC>]
```

Parameters

- `client-identifier <CLIENT>` Enables a static binding configuration for a client based on its client identifier (as provided by DHCP option 61 and its key value)
  - `<CLIENT>` – Specify the client identifier (DHCP option 61).
- `hardware-address <MAC>` Enables a static binding configuration for a client based on its MAC address
  - `<MAC>` – Specify the MAC address of the client.

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
dns server 192.168.13.9
dns 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
static-binding client-identifier test
rfs4000-229D58(config-dhcp-policy-test-pool-testPool-binding-test)#
rfs4000-229D58(config-dhcp-policy-test-pool-testPool-binding-test)#?
```

DHCP static binding Mode commands:

- bootfile
- client-name
- default-router
- dns-server
- domain-name
- ip-address
- netbios-name-server
- netbios-node-type
- next-server
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

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-dhcp-policy-test-pool-testPool-binding-test)#

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1)#static-binding hardware-address
11-22-33-44-55-66

rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-11-22-33-44-55-66)#?

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

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-pool-pool1-binding-11-22-33-44-55-66)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets values or disables the DHCP policy static binding settings</td>
</tr>
<tr>
<td>static-binding-mode</td>
<td>Invokes static binding configuration commands</td>
</tr>
</tbody>
</table>
**12.1.3.3.2 static-binding-mode commands**

Table 12.7 summarizes static binding configuration 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 12-43</td>
</tr>
<tr>
<td>client-name</td>
<td>Configures a client name</td>
<td>page 12-44</td>
</tr>
<tr>
<td>default-router</td>
<td>Configures default router or gateway IP address</td>
<td>page 12-45</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 12-46</td>
</tr>
<tr>
<td>domain-name</td>
<td>Sets the network pool’s domain name</td>
<td>page 12-48</td>
</tr>
<tr>
<td>ip-address</td>
<td>Configures a host’s fixed IP address</td>
<td>page 12-49</td>
</tr>
<tr>
<td>netbios-name-server</td>
<td>Configures a NetBIOS (WINS) name server IP address</td>
<td>page 12-50</td>
</tr>
<tr>
<td>netbios-node-type</td>
<td>Defines the NetBIOS node type</td>
<td>page 12-51</td>
</tr>
<tr>
<td>next-server</td>
<td>Specifies the next server used in the boot process</td>
<td>page 12-52</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 12-53</td>
</tr>
<tr>
<td>option</td>
<td>Configures raw DHCP options</td>
<td>page 12-55</td>
</tr>
<tr>
<td>respond-via-unicast</td>
<td>Sends a DHCP offer and DHCP Ack as unicast messages</td>
<td>page 12-56</td>
</tr>
<tr>
<td>static-route</td>
<td>Adds static routes installed on DHCP clients</td>
<td>page 12-57</td>
</tr>
</tbody>
</table>
12.1.3.3 bootfile

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
bootfile <IMAGE-FILE-PATH>
```

Parameters

- `<IMAGE-FILE-PATH>`

Examples

```
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#bootfile test.txt
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#show context
  static-binding client-identifier test
  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
- `bootp` - Configures BOOTP protocol parameters
12.1.3.3.4 client-name

- **static-binding-mode commands**

Configures the client's name

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

client-name <NAME>

**Parameters**

- client-name <NAME>

<table>
<thead>
<tr>
<th>&lt;NAME&gt;</th>
<th>Specify the name of the client using this static IP address host pool. Do not include the domain name.</th>
</tr>
</thead>
</table>

**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
  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 |
12.1.3.5 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

| {<IP1>|<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
client-name RFID
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 |
12.1.3.3.6 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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:
|--------------------------|--------------------------------------------------|
| <HOST-ALIAS-NAME>        | Configures the primary DNS server's host alias. The host alias is mapped to the DNS server's IP address, and should be existing and configured.
| <HOST-ALIAS-NAME1>       | Optional. Configures the secondary DNS server's host alias (if configured). 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.

| {<IP1>|<HOST-ALIAS-NAME1>} | Optional. Configures the secondary DNS server, using one of the following options:
|---------------------------|---------------------------------------------------------------------------|
| <HOST-ALIAS-NAME1>        | Specifies 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

| no            | Resets values or disables DHCP pool static binding settings |
12.1.3.7 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

domain-name <DOMAIN-NAME>

**Parameters**

- domain-name <DOMAIN-NAME>

<table>
<thead>
<tr>
<th>&lt;DOMAIN-NAME&gt;</th>
<th>Defines the domain name for the static binding configuration</th>
</tr>
</thead>
</table>

**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.
12.1.3.8 ip-address

static-binding-mode commands

Configures a fixed IP address for a host

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
ip-address \[<IP>|<HOST-ALIAS-NAME>\]

Parameters
- ip-address \[<IP>|<HOST-ALIAS-NAME>\]

<table>
<thead>
<tr>
<th>&lt;IP&gt;</th>
<th>Configures a fixed IP address (in dotted decimal format) of the client using this host pool</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;HOST-ALIAS-NAME&gt;</td>
<td>Configures a host alias identifying the fixed IP address of the client using this host pool</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.

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
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#

Related Commands
- no
  Resets values or disables DHCP pool static binding settings
12.1.3.3.9 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP&gt;</td>
<td>Specifies the primary NetBIOS name server’s IP address</td>
</tr>
<tr>
<td>&lt;HOST-ALIAS-NAME&gt;</td>
<td>Specifies a host alias, mapped to the primary NetBIOS name server’s IP address</td>
</tr>
</tbody>
</table>

| {<IP1>|<HOST-ALIAS-NAME1>} | Optional. Configures the secondary NetBIOS name server, using one of the following options:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP1&gt;</td>
<td>Specifies the secondary NetBIOS name server’s IP address</td>
</tr>
</tbody>
</table>
| <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**

```
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
dynamic-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
  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
### 12.1.3.10 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```
netbios-node-type [b-node|h-node|m-node|p-node]
```

#### Parameters

- **netbios-node-type [b-node|h-node|m-node|p-node]**

| [b-node|h-node|m-node|p-node] | Defines the netbios node type |
|-----------------------------|-----------------------------|
| 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 | Sets the node type as hybrid. Uses a combination of two or more nodes. |
| m-node | Sets the node type as mixed. A mixed node uses broadcasted queries to find a node, and failing that, queries a known p-node name server for the address. |
| 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

```bash
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
  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
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#
```

#### Related Commands

- **no** Resets values or disables DHCP pool static binding settings
12.1.3.3.11 next-server

*static-binding-mode commands*

Configures the next server utilized in the boot process

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>
</tbody>
</table>

- <HOST-ALIAS-NAME>—Specify the host alias name. It 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.

**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 |
### 12.1.3.3.12 no

Negates or reverts static binding settings for the selected DHCP server policy.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### 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]
```

```
nos option <OPTION-NAME>
```

#### Parameters

- **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 bootfile
    - Removes the BOOTP bootfile configuration
  - no client-name
    - Removes the client name from the static binding configuration
  - no default-router
    - Removes the default router from the static binding configuration
  - no dns-server
    - Removes the DNS server from the static binding configuration
  - no domain-name
    - Removes the DNS domain name
  - no ip-address
    - Removes IP addresses from the static binding configuration
  - no netbios-name-server
    - Removes the NetBIOS name server
  - no netbios-node-type
    - Removes the NetBIOS node type
  - no next-server
    - Removes the next server utilized in the boot process
  - no respond-via-unicast
    - Sets the DHCP offer and ACK as broadcast instead of unicast

- **no option <OPTION-NAME>**

  - Resets the DHCP option to the value specified by the <OPTION-NAME> parameter

- **no static-route <IP/MASK> <GATEWAY-IP>**

  - no static-route
    - Removes static routes from the static binding configuration
  - <IP/MASK>
    - Removes information for a particular subnet
  - <GATEWAY-IP>
    - Removes gateway information from a particular subnet’s routing information
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
c 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)#
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
c static-binding client-identifier test
   client-name RFID
   domain-name documentation
   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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bootfile</td>
<td>Configures the BOOTP boot file path</td>
</tr>
<tr>
<td>client-name</td>
<td>Configures a host's name</td>
</tr>
<tr>
<td>default-router</td>
<td>Configures default routers for a DHCP pool</td>
</tr>
<tr>
<td>dns-server</td>
<td>Configures default DNS servers for a DHCP pool</td>
</tr>
<tr>
<td>domain-name</td>
<td>Configures the DDNS domain name for a DHCP pool</td>
</tr>
<tr>
<td>ip-address</td>
<td>Configures IP addresses assigned to a host</td>
</tr>
<tr>
<td>netbios-name-server</td>
<td>Configures the NetBIOS name server</td>
</tr>
<tr>
<td>netbios-node-type</td>
<td>Configures the NetBIOS node type</td>
</tr>
<tr>
<td>next-server</td>
<td>Configures the next server utilized in the BOOTP boot process</td>
</tr>
<tr>
<td>option</td>
<td>Configures the DHCP option</td>
</tr>
<tr>
<td>respond-via-unicast</td>
<td>Configures the DHCP request and ACK sending mode (broadcast or unicast)</td>
</tr>
<tr>
<td>static-route</td>
<td>Configures the static binding's route</td>
</tr>
</tbody>
</table>
12.1.3.13 option

Configure 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
option <OPTION-NAME> [<DHCP-OPTION-IP>|<DHCP-OPTION-ASCII>]

Parameters
- option <OPTION-NAME> [<DHCP-OPTION-IP>|<DHCP-OPTION-ASCII>]

<table>
<thead>
<tr>
<th>&lt;OPTION-NAME&gt;</th>
<th>Sets the DHCP option name</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;DHCP-OPTION-IP&gt;</td>
<td>Sets the DHCP option as an IP address</td>
</tr>
<tr>
<td>&lt;DHCP-OPTION-ASCII&gt;</td>
<td>Sets the DHCP option as an ASCII string</td>
</tr>
</tbody>
</table>

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)#
12.1.3.3.14 respond-via-unicast

(static-binding-mode commands)

Sends a DHCP offer and DHCP acknowledge as unicast messages

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
respond-via-unicast
rfs7000-37FABE(config-dhcp-policy-test-pool-pool1-binding-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets values or disables DHCP pool static binding settings</td>
</tr>
</tbody>
</table>
12.1.3.3.15 static-route

*static-binding-mode commands*

Adds static routes to the static binding configuration

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`static-route <IP/MASK> <GATEWAY-IP>`

**Parameters**

- `static-route <IP/MASK> <GATEWAY-IP>`

<table>
<thead>
<tr>
<th><code>&lt;IP/MASK&gt;</code></th>
<th>Sets the subnet for which the static route is configured</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;GATEWAY-IP&gt;</code></td>
<td>Specify the gateway's IP address</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs7000-37FA BE(config-dhcp-policy-test-pool-pool1-binding-1)#static-route 10.0.0.0/10 157.235.208.235
rfs7000-37FA BE(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
rfs7000-37FA BE(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 an RF Domain, cluster setup, and a Virtual Router Redundancy Protocol (VRRP) master/client setup.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

dhcp-server activation-criteria [cluster-master|rf-domain-manager|vrrp-master <1-255>]

Parameters

- dhcp-server activation-criteria [cluster-master|rf-domain-manager|vrrp-master <1-255>]

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

<table>
<thead>
<tr>
<th>dhcp-server</th>
<th>Enables/disables 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 &lt;1-255&gt; — 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>
<tr>
<td>• &lt;1-255&gt; — Specify the VRRP group number from 1 - 255.</td>
<td></td>
</tr>
</tbody>
</table>
rfs4000-229D58(config-dhcp-policy-test)#show context
dhcp-server-policy test
rfs4000-229D58(config-dhcp-policy-test)#

<table>
<thead>
<tr>
<th><strong>Related Commands</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
</tr>
</tbody>
</table>

Removes the DHCP service activation criteria configured on this DHCP server policy
### 12.1.5 no

- **dhcp-server-policy**

  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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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 bootp ignore**
  - Removes the BOOTP specific configuration
- **no dhcp-class <DHCP-CLASS-NAME>**
  - Removes a specified DHCP class
    - `<DHCP-CLASS-NAME>` — Specifies the DHCP class name
  - **no dhcp-pool <DHCP-POOL-NAME>**
    - Removes a specified DHCP pool
      - `<DHCP-POOL-NAME>` — Specifies the DHCP pool name
  - **no dhcp-server activation-criteria**
    - Removes the DHCP service activation criteria configured on this DHCP server policy
  - **no option <DHCP-OPTION>**
    - Removes a DHCP option
    - `<DHCP-OPTION>` — Sets the DHCP option
- no ping timeout

| no ping timeout | Resets the DHCP server ping timeout
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• timeout</td>
<td>Resets the timeout to its default</td>
</tr>
</tbody>
</table>

**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)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>bootp</th>
<th>Configures the BOOTP protocol parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>dhcp-class</td>
<td>Configures the DHCP user class parameters</td>
</tr>
<tr>
<td>dhcp-pool</td>
<td>Configures the DHCP pool</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>
</tr>
<tr>
<td>option</td>
<td>Configures the DHCP options</td>
</tr>
<tr>
<td>ping</td>
<td>Configures the DHCP ping timeout</td>
</tr>
</tbody>
</table>
### 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
option <OPTION-NAME> <0-250> [ascii|hexstring|ip]
```

**Parameters**

- `option <OPTION-NAME> <0-250> [ascii|hexstring|ip]`

<table>
<thead>
<tr>
<th>&lt;OPTION-NAME&gt;</th>
<th>Configures the option name</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0-250&gt;</td>
<td>Configures the DHCP option code from 0 - 250</td>
</tr>
<tr>
<td>ascii</td>
<td>Configures the DHCP option as an ASCII string</td>
</tr>
<tr>
<td>hexstring</td>
<td>Configures the DHCP option as a hexadecimal string</td>
</tr>
<tr>
<td>ip</td>
<td>Configures the DHCP option as an IP address</td>
</tr>
</tbody>
</table>

**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)#option option1 200 ascii
rfs7000-37FABE(config-dhcp-policy-test)#show context
dhcp-server-policy test
    option option1 200 ascii
rfs7000-37FABE(config-dhcp-policy-test)#
```

**Related Commands**

- `no` Removes DHCP server options
12.1.7 ping

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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

Table 12.8 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 12-65</td>
</tr>
<tr>
<td>option</td>
<td>Configures this DHCPv6 server policy's DHCP option settings, such as enterprise (vendor ID)</td>
<td>page 12-77</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 12-79</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 12-80</td>
</tr>
<tr>
<td>no</td>
<td>Negates or reverts this DHCPv6 server policy's settings</td>
<td>page 12-81</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
12.2.1 dhcpv6-pool

Table 12.9 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 12-66</td>
</tr>
<tr>
<td>dhcpv6-pool-mode commands</td>
<td>Summarizes DHCPv6 pool configuration mode commands</td>
<td>page 12-68</td>
</tr>
</tbody>
</table>
12.2.1.1 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

dhcpv6-pool <POOL-NAME>

Parameters
- dhcpv6-pool <POOL-NAME>

Examples

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
- 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-pool-DHCPv6Pool1)#

rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#show context
dhcpv6-server-policy test
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-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.
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></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

Table 12.10 summarizes DHCP pool configuration commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>dns-server</td>
<td>Configures this DHCPv6 pool’s DNS server</td>
<td>page 12-69</td>
</tr>
<tr>
<td>domain-name</td>
<td>Configures this DHCPv6 pool’s domain name</td>
<td>page 12-70</td>
</tr>
<tr>
<td>network</td>
<td>Configures this DHCPv6 pool’s network</td>
<td>page 12-71</td>
</tr>
<tr>
<td>option</td>
<td>Configures this DHCPv6 pool’s raw DHCPv6 options. This is the vendor-specific option used in this DHCPv6 pool.</td>
<td>page 12-74</td>
</tr>
<tr>
<td>refresh-time</td>
<td>Configures this DHCPv6 pool’s refresh time in seconds</td>
<td>page 12-75</td>
</tr>
<tr>
<td>sip</td>
<td>Configures this DHCPv6 pool’s Session Initiation Protocol (SIP) server setting</td>
<td>page 12-76</td>
</tr>
<tr>
<td>no</td>
<td>Negates or reverts this DHCPv6 pool’s settings</td>
<td>page 12-72</td>
</tr>
</tbody>
</table>
12.2.1.2.1 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**
dns-server <IPv6> {<IPv61>}

**Parameters**
- dns-server <IPv6> {<IPv61>}

<table>
<thead>
<tr>
<th>&lt;IPv6&gt;</th>
<th>Configures the primary DNS server’s IPv6 address</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IPv6&gt;</td>
<td>&lt;IPv6&gt; — Specify the DNS server’s IPv6 address (the server associated with this DHCP pool).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&lt;IPv61&gt;</th>
<th>Configures the secondary DNS server’s IPv6 address</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IPv6&gt;</td>
<td>&lt;IPv6&gt; — Specify the secondary DNS server’s IPv6 address (the server associated with this DHCP pool).</td>
</tr>
</tbody>
</table>

**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
12.2.1.2.2 domain-name

* dhcpv6-pool-mode commands

Configures this DHCPv6 pool's domain name

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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**

```bash
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
12.2.1.2.3 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
network [IPv6/M | NETWORK-ALIAS-NAME]
```

Parameters

- **network** <IPv6/M>

Examples

```
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#network 2002::0/64
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
12.2.1.2.4 **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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
no [dns-server|domain-name|network|option|refresh-time|sip]
```

**Parameters**

- `no [dns-server|domain-name|network|option|refresh-time|sip]`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no dns-server</td>
<td>Removes this DHCPv6 pool’s configured DNS server settings</td>
</tr>
<tr>
<td>no domain-name</td>
<td>Removes this DHCPv6 pool’s domain name</td>
</tr>
<tr>
<td>no network</td>
<td>Removes the network IPv6 address and mask configured for this DHCPv6 pool</td>
</tr>
<tr>
<td>no option</td>
<td>Removes this DHCPv6 pool’s DHCP option settings</td>
</tr>
<tr>
<td>no refresh-time</td>
<td>Removes or reverts the configured DHCPv6 pool’s refresh time</td>
</tr>
<tr>
<td>no sip</td>
<td>Removes this DHCPv6 pool’s SIP server setting</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
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)#
```

```plaintext
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#no option DHCPv6Pool1Option
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#no refresh-time
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>dns-server</strong></td>
<td>Configures this DHCPv6 pool’s DNS server</td>
</tr>
<tr>
<td><strong>domain-name</strong></td>
<td>Configures this DHCPv6 pool’s domain name</td>
</tr>
<tr>
<td><strong>network</strong></td>
<td>Configures this DHCPv6 pool’s network</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>option</td>
<td>Configures this DHCPv6 pool's raw DHCPv6 options. This is the vendor-specific option in the DHCPv6 pool.</td>
</tr>
<tr>
<td>refresh-time</td>
<td>Configures this DHCPv6 pool's refresh time in seconds</td>
</tr>
<tr>
<td>sip</td>
<td>Configures this DHCPv6 pool's SIP server setting</td>
</tr>
</tbody>
</table>
12.2.1.2.5 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

option <OPTION-NAME> [<DHCPv6-OPTION-IP>|<DHCPv6-OPTION-ASCII>]

Parameters

- option <OPTION-NAME> [<DHCPv6-OPTION-IP>|<DHCPv6-OPTION-ASCII>]

<table>
<thead>
<tr>
<th>&lt;OPTION-NAME&gt;</th>
<th>Sets the name of the DHCPv6 option</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;DHCPv6-OPTION-IP&gt;</td>
<td>Sets DHCPv6 option as an IPv6 address</td>
</tr>
<tr>
<td>&lt;DHCPv6-OPTION-ASCII&gt;</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

no
| Removes this DHCPv6 pool's DHCP option settings |
12.2.1.2.6 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`refresh-time <600-4294967295>`

**Parameters**

- `refresh-time <600-4294967295>`

**Examples**

```plaintext
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
12.2.1.2.7 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
sip [address <IPv6>|domain-name <DOMAIN-NAME>]
```

Parameters

- `sip [address <IPv6>|domain-name <DOMAIN-NAME>]`

Examples

```
rfs7000-37FABE(config-dhcpv6-server-policy-test-pool-DHCPv6Pool1)#sip domain-name TechPubsSIP
```

```
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)#
```

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

### Syntax

```
option <OPTION-NAME> <0-254> [ascii|hexstring|ipv6] <1-4294967295>
```

### Parameters

- **option**
  - **<OPTION-NAME>**
    - Specify a unique name for this DHCP option. The name should describe option’s function.
  - **<0-254>**
    - Specify a DHCP option code for this option.
    - *Note:* The system allows only one code, of the same value, for each DHCP option used in each DHCPv6 server policy.
  - **ascii**
    - Specifies the option type as ASCII (sends an ASCII compliant string to the client)
  - **hexstring**
    - Specifies the option type as a string of hexadecimal characters (sends a hexadecimal string to the client)
  - **ipv6**
    - Specifies the option type as IPv6 address (sends an IPv6 compatible address to the client)
  - **<1-4294967295>**
    - This parameter is common to all option types.
    - *Note:* Each vendor should have a unique vendor ID used by the DHCP server to issue vendor-specific DHCP options.

### 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>no</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

server-preference <0-255>

Parameters

- server-preference <0-255>

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
rfs7000-6DCD4B(config-dhcpv6-server-policy-test)#

Related Commands

no

Removes this DHCPv6 server's preference value
12.2.5 no

Negates or reverts this DHCPv6 server policy's settings

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [dhcpv6-pool|option|restrict-vendor-options|server-preference]

Parameters

- no [dhcpv6-pool|option|restrict-vendor-options|server-preference]

<table>
<thead>
<tr>
<th>no dhcpv6-pool &lt;POOL-NAME&gt;</th>
<th>Removes the DHCPv6 pool identified by the &lt;POOL-NAME&gt; keyword</th>
</tr>
</thead>
<tbody>
<tr>
<td>no option</td>
<td>Removes the DHCPv6 server option settings configured for this DHCPv6 server policy</td>
</tr>
<tr>
<td>no restrict-vendor-options</td>
<td>Removes restriction on sending of vendor-specific options in DHCPv6 server replies to IPv6 clients</td>
</tr>
<tr>
<td>no server-preference</td>
<td>Removes this DHCPv6 server's preference value</td>
</tr>
</tbody>
</table>

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)#

Related Commands

dhcpv6-pool | Creates a DHCPv6 pool and enters its configuration mode
option      | Configures this DHCPv6 server policy's DHCP option settings
restrict-vendor-options | Restricts the use of vendor-specific DHCP options on this DHCPv6 server policy
server-preference | Configures this DHCPv6 server's preference value
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
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)#
13.1 firewall-policy

Table 13.1 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 13-6</td>
</tr>
<tr>
<td>dhcp-offer-convert</td>
<td>Enables the conversion of broadcast DHCP offers to unicast</td>
<td>page 13-7</td>
</tr>
<tr>
<td>dns-snoop</td>
<td>Sets the timeout value for DNS entries</td>
<td>page 13-8</td>
</tr>
<tr>
<td>firewall</td>
<td>Configures the wireless firewall</td>
<td>page 13-9</td>
</tr>
<tr>
<td>flow</td>
<td>Defines a session flow timeout</td>
<td>page 13-10</td>
</tr>
<tr>
<td>ip</td>
<td>Configures Internet Protocol (IP) components on this firewall policy</td>
<td>page 13-12</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 13-39</td>
</tr>
<tr>
<td>stateful-packet-inspection-12</td>
<td>Enables stateful packets-inspection in layer 2 firewall</td>
<td>page 13-38</td>
</tr>
<tr>
<td>storm-control</td>
<td>Defines storm control and logging settings</td>
<td>page 13-40</td>
</tr>
<tr>
<td>virtual-defragmentation</td>
<td>Enables virtual defragmentation of IPv4 packets</td>
<td>page 13-42</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
13.1.1 acl-logging

Enables logging on flow creating traffic

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
 acl-logging
```

Parameters

None

Examples

```
 rfs4000-229D58(config-fw-policy-test)#acl-logging
 rfs4000-229D58(config-fw-policy-test)#

 rfs4000-229D58(config-fw-policy-test)#no acl-logging
 rfs4000-229D58(config-fw-policy-test)#

 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

<table>
<thead>
<tr>
<th>firewall-policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables preconfigured algorithms supporting a particular protocol</td>
</tr>
<tr>
<td>The Firewall policy allows traffic filtering at the application layer using the Application Layer Gateway (ALG) feature</td>
</tr>
</tbody>
</table>

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

alg [dns|facetime|ftp|sccp|sip|tftp]

**Parameters**

- alg [dns|facetime|ftp|sccp|sip|tftp]

<table>
<thead>
<tr>
<th>alg</th>
<th>Enables preconfigured algorithms. The default is enabled.</th>
</tr>
</thead>
<tbody>
<tr>
<td>dns</td>
<td>Enables the Domain Name System (DNS) algorithm. The default is enabled.</td>
</tr>
<tr>
<td>facetime</td>
<td>Enables the FaceTime algorithm. The default is enabled.</td>
</tr>
<tr>
<td>ftp</td>
<td>Enables the File Transfer Protocol (FTP) algorithm. The default is enabled.</td>
</tr>
<tr>
<td>sccp</td>
<td>Enables the Skinny Call Control Protocol (SCCP) algorithm. The default is enabled.</td>
</tr>
<tr>
<td>sip</td>
<td>Enables the Session Initiation Protocol (SIP) algorithm. The default is enabled.</td>
</tr>
<tr>
<td>tftp</td>
<td>Enables the Trivial File Transfer Protocol (TFTP) algorithm. The default is enabled.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-fw-policy-test)#alg tftp
```

**Related Commands**

<table>
<thead>
<tr>
<th>no</th>
<th>Disables or resets a specified algorithm</th>
</tr>
</thead>
</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.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
clamp tcp-mss

Parameters
- clamp 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

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
  no ip dos tcp-sequence-past-window
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

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

dns-snoop entry-timeout <30-86400>

**Parameters**

- *dns-snoop entry-timeout <30-86400>*

<table>
<thead>
<tr>
<th>entry-timeout</th>
<th>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.</th>
</tr>
</thead>
</table>

**Examples**

```
rfs7000-37FABE(config-fw-policy-test)#dns-snoop entry-timeout 35
rfs7000-37FABE(config-fw-policy-test)#show context
firewall-policy
tcp-sequence-past-window
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
firewall enable

Parameters

- firewall enable

| firewall enable | Enables wireless firewalls |

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

**firewall-policy**

Defines the session flow timeout interval for different packet types

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
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**
  
<table>
<thead>
<tr>
<th>dhcp</th>
<th>Performs a stateful check on DHCP packets. This feature is enabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>stateful</td>
<td>Configures DHCP packet flow</td>
</tr>
</tbody>
</table>

- **flow timeout [icmp|other] <1-32400>**
  
<table>
<thead>
<tr>
<th>timeout</th>
<th>Configures a packet timeout</th>
</tr>
</thead>
<tbody>
<tr>
<td>icmp</td>
<td>Configures the timeout for ICMP packets. The default is 30 seconds.</td>
</tr>
<tr>
<td>other</td>
<td>Configures the timeout for packets other than ICMP, TCP, or UDP. The default is 30 seconds.</td>
</tr>
<tr>
<td>&lt;1-32400&gt;</td>
<td>Configures the timeout from 1 - 32400 seconds</td>
</tr>
</tbody>
</table>

- **flow timeout udp <15-32400>**
  
<table>
<thead>
<tr>
<th>timeout</th>
<th>Configures a packet timeout</th>
</tr>
</thead>
<tbody>
<tr>
<td>udp</td>
<td>Configures the timeout for UDP packets. The default is 30 seconds.</td>
</tr>
<tr>
<td>&lt;15-32400&gt;</td>
<td>Configures the timeout from 15 - 32400 seconds</td>
</tr>
</tbody>
</table>

- **flow timeout tcp [close-wait|reset|setup|stateless-fin-or-reset|stateless-general] <1-32400>**
  
<table>
<thead>
<tr>
<th>timeout</th>
<th>Configures a packet timeout</th>
</tr>
</thead>
<tbody>
<tr>
<td>tcp</td>
<td>Configures the timeout for TCP packets</td>
</tr>
<tr>
<td>close-wait</td>
<td>Configures the closed TCP flow timeout. The default is 10 seconds.</td>
</tr>
<tr>
<td>reset</td>
<td>Configures the reset TCP flow timeout. The default is 10 seconds.</td>
</tr>
<tr>
<td>setup</td>
<td>Configures the opening TCP flow timeout. The default is 10 seconds.</td>
</tr>
<tr>
<td>&lt;1-32400&gt;</td>
<td>Configures the timeout from 1 - 32400 seconds</td>
</tr>
<tr>
<td><code>stateless-fin-or-reset</code></td>
<td>Configures stateless TCP flow timeout created with the FIN or RESET packets. The default is 10 seconds.</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>stateless-general</code></td>
<td>Configures the stateless TCP flow timeout. The default is 90 seconds (1m 30 s).</td>
</tr>
<tr>
<td><code>&lt;1-32400&gt;</code></td>
<td>Configures the timeout from 1 - 32400 seconds</td>
</tr>
</tbody>
</table>

- `flow timeout tcp established `<15-32400>`

<table>
<thead>
<tr>
<th><code>timeout</code></th>
<th>Configures the packet timeout</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>tcp</code></td>
<td>Configures the timeout for TCP packets</td>
</tr>
<tr>
<td><code>established</code></td>
<td>Configures the established TCP flow timeout. The default is 5400 seconds.</td>
</tr>
<tr>
<td><code>&lt;15-32400&gt;</code></td>
<td>Configures the timeout from 15 - 32400 seconds</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-rw-policy-test)#flow timeout udp 10000
rfs7000-37FABE(config-rw-policy-test)#flow timeout icmp 16000
rfs7000-37FABE(config-rw-policy-test)#flow timeout other 16000
rfs7000-37FABE(config-rw-policy-test)#flow timeout tcp established 1500

rfs7000-37FABE(config-fw-policy-test)#show context
dhcp-offer-convert
dns-snoop entry-timeout 35
eas-snoop entry-timeout 35
dhcp-offer-convert
dns-snoop entry-timeout 35
eas-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

> firewall-policy

Configures Internet Protocol (IP) components

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ip [dos|tcp]
ip dos {ascend|broadcast-multicast-icmp|chargen|fraggle|ftp-bounce|invalid-protocol|
ip-ttl-zero|ipspoof|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|ipspoof|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 {ascend|broadcast-multicast-icmp|chargen|fraggle|ftp-bounce|invalid-protocol|
ip-ttl-zero|ipspoof|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} [drop-only]
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|ipspoof|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>
</tbody>
</table>

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.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>broadcast-multicast-icmp</td>
<td>Optional. Detects broadcast or multicast ICMP DoS attacks</td>
</tr>
<tr>
<td></td>
<td>Broadcast or multicast ICMP DoS attacks take advantage of ICMP behavior in</td>
</tr>
<tr>
<td></td>
<td>response to echo replies. These attacks spoof the source address of the</td>
</tr>
<tr>
<td></td>
<td>target and send ICMP broadcast or multicast echo requests to the rest of</td>
</tr>
<tr>
<td></td>
<td>the network, flooding the target machine with replies.</td>
</tr>
<tr>
<td>chargen</td>
<td>Optional. Detects Chargen attacks</td>
</tr>
<tr>
<td></td>
<td>The Character Generation Protocol (chargen) is an IP suite service primarily</td>
</tr>
<tr>
<td></td>
<td>used for testing and debugging networks. It is also used as a source of</td>
</tr>
<tr>
<td></td>
<td>generic payload for bandwidth and QoS measurements.</td>
</tr>
<tr>
<td></td>
<td>The Chargen attack establishes a Telnet connection to port 19 and attempts</td>
</tr>
<tr>
<td></td>
<td>to use the character generator service to create a string of characters</td>
</tr>
<tr>
<td></td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>The Fraggle DoS attack uses a list of broadcast addresses to send spoofed</td>
</tr>
<tr>
<td></td>
<td>UDP packets to each broadcast address’ echo port (port 7). Each of those</td>
</tr>
<tr>
<td></td>
<td>addresses that have port 7 open will respond to the request generating a</td>
</tr>
<tr>
<td></td>
<td>lot of traffic on the network. For those that do not have port 7 open they</td>
</tr>
<tr>
<td></td>
<td>will send an unreachable message back to the originator, further clogging</td>
</tr>
<tr>
<td></td>
<td>the network with more traffic.</td>
</tr>
<tr>
<td>ftp-bounce</td>
<td>Optional. Detects FTP bounce attacks</td>
</tr>
<tr>
<td></td>
<td>A FTP bounce attack is a MIM attack that enables an attacker to open a port</td>
</tr>
<tr>
<td></td>
<td>on a different machine using FTP. FTP requires that when a connection is</td>
</tr>
<tr>
<td></td>
<td>requested by a client on the FTP port (21), another connection must open</td>
</tr>
<tr>
<td></td>
<td>between the server and the client. To confirm, the PORT command has the</td>
</tr>
<tr>
<td></td>
<td>client specify an arbitrary destination machine and port for the data</td>
</tr>
<tr>
<td></td>
<td>connection. This is exploited by the attacker to gain access to a device</td>
</tr>
<tr>
<td></td>
<td>that may not be the originating client.</td>
</tr>
<tr>
<td>invalid-protocol</td>
<td>Optional. Enables a check for an invalid protocol number</td>
</tr>
<tr>
<td></td>
<td>Attackers may use vulnerability in the endpoint implementation by sending</td>
</tr>
<tr>
<td></td>
<td>invalid protocol fields, or may misuse the misinterpretation of endpoint</td>
</tr>
<tr>
<td></td>
<td>software. This can lead to inadvertent leakage of sensitive network topology</td>
</tr>
<tr>
<td></td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>(0)</td>
</tr>
<tr>
<td></td>
<td>The TCP IP TTL Zero DoS attack sends spoofed multicast packets onto the</td>
</tr>
<tr>
<td></td>
<td>network which have a <em>Time to Live</em> (TTL) of 0. This causes packets to loop</td>
</tr>
<tr>
<td></td>
<td>back to the spoofed originating machine, and can cause the network to</td>
</tr>
<tr>
<td></td>
<td>overload.</td>
</tr>
<tr>
<td>ipsproof</td>
<td>Optional. Enables a check for the IP spoofing DoS attacks</td>
</tr>
<tr>
<td></td>
<td>IP Spoof is a category of DoS attack that sends IP packets with forged</td>
</tr>
<tr>
<td></td>
<td>source addresses. This can hide the identity of the attacker.</td>
</tr>
<tr>
<td>land</td>
<td>Optional. Detects LAND DoS attacks</td>
</tr>
<tr>
<td></td>
<td>A <em>Local Area Network Denial</em> (LAND) is a DoS attack where IP packets are</td>
</tr>
<tr>
<td></td>
<td>spoofed and sent to a device where the source IP and destination IP of the</td>
</tr>
<tr>
<td></td>
<td>packet are the target device's IP, and similarly, the source port and</td>
</tr>
<tr>
<td></td>
<td>destination port are open ports on the same device. This causes the</td>
</tr>
<tr>
<td></td>
<td>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>Attack Type</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>router-advt</td>
<td>Optional. Detects router-advertisement attacks. This attack uses ICMP to redirect the network router function to some other host. If that host cannot 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).</td>
</tr>
<tr>
<td>router-solicit</td>
<td>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). (For more information about the process of ICMP router solicitation, see “Routing Sequences for ICMP.”) 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.</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. 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.</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>tcp-intercept</td>
<td>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 overwhelms 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.</td>
</tr>
<tr>
<td>tcp-null-scan</td>
<td>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.</td>
</tr>
<tr>
<td>tcp-post-syn</td>
<td>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.</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>
</tbody>
</table>
### ip dos

- **ascend**
  - 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.
- **broadcast-multicast-icmp**
  - Optional. Detects broadcast or multicast ICMP packets as an attack
- **chargen**
  - 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.
- **fraggle**
  - Optional. A Fraggle DoS attack checks for UDP packets to or from port 7 or 19
- **ftp-bounce**
  - 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.
- **invalid-protocol**
  - Optional. Enables a check for invalid protocol number
- **ip-ttl-zero**
  - Optional. Enables a check for the TCP/IP TTL field having a value of zero (0)

### log-and-drop
- Logs the event and drops the packet

### log-only
- Logs the event only, the packet is not dropped

### log-level
- Configures the log level
- `<0-7>`
  - Sets the numeric logging level

### dos
- Identifies IP events as DoS events

### winnuke
- 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.

### udp-short-hdr
- Optional. Enables the identification of truncated UDP headers and UDP header length fields
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipsproof</td>
<td>Optional. Enables a check for IP spoofing DoS attack</td>
</tr>
<tr>
<td>land</td>
<td>Optional. A Local Area Network Denial (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 attack vector.</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 Maximum Segment Size (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-sync|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-fw-policy-test)#ip dos fraggle drop-only`
- `rfs7000-37FABE(config-fw-policy-test)#ip dos tcp-max-incomplete high 600`
- `rfs7000-37FABE(config-fw-policy-test)#ip dos tcp-max-incomplete low 60`
- `rfs7000-37FABE(config-fw-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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Resets firewall policy IP components</td>
</tr>
</tbody>
</table>
### 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
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**
  - **conflict**
    - Action performed when a conflict exists between the IP address and MAC address. This option is enabled by default.
  - **drop-only**
    - Drops a packet without logging

- **ip-mac conflict [log-and-drop|log-only] log-level [<0-7>|alerts|critical|debug|emergencies|errors|informational|notifications|warnings]**
  - **conflict**
    - Action performed when a conflict exists between the IP address and MAC address. This option is enabled by default.
  - **log-and-drop**
    - Logs the event and drops the packet. This is the default setting.
  - **log-only**
    - Logs the event only, the packet is not dropped
  - **log-level**
    - Configures the log level
  - **<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
  - **notification**
    - Numerical severity 5. Indicates a normal but significant condition
  - **warnings**
    - Numerical severity 4. Indicates a warning condition. This is the default setting
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]

    routing                  | Defines a routing table based action                                                                                                                                                               |
    conflict                 | Action performed when a conflict exists in the routing table. This option is enabled by default.                                                                                                      |
    log-and-drop             | Logs the event and drops the packet. This is the default setting.                                                                                                                                  |
    log-only                 | Logs the event only, the packet is not dropped                                                                                                                                                     |
    log-level                | Configures the log level to log this event under                                                                                                                                                   |
    <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                                                                                                                                           |
    notification             | Numerical severity 5. Indicates a normal but significant condition                                                                                                                                    |
    warnings                 | Numerical severity 4. Indicates a warning condition. This is the default setting.                                                                                                                   |

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><code>no</code></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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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/disables 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/disables 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/disables 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>
</tbody>
</table>
### `ipv6` Keywords

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>duplicate-options</code></td>
<td>Enables/disables 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/disables checking of the following IPv6 routing types:  
  - one – Routing Type 1 (Nimrod routing). This option is disabled by default.  
  - two – Routing Type 2 (Mobile IP). This option is disabled by default. |
| `strict-ext-hdr-check` | Enables/disables strict checking for out of order and number of occurrences of extension header. This option is enabled by default. |
| `unknown-options` | Enables/disables 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. |

- 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]`

<table>
<thead>
<tr>
<th>option</th>
<th>Enables/disables checking for the following ipv6 extension header options:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• End point identification option (disabled by default)</td>
</tr>
<tr>
<td></td>
<td>• Network service access point address option (disabled by default)</td>
</tr>
<tr>
<td></td>
<td>• Router alert option (disabled by default)</td>
</tr>
<tr>
<td></td>
<td>• Home address option in destination option extension header (enabled by default)</td>
</tr>
<tr>
<td></td>
<td>• Pad1 and PadN options validating (enabled by default)</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> All of these are optional parameters. If no option is specified, the system enables checks as per the default values.</td>
</tr>
</tbody>
</table>

- **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 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.

- **ipv6 [firewall enable|rewrite-flow-label]**

<table>
<thead>
<tr>
<th>ipv6 firewall enable</th>
<th>Enables/disables IPv6 firewall. This option is enabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>rewrite-flow-label</td>
<td>Rewrites the IPv6 flow label field of every packet. This option is disabled by default.</td>
</tr>
</tbody>
</table>

**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

Defines an action based on conflicts detected in a device’s IPv6 and MAC addresses

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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]

conflict Enables/disables 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

drop-only Drops a packet (with conflicting IPv6 and MAC address) without logging

log-and-drop Logs the event and drops the packet. This is the default setting.

log-only Logs the event only, the packet is not dropped

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.

- ipv6-mac routing conflict [drop-only|log-and-drop|log-only]

routing conflict Enables/disables 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

drop-only Drops a packet (with conflicting next-hop IPv6 and MAC addresses) without logging

log-and-drop Logs the event and drops the packet. 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

<table>
<thead>
<tr>
<th>no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disables actions based on device IPv6 MAC table, next-hop's IPv6 and MAC address conflict detection</td>
</tr>
</tbody>
</table>
13.1.12 logging

Configures enhanced firewall logging

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

rfs7000-37FABE(config-rw-policy-test)#logging verbose
rfs7000-37FABE(config-rw-policy-test)#logging icmp-packet-drop rate-limited
rfs7000-37FABE(config-rw-policy-test)#logging malformed-packet-drop all
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
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><code>no</code></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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
no [acl-logging|alg|clamp|dhcp-offer-convert|dns-snoop|firewall|flow|ip|ip-mac|
ipv6|ipv6-mac|logging|proxy-arp|stateful-packet-inspection-l2|storm-control|
virtual-defragmentation]

no [acl-logging|dhcp-offer-convert|proxy-arp|stateful-packet-inspection-l2]

no alg [dns|ftp|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|
smurf|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}

ipv6 [duplicate-options|routing-type [one|two]|strict-ext-hdr-check|
unknown-options]

ipv6 option {endpoint-identification|network-service-access-point|router-alert|
strict-hao-opt-alert|strict-padding}

ipv6 [firewall enable|rewrite-flow-label]

no logging [icmp-packet-drop|verbose|malformed-packet-drop]

storm-control [arp|broadcast|multicast|unicast] {fe <1-4>|ge <1-8>|log|
port-channel <1-8>|up1|wlan <WLAN-NAME>}

no virtual-defragmentation {maximum-fragments-per-datagram|
minimum-first-fragment-length|maximum-defragmentation-per-host}
### Parameters

- **no acl-logging** Disables logging of flow creating traffic
- **no dhcp-offer-convert** Disables the conversion of broadcast DHCP offers to unicast
- **no proxy-arp** Disables the generation of ARP responses on behalf of other devices
- **no stateful-packet-inspection-l2** Disables layer 2 stateful packet inspection

- **no alg [dns|ftp|sip|tftp]**
  - **no alg** Disables preconfigured algorithms (dns, ftp, sip, and tftp)
  - **dns** Disables the DNS algorithm
  - **ftp** Disables the FTP algorithm
  - **sip** Disables the SIP algorithm
  - **tftp** Disables the TFTP algorithm

- **no clamp tcp-mss**
  - **no clamp tcp-mss** Disables TCP MSS size limiting to the size of the MTU in the inner protocol of a tunneled packet

- **no dns-snoop entry-timeout**
  - **no dns** Disables DNS snooping
  - **entry-timeout** Disables DNS snoop table entry timeout

- **no firewall enable**
  - **no firewall enable** Disables a device's firewalls

- **no flow dhcp stateful**
  - **no flow** Disables firewall flows
  - **dhcp stateful** Disables DHCP stateful flow

- **no flow timeout [icmp|other|udp]**
  - **no flow** Disables firewall flow
  - **timeout** Disables the timeout for various packet types
  - **icmp** Disables ICMP packet timeout
  - **others** Disables the timeout for packets other than TCP, ICMP, or UDP
  - **udp** Disables UDP packet timeout
- no flow timeout tcp [closed-wait|established|reset|setup|stateless-fin-or-reset|stateless-general]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no flow</td>
<td>Disables firewall flows</td>
</tr>
<tr>
<td>timeout</td>
<td>Disables the timeout for various packet types</td>
</tr>
<tr>
<td>tcp</td>
<td>Disables TCP packet timeout</td>
</tr>
<tr>
<td>close-wait</td>
<td>Disables the timeout for TCP flows in close wait status</td>
</tr>
<tr>
<td>established</td>
<td>Disables the timeout for TCP flows in established status</td>
</tr>
<tr>
<td>reset</td>
<td>Disables the timeout for TCP flows in reset status</td>
</tr>
<tr>
<td>setup</td>
<td>Disables the timeout for TCP flows in setup status</td>
</tr>
<tr>
<td>stateless-fin-or-reset</td>
<td>Disables the timeout for TCP flows in stateless FIN or RST status</td>
</tr>
<tr>
<td>stateless-general</td>
<td>Disables the timeout for TCP flows in general stateless states</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no ip</td>
<td>Disables IP events</td>
</tr>
<tr>
<td>dos</td>
<td>Disables IP DoS events</td>
</tr>
<tr>
<td>ascend</td>
<td>Optional. Disables an ASCEND DoS check</td>
</tr>
<tr>
<td></td>
<td>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. Disables the detection of broadcast or multicast ICMP packets as an attack</td>
</tr>
<tr>
<td>chargen</td>
<td>Optional. Disables the chargen service</td>
</tr>
<tr>
<td></td>
<td>The Character Generation Protocol (chargen) is an IP suite service primarily used for testing and debugging networks. It is also used as a generic payload for bandwidth and QoS measurements.</td>
</tr>
<tr>
<td>fraggle</td>
<td>Optional. Disables checking for Fraggle DoS attacks. This checks for UDP packets to or from port 7 or 19</td>
</tr>
<tr>
<td>ftp-bounce</td>
<td>Optional. Disables FTP bounce attack checks</td>
</tr>
<tr>
<td></td>
<td>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. Disables a check for invalid protocol number</td>
</tr>
<tr>
<td>ip-ttl-zero</td>
<td>Optional. Disables a check for the TCP/IP TTL field with a value of Zero (0)</td>
</tr>
<tr>
<td>ipsproof</td>
<td>Optional. Disables IP spoofing DoS attack checks</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| land                   | Optional. Disables LAND attack checks  
*Local Area Network Denial* (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. |
| option-route           | Optional. Disables an IP Option Record Route DoS check                                                                                                                                                       |
| router-advt            | Optional. Disables router-advt attack checks  
This is an attack where a default route entry is added remotely to a device. This route entry is given preference, and thereby exposes a vector of attacks.                                           |
| router-solicit         | Optional. Disables router-solicit attack checks  
Router solicitation messages are sent to locate routers as a form of network scanning. This information can then be used to attack a device.                                                                   |
| smurf                  | Optional. Disables smurf attack checks  
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. Disables snork attack checks  
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. Disables tcp-bad-sequence checks  
This DoS attack uses a specially crafted TCP packet to cause the targeted device to drop all subsequent network of a specific TCP connection. Disables tcp-bad-sequence check.                  |
| tcp-fin-scan           | Optional. Disables TCP FIN scan checks  
A FIN scan finds services on ports. A closed port returns a RST. This allows the attacker to identify open ports                                                                                     |
| tcp-intercept          | Optional. Disables TCP intercept attack checks  
Prevents TCP intercept attacks by using TCP SYN cookies                                                                                                                                                    |
| tcp-null-scan          | Optional. Disables TCP Null scan checks  
A TCP null scan finds services on ports. A closed port returns a RST. This allows the attacker to identify open ports                                                                                   |
| tcp-post-syn           | Optional. Disables TCP post SYN DoS attack checks                                                                                                                                                          |
| tcp-sequence-past-window | Optional. Disables TCP SEQUENCE PAST WINDOW DoS attack checks  
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. Disables TCP XMAS scan checks  
A TCP XMAS scan finds services on ports. A closed port returns a RST. This allows the attacker to identify open ports                                                                                     |
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tcphdrfrag</td>
<td>Optional. Disables TCP header checks. A DoS attack where the TCP header spans IP fragments.</td>
</tr>
<tr>
<td>twinge</td>
<td>Optional. Disables twinge attack checks. A twinge attack is a flood of false ICMP packets to try and slow down a system.</td>
</tr>
<tr>
<td>winnuka</td>
<td>Optional. Disables Winnuke checks. This DoS attack is specific to Windows™ 95 and Windows™ NT, causing devices to crash with a blue screen.</td>
</tr>
<tr>
<td>no ip tcp [adjust-mss</td>
<td>optimize-unnecessary-resends</td>
</tr>
<tr>
<td>no ip</td>
<td>Disables IP DoS events.</td>
</tr>
<tr>
<td>tcp</td>
<td>Identifies and disables TCP events and configuration items.</td>
</tr>
<tr>
<td>adjust-mss</td>
<td>Disables the adjust MSS configuration.</td>
</tr>
<tr>
<td>optimize-unnecessary-resends</td>
<td>Disables the validation of unnecessary TCP packets.</td>
</tr>
<tr>
<td>recreate-flow-on-out-of-state-sync</td>
<td>Disallows 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>Disables the sequence number validation in ICMP unreachable error packets.</td>
</tr>
<tr>
<td>validate-rst-ack-number</td>
<td>Disables the acknowledgment number validation in RST packets.</td>
</tr>
<tr>
<td>validate-rst-seq-number</td>
<td>Disables the sequence number validation in RST packets.</td>
</tr>
<tr>
<td>no ip-mac conflict</td>
<td>Disables IP MAC configuration.</td>
</tr>
<tr>
<td>no ip-mac conflict</td>
<td>Disables the action performed when a conflict exists between the IP address and MAC address.</td>
</tr>
<tr>
<td>routing</td>
<td>Configures a routing table based action.</td>
</tr>
<tr>
<td>conflict</td>
<td>Disables the action performed when a conflict exists in the routing table.</td>
</tr>
<tr>
<td>no ipv6 dos {hop-limit-zero</td>
<td>multicast-icmpv6</td>
</tr>
<tr>
<td>hop-limit-zero</td>
<td>Optional. Disables checking of IPv6 hop limit field. If the IPv6 hop limit field is ZERO (0) it is considered as attack.</td>
</tr>
<tr>
<td>multicast-icmpv6</td>
<td>Optional. Disables detection of multicast ICMPv6 traffic as attack (allows normal flow of multicast ICMPv6 Echo request or reply packets).</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tcp-intercept-mobility</td>
<td>Optional. Disables detection of IPv6 TCP packets with mobility option &quot;HAO(Home-Address-Option)&quot; or &quot;RH(Routing Header) type two&quot;. When disabled, TCP sync cookies for IPv6 TCP packets with mobility option are not generated.</td>
</tr>
</tbody>
</table>

- **ipv6** {duplicate-options|routing-type [one|two]|strict-ext-hdr-check|unknown-options} [drop-only|log-and-drop|log-only]

- no ipv6 duplicate-options Disables handling of duplicate options in hop-by-hop and destination option extension headers. This configuration excludes HAO(Home Address Option) handling.

- no ipv6 routing-type [one|two] Disables checking of the following IPv6 routing types:
  - one – Routing Type 1(Nimrod routing)
  - two – Routing Type 2(Mobile IP)

- no ipv6 strict-ext-hdr-check Disables strict checking for out of order and number of occurrences of extension header

- no ipv6 unknown-options Disables handling unknown options in hop-by-hop and destination option extension headers

- **ipv6** option {endpoint-identification|network-service-access-point|router-alert|strict-hao-opt-alert|strict-padding} [drop-only|log-and-drop|log-only]

- no ipv6 option Disables checking for the following ipv6 extension header options:
  - End point identification option (disabled by default)
  - Network service access point address option
  - Router alert option
  - Home address option in destination option extension header
  - Pad1 and PadN options validating

- **ipv6** [firewall enable|rewrite-flow-label]

- no ipv6 firewall enable Disables IPv6 firewall

- no ipv6 rewrite-flow-label Disable rewriting of the IPv6 flow label field of every packet

- no logging [icmp-packet-drop|verbose|malformed-packet-drop]

- no logging Disables enhanced firewall logging

- icmp-packet-drop Disables dropping of ICMP packets that do not pass sanity checks

- malformed-packet-drop Disables dropping of raw IP packets that do not pass sanity checks

- verbose Disables verbose logging

- **no storm-control** [arp|broadcast|multicast|unicast] {fe <1-4>|ge <1-8>|log|port-channel <1-8>|up|wlan <WLAN-NAME>}

- no storm-control Disables storm control

- arp Disables storm control for ARP packets

- broadcast Disables storm control for broadcast packets

- multicast Disables storm control for multicast packets
- **unicast**
  Disables storm control for unicast packets

- **fe <1-4>**
  Disables the FastEthernet port
  - `<1-4>` – Sets the FastEthernet port

- **ge <1-8>**
  Disables the Gigabit Ethernet port
  - `<1-8>` – Sets the GigabitEthernet port
  
  **Note:** For the NX45XX and NX65XX service platforms, the GE port range is 1 - 24.

- **log**
  Disables storm control logging

- **port-channel <1-8>**
  Disables the port channel.
  - `<1-8>` – Sets the port channel port

- **up1**
  Disables the uplink interface
  
  **Note:** For the NX45XX and NX65XX service platforms, the uplink interface range is 1 - 2.

- **wlan <WLAN-NAME>**
  Disables the WLAN
  - `<WLAN-NAME>` – Sets the WLAN ID

- **no virtual-defragmentation**
  Disables the virtual defragmentation of IPv4 packets

- **maximum-defragmentation-per-host <1-16384>**
  Optional. Disables the maximum active IPv4 defragmentation per host

- **maximum-fragments-per-datagram <2-8129>**
  Optional. Disables the maximum IPv4 fragments per datagram

- **minimum-first-fragment-length <8-1500>**
  Optional. Disables the minimum length required for the first IPv4 fragment

**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)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>acl-logging</td>
<td>Enables logging on flow creating traffic</td>
</tr>
<tr>
<td>alg</td>
<td>Configures algorithms used with a firewall policy</td>
</tr>
<tr>
<td>clamp</td>
<td>Limits the TCP MSS to the MTU value of the inner protocol for tunneled packets</td>
</tr>
<tr>
<td>dhcp-offer-convert</td>
<td>Enables the conversion of broadcast DHCP offer packets to unicast</td>
</tr>
<tr>
<td>dns-snoop</td>
<td>Configures the DNS snoop table entry timeout</td>
</tr>
<tr>
<td>firewall</td>
<td>Enables firewalls</td>
</tr>
<tr>
<td>flow</td>
<td>Configures firewall flows</td>
</tr>
<tr>
<td>ip</td>
<td>Configures IP settings</td>
</tr>
<tr>
<td>ip-mac</td>
<td>Defines actions based on the device IP MAC table</td>
</tr>
<tr>
<td>ipv6</td>
<td>Configures IPv6 components on this firewall policy</td>
</tr>
<tr>
<td>ipv6-mac</td>
<td>Defines an action based on conflicts detected in a device's IPv6 and MAC addresses</td>
</tr>
<tr>
<td>logging</td>
<td>Configures firewall logging</td>
</tr>
<tr>
<td>proxy-arp</td>
<td>Enables the generation of ARP responses on behalf of other devices</td>
</tr>
<tr>
<td>stateful-packet-</td>
<td>Enables layer 2 stateful packet inspection</td>
</tr>
<tr>
<td>inspection-12</td>
<td></td>
</tr>
<tr>
<td>storm-control</td>
<td>Configures storm control</td>
</tr>
<tr>
<td>virtual-defragmentation</td>
<td>Configures the virtual defragmentation of packets at the firewall level</td>
</tr>
</tbody>
</table>
13.1.14 `stateful-packet-inspection-12`

Enables layer 2 firewall stateful packet inspection. This option is enabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`stateful-packet-inspection-12`

**Parameters**

None

**Examples**

```bash
rfs7000-37FABE(config-fw-policy-test)#stateful-packet-inspection-12
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>
13.1.15 **proxy-arp**

   ```
   firewall-policy
   ```

Enables the generation of ARP responses on behalf of another device. This option is enabled by default.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
proxy-arp
```

**Parameters**

None

**Examples**

```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>no</td>
<td>Disables the generation of ARP responses on behalf of another device</td>
</tr>
</tbody>
</table>
13.1.16 storm-control

**firewall-policy**

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
storm-control [arp|broadcast|multicast|unicast]
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**

- **arp** Configures storm control for ARP packets
- **broadcast** Configures storm control for broadcast packets
- **multicast** Configures storm control for multicast packets
- **unicast** Configures storm control for unicast packets
- **level <1-1000000>** Configures the allowed number of packets received per second before storm control begins
- **fe <1-4>** — Sets the number of packets received per second
- **ge <1-8>** Sets the GigabitEthernet port for storm control from 1 - 8
- **port-channel <1-8>** Sets the port channel for storm control from 1 - 8
- **up1** Sets the uplink interface
  - **Note**: For the NX45XX and NX65XX service platforms, the uplink interface range is 1 - 2.
- **wlan <WLAN-NAME>** Configures the WLAN
  - **<WLAN-NAME>** — Sets the WLAN ID for the storm control configuration
* 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 a 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>
13.1.17 virtual-defragmentation

`firewall-policy`

Enables the virtual defragmentation of IPv4 packets. This parameter is required for optimal firewall functionality and is enabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
virtual-defragmentation {maximum-defragmentation-per-host <1-16384>|
maximum-fragments-per-datagram <2-8129>|minimum-first-fragment-length <8-1500>}
```

Parameters

- `virtual-defragmentation {maximum-defragmentation-per-host <1-16384>|
maximum-fragments-per-datagram <2-8129>|minimum-first-fragment-length <8-1500>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>maximum-defragmentation-per-host &lt;1-16384&gt;</td>
<td>Optional. Defines the maximum active IPv4 defragmentation per host.</td>
</tr>
<tr>
<td>maximum-fragments-per-datagram &lt;2-8129&gt;</td>
<td>Optional. Defines the maximum IPv4 fragments per datagram (for virtual defragmentation).</td>
</tr>
<tr>
<td>minimum-first-fragment-length &lt;8-1500&gt;</td>
<td>Optional. Defines the minimum length required for the first IPv4 fragment (for virtual defragmentation).</td>
</tr>
</tbody>
</table>

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

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
- `mtu`  Configure the global Mint MTU
- `no`  Negate a command or set its defaults
- `router`  Mint router
- `udp`  Configure mint UDP/IP encapsulation

```
clarex  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)#
```
14.1 mint-policy

Table 14.1 summarizes MiNT policy configuration 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>mtu</td>
<td>Configures the global MiNT MTU</td>
<td>page 14-4</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 14-7</td>
</tr>
<tr>
<td>router</td>
<td>Configures the priority for MiNT router packets (HELLO, LSP, PSNP, and EXTVLAN)</td>
<td>page 14-5</td>
</tr>
<tr>
<td>udp</td>
<td>Configures the MiNT UDP/IP encapsulation parameters</td>
<td>page 14-6</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
### 14.1.1 level

*mint-policy*

Configures the global MiNT routing level

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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 mtu

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
mtu <900-1500>
```

**Parameters**

- `<900-1500>`

  Specifies the maximum packet size from 900 - 1500 bytes

  The maximum packet size specified is rounded down to a value using the following formula:

  ```
  4 + a multiple of 8.
  ```

  The MTU setting specifies the maximum packet size used for MiNT packets. Larger packets are fragmented to fit within the specified packet size limit. You may want to configure this parameter if the MiNT backhaul network requires or recommends smaller packet sizes. The default value is 1500 bytes.

**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
14.1.3 router

mint-policy

Configures the priority for MiNT router packets (HELLO, LSP, PSNP, and EXTVLAN)

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

router packet priority <0-7>

Parameters

- router packet priority <0-7>

<table>
<thead>
<tr>
<th>router packet priority &lt;0-7&gt;</th>
<th>Allows you to configure the priority for MiNT router packets from 0 - 7. The default is 5.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: Higher the value higher is the priority. Therefore, seven (7) represents highest priority.</td>
<td></td>
</tr>
</tbody>
</table>

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)
14.1.4 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
udp port <2-65534>
```

**Parameters**

- **udp port <2-65534>**

  | 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 |
14.1.5 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
no [level|mtu|router|udp]
```

- `no level 2 area-id`
- `no mtu`
- `no router packet priority`
- `no udp port <LINE-SINK>`

**Parameters**

- `no level 2 area-id`
  - **no level 2** Disables level 2 MiNT routing
  - **area identifier** Negates the area identifier
- `no mtu`
  - **No mtu** Reverts the configured MiNT MTU value to its default
- `no router packet priority`
  - **no router packet priority** Resets the MiNT router packet priority to default
- `no udp port <LINE-SINK>`
  - **No udp** Resets the UDP/IP encapsulation parameters to its default
  - **port <LINE-SINK>** Uses the default UDP port for MiNT encapsulation

**Examples**

The following example shows the global Mint Policy parameters before the ‘**no**’ commands are executed:

```plaintext
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)#
```
rfs7000-37FABE(config-mint-policy-global-default)#no level 2 area-id
rfs7000-37FABE(config-mint-policy-global-default)#no mtu
rfs7000-37FABE(config-mint-policy-global-default)#no udp port

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)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>level</strong></td>
<td>Configures the global MiNT routing level</td>
</tr>
<tr>
<td><strong>mtu</strong></td>
<td>Configures the global MiNT MTU</td>
</tr>
<tr>
<td><strong>router</strong></td>
<td>Configures the priority for MiNT router packets (HELLO, LSP, PSNP, and EXTVLAN)</td>
</tr>
<tr>
<td><strong>udp</strong></td>
<td>Configures the MiNT UDP/IP encapsulation parameters</td>
</tr>
</tbody>
</table>
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, 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.

Disabling un-used and insecure interfaces is recommended 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.

```plaintext
<DEVICE>(config-management-policy-<POLICY-NAME>)#user admin password 0 motorolasolutions
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>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>

<DEVICE>(config-management-policy-<POLICY-NAME>)#
### 15.1 management-policy

Table 15.1 summarizes management policy configuration 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>banner</td>
<td>Configures the <em>message of the day</em> (motd) text</td>
<td>page 15-6</td>
</tr>
<tr>
<td>ftp</td>
<td>Enables FTP on this management policy</td>
<td>page 15-7</td>
</tr>
<tr>
<td>http</td>
<td>Enables HTTP on this management policy</td>
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<td>Enables HTTPS on this management policy</td>
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<td>ssh</td>
<td>Enables SSH on this management policy</td>
<td>page 15-28</td>
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<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 15-29</td>
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<td>clrscr</td>
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<td>page 5-3</td>
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<tr>
<td>commit</td>
<td>Commits (saves) changes made in the current session</td>
<td>page 5-4</td>
</tr>
<tr>
<td>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous mode</td>
<td>page 5-5</td>
</tr>
<tr>
<td>help</td>
<td>Displays the interactive help system</td>
<td>page 5-6</td>
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<tr>
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<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
</tbody>
</table>
15.1.1 aaa-login

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```plaintext
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

- **local**
  - `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.

- **radius**
  - `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.

- **external**
  - Configures external RADIUS server as the preferred authentication mode

- **fallback**
  - Configures RADIUS server authentication as the primary authentication mode
  - When RADIUS server authentication fails, the system uses local authentication. This command configures local authentication as a backup mode.

- **policy <AAA-POLICY-NAME>**
  - Associates a specified AAA policy with this management policy. The AAA policy determines if a client is granted access to the network.
    - **Note:** For more information on configuring AAA policy, see AAA-POLICY.

- **tacacs**
  - Configures Terminal Access Control Access-Control System (TACACS) server parameters
  - `aaa-login tacacs [accounting|authentication|authorization|fallback|policy <AAA-TACACS-POLICY-NAME>]`
  - Configures TACACS accounting
  - Configures TACACS authentication
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><strong>no</strong></td>
<td>Removes the TACACS server settings</td>
</tr>
</tbody>
</table>
15.1.2 banner

managers-policy

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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;</td>
<td>– Enter the message string. The message string should not exceed 255 characters.</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
15.1.3 ftp

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
ftp {password\rootdir\username}
```

```python
def ftp(filename, password='password', rootdir='dir', username='username', encrypt_password='1', password_encrypt='<ENCRYPTED-PASSWORD>', password_plain='<PASSWORD>', rootdir_path='flash:/'):
    # Configure FTP
    # password:
    #   1 - Configures an encrypted password
    #   <ENCRYPTED-PASSWORD> - Specify the password. The password should not exceed 63 characters in length.
    #   <PASSWORD> - Configures a clear text password
    # rootdir:
    #   <DIR> - Specify the root directory path. By default the root directory is set to flash:/
    # username:
    #   <USERNAME> - Specify the username. The username should not exceed 32 characters in length.
    # encrypt_password:
    #   1 - Specifies an encrypted password (use this option if copy pasting from another device). The password should not exceed 63 characters in length.
    # password_encrypt:
    #   <ENCRYPTED-PASSWORD> - Configures an encrypted password
    # password_plain:
    #   <PASSWORD> - Configures a clear text password
    # rootdir_path:
    #   <DIR> - Configures the root directory path for FTP logins.
```

Parameters

- **ftp {password [1 <ENCRYPTED-PASSWORD>|<PASSWORD>]}**
  - `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.
    - `<ENCRYPTED-PASSWORD>` — Specify the password. The password should not exceed 63 characters in length.
    - `<PASSWORD>` — Configures a clear text password

- **ftp {rootdir <DIR>}**
  - `rootdir`:
    - `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> password [1 <ENCRYPTED-PASSWORD>|<PASSWORD>] rootdir <DIR>}**
  - `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`:
    - `Configures an encrypted password`
    - `<ENCRYPTED-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`:
    - `After specifying the password, configure the FTP root directory.`
    - `<DIR>` — Configures the root directory path 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**

```bash
rfs7000-37FABE(config-management-policy-test)#ftp username superuser password motorolasolutions@123 rootdir dir

rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
http server
  ftp username superuser password 1
  7ccb4568cb83e54f1e402f785a78ee930a453afda152baaf7c2b79277f225872 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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables FTP and its settings, such as the server password, root directory, and users</td>
</tr>
</tbody>
</table>
15.1.4 http

Enables Hyper Text Transport Protocol (HTTP) on this management policy.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

http server

Parameters

- http server

| http server | Enables HTTP on this management policy. HTTP provides limited authentication and no encryption. |

Examples

rfs7000-37FABE(config-management-policy-test)#http server

rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
  http server
  ftp username superuser password 1
  7ccb4568cb83e54f1e402f785a78ee930a453afda152baaf7c2b79277f225872 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

| no | Disables HTTP on this management policy |
15.1.5 **https**

*management-policy*

Enables *Hyper Text Transport Protocol Secure* (HTTPS) on this management policy.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`https server`

**Parameters**

- `https server`

| https server | Enables HTTPS on this management policy. HTTPS provides both authentication and data encryption as opposed to just authentication. |

**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
    7ccb4568cb83e54f1e402f785a78ee930a453afda152baaf7c2b79277f225872 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 HTTPS on this management policy
15.1.6 idle-session-timeout

Configure a session's idle timeout. An idle session is automatically terminated after the specified interval is exceeded.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

idle-session-timeout <1-4320>

Parameters

- idle-session-timeout <1-4320>

| <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
7cc84568cb83e54f1e402f785a78ee930a453afda152baaf7c2b79277f225872 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 |
15.1.7 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
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**

- **ipv6 restrict-access host <IPv6> {log [all|denied-only]}**

  ```
  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).

- **ipv6 restrict-access subnet <IPv6-PREFIX> {log [all|denied-only]}**

  ```
  host <IPv6> | Restricts management access to a specified host, based on the host’s IPv6 address.
  ```

  - `<IPv6>` — Specify the host’s IPv6 address.

  ```
  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 Lists (ACLs) to filter access requests
  - IPv6 ACL filter/mark packets based on the IPv6 address from which they arrive. IPv6 hosts can 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: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 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:X/M 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
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
15.1.8 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
no [aaa-login|banner|ftp|http|https|idle-session-timeout|ipv6|privilege-mode-password|
restrict-access|snmp-server|ssh|t5|telnet|user|service]
```

```
no aaa-login tacacs [accounting|authentication|authorization|fallback|policy]
```

```
no banner motd
```

```
no ftp {password|rootdir}
```

```
no [http|https] server
```

```
no [idle-session-timeout|privilege-mode-password|restrict-access]
```

```
o ipv6 restrict-access
```

```
o snmp-server [community|display-vlan-info-per-radio|enable|host|manager|
max-pending-requests|request-timeout|suppress-security-configuration-level|
throttle|user]
```

```
o 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]]
```

```
o ssh {login-grace-time|port|use-key}
```

```
o t5 snmp-server [community|enable|host]
```

```
o [telnet|user <USERNAME>]
```

```
o service prompt crash-info
```

**Parameters**

- **no aaa-login tacacs [accounting|authentication|authorization|fallback|policy]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no aaa-login</td>
<td>Disables or reverts user authorization parameters</td>
</tr>
<tr>
<td>tacacs</td>
<td>Disables the TACACS server parameters</td>
</tr>
<tr>
<td>accounting</td>
<td>Disables TACACS accounting</td>
</tr>
<tr>
<td>authentication</td>
<td>Disables TACACS authentication</td>
</tr>
<tr>
<td>authorization</td>
<td>Disables TACACS authorization</td>
</tr>
<tr>
<td>fallback</td>
<td>Disables TACACS as the primary authentication mode</td>
</tr>
<tr>
<td>policy</td>
<td>Disassociates a specified TACACS policy from this management policy</td>
</tr>
</tbody>
</table>
- **no banner motd**

  | no banner motd | Removes the motd banner |

- **no ftp {password|rootdir}**

  | no ftp | Reverts to default FTP server settings |
  | password | Optional. Reverts to default FTP password |
  | rootdir | Optional. Reverts to default FTP root directory |

- **no [http|https] server**

  | no http | Disables the HTTP server on this management policy |
  | no https | Disables the HTTPS server on this management policy |

- **no [idle-session-timeout|privilege-mode-password|restrict-access]**

  | no idle-session-timeout | Disables a defined session timeout interval |
  | no privilege-mode-password | Removes the configured CLI privilege mode access password |
  | no restrict-session | Removes management access restrictions on this management policy |

- **no ipv6 restrict-access**

  | no ipv6 restrict-access | Removes management access restrictions applied to specific hosts and/or subnets based on their IPv6 addresses and prefixes respectively |

- **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 snmp-server | Disables the SNMP server parameters |
  | community <WORD> | Disables SNMP server access to a community |
  | display-vlan-info-per-radio | Disables the display of the VLAN ID along with the radio interface ID (only displays the radio interface) |
  | enable traps | Disables SNMP traps |
  | host <IP> {<1-65535>} | Removes SNMP host (trap recipient) details |
  | manager [all|v1|v2|v3] | Disables SNMP manager |
  | max-pending-requests | Resets the maximum pending requests to default (128) |
  | request-timeout | Resets the request timeout to default (240 seconds) |
  | suppress-security-configuration-level | Reverts the SNMP security configuration suppression level to default (Level 0) |
### no ssh

Sets the following secure shell settings:
- **login-grace-time** – Optional. Resets SSH login grace time to its default (60 seconds)
- **port** – Optional. Resets SSH port to default (port 22)
- **use-key** – Optional. Resets RSA key to default

### no t5

Removes or reverts SNMP server settings for T5 devices

#### community

Removes the SNMP community for T5 devices
- `<COMMUNITY-NAME>` – Specify the community name.

#### enable

Disables the SNMP server configuration. And disables SNMP traps.

#### host <IP>

Disables the SNMP host
- `<IP>` – Specify the SNMP host’s IP address.

### no telnet

Disables Telnet on this management policy

### no user <USERNAME>

Removes a specified user account from this management policy
- `<USERNAME>` – Specify the account’s username.

### no service

Disables service commands

### prompt

Disables the updating of CLI prompt settings

### crash-info

Excludes asterisks (**) at the end of the prompt, if the device has crash files in flash:/crashinfo

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>throttle</strong></td>
<td>Enables CPU throttle for SNMP</td>
</tr>
<tr>
<td><strong>user</strong></td>
<td>Removes a SNMPv3 user from this management policy</td>
</tr>
</tbody>
</table>
| [snmpmanager|snmpoperator|snmptrap] | • snmpmanager – Removes a SNMP manager account  
   • snmpoperator – Removes a SNMP operator account  
   • snmptrap – Removes a SNMP trap user account |
| **no ssh** | Resets the following secure shell settings: |
| {login-grace-time|port|use-key} | • **login-grace-time** – Optional. Resets SSH login grace time to its default (60 seconds)  
   • **port** – Optional. Resets SSH port to default (port 22)  
   • **use-key** – Optional. Resets RSA key to default |
| **no t5** | Removes or reverts SNMP server settings for T5 devices |
| [community|enable|host] | Note: This command is available only RFS4000, RFS6000, RFS7000, NX45XX, NX65XX, and NX9000 platforms. |
| **community** | Removes the SNMP community for T5 devices |
| | • `<COMMUNITY-NAME>` – Specify the community name. |
| **enable** | Disables the SNMP server configuration. And disables SNMP traps. |
| **host <IP>** | Disables the SNMP host |
| | • `<IP>` – Specify the SNMP host’s IP address. |
| **no [telnet|user <USERNAME>]** | |
| **no telnet** | Disables Telnet on this management policy |
| **no user <USERNAME>** | Removes a specified user account from this management policy |
| | • `<USERNAME>` – Specify the account’s username. |
| **no service prompt crash-info** | |
| **no service** | Disables service commands |
| **prompt** | Disables the updating of CLI prompt settings |
| **crash-info** | Excludes asterisks (**) at the end of the prompt, if the device has crash files in flash:/crashinfo |
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
    7ccb4568cb83e54f1e402f785a78ee930a453afda152baaf7c2b79277f225872 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)#
```

```
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
    626b403263d62ae4e79c48c6dfc6ccbb60fd4c77a8da9e36560597a6d6570ec2 rootdir dir
    no ssh
    aaa-login radius external
    aaa-login radius policy test
    idle-session-timeout 0
rfs7000-37FABE(config-management-policy-test)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>aaa-login</td>
<td>Configures the AAA authentication mode used with this management policy</td>
</tr>
<tr>
<td>banner</td>
<td>Configures the login motd banner</td>
</tr>
<tr>
<td>ftp</td>
<td>Configures the FTP server parameters</td>
</tr>
<tr>
<td>http</td>
<td>Enables HTTP</td>
</tr>
<tr>
<td>https</td>
<td>Enables HTTPS</td>
</tr>
<tr>
<td>idle-session-timeout</td>
<td>Configures a session's idle timeout</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>
</tr>
<tr>
<td>privilege-mode-password</td>
<td>Configures the CLI's privilege mode access password</td>
</tr>
<tr>
<td>restrict-access</td>
<td>Restricts management access to a set of hosts or subnets. Also enables the logging of access requests</td>
</tr>
<tr>
<td>snmp-server</td>
<td>Configures SNMP engine settings</td>
</tr>
<tr>
<td>ssh</td>
<td>Enables a SSH connection between client and server</td>
</tr>
<tr>
<td>t5</td>
<td>Configures SNMP server settings for T5 devices on this management policy</td>
</tr>
<tr>
<td>telnet</td>
<td>Enables Telnet</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><code>user</code></td>
<td>Adds a new user account</td>
</tr>
<tr>
<td><code>service</code></td>
<td>Invokes service commands to troubleshoot or debug <code>config-if</code> instance configurations</td>
</tr>
</tbody>
</table>
15.1.9 privilege-mode-password

**management-policy**

Configures the CLI's privilege mode access password

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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></td>
<td>- <code>&lt;PASSWORD&gt;</code> — Enter the password.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&lt;PASSWORD&gt;</th>
<th>Configures a clear text password</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- <code>&lt;PASSWORD&gt;</code> — 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)#
```

```
rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
        http_server
        no ssh
        privilege-mode-password 1 2e9f038ac2ed27f919ed5a4dceb3d30e32f356f2ceff6bf26a153d0339c734f
rfs7000-37FABE(config-management-policy-test)#
```

**Related Commands**

| no | Removes the configured CLI privilege mode access password |
15.1.10 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

- **host <IP>**
  - Restricts management access to a specified host, based on the host’s IPv4 address
  - ```<IP>``` – Specify the host’s IPv4 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 (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]}}**

  - **host <IP>**
    - Restricts management access to a specified host, based on the host’s IPv4 address
    - ```<IP>``` – Specify the host’s IPv4 address.

  - **subnet <IP/M>**
    - Optional. Restricts access to the host on a specified subnet
    - ```<IP/M>``` – Specify the subnet’s IPv4 address and mask in the A.B.C.D/M format.
### MANAGEMENT-POLICY 15 - 21

| log [all|denied-only] | Optional. Configures a logging policy for access requests.  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>- Logs all access requests, both denied and permitted</td>
</tr>
<tr>
<td>denied-only</td>
<td>- Logs only denied access events (when access request received from a host is denied)</td>
</tr>
</tbody>
</table>

**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
  626b4033263d6d2ae4e79c48cddf66bb60fd4c77a8da9e365060597a6d6570ec2 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
rfs7000-37FABE(config-management-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes device access restrictions</td>
</tr>
</tbody>
</table>
15.1.11 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000 NX9500, NX9510

**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 <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>|
suppress-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>**

| community [0 <WORD>|2 <WORD>|<WORD>] | 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 <WORD> | Sets a clear text SNMP community string |
| 2 <WORD> | Sets an encrypted SNMP community string |
| <WORD> | Sets the SNMP community string |
### SNMP Configuration

**Enable Traps**

- `/snmp-server 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.

### Host Configuration

- `/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 Configuration Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>**snmp-server manager [all</td>
<td>v1</td>
</tr>
<tr>
<td>manager [all</td>
<td>v2</td>
</tr>
<tr>
<td>all – Enables SNMP manager version v2 and v3</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>v2 – Enables SNMP manager version v2 only. SNMPv2 provides device management using a hierarchical set of variables. SNMPv2 uses <code>Get</code>, <code>GetNext</code>, and <code>Set</code> operations for data management. SNMPv2 is enabled by default.</td>
<td></td>
</tr>
<tr>
<td>v3 – Enables SNMP manager version v3 only. SNMPv3 adds security and remote configuration capabilities to previous versions. The SNMPv3 architecture introduces the User-based Security Model (USM) for message security and the View-based Access Control Model (VACM) for access control. The architecture supports the concurrent use of different security, access control and message processing techniques. SNMPv3 is enabled by default.</td>
<td></td>
</tr>
<tr>
<td>**snmp-server [max-pending-requests {&lt;64-1024&gt;}</td>
<td>request-timeout {&lt;2-720&gt;}]**</td>
</tr>
<tr>
<td>max-pending-requests {&lt;64-1024&gt;}</td>
<td>Sets the maximum number of requests that can be pending at any given time</td>
</tr>
<tr>
<td>(&lt;64-1024&gt;) – Optional. Specify a value from 64 - 1024. The default is 128.</td>
<td></td>
</tr>
<tr>
<td>request-timeout {&lt;2-720&gt;}</td>
<td>Sets the interval, in seconds, after which an error message is returned for a pending request</td>
</tr>
<tr>
<td>(&lt;2-720&gt;) – Optional. Specify a value from 2 - 720 seconds. The default is 240 seconds.</td>
<td></td>
</tr>
<tr>
<td>**snmp-server [display-vlan-info-per-radio</td>
<td>throttle &lt;1-100&gt;</td>
</tr>
<tr>
<td>display-vlan-info-per-radio</td>
<td>Enables the display of the VLAN ID along with the radio interface ID</td>
</tr>
<tr>
<td>throttle &lt;1-100&gt;</td>
<td>Sets CPU usage for SNMP activities. Use this command to set the CPU usage from 1 - 100.</td>
</tr>
<tr>
<td>suppress-security-configuration-level [0</td>
<td>1]</td>
</tr>
<tr>
<td>suppress-security-configuration-level [0</td>
<td>1]</td>
</tr>
<tr>
<td>0 – If this option is selected, an empty string is returned for the SNMP request for security configuration information. Security configuration information consists of:</td>
<td></td>
</tr>
<tr>
<td>• Passwords</td>
<td></td>
</tr>
<tr>
<td>• Keys</td>
<td></td>
</tr>
<tr>
<td>• Shared secrets</td>
<td></td>
</tr>
<tr>
<td>The default setting is 0.</td>
<td></td>
</tr>
<tr>
<td>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:</td>
<td></td>
</tr>
<tr>
<td>• Management policies</td>
<td></td>
</tr>
<tr>
<td>• IP ACL</td>
<td></td>
</tr>
<tr>
<td>• Tables containing user names and community strings</td>
<td></td>
</tr>
</tbody>
</table>
### 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 |

<table>
<thead>
<tr>
<th>v3 auth md5</th>
<th>Uses SNMP version 3 as the security model</th>
</tr>
</thead>
<tbody>
<tr>
<td>• auth – Uses an authentication protocol</td>
<td></td>
</tr>
<tr>
<td>• md5 – Uses HMAC-MD5 algorithm for authentication</td>
<td></td>
</tr>
</tbody>
</table>

| [0 <PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]| Configures password using one of the following options: |
|--------------------------------|---------------------------------------------------------|
|  • 0 <PASSWORD> – Configures clear text password |
|  • 2 <PASSWORD> – Configures encrypted password |
|  • <PASSWORD> – Specifies a password for authentication and privacy protocols |

### 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>• encrypted – Uses encrypted privacy protocol</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>auth md5</th>
<th>Uses authentication protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>• auth – Sets authentication parameters</td>
<td></td>
</tr>
<tr>
<td>• md5 – Uses HMAC-MD5 algorithm for authentication</td>
<td></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>• des – Uses CBC-DES for privacy</td>
<td></td>
</tr>
</tbody>
</table>

After specifying the privacy protocol, specify the authentication mode.

| [0 <PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]| The following are common to both the auth and des parameters: |
|--------------------------------|---------------------------------------------------------|
|  • auth – Sets user authentication parameters |
|  • md5 – Uses HMAC-MD5 algorithm for authentication |

<table>
<thead>
<tr>
<th>Configures password using one of the following options:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 0 &lt;PASSWORD&gt; – Configures a clear text password</td>
</tr>
<tr>
<td>• 2 &lt;PASSWORD&gt; – Configures an encrypted password</td>
</tr>
<tr>
<td>• &lt;PASSWORD&gt; – Specifies a password for authentication and privacy protocols</td>
</tr>
</tbody>
</table>
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 motorola123
rfs7000-37FABE(config-management-policy-test)#show context
management-policy test
 no http server
 https server
 ftp username superuser password 1
 626b4033263d6d2ae4e79c48c4fdcccb60f4c77a8da9e36560597a6d6570ec2 rootdir dir
 no ssh
 snmp-server community snmpl ro
 snmp-server user snmpmanager v3 encrypted des auth md5 0 motorola123
 snmp-server host 172.16.10.23 v3 162
 aaa-login radius external
 idle-session-timeout 0
 restrict-access host 172.16.10.2 log all
rfs7000-37FABE(config-management-policy-test)#

Related Commands

|   no   | Disables or resets the SNMP server settings |
15.1.12 ssh

 shorthand

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.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

ssh {login-grace-time <60-300>|port <1-65535>}

Parameters

- ssh {login-grace-time <60-300>|port <1-65535>}

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ssh</td>
<td>Enables SSH communication between client and server</td>
</tr>
<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
  626b403263d6d2ae4e79c482dccc60fd4c77a8da9e365060597a6d6570ec2 rootdir dir
  ssh port 162
  snmp-server community snmp1 ro
  snmp-server user snmpmanager v3 encrypted des auth md5 0 motorola1123
  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)
15.1.13 **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 its 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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>t5 snmp-server [community</td>
<td>contact</td>
</tr>
<tr>
<td>t5 snmp-server community &lt;COMMUNITY-NAME&gt; [ro</td>
<td>rw] &lt;SNMP-STATION-IP&gt;</td>
</tr>
<tr>
<td>t5 snmp-server contact &lt;LINE&gt;</td>
<td>Configures the administrator of SNMP trap events for the T5 controller.</td>
</tr>
<tr>
<td>t5 snmp-server enable [server</td>
<td>traps]</td>
</tr>
<tr>
<td>t5 snmp-server host &lt;IP&gt;</td>
<td></td>
</tr>
<tr>
<td>t5 snmp-server location &lt;LINE&gt;</td>
<td></td>
</tr>
</tbody>
</table>

**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

- **t5 snmp-server contact <LINE>**
  - **<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>**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>host &lt;IP&gt;</td>
<td>Configures the T5 SNMP host’s IP address. The SNMP host receives the SNMP notifications.</td>
</tr>
<tr>
<td>• &lt;IP&gt; – Specify the SNMP host’s IP address.</td>
<td></td>
</tr>
</tbody>
</table>

**t5 snmp-server location <LINE>**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>location &lt;LINE&gt;</td>
<td>Configures the system location for SNMP traps.</td>
</tr>
<tr>
<td>• &lt;LINE&gt; – Specify the SNMP trap location (should not exceed 64 characters).</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```bash
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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes or reverts SNMP server configuration for T5 devices</td>
</tr>
</tbody>
</table>
15.1.14 telnet

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
```
telnet {port <1-65535>}
```

Parameters
- `telnet {port <1-65535>}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>telnet</td>
<td>Enables Telnet</td>
</tr>
<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 - 165535. The default port is 23.</td>
</tr>
</tbody>
</table>

Examples
```
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
  626b40323d662b4e579c48c7dfeac60740c77a8da9e365060597a6d6570ec2 rootdir dir
  ssh port 162
  snmp-server community snmp1 ro
  snmp-server user snmpmanager v3 encrypted des auth md5 0 motorola1123
  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
```
15.1.15 user

management-policy

Adds new user account

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
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]
```

Parameters

- `user <USERNAME>` Adds new user account to this management policy
  - `<USERNAME>` – Sets the username
- `password [0 <PASSWORD>|1 <SHA1-PASSWORD>|<PASSWORD>]` Configures a password
  - `0 <PASSWORD>` – Sets a clear text password
  - `1 <SHA1-PASSWORD>` – Sets the SHA1 hash of the password
  - `<PASSWORD>` – Sets the password
- `role [device-provisioning-admin|helpdesk|monitor|network-admin|security-admin|superuser|system-admin|web-user-admin] access [all|console|ssh|telnet|web]` Configures the user role. The options are:
  - `device-provisioning-admin` – 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.
  - `helpdesk` – Helpdesk administrator. Performs troubleshooting tasks, such as clear statistics, reboot, create and copy technical 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 mobile phone.
  - `monitor` – Monitor. Has read-only access to the system. Can view configuration and statistics except for secret information
  - `network-admin` – Network administrator. Manages layer 2, layer 3, Wireless, RADIUS server, DHCP server, and Smart RF
  - `security-admin` – Security administrator. Modifies WLAN keys and passphrases
  - `superuser` – Superuser. Has full access, including halt and delete startup-config
  - `system-admin` – System administrator. Upgrades image, boot partition, time, and manages admin access
  - `web-user-admin` – 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.
### Examples

```bash
rfs7000-37FABE(config-management-policy-test)#user TESTER password moto123 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 626b4033263d6d2ae4e79c48cdefcccb60fd4c77a8da9e365060597a6d6570ec2 rootdir dir
  ssh port 162
user TESTER password 1 737670e898600bcc42ee91aab93b568efa73ffee5f4d1e1b12262887ac3646bc role superuser access all
snmp-server community snmp1 ro
snmp-server user snmpmanager v3 encrypted des auth md5 0 motorola1123
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

<table>
<thead>
<tr>
<th><code>no</code></th>
<th>Removes a user account</th>
</tr>
</thead>
</table>

| `access [all|console|ssh|telnet|web]` | Configures the access type |
|--------------------------------|-----------------------------|
| `all` – Allows all types of access: console, SSH, Telnet, and Web | |
| `console` – Allows console access only | |
| `ssh` – Allows SSH access only | |
| `telnet` – Allows Telnet access only | |
| `web` – Allows Web access only | |
15.1.16 service

Invokes service commands

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

service [prompt|show]

service [prompt crash-info|show cli]

Parameters
- service [prompt crash-info|show cli]

service prompt
- crash-info

Updates CLI prompt settings
- crash-info – Includes an asterix at the end of the prompt if the device has crash files in the flash:/crashinfo folder

service show cli

Displays running system information
- cli – Displays the current mode’s CLI tree

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`
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 depend 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
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.
Table 16.1 summarizes RADIUS group configuration 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>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug <code>config-if</code> instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

guest

**Parameters**

None

**Examples**

```bash
rfs7000-37FABE(config-radius-group-test)#guest
rfs7000-37FABE(config-radius-group-test)#show context radius-group test
  guest
rfs7000-37FABE(config-radius-group-group-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Makes this group a non-guest group</td>
</tr>
</tbody>
</table>
16.1.2 policy

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 — AP300, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

`policy [access|day|inactivity-timeout|role|ssid|time|vlan]`

`policy vlan <1-4094>`

`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 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 access [all|console|ssh|telnet|web] { (all|console|ssh|telnet|web) }**
  - **access** Configures access type for a management group. Management groups can be assigned unique access and role permissions.
    - all – Allows all access. Wireless client access to the console, ssh, telnet, and/or Web
    - console – Allows console access only
    - ssh – Allows SSH access only
    - telnet – Allows Telnet access only
    - web – Allows Web access only
  - These parameters are recursive, and you can provide access to more than one component.

- **policy role [device-provisioning-admin|helpdesk|monitor|network-admin|security-admin|superuser|system-admin|web-user-admin]**
  - **role** Configures the role assigned to a management RADIUS group. If a group is listed as a management group, it may also have a unique role assigned. Available roles include:
    - device-provisioning-admin – Device provisioning administrator. Has privileges to update (provision) device configuration files or firmware. Such updates run the risk of overwriting and losing a device’s existing configuration unless the configuration is properly archived.
    - helpdesk – 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.
    - monitor – Monitor. Has read-only access to the network. Can view configuration and statistics except for secret information
    - network-admin – Network administrator. Has wired and wireless access to the network. Manages layer 2, layer 3, Wireless, RADIUS server, DHCP server, and Smart RF
    - security-admin – Security administrator. Has full read/write access to the network. Modifies WLAN keys and passphrases
    - superuser – Superuser. Has full access, including halt and delete startup config
    - system-admin – System administrator. Upgrades image, boot partition, time, and manages admin access
    - web-user-admin – 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.

- **policy inactivity-timeout <60-86400>**
  - **policy inactivity-timeout** 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.
    - <60-86400> – Specify a value from 60 - 86400 seconds.
### 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 motorolasol
```
rfs7000-37FABE(config-radius-group-test)#show context
radius-group test
  guest
  policy vlan 1
  policy ssid motorolasol
  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>no</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 101
rfs7000-37FABE(config-radius-group-test)#show context
radius-group test
guest
policy vlan 1
policy ssid motorolasol
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
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

- `no [guest|policy|rate-limit]`
- `no policy [access|day|inactivity-timeout|role|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 ssid [<SSID>|all]`
- `no policy [inactivity-timeout|role|time|vlan]`
- `no rate-limit [from-air|to-air]`

**Parameters**

- `no guest`

  Makes a RADIUS guest group a non-guest (management) group

- `no policy access [all|console|ssh|telnet|web]`

  Removes or modifies the RADIUS management group access
  - `all` — Removes all access (Wireless client access to the console, SSH, Telnet, and Web)
  - `console` — Removes console access
  - `ssh` — Removes SSH access
  - `telnet` — Removes Telnet
  - `web` — Removes Web access

  These are recursive options, and you can remove more than one at a time.

- `no policy day [all|fr|mo|sa|su|th|tu|we|weekdays]`

  Removes or modifies the days on which access is provided to a RADIUS guest group
  - `all` — Removes access on all days (Monday to Sunday)
  - `fr` — Removes access on Fridays only
  - `mo` — Removes access on Mondays only
  - `sa` — Removes access on Saturdays only
  - `su` — Removes access on Sundays only
  - `th` — Removes access on Thursdays only
  - `tu` — Removes access on Tuesdays only

  Contd..
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 motorolasol
  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)#
```

```
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
guest
  policy vlan 1
  policy ssid motorolasol
  policy time start 13:30 end 17:30
rfs7000-37FABE(config-radius-group-test)#
```
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>guest</td>
<td>Manages a guest user linked with a captive portal</td>
</tr>
<tr>
<td>policy</td>
<td>Sets a RADIUS group’s authorization policies</td>
</tr>
<tr>
<td>rate-limit</td>
<td>Sets a RADIUS group’s rate limit</td>
</tr>
</tbody>
</table>
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:

```plaintext
<DEVICE>(config)#radius-server-policy <POLICY-NAME>
rfs7000-37FABE(config)#radius-server-policy test
rfs7000-37FABE(config-radius-server-policy-test)#?
```

Radius Configuration commands:

- `authentication`: Radius authentication
- `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
- `nas`: 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
- `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

```
```

Table 16.2 summarizes RADIUS server policy configuration commands.

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>authentication</td>
<td>Configures RADIUS authentication settings</td>
<td>page 16-15</td>
</tr>
<tr>
<td>chase-referral</td>
<td>Enables LDAP server referral chasing</td>
<td>page 16-17</td>
</tr>
<tr>
<td>crl-check</td>
<td>Enables a certificate revocation list (CRL) check</td>
<td>page 16-18</td>
</tr>
<tr>
<td>ldap-agent</td>
<td>Configures the LDAP agent’s settings</td>
<td>page 16-19</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-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 16-31</td>
</tr>
<tr>
<td>session-resumption</td>
<td>Enables session resumption</td>
<td>page 16-33</td>
</tr>
<tr>
<td>use</td>
<td>Defines settings used with the RADIUS server policy</td>
<td>page 16-34</td>
</tr>
<tr>
<td>clrsr</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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
authentication [data-source|eap-auth-type]

authentication data-source [ldap|local]
authentication data-source [ldap {fallback}|local] { (ssid <SSID> precedence <1-5000>) }

authentication eap-auth-type [all|peap-gtc|peap-mschapv2|tls|ttls-md5|ttls-mschapv2|ttls-pap]
```

**Parameters**

- **authentication data-source [ldap {fallback}|local] { (ssid <SSID> precedence <1-5000>) }**
  - **data-source**
    - The RADIUS sever 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.
    - **Note:** The default setting is local.
  - **ldap fallback**
    - Uses a remote LDAP server as the data source
      - fallback – Optional. Enables fallback to local authentication. This feature ensures that when the configured LDAP data source is unreachable, the client is authenticated against the local RADIUS resource. This option is disabled by default.
  - **local**
    - Uses the local user database to authenticate a user
  - **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.

- **authentication eap-auth-type [all|peap-gtc|peap-mschapv2|tls|ttls-md5|ttls-mschapv2|ttls-pap]**
  - **eap-auth-type**
    - Uses *Extensible Authentication Protocol* (EAP), with this RADIUS server policy, for user authentication.
    - The EAP authentication types supported by the local RADIUS server are: all, peap-gtc, peap-mschapv2, tls,(ttls-md5, ttls-mschapv2, ttls-pap.)
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>Enables both TTLS and PEAP authentication</td>
</tr>
<tr>
<td>peap-gtc</td>
<td>Enables PEAP with default authentication using GTC</td>
</tr>
<tr>
<td>peap-mschapv2</td>
<td>Enables PEAP with default authentication using MSCHAPv2</td>
</tr>
<tr>
<td>tls</td>
<td>Enables TLS as the EAP type</td>
</tr>
<tr>
<td>ttls-md5</td>
<td>Enables TTLS with default authentication using md5</td>
</tr>
<tr>
<td>ttls-mschapv2</td>
<td>Enables TTLS with default authentication using MSCHAPv2</td>
</tr>
<tr>
<td>ttls-pap</td>
<td>Enables TTLS with default authentication using PAP</td>
</tr>
</tbody>
</table>

**Examples**

```bash
rfs7000-37FABE(config-radius-server-policy-test)#authentication eap-auth-type tls
```

```bash
rfs7000-37FABE(config-radius-server-policy-test)#show context
radius-server-policy test
  authentication eap-auth-type tls
```

**Related Commands**

```bash
no
```
Removes the RADIUS authentication settings
16.2.2 `chase-referral`

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 disabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>
16.2.3 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
   - Wireless Controllers — RFS4000, RFS6000, RFS7000
   - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables CRL check on a RADIUS server policy</td>
</tr>
</tbody>
</table>
16.2.4 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 — AP300, AP622, AP650, ES6510, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
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><strong>on &lt;DEVICE-NAME&gt;</strong></td>
<td>Optional. Specifies the device name</td>
</tr>
<tr>
<td><strong>&lt;DEVICE-NAME&gt;</strong></td>
<td>Specify the name of the AP, wireless controller, or service platform.</td>
</tr>
</tbody>
</table>

**Note:** To confirm the join status of a controller, use the `show > ldap-agent > join-status` command.

- `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>ldap-agent</th>
<th>Configures the LDAP agent’s settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>primary</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>secondary</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>
</tbody>
</table>
domain-name <LDAP-DOMAIN-NAME>

This keyword is common to both the 'primary' and 'secondary' parameters.
- domain-name – Configures the primary or secondary LDAP server’s domain name
  - <LDAP-DOMAIN-NAME> – Specify the domain name.

domain-admin-user <ADMIN-USER-NAME>

This keyword is common to both the 'primary' and 'secondary' parameters.
- domain-admin-user – Configures the primary or secondary LDAP server’s admin user name
  - <ADMIN-USER-NAME> – Specify the admin user’s name.

domain-admin-password [0 <WORD>|2 <WORD>]

This keyword is common to both the 'primary' and 'secondary' parameters.
- domain-admin-password – Configures the primary or secondary LDAP server’s admin user password
  - 0 <WORD> – Specifies the password in the unencrypted format
  - 2 <WORD> – Specifies the password in the encrypted format

Examples

rfs4000-229D58(config-radius-server-policy-test)#ldap-agent primary domain-name symbol domain-admin-user Administrator domain-admin-password 0 Symbol@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 symbol domain-admin-user Administrator domain-admin-password 0 Symbol@123
rfs4000-229D58(config-radius-server-policy-test)#

Related Commands

no

Removes LDAP agent settings from this RADIUS server policy
16.2.5 ldap-group-verification

- radius-server-policy

Enables LDAP group verification settings on this RADIUS server policy. This option is enabled by default.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

| no | Disables LDAP group verification settings |
16.2.6 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

ldap-server [dead-period|primary|secondary]

dead-period <0-600>

primary|secondary host <IP> port <1-65535> login <LOGIN-NAME> bind-dn <BIND-DN> base-dn <BASE-DN> passwd [0 <PASSWORD>|2 <ENCRYPTED-PASSWORD> | <PASSWORD>] passwd-attr <ATTR> group-attr <ATTR> group-filter <FILTER> group-membership <WORD> {net-timeout <1-10>}

Parameters

- ldap-server dead-period <0-600>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dead-period &lt;0-600&gt;</td>
<td>Set 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.</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-600&gt; – Specify a value from 0 - 600 seconds.</td>
</tr>
</tbody>
</table>

- ldap [primary|secondary] host <IP> port <1-65535> login <LOGIN-NAME> bind-dn <BIND-DN> base-dn <BASE-DN> passwd [0 <PASSWORD>|2 <ENCRYPTED-PASSWORD> | <PASSWORD>] passwd-attr <ATTR> group-attr <ATTR> group-filter <FILTER> group-membership <WORD> {net-timeout <1-10>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>host &lt;IP&gt;</td>
<td>Specifies the LDAP host IP address</td>
</tr>
<tr>
<td></td>
<td>• &lt;IP&gt; – Specify the LDAP server’s IP address.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>port &lt;1-65535&gt;</td>
<td>Configures the LDAP server port</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-65535&gt; – Specify a port between 1 - 65535.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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>• &lt;LOGIN-NAME&gt; – Specify a login ID (should not exceed 127 characters).</td>
</tr>
</tbody>
</table>
### Examples

```
rfs7000-37FABE(config-radius-server-policy-test)#ldap-server dead-period 100

rfs7000-37FABE(config-radius-server-policy-test)#ldap-server primary host 172.16.10.19 port 162 login motorolasol bind-dn bind-dn1 base-dn base-dn1 passwd 0 motorolasol@123 passwd-attr moto123 group-attr group1 group-filter groupfilter1 group-membership groupmembership1 net-timeout 2
rfs7000-37FABE(config-radius-server-policy-test)#

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 "motorolasol" bind-dn "bind-dn1" base-dn "base-dn1" passwd 0 motorolasol@123 passwd-attr moto123 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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables the LDAP server parameters</td>
</tr>
</tbody>
</table>
16.2.7 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

local realm <RADIUS-REALM>

Parameters

- local realm <RADIUS-REALM>

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 "motorolasol" bind-dn "bind-dn1"
   base-dn "base-dn1" passwd 0 motorolasol@123 passwd-attr motorolasol group-attr group1 group-filter "groupfilter1" group-membership groupmembership1 net-timeout 2
dead-period 100
rfs7000-37FABE(config-radius-server-policy-test)#

Related Commands

- no

Removes the RADIUS local realm
16.2.8 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
nas <IP/M> secret [0|2]<LINE>
nas <IP/M> secret [0 <LINE>]|2 <LINE>|<LINE>
```

Parameters

- nas <IP/M> secret [0 <LINE>]|2|<LINE>

| <IP/M> | Sets the RADIUS client’s IP address  
| ------ | -------------------------------  
| <IP/M> | – Sets the RADIUS client’s IP address in the A.B.C.D/M format |

| secret | Sets the RADIUS client’s shared secret. Use one of the following options:  
| ------ | ---------------------------------  
| [0 <LINE>]|2 <LINE>|<LINE> |  
| <LINE> | – Defines the secret (client shared secret) up to 64 characters |

| [0 <LINE>] | – Sets an UNENCRYPTED secret  
| 2 <LINE> | – Sets an ENCRYPTED secret  
| <LINE> | – |  

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 "motorolasol" bind-dn "bind-dn1"
  base-dn "base-dn1" passwd 0 motorolasol@123 passwd-attr moto123 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 a RADIUS server’s client on a RADIUS server policy |
### 16.2.9 no

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```
no [authentication|chase-referral|clr-check|ldap-agent|ldap-group-verification|
ldap-server|local|nas|proxy|session-resumption|use]
```

#### Parameters

- **no authentication [data-source|eap]**
  - `data-source` {ldap {fallback|local}|ssid <SSID> precedence <1-5000>}
  - `eap` configuration
  - Removes the RADIUS authentication settings

- **no authentication** Removes configured data source
  - `ldap fallback` – Optional. Removes a remote LDAP server as the data source for user authentication
  - `fallback` – Optional. Disables fallback to local authentication in case LDAP authentication fails
  - `local` – Optional. Removes a local database as the source of user authentication

The following keywords are recursive and common to both 'ldap' and 'local' parameters:
- `ssid` – Optional. Removes the SSID associated with this LDAP data source.
- `<SSID>` – Specify the SSID.
  - `precedence <SSID>` – resets the precedence for this LDAP authentication rule.
  - `<1-5000>` – Specify the precedence from 1 - 5000.

**Note:** Use this option to configure different data sources for each SSID.

- **eap configuration** Resets EAP authentication to the default mode
- **no** [chase-referral|crl-check|ldap-group-verification|nas <IP/M>|session-resumption]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no chase-referral</td>
<td>Disables LDAP server referral chasing</td>
</tr>
<tr>
<td>no crl-check</td>
<td>Removes the CRL check</td>
</tr>
<tr>
<td>no ldap-group-verification</td>
<td>Disables a RADIUS server’s LDAP group verification settings</td>
</tr>
<tr>
<td>no nas</td>
<td>Removes a RADIUS server’s client</td>
</tr>
<tr>
<td></td>
<td>- &lt;IP/M&gt; – Sets the IP address of the RADIUS client in the A.B.C.D/M format</td>
</tr>
<tr>
<td>no session-resumption</td>
<td>Disables a RADIUS server’s session resumption settings</td>
</tr>
</tbody>
</table>

- **no** ldap-agent [join-retry-timeout|primary|secondary]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no ldap-agent</td>
<td>Removes the LDAP agent parameters on this RADIUS server policy</td>
</tr>
<tr>
<td>join-retry-timeout</td>
<td>Removes the configured retry interval (this is the interval, in seconds, after which a access point or wireless controller retries joining the LDAP server’s domain)</td>
</tr>
<tr>
<td>primary</td>
<td>Removes the primary LDAP server details (such as, domain name, admin user name, and password)</td>
</tr>
<tr>
<td>secondary</td>
<td>Removes the secondary LDAP server details (such as, domain name, admin user name, and password)</td>
</tr>
</tbody>
</table>

- **no** local realm [<REALM-NAME>|all]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no local</td>
<td>Removes a RADIUS server’s local realm</td>
</tr>
<tr>
<td>realm [&lt;REALM-NAME&gt;</td>
<td>all]</td>
</tr>
</tbody>
</table>

- **no** proxy [realm <REALM-NAME>|retry-count|retry-delay]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no proxy</td>
<td>Removes a RADIUS proxy server’s settings</td>
</tr>
<tr>
<td>realm &lt;REALM-NAME&gt;</td>
<td>Removes a proxy server’s realm name (specified by the &lt;REALM-NAME&gt; parameter)</td>
</tr>
<tr>
<td>retry-count</td>
<td>Removes a proxy server’s retry count</td>
</tr>
<tr>
<td>retry-delay</td>
<td>Removes a proxy server’s retry delay count</td>
</tr>
</tbody>
</table>

- **no** ldap-server [dead-period|primary|secondary]

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no ldap-server</td>
<td>Disables the LDAP server parameters</td>
</tr>
<tr>
<td>dead-period</td>
<td>Sets the dead period as the duration the RADIUS server will not contact the LDAP server after finding it unavailable.</td>
</tr>
<tr>
<td>primary</td>
<td>Removes the primary LDAP server</td>
</tr>
<tr>
<td>secondary</td>
<td>Removes the secondary LDAP server</td>
</tr>
</tbody>
</table>
• no use [radius-group [<RAD-GROUP-NAME>|all]|radius-user-pool-policy [<RAD-USER-POOL-NAME>|all]]

no use
Removes the RADIUS group or a RADIUS user pool policy

radius-group
Removes a specified RADIUS group or all RADIUS groups

<RAD-GROUP-NAME>
• <RAD-GROUP-NAME> – Specify the RADIUS group name.
• all – Removes all RADIUS groups

radius-user-pool-policy
Removes a specified RADIUS user pool or all RADIUS user pools

<RAD-USER-POOL-NAME>|all]
• <RAD-USER-POOL-NAME> – Specify the RADIUS user pool name.
• all – Removes all RADIUS user pools

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
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 "motorolasol" bind-dn "bind-dn1"
  base-dn "bas-dn1" passwd 0 motorolasol123 passwd-attr moto123 group-attr group1 group-filter "groupfilter1" group-membership groupmembership1 net-timeout 2
  ldap-server dead-period 100
rfs7000-37FABE(config-radius-server-policy-test)#

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 realm1
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 "motorolasol" bind-dn "bind-dn1"
  base-dn "bas-dn1" passwd 0 motorolasol123 passwd-attr moto123 group-attr group1 group-filter "groupfilter1" group-membership groupmembership1 net-timeout 2
rfs7000-37FABE(config-radius-server-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>authentication</td>
<td>Configures RADIUS server authentication parameters</td>
</tr>
<tr>
<td>chase-referral</td>
<td>Enables LDAP server referral chasing</td>
</tr>
<tr>
<td>crl-check</td>
<td>Enables a CRL check</td>
</tr>
<tr>
<td>ldap-agent</td>
<td>Configures the LDAP agent's parameters</td>
</tr>
<tr>
<td>ldap-group-verification</td>
<td>Enables LDAP group verification settings</td>
</tr>
<tr>
<td>ldap-server</td>
<td>Configures the LDAP server parameters. Configuring the LDAP server allows users to login and authenticate from anywhere on the network</td>
</tr>
<tr>
<td>local</td>
<td>Configures a local RADIUS realm on this RADIUS server policy</td>
</tr>
<tr>
<td>nas</td>
<td>Configures the key sent to a RADIUS client</td>
</tr>
<tr>
<td><strong>proxy</strong></td>
<td>Configures a proxy RADIUS server based on the realm/suffix</td>
</tr>
<tr>
<td><strong>session-resumption</strong></td>
<td>Enables session resumption/fast re-authentication by using cached attributes</td>
</tr>
<tr>
<td><strong>use</strong></td>
<td>Defines settings used with the RADIUS server policy</td>
</tr>
</tbody>
</table>
16.2.10 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

- `realm`<REALM-NAME>
  
  Configures the realm name
  
  - `<REALM-NAME>` – Specify the realm name. The name should not exceed 50 characters.

- `server <IP>`
  
  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.
  
  - `<IP>` – Sets the proxy server’s IP address

- `port <1024-65535>`
  
  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.
  
  - `<1024-65535>` – Sets the proxy server’s port from 1024 - 65535 (default port is 1812)

- `secret [0 <PASSWORD>|2 <ENCRYPTED-PASSWORD>|<PASSWORD>]`
  
  Sets the proxy server secret string. The options are:
  
  - 0 <PASSWORD> – Sets an UNENCRYPTED password
  - 2 <ENCRYPTED-PASSWORD> – Sets an ENCRYPTED password
  - `<PASSWORD>` – Sets the proxy server shared secret value
### proxy retry-count <3-6>

<table>
<thead>
<tr>
<th>retry-count &lt;3-6&gt;</th>
<th>Sets the proxy server’s retry count. This is the maximum number attempts made by a controllers RADIUS server to connect to the proxy server.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;3-6&gt; – Sets a value from 3 - 6 (default is 3 counts)</td>
</tr>
</tbody>
</table>

### proxy retry-delay <5-10>

<table>
<thead>
<tr>
<th>retry-delay &lt;5-10&gt;</th>
<th>Sets the proxy server’s retry delay count. This is the interval the controller’s RADIUS server waits before making an additional connection attempt.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;5-10&gt; – Sets a value from 5 - 10 seconds (default is 5 seconds)</td>
</tr>
</tbody>
</table>

### 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 motorolaso1123
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 motorolaso1123
dap-server primary host 172.16.10.19 port 162 login "motorolaso1" bind-dn "bind-dn1" base-dn "bas-dn1" passwd 0 motorolaso121 passwd-attr motorolaso1 group-attr group1 group-filter "groupfilter1" group-membership groupmembership1 net-timeout 2
rfs7000-37FABE(config-radius-server-policy-test)#
```
16.2.11 session-resumption

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

session-resumption {lifetime|max-entries}

session-assumption {lifetime <1-24> {max-entries <10-1024>]|max-entries <10-1024>}

Parameters

- session-assumption {lifetime <1-24> {max-entries <10-1024>]|max-entries <10-1024>}

 lifetime <1-24> {max-entries <10-1024>}
  | Optional. Sets the lifetime of cached entries
  | <1-24> – Specify the lifetime period from 1 - 24 hours (default is 1 hour)
  | max-entries – Optional. Configures the maximum number of entries in the cache
  | <10-1024> – Sets the maximum number of entries in the cache from 10 - 1024 (default is 128 entries)

 max-entries <10-1024>
  | Optional. Configures the maximum number of entries in the cache
  | <10-1024> – Sets the maximum number of entries in the cache from 10 - 1024 (default is 128 entries)

Examples

rfs7000-37FABE(config-radius-server-policy-test)#session-resumption lifetime 10 max-entries 11

rfs7000-37FABE(config-radius-server-policy-test)#show context

Related Commands

no

Disables session resumption on this RADIUS server policy
### 16.2.12 `use`

`radius-server-policy` defines settings used with the RADIUS server policy.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
use [radius-group <RAD-GROUP-NAME1> {RAD-GROUP-NAME2} | radius-user-pool-policy <RAD-USER-POOL-NAME>]
```

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>radius-group &lt;RAD-GROUP-NAME1&gt; {RAD-GROUP-NAME2}</td>
<td>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.</td>
</tr>
<tr>
<td>radius-user-pool-policy &lt;RAD-USER-POOL-NAME&gt;</td>
<td>Associates a specified RADIUS user pool with this RADIUS server policy. Specify a user pool name.</td>
</tr>
</tbody>
</table>

**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 motorolaSol1123
ldap-server primary host 172.16.10.19 port 162 login "motorolaSol" bind-dn "bind-dn1"
base-dn "bas-dn1" passwd 0 motorolasol123 passwd-attr motol23 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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disassociates a RADIUS group or a RADIUS user pool policy from this RADIUS server policy</td>
</tr>
</tbody>
</table>
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)#
```

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)#
```

Table 16.3 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 16-37</td>
</tr>
<tr>
<td><code>user</code></td>
<td>Configures the RADIUS user parameters</td>
<td>page 16-38</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Negates a command or sets its default</td>
<td>page 16-40</td>
</tr>
<tr>
<td><code>clrscr</code></td>
<td>Clears the display screen</td>
<td>page 5-3</td>
</tr>
<tr>
<td><code>commit</code></td>
<td>Commits (saves) changes made in the current session</td>
<td>page 5-4</td>
</tr>
<tr>
<td><code>end</code></td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td><code>exit</code></td>
<td>Ends the current mode and moves to the previous mode</td>
<td>page 5-5</td>
</tr>
<tr>
<td><code>help</code></td>
<td>Displays the interactive help system</td>
<td>page 5-6</td>
</tr>
<tr>
<td><code>revert</code></td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td><code>service</code></td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
</tbody>
</table>
### Table 16.3  RADIUS-User-Pool-Policy-Config Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
16.3.1 duration

Modifies the duration, in minutes, that a guest user can access the captive portal.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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; – Specify the guest user's name.</td>
<td>&lt;0-525600&gt; – Specify the access duration from 0 - 5252600 minutes. A value of &quot;0&quot; 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

user <USERNAME> password [0 <UNECRYPTED-PASSWORD>|2 <ECRYPTED-PASSWORD>|<PASSWORD>] {group <RAD-GROUP-NAME>} {guest}
user <USERNAME> password [0 <UNECRYPTED-PASSWORD>|2 <ECRYPTED-PASSWORD>|<PASSWORD>] {group <RAD-GROUP-NAME>} {guest expiry-time <HH:MM> expiry-date <MM/DD/YYYY> access-duration <0-525600>|email-id <EMAIL-ID>|start-time <HH:MM> start-date <MM/DD/YYYY>|telephone <TELEPHONE-NUMBER>}

Parameters

user <USERNAME> password [0 <UNECRYPTED-PASSWORD>|2 <ECRYPTED-PASSWORD>|<PASSWORD>] {group <RAD-GROUP-NAME>} {guest expiry-time <HH:MM> expiry-date <MM/DD/YYYY> access-duration <0-525600>|email-id <EMAIL-ID>|start-time <HH:MM> start-date <MM/DD/YYYY>|telephone <TELEPHONE-NUMBER>}

<table>
<thead>
<tr>
<th>user &lt;USERNAME&gt;</th>
<th>Adds a new RADIUS user to the RADIUS user pool</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;USERNAME&gt;</td>
<td>Specify the name of the user. The username should not exceed 64 characters.</td>
</tr>
<tr>
<td>Note:</td>
<td>The username is a unique alphanumeric string identifying this user, and cannot be modified with the rest of the configuration.</td>
</tr>
</tbody>
</table>

passwd [0 <UNECRYPTED-PASSWORD>|2 <ECRYPTED-PASSWORD>|<PASSWORD>] Configures the user password (provide a password unique to this user)

| 0 <UNECRYPTED-PASSWORD> | Sets an unencrypted password |
| 2 <ECRYPTED-PASSWORD>   | Sets an encrypted password |
| <PASSWORD>            | Sets a password (specified unencrypted) up to 21 characters |

<table>
<thead>
<tr>
<th>group &lt;RAD-GROUP-NAME&gt;</th>
<th>Optional. Configures the RADIUS server group of which this user is a member</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;RAD-GROUP-NAME&gt;</td>
<td>Specify the group name in the local database.</td>
</tr>
<tr>
<td>Note:</td>
<td>If the user is a guest, assign the user a group with temporary access privileges.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>guest</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note:</td>
<td>A guest user can be assigned only to a guest user group.</td>
</tr>
</tbody>
</table>

| 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). |

| expiry-date <MM:DD:YYYY> | Specify the user account expiry date in the MM:DD:YYYY format (for example, 02:15:2014). |
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Examples

```bash
rfs4000-229D58(config-radius-user-pool-wdws)#user guestuser1 password 0 guestuser@1
rfs4000-229D58(config-radius-user-pool-wdws)#group wdws guest expiry-time 12:30 expiry-date 12/15/2014 access-duration 500
```

```bash
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
```

```bash
rfs4000-229D58(config-radius-user-pool-wdws)#show radius guest-users time
TIME (min:sec) USED REMAINING GUEST USER
0:00 500:00 user1
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Deletes a user from a RADIUS user pool</td>
</tr>
</tbody>
</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`no user <USERNAME>`

**Parameters**
- **no user <USERNAME>**
- **user <USERNAME>** Deletes a RADIUS user
- **<USERNAME>** — Specify the user name.

**Examples**

The following example shows the RADIUS user pool 'wdws' settings before the 'no' command is executed:

```
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)#no user guestuser1
```

The following example shows the RADIUS user pool 'wdws' settings after the 'no' command is executed:

```
rfs4000-229D58(config-radius-user-pool-wdws)#show context
radius-user-pool-policy wdws
rfs4000-229D58(config-radius-user-pool-wdws)#
```

**Related Commands**

- `user` Configures the RADIUS user parameters
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 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. Both WMM and WMM-
Power Save techniques wireless networks are supported. 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.

WiNG controllers (access points, wireless 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.

WiNG controllers 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.

Vendor specific 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 WiNG 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:

```
<DEVICE>(config)#radio-qos-policy <POLICY-NAME>
```

```
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
ddo End current mode and change to EXEC mode
ddo End current mode and down to previous mode
ddo Description of the interactive help system
ddo Revert changes
ddo Service Commands
ddo Show running system information
ddo Write running configuration to memory or terminal
```

```
rfs7000-37FABE(config-radio-qos-test)#
```
### 17.1 radio-qos-policy

Table 17.1 summarizes radio 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 multicast streams for acceleration</td>
<td>page 17-4</td>
</tr>
<tr>
<td>admission-control</td>
<td>Enables admission control across all radios for one or more access categories</td>
<td>page 17-5</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or resets configured settings to their default</td>
<td>page 17-8</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 17-15</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
17.1.1 accelerated-multicast

Configures multicast streams for acceleration. Multicasting allows group transmission of data streams.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
accelerated-multicast [client-timeout|max-client-streams|max-streams|overflow-policy|stream-threshold]
accelerated-multicast [client-timeout <5-6000>|max-client-streams <1-4>|max-streams <0-256>|overflow-policy [reject|revert]|stream-threshold <1-500>]

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>client-timeout</td>
<td>Configures a timeout period in seconds for wireless clients</td>
</tr>
<tr>
<td>&lt;5-6000&gt;</td>
<td>- Specify a value from 5 - 6000 seconds. The default is 60 seconds.</td>
</tr>
<tr>
<td>max-client-streams</td>
<td>Configures the maximum number of accelerated multicast streams per client</td>
</tr>
<tr>
<td>&lt;1-4&gt;</td>
<td>- Specify a value from 1 - 4. The default is 2.</td>
</tr>
<tr>
<td>max-streams</td>
<td>Configures the maximum number of accelerated multicast streams per radio</td>
</tr>
<tr>
<td>&lt;0-256&gt;</td>
<td>- Specify a value from 0 - 256. The default is 25.</td>
</tr>
<tr>
<td>overflow-policy</td>
<td>Specifies the policy in case too many clients register simultaneously. The radio QOS policy can be configured to follow one of the following courses of action:</td>
</tr>
<tr>
<td>[reject</td>
<td>revert]</td>
</tr>
<tr>
<td></td>
<td>- revert – Reverts to regular multicast delivery</td>
</tr>
<tr>
<td>stream-threshold</td>
<td>Configures the number of multicast packets per second threshold value. Once this threshold is crossed, the system triggers streams to accelerate.</td>
</tr>
<tr>
<td>&lt;1-500&gt;</td>
<td>- Specify a value from 1 - 500. The default is 25 packets per second.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-radio-qos-test)#accelerated-multicast client-timeout 500
rfs7000-37FABE(config-radio-qos-test)#accelerated-multicast stream-threshold 15

rfs7000-37FABE(config-radio-qos-test)#show context
radio-qos-policy test
accelerated-multicast stream-threshold 15
accelerated-multicast client-timeout 500
rfs7000-37FABE(config-radio-qos-test)#

Related Commands

no | Reverts accelerated multicasting settings to their default
17.1.2 admission-control

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 | 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 next non admission controlled traffic class priority. This applies to clients that do not send TPSEC 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 TPSEC 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. |
### 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
```

### 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```plaintext
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]

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 accelerated-multicast** [client-timeout|max-client-streams|max-streams|
overflow-policy|stream-threshold]

  Resets accelerated multicasting settings to their default. The following accelerated multicast control settings can be reverted:
  - client-timeout – Resets the client timeout to the default (60 seconds)
  - max-client-streams – Resets the maximum number of accelerated streams per client to default (2 streams per client)
  - max-streams – Resets the maximum number of accelerated streams per radio to default (25 streams)
  - overflow-policy – Resets the overflow policy to default (reject)
  - stream-threshold – Resets the number of packets per second threshold to default (25 packets)

- **no admission-control** [firewall-detected-traffic|implicit-tspec]

  Reverts or resets admission control settings to their default. These controls are configured on a radio for one or more access categories.
  - firewall-detected-traffic – Does not enforce admission control for traffic whose access category is detected by the firewall ALG
  - implicit-tspec – Disables implicit traffic specifiers for wireless clients that do not support WMM-TSPEC

---

**Note:** The table above is a summary of the parameters available for each `no` command.

---

**Additional Note:** The `no` command is used to negate a command or reset configured settings to their default. It is particularly useful in the context of WiNG 5.6's CLI Reference Guide, where it is applied to various QoS policies to reset or disable certain settings.

---

**Technical Detail:** The `no` command is a powerful feature in command-line interfaces, allowing for the reverse of configuration changes. In the context of WiNG 5.6, it enables administrators to quickly reset QoS settings to their default values, which can be beneficial for troubleshooting or testing purposes.

---

**Conclusion:** Understanding the usage and implications of the `no` command is crucial for effective network management and configuration. It empowers administrators with the ability to revert settings, ensuring that the network remains stable and responsive to changes.
- **no admission-control** [background|best-effort|video|voice] {max-airtime-percent|max-clients|max-roamed-clients|reserved-for-roam-percent}

  no admission-control
  Reverts or resets admission control settings to their default. These controls are configured on a radio for one or more access categories.
  - background – Resets background access category admission control settings
  - best-effort – Resets best effort access category admission control settings
  - video – Resets video access category admission control settings
  - voice – Resets voice access category admission control settings

  max-airtime-percent
  Optional. Resets the maximum percentage of airtime used by the selected access category to its default (75%)

  max-clients
  Optional. Resets the maximum number of wireless clients admitted by the selected access category to its default (100 clients)

  max-roamed-clients
  Optional. Resets the maximum number of roaming wireless clients admitted by the selected access category to its default (10 roamed clients)

  reserved-for-roam-percent
  Resets the percentage of air time allocated exclusively for roaming wireless clients by the selected access category to its default (10%)

- **no smart-aggregation** {delay [background|best-effort|streaming-video|video-conferencing|voice]|max-mesh-hops|min-aggregation-limit}

  no smart-aggregation
  Disable smart aggregation parameters

  delay [background|best-effort|streaming-video|video-conferencing|voice]
  Optional. Removes the configured maximum delay setting for the specified traffic type

  max-mesh-hops
  Optional. Removes the configured maximum number of expected mesh hops

  min-aggregation-limit
  Optional. Removes the minimum number of aggregates buffered before an aggregate is sent

- **no wmm** [background|best-effort|video|voice] [aifsn|cw-max|cw-min|txop-limit]

  no wmm
  Reverts or resets 802.11e/wireless multimedia settings to default
  - background – Removes background access category wireless multimedia settings
  - best-effort – Removes best effort access category wireless multimedia settings
  - video – Removes video access category wireless multimedia settings
  - voice – Removes voice access category wireless multimedia settings

  The following are common to the background, best-effort, video, and voice parameters:

  aifsn
  Removes the configured AIFSN value

  cw-max
  Removes the configured maximum contention window value

  cw-min
  Removes the configured minimum contention window value

  txop-limit
  Removes the configured transmit opportunity limit value
- no service admission-control across-reassoc

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no service admission-control across-reassoc</td>
<td>Enables admission control across all radios for one or more access categories</td>
</tr>
<tr>
<td>accelerated-multicast</td>
<td>Configures multicast streams for acceleration. Multicasting allows the group transmission of data streams</td>
</tr>
<tr>
<td>admission-control</td>
<td>Enables admission control across all radios for one or more access categories</td>
</tr>
<tr>
<td>smart-aggregation</td>
<td>Configures smart aggregation parameters on this Radio QoS policy</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands in the radio QoS configuration mode</td>
</tr>
<tr>
<td>wmm</td>
<td>Configures 802.11e wireless multimedia parameters</td>
</tr>
</tbody>
</table>

**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)#
```

```
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:

```
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 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

- `smart-aggregation {delay|max-mesh-hops|min-aggregation-limit}`
- `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>}`

Parameters

- `smart-aggregation {delay [background|best-effort|streaming-video|video-conferencing|voice] <0-1000>}`

<table>
<thead>
<tr>
<th>delay</th>
<th>Optional. Configures the maximum delay parameter for each traffic type.</th>
</tr>
</thead>
<tbody>
<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 \langle1-10\rangle\}

| max-mesh-hops \langle1-10\rangle | Optional. Sets the maximum number of expected hops to the destination within a mesh  
| - 1-10 – Specify a value from 1 - 10. The default is 3 hops. |

### smart-aggregation \{min-aggregation-limit \langle0-64\rangle\}

| min-aggregation-limit \langle0-64\rangle | Optional. Sets the minimum number of aggregates buffered before an aggregate is sent  
| - 0-64 – Specify a value from 0 - 64. The default is 8 frames. |

### 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

| no | Resets the minimum aggregation limit |
### 17.1.5 service

In this section, we discuss the `service` command, which is used to invoke commands in the radio QoS configuration mode. The `service` command is supported on various platforms, including Access Points, Wireless Controllers, and Service Platforms.

#### Syntax

The syntax for the `service` command is as follows:

```
service [admission-control|show]
```

- **service admission-control across-reassoc**
- **service show cli**

#### Parameters

- **service admission-control across-reassoc**
- **service show cli**

#### Examples

The examples below demonstrate the usage of the `service` command:

```
rfs4000-229D58(config-radio-qos-test)#service admission-control across-reassoc
rfs4000-229D58(config-radio-qos-test)#
```

```
rfs4000-229D58(config-radio-qos-test)#show context
radio-qos-policy test
rfs4000-229D58(config-radio-qos-test)#
```

```
rfs4000-229D58(config-radio-qos-test)#service show cli
Radio QoS 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]
  ++adoption
  ++log
  +++adoptee [show adoption log adoptee([|on DEVICE-NAME])]
  +++on
  +++DEVICE-NAME [show adoption log adoptee([|on DEVICE-NAME])]
  +++adoption [show adoption log adopter ([|mac AA-BB-CC-DD-EE-FF])]
  +++mac
  +++AA-BB-CC-DD-EE-FF [show adoption log adopter ([|mac AA-BB-CC-DD-EE-FF])]
  ++on
```
+DEVICE-NAME [show adoption log adopter (|mac AA-BB-CC-DD-EE-FF)(|on DEVICE-
NAME)]

---More---

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables retention of previously negotiated TSPEC parameters across re-associations on the radio</td>
</tr>
</tbody>
</table>
17.1.6 wmm

Configures 802.11e wireless multimedia (wmm) parameters

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

wmm [background|best-effort|video|voice]

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>|cw-max <0-15>|cw-min <0-15>|txop-limit <0-65535>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wmm background</td>
<td>Configures background access category wireless multimedia settings</td>
</tr>
<tr>
<td>wmm best-effort</td>
<td>Configures best effort access category wireless multimedia settings</td>
</tr>
<tr>
<td>wmm video</td>
<td>Configures video access category wireless multimedia settings</td>
</tr>
<tr>
<td>wmm voice</td>
<td>Configures voice access category wireless multimedia settings</td>
</tr>
<tr>
<td>aifsn &lt;1-15&gt;</td>
<td>Configures Arbitrary Inter-Frame Space Number (AIFSN) as the wait time between data frames derived from the AIFSN and slot time</td>
</tr>
</tbody>
</table>
  - 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 — Set 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
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.
- It is recommended that default WMM values be used 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.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cw-max &lt;0-15&gt;</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>• background – Sets CW Max for low (background) traffic. The default is 10.</td>
</tr>
<tr>
<td></td>
<td>• best-effort – Sets CW Max for normal (best effort) traffic. The default is 6.</td>
</tr>
<tr>
<td></td>
<td>• voice – Sets CW Max for voice traffic. The default is 3.</td>
</tr>
<tr>
<td></td>
<td>• video – Sets CW Max for video traffic. The default is 4</td>
</tr>
<tr>
<td></td>
<td>The following keyword is common to all of the above traffic types:</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-15&gt; – ECW: the contention window. The actual value used is (2^{ECW} - 1).</td>
</tr>
<tr>
<td></td>
<td>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).</td>
</tr>
<tr>
<td>cw-min &lt;0-15&gt;</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>• background – Sets CW Min for low (background) traffic. The default is 4.</td>
</tr>
<tr>
<td></td>
<td>• best-effort – Sets CW Min for normal (best effort) traffic. The default is 4.</td>
</tr>
<tr>
<td></td>
<td>• voice – Sets CW Min for voice traffic. The default is 2.</td>
</tr>
<tr>
<td></td>
<td>• video – Sets CW Min for video traffic. The default is 3.</td>
</tr>
<tr>
<td></td>
<td>The following keyword is common to all of the above traffic types:</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-15&gt; – ECW: the contention window. The actual value used is (2^{ECW} - 1).</td>
</tr>
<tr>
<td></td>
<td>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).</td>
</tr>
<tr>
<td>txop-limit &lt;0-65535&gt;</td>
<td>Set the interval, in microseconds, during which a particular client has the right to initiate transmissions</td>
</tr>
<tr>
<td></td>
<td>• background – Sets TXOP for low (background) traffic. The default is 0.</td>
</tr>
<tr>
<td></td>
<td>• best-effort – Sets TXOP for normal (best effort) traffic. The default is 4.</td>
</tr>
<tr>
<td></td>
<td>• voice – Sets TXOP for voice traffic. The default is 47.</td>
</tr>
<tr>
<td></td>
<td>• video – Sets TXOP for video traffic. The default is 94.</td>
</tr>
<tr>
<td></td>
<td>The following keyword is common to all of the above traffic types:</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-65535&gt; – Specify a value from 0 - 65535 to configure the transmit opportunity limit in 32 microsecond units.</td>
</tr>
<tr>
<td></td>
<td>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).</td>
</tr>
</tbody>
</table>
- TSPEC admission control is only available with newer voice over WLAN phones. Many legacy voice devices do not support TPSEC or even support WMM traffic prioritization.

Examples

```
rfs7000-37FABE(config-radio-qos-test)#wmm best-effort aifsn 7
rfs7000-37FABE(config-radio-qos-test)#wmm voice txop-limit 1
```

```
rfs7000-37FABE(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
rfs7000-37FABE(config-radio-qos-test)#
```

Related Commands

```
no
```

Reverts or resets 802.11e/wireless multimedia settings to their default
CHAPTER 18
ROLE-POLICY

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)#
18.1 role-policy

Table 18.1 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 roles defined in the role policy</td>
<td>page 18-3</td>
</tr>
<tr>
<td>ldap-deadperiod</td>
<td>Configures the Lightweight Directory Access Protocol (LDAP) deadperiod interval</td>
<td>page 18-5</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 18-12</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

default-role use [ip-access-list|ipv6-access-list|mac-access-list]
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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>default-role use</td>
<td>Enables default role configuration. This role is applied to a wireless client not matching any of the user-defined roles.</td>
</tr>
<tr>
<td>[ip-access-list] ipv6-access-list] mac-access-list] [in</td>
<td>out] &lt;IP/IPv6/MAC-ACCESS-LIST-NAME&gt;</td>
</tr>
<tr>
<td>precedence &lt;1-100&gt;</td>
<td>The following keyword is common to the all of the above parameters:</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.

Note: The ACL applied determines the action applied to a client assigned the default role.
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes or resets the default role configuration</td>
</tr>
</tbody>
</table>
### 18.1.2 ldap-deadperiod

*role-policy*

Configures the Lightweight Directory Access Protocol (LDAP) deadperiod interval

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
ldap-deadperiod <60-300>
```

**Parameters**

- `ldap-deadperiod <60-300>`

#### ldap-deadperiod <60-300>

| ldap-deadperiod <60-300> | 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.
|                           |   - `<60-300>` — Specify the interval from 60 - 600 seconds. The default is 120 seconds.

**Examples**

```plaintext
rfs7000-37FABE(config-role-policy-test)#ldap-deadperiod 100
rfs7000-37FABE(config-role-policy-test)#show context
default-role use ip-access-list in test precedence 1
ldap-deadperiod 100
```

**Related Commands**

- `no` | Removes or resets the LDAP deadperiod interval
18.1.3 ldap-query

> role-policy

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`ldap-query [self|through-controller]`

**Parameters**

- `ldap-query [self|through-controller]`

**Examples**

```
rfs7000-37FABE(config-role-policy-test)#ldap-query self
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
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 in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
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 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>no</td>
<td>Removes or resets the LDAP server settings</td>
</tr>
</tbody>
</table>
18.1.5 `ldap-timeout`

- `role-policy`

Configures the LDAP timeout interval. This is the interval after which a LDAP query is timed out.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`ldap-timeout <1-5>`

**Parameters**

- `ldap-timeout <1-5>`

| `ldap-timeout <1-5>` | 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. |

**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
```

**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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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|mac-access-list] [in|out] <IP/MAC-ACCESS-LIST-NAME> precedence <1-100>
```

**Parameters**
- `no [default-role|ldap-deadperiod|ldap-query|ldap-server <1-2>|ldap-timeout]`
- `no default-role use [ip-access-list|mac-access-list] [in|out] <IP/MAC-ACCESS-LIST-NAME> precedence <1-100>`
- `no user-role <ROLE-NAME>`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no ldap-deadperiod</code></td>
<td>Resets the LDAP dead period interval to default (120 seconds)</td>
</tr>
<tr>
<td><code>no ldap-query</code></td>
<td>Disables LDAP service on a role policy</td>
</tr>
<tr>
<td><code>no ldap-server &lt;1-2&gt;</code></td>
<td>Removes the selected LDAP server settings. Specify the LDAP server ID.</td>
</tr>
<tr>
<td><code>no ldap-timeout</code></td>
<td>Resets the LDAP timeout to default (2 seconds)</td>
</tr>
<tr>
<td>`no default-role use [ip-access-list</td>
<td>mac-access-list] [in</td>
</tr>
<tr>
<td><code>&lt;IP/MAC-ACCESS-LIST-NAME&gt;</code></td>
<td>Specifies the IP or MAC access list to remove</td>
</tr>
<tr>
<td><code>precedence &lt;1-100&gt;</code></td>
<td>The following keywords are common to the IP and MAC access list parameters:</td>
</tr>
<tr>
<td><code>no user-role &lt;ROLE-NAME&gt;</code></td>
<td>Deletes a user-defined role</td>
</tr>
</tbody>
</table>

**Note:** The system removes the access list rule identified by the specified precedence.
Examples
The following example shows the role policy 'test' setting before the 'no' commands are executed:

rfs7000-37FABE(config-role-policy-test)#show context
erole-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)#
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
erole-policy test
  default-role use ip-access-list in test precedence 1
  ldap-query self
rfs7000-37FABE(config-role-policy-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>default-role</td>
<td>Assigns a default role to a wireless client</td>
</tr>
<tr>
<td>ldap-deadperiod</td>
<td>Configures the LDAP deadperiod interval</td>
</tr>
<tr>
<td>ldap-query</td>
<td>Enables LDAP service on a role policy</td>
</tr>
<tr>
<td>ldap-server</td>
<td>Configures the LDAP server settings</td>
</tr>
<tr>
<td>ldap-timeout</td>
<td>Configures the LDAP server query timeout</td>
</tr>
<tr>
<td>user-role commands</td>
<td>Creates a role and associates it to the newly created role policy</td>
</tr>
</tbody>
</table>
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.

Table 18.2 summarizes user role configuration commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>user-role</td>
<td>Creates a new user role and enters its configuration mode</td>
<td>18-13</td>
</tr>
<tr>
<td>user-role commands</td>
<td>Summarizes user role configuration mode commands</td>
<td>18-15</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>&lt;ROLE-NAME&gt; Specify a name for this user role.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>precedence &lt;1-10000&gt;</th>
<th>Sets the precedence for this role</th>
</tr>
</thead>
<tbody>
<tr>
<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>
<td></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
domain 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
clrsr 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

Table 18.3 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 18-17</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 18-18</td>
</tr>
<tr>
<td>authentication-type</td>
<td>Configures an authentication type based filter</td>
<td>page 18-20</td>
</tr>
<tr>
<td>captive-portal</td>
<td>Configures a captive portal based filter</td>
<td>page 18-22</td>
</tr>
<tr>
<td>city</td>
<td>Configures a city name based filter</td>
<td>page 18-23</td>
</tr>
<tr>
<td>client-identity</td>
<td>Associates a client-identity (device fingerprinting) based filter</td>
<td>page 18-24</td>
</tr>
<tr>
<td>company</td>
<td>Configures a company name based filter</td>
<td>page 18-25</td>
</tr>
<tr>
<td>country</td>
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<td>Configures a department name based filter</td>
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</tr>
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### Table 18.3 User-Role-Mode Commands

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<th>Reference</th>
</tr>
</thead>
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</tr>
<tr>
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<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ap-location [any|contains|exact|not-contains]
ap-location any
ap-location [contains|exact|not-contains] <WORD>
```

**Parameters**

- `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>`
  Specifies the AP location to match (in a RF Domain) or the AP's resident configuration. Select one of the following filter options: contains, exact, or not-contains.

  **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

<table>
<thead>
<tr>
<th>user-role commands</th>
</tr>
</thead>
</table>

Assigns an upstream and downstream traffic rate limit

- **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)#

rfs4000-229D58(config-role-policy-test-user-role-test)#commit
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
   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 Motorola, Santa Clara, USA onto VLAN 2.

Create a new role policy with name ‘motorola-policy’.

<DEVICE>(config)#role-policy motorola-policy

Specify the LDAP server used for this role policy.

<DEVICE>(config-role-policy-motorola-policy)#ldap-query self
<DEVICE>(config-role-policy-motorola-policy)#ldap-server 1 host 192.160.1.1 bind-dn CN=Administrator,CN=Users,DC=motorolaMotorola,DC=com base-dn CN=Administrator,CN=Users,DC=com bind-password 0 Motorola port 389
<DEVICE>(config-role-policy-motorola-policy)#ldap-timeout 2

Create a user defined role.

<DEVICE>(config-role-policy-motorola-policy)#user-role SCEngineer precedence 100

Define the role by adding appropriate values and match operators.

<DEVICE>(config-role-policy-motorola-policy-user-role-SCEngineer)#city exact santa-clara
<DEVICE>(config-role-policy-motorola-policy-user-role-SCEngineer)#company exact motorola
<DEVICE>(config-role-policy-motorola-policy-user-role-SCEngineer)#country exact usa
<DEVICE>(config-role-policy-motorola-policy-user-role-SCEngineer)#title contains engineer
<DEVICE>(config-role-policy-motorola-policy-user-role-SCEngineer)#assign vlan-id 2

Apply role policy to an access point.

ap7131-99BFA8(config-device-ap7131)# use role-policy motorola-policy

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</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

Configures the authentication type based filter for this user-defined role

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

\[ \text{authentication-type [any|eq|neq]} \]
\[ \text{authentication-type any} \]
\[ \text{authentication-type [eq|neq] [eap|kerberos|mac-auth|none]} \]
\[ \{(eap|kerberos|mac-auth|none)\} \]

Parameters

- authentication-type any
  
  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)\}

  eq [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.

  neq [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**

```bash
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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes the authentication type filter configured for this user-defined role</td>
</tr>
</tbody>
</table>
18.1.7.2.4 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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

Configures a wireless client filter based on the city name

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>]

- city
  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.

- any
  No specific city associated with this user-defined role. This role can be applied to any wireless client from any city.

- contains <WORD>
  The role is applied only when the city 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 city name returned by the RADIUS server). It should contain the provided expression.

- exact
  The role is applied only when the city 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 city name returned by the RADIUS server). It should be an exact match.

- not-contains <WORD>
  The role is applied only when the city 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 city name returned by the RADIUS server). It should not contain the provided expression.

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
client-identity <CLIENT-IDENTITY-NAME> {<CLIENT-IDENTITY-NAME>}

Parameters
- client-identity <CLIENT-IDENTITY-NAME> {<CLIENT-IDENTITY-NAME>}

Usage Guidelines
When associating a single or multiple client identities with a role policy, ensure that a client identity group, containing 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
company [any|contains|exact|not-contains]
company [any|exact <WORD>|contains <WORD>|not-contains <WORD>]
```

**Parameters**

- **company [any|contains|exact|not-contains]**
  - *any* - 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.
  - *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 MotorolaSolutions
```

```
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 MotorolaSolutions
```

**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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>Specifies a wireless client filter based on how the ‘country’ 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 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>
</tbody>
</table>
| contains <WORD> | The role is applied only when the country 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 country name returned by the RADIUS server). It should contain the provided expression. |
| exact   | The role is applied only when the country 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 country name returned by the RADIUS server). It should be an exact match. |
| not-contains <WORD> | The role is applied only when the country 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 country name returned by the RADIUS server). It should not contain the provided expression. |

**Examples**

```
rfs7000-37FABE(config-role-policy-test-user-role-testing)#country exact America
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 MotorolaSolutions
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

\[ \text{department \ [any|contains|exact|not-contains]} \]
\[ \text{department \ [any|exact <WORD>|contains <WORD>|not-contains <WORD>]} \]

Parameters

- department \ [any|exact <WORD>|contains <WORD>|not-contains <WORD>]

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 MotorolaSolutions
    country exact America
    department exact TnV
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
```
<table>
<thead>
<tr>
<th><strong>Related Commands</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>no</em></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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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@zebra.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 MotorolaSolutions
  country exact America
  department exact TnV
  emailid exact testing@zebra.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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
employee-type [any|contains|exact|not-contains]
employee-type [any|exact <WORD>|contains <WORD>|not-contains <WORD>]
```

**Parameters**

- `employee-type [any|contains <WORD>|exact <WORD>|not-contains <WORD>]`

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>any</code></td>
<td>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.</td>
</tr>
</tbody>
</table>
| `contains <WORD>`  | The role is applied only when the employee type, 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 employee type returned by the RADIUS server). It should contain the provided expression. |
| `exact`            | The role is applied only when the employee type, 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 employee type returned by the RADIUS server). It should be an exact match. |
| `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.  
  - `<WORD>` – Specify the string not to match (this is case sensitive, and is compared against the employee type returned by the RADIUS server). It should not contain the provided expression. |

**Examples**

```
rfs4000-229D58 (config-role-policy-test-user-role-test1)#employee-type exact consultant
rfs4000-229D58 (config-role-policy-test-user-role-test1)#show context  
user-role user1 precedence 1  
  employee-type exact consultant
rfs4000-229D58 (config-role-policy-test-user-role-user1)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>command</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the employee type filter configured with this user-defined role</td>
</tr>
</tbody>
</table>
18.1.7.2.12 employeeid

Configures a wireless client filter based on the employee ID

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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. &lt;WORD&gt; – Specify the string to match (this is case sensitive, and is compared against the employee ID 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 employee ID, returned by the RADIUS server, exactly matches the string specified in the role. &lt;WORD&gt; – Specify the exact string to match (this is case sensitive, and is compared against the employee ID 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 employee ID, returned by the RADIUS server, does not contain the string specified in the role. &lt;WORD&gt; – Specify the string not to match (this is case sensitive, and is compared against the employee ID 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)#employeeid contains TnVMoto

erfs7000-37FABE(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 MotorolaSolutions
  - country exact America
  - department exact TnV
  - emailid exact testing@zebra.com
  - employeeid contains TnVMoto
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 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

| 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]

{(ccmp|keyguard|none|tkip|tkip-ccmp|wep128|wep64)}

| eq [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.

| 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 MotorolaSolutions
    country exact America
    department exact TnV
    emailid exact testing@zebra.com
    employeeid contains TnVMoto
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

This user-defined role can fit into any group (no strings to match). This is the default setting.

The role is applied only when the RADIUS group name contains the string specified in the role.

- `<WORD>` – 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.

The role is applied only when the RADIUS group name exactly matches the string specified in the role.

- `<WORD>` – 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.

The role is applied only when the RADIUS group name 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 group name returned by the RADIUS server). It should not contain the provided expression.

**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 MotorolaSolutions
country exact America
department exact TnV
emailid exact testing@zebra.com
employeeid contains TnVMoto
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

user-role commands

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
memberOf <AD-GROUP-NAME>

Parameters
- memberOf <AD-GROUP-NAME>

Examples
rfs4000-229D58 (config-role-policy-test-user-role-test)#memberOf ADTestgroup
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
assign vlan 1
assign rate-limit to-client 200
memberOf ADTestgroup
rfs4000-229D58 (config-role-policy-test-user-role-test)#

Related Commands
- no
  Removes the AD group assigned to this user-defined role
18.1.7.2.16 mu-mac

Configures a MAC address and mask based filter for this role policy

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

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 MotorolaSolutions
  country exact America
  department exact TnV
  emailid exact testing@zebra.com
  employeeid contains TnVMoto

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 [ip-access-list|mac-access-list] [in|out] <IP/MAC-ACCESS-LIST-NAME>

no use bonjour-gw-discovery-policy

Parameters
- no [ap-location|assign|authentication-type|city|client-identity|company|country|department|emailid|employee-type|employeeid|encryption-type|group|memberOf|mu-mac|radius-user|ssid|state|title|use|user-defined]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no ap-location</td>
<td>Removes an AP's deployment location filter</td>
</tr>
<tr>
<td>no assign</td>
<td>Removes the upstream and/or downstream rate limits and the VLAN ID associated with this user-defined role</td>
</tr>
<tr>
<td>no authentication-type</td>
<td>Removes the authentication type filter</td>
</tr>
<tr>
<td>no city</td>
<td>Removes the configured city name filter</td>
</tr>
<tr>
<td>no client-identity</td>
<td>Removes the client identity fingerprints based filter</td>
</tr>
<tr>
<td>no company</td>
<td>Removes the configured company name filter</td>
</tr>
<tr>
<td>no country</td>
<td>Removes the configured country name filter</td>
</tr>
<tr>
<td>no department</td>
<td>Removes the configured department name filter</td>
</tr>
<tr>
<td>no emailid</td>
<td>Removes the configured e-mail ID filter</td>
</tr>
<tr>
<td>no employee-type</td>
<td>Removes the configured employee-type filter</td>
</tr>
<tr>
<td>no employeeid</td>
<td>Removes the configured employee ID filter</td>
</tr>
<tr>
<td>no encryption-type</td>
<td>Removes the encryption type filter</td>
</tr>
<tr>
<td>no group</td>
<td>Removes the RADIUS group name filter</td>
</tr>
<tr>
<td>no memberOf</td>
<td>Removes the AD group based filter</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>no mu-mac</td>
<td>Removes the MAC address and mask filter</td>
</tr>
<tr>
<td>no ssid</td>
<td>Removes the SSID filter</td>
</tr>
<tr>
<td>no radius-user</td>
<td>Removes the radius-user filter</td>
</tr>
<tr>
<td>no state</td>
<td>Removes the configured state filter</td>
</tr>
<tr>
<td>no title</td>
<td>Removes the title filter</td>
</tr>
<tr>
<td>no user-defined</td>
<td>Removes the user-defined filter (an attribute defined in the AD or OpenLDAP server)</td>
</tr>
</tbody>
</table>

- **no captive-portal authentication-state**
- **no captive-portal** Removes the captive portal based filter
- **authentication-state** Removes the authentication state filter

- **no use [ip-access-list|mac-access-list] [in|out] <IP/MAC-ACCESS-LIST-NAME> precedence <1-100>**
  - **no use** Removes an IP or MAC access list from this user-defined role
  - **[ip-access-list|mac-access-list] [in|out]** Removes the specified IP or MAC access list from a user group
    - **in** – Removes the list from being applied to incoming packets
    - **out** – Removes the list from being applied to outgoing packets
  - **<IP/MAC-ACCESS-LIST-NAME>** Specifies the IP or MAC access list name
  - **precedence <1-100>** Specifies the access list precedence
    - **<1-100>** – Specify the precedence from 1 - 100.

- **no use bonjour-gw-discovery-policy**
  - **no use** Removes an IP or MAC access list from this user-defined role
  - **bonjour-gw-discovery-policy** Removes the bonjour-gw-discovery-policy associated with this user role

**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:

```bash
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 MotorolaSolutions
  country exact America
  department exact TnV
  emailid exact testing@zebra.com
```
**employeeid contains TnVMoto**
rfs7000-37FABE(config-role-policy-test-user-role-testing)#

```
rfs7000-37FABE(config-role-policy-test-user-role-testing)#no authentication-type
rfs7000-37FABE(config-role-policy-test-user-role-testing)#no encryption-type
rfs7000-37FABE(config-role-policy-test-user-role-testing)#no group
rfs7000-37FABE(config-role-policy-test-user-role-testing)#no mu-mac
rfs7000-37FABE(config-role-policy-test-user-role-testing)#no ap-location
rfs7000-37FABE(config-role-policy-test-user-role-testing)#no employeeid
```

The following example shows the Role Policy ‘test’ User Role ‘testing’ configuration after the ‘no’ commands are executed:

```
rfs7000-37FABE(config-role-policy-test-user-role-testing)#show context
user-role testing precedence 10
captive-portal authentication-state pre-login
city exact SanJose
country exact America
department exact TnV
eemailid exact testing@zebra.com
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ap-location</strong></td>
<td>Configures an AP deployment location based filter</td>
</tr>
<tr>
<td><strong>assign</strong></td>
<td>Configures upstream/downstream rate limits and VLAN ID assigned to clients matching the filters defined in the user-defined role</td>
</tr>
<tr>
<td><strong>authentication-type</strong></td>
<td>Configures the authentication type filter</td>
</tr>
<tr>
<td><strong>captive-portal</strong></td>
<td>Configures a captive portal based filter</td>
</tr>
<tr>
<td><strong>city</strong></td>
<td>Configures a city name based filter</td>
</tr>
<tr>
<td><strong>client-identity</strong></td>
<td>Associates a client-identity (device fingerprinting) based filter with this user-defined role</td>
</tr>
<tr>
<td><strong>company</strong></td>
<td>Configures a company name based filter</td>
</tr>
<tr>
<td><strong>country</strong></td>
<td>Configures a country name based filter</td>
</tr>
<tr>
<td><strong>department</strong></td>
<td>Configures a department name based filter</td>
</tr>
<tr>
<td><strong>emailid</strong></td>
<td>Configures a e-mail ID based filter</td>
</tr>
<tr>
<td><strong>employee-type</strong></td>
<td>Configures a employee type based filter</td>
</tr>
<tr>
<td><strong>employeeid</strong></td>
<td>Configures a employee ID based filter</td>
</tr>
<tr>
<td><strong>encryption-type</strong></td>
<td>Configures the encryption type filter</td>
</tr>
<tr>
<td><strong>group</strong></td>
<td>Configures a RADIUS group based filter</td>
</tr>
<tr>
<td><strong>memberof</strong></td>
<td>Configures an AD group based filter</td>
</tr>
<tr>
<td><strong>mu-mac</strong></td>
<td>Configures a MAC address and mask based filter</td>
</tr>
<tr>
<td><strong>ssid</strong></td>
<td>Configures a SSID based filter</td>
</tr>
<tr>
<td><strong>radius-user</strong></td>
<td>Configures a wireless client filter based on the RADIUS user type</td>
</tr>
<tr>
<td><strong>state</strong></td>
<td>Configures a state name based filter</td>
</tr>
<tr>
<td><strong>title</strong></td>
<td>Configures a user title based filter</td>
</tr>
<tr>
<td><strong>use</strong></td>
<td>Associates an IP and/or MAC ACL with this user-defined role</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>user-defined</strong></td>
<td>Configures a user-defined filter (an attribute defined in AD or OpenLDAP server)</td>
</tr>
</tbody>
</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
radius-user [any|contains|ends-with|exact|not-contains|starts-with]
```

**Parameters**

- **radius-user** [any|contains|ends-with|exact|not-contains|starts-with]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>radius-user</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>any</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>contains &lt;WORD&gt;</strong></td>
<td>The role is applied only when the 'radius-user' name, returned by the RADIUS server, contains the string specified here.</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 'radius-user' name returned by the RADIUS server). It should contain the provided expression.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> You can use the realm or any sub-string of the user name.</td>
</tr>
<tr>
<td><strong>ends-with &lt;WORD&gt;</strong></td>
<td>Enables role assignment on the basis of the wireless client’s “department” and/or “group”</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;WORD&gt;</code> — Specify the string (could be department/group code). For example: 1005000002.</td>
</tr>
<tr>
<td></td>
<td>In this the last three digits represent the department/group code. The remaining digits represent user’s badge number.</td>
</tr>
<tr>
<td></td>
<td>The role is applied only when the 'radius-user' name, returned by the RADIUS server, ends with the string specified here.</td>
</tr>
<tr>
<td><strong>exact</strong></td>
<td>The role is applied only when the 'radius-user' name, returned by the RADIUS server, 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 'radius-user' name returned by the RADIUS server). It should be an exact match.</td>
</tr>
<tr>
<td><strong>Note:</strong> Provide the complete user name along with the realm.</td>
<td></td>
</tr>
</tbody>
</table>
### Examples

```
rfs7000-37FABE(config-role-policy-moto-user-role-moto-users)#radius-user contains mot.com
rfs7000-37FABE(config-role-policy-moto-user-role-moto-users)#show context
  user-role moto-users precedence 1
  radius-user contains mot.com
rfs7000-37FABE(config-role-policy-moto-user-role-moto-users)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the radius-user filter</td>
</tr>
</tbody>
</table>
18.1.7.2.19 ssid

**user-role commands**

Configures a SSID based filter

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
ssid [any|exact|contains|not-contains]

ssid any

ssid [exact|contains|not-contains] <WORD>
```

**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**

```plaintext
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
company exact MotorolaSolutions
country exact America
department exact TnV
eemailid exact testing@zebra.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 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>state</td>
<td>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.</td>
</tr>
<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@zebra.com
state exact active
rfs7000-37FABE(config-role-policy-test-user-role-testing)#
```

**Related Commands**

```
no
```

Removes the `state` filter string associated with a user role.
### title

**user-role commands**

Configures a ‘title’ string to match

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>

| Example | 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

use [bonjour-gw-discovery-policy|ip-access-list|ipv6-access-list|mac-access-list]

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>

#### Parameters

- **use bonjour-gw-discovery-policy <POLICY-NAME>**
  - 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.
  - `<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`.

- **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/IPv6-ACCESS-LIST-NAME>` – Specify the IP access list name.
  - **in** – Applies the rule to incoming packets
  - **out** – Applies the rule to outgoing packets

- **precedence <1-100>**
  - After specifying the name of the access list, specify the precedence applied to it. Based on the packets received, a lower precedence value is evaluated first.
  - `<1-100>` – Sets a precedence from 1 - 100
• use mac-access-list [in|out] <MAC-ACCESS-LIST-NAME> precedence <1-100>

mac-access-list [in|out] | Uses a MAC access list with this user role  
• in – Applies the rule to incoming packets  
• out – Applies the rule to outgoing packets

<br>

<MAC-ACCESS-LIST-NAME> | Specify the MAC access list name.

precedence <1-100> | After specifying the name of the access list, specify the precedence applied to it. Based on the packets received, a lower precedence value is evaluated first  
• <1-100> – Sets a precedence from 1 - 100

Examples

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 MotorolaSolutions  
country exact America  
department exact TnV  
emailid exact testing@zebra.com  
state exact active  
use ip-access-list in test precedence 9

rfs7000-37FABE(config-role-policy-test-user-role-testing)#

rfs7000-37FABE(config-role-policy-bonjour_test-user-role-bonjour_user1)#use bonjour-gw-discovery-policy role2

rfs7000-37FABE(config-role-policy-bonjour_test-user-role-bonjour_user1)#show context  
user-role bonjour_user1 precedence 2  
use bonjour-gw-discovery-policy role2

rfs7000-37FABE(config-role-policy-bonjour_test-user-role-bonjour_user1)#

rfs7000-37FABE(config-role-policy-bonjour_test)#show context  
role-policy bonjour_test  
user-role bonjour_user precedence 1  
mu-mac A4-D1-D2-BF-3D-19  
use bonjour-gw-discovery-policy role1  
user-role bonjour_user1 precedence 2  
mu-mac B0-65-BD-4B-BC-09  
use bonjour-gw-discovery-policy role2

rfs7000-37FABE(config-role-policy-bonjour_test)#

Related Commands

no | Removes an IP, MAC access list, or a Bonjour GW Discovery policy from use with a user role
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>]

| user-defined <ATTR-STRING> | Specify a filter based on an attribute defined in the AD or OpenLDAP server.  
|-----------------------------|---|
| any                         | No specific string to match. This role can be applied to any wireless client. This is the default setting.  
| contains <WORD>             | The role is applied only when the user-defined attribute value, returned by the RADIUS server, contains the string specified in the role.  
| exact <WORD>                | The role is applied only when the user-defined attribute value, returned by the RADIUS server, exactly matches the string specified in the role.  
| not-contains <WORD>         | 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.  

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
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 detects 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 trouble shooting.

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
- `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)#
```
19.1 smart-rf-policy

Table 19.1 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>channel-list</td>
<td>Assigns the channel list for the selected frequency</td>
<td>page 19-6</td>
</tr>
<tr>
<td>channel-width</td>
<td>Selects the channel width for Smart RF configuration</td>
<td>page 19-7</td>
</tr>
<tr>
<td>coverage-hole-recovery</td>
<td>Enables recovery from errors</td>
<td>page 19-9</td>
</tr>
<tr>
<td>enable</td>
<td>Enables a Smart RF policy</td>
<td>page 19-11</td>
</tr>
<tr>
<td>group-by</td>
<td>Configures grouping parameters</td>
<td>page 19-12</td>
</tr>
<tr>
<td>interference-recovery</td>
<td>Recovers issues due to excessive noise and interference</td>
<td>page 19-13</td>
</tr>
<tr>
<td>neighbor-recovery</td>
<td>Enables recovery from errors due to faulty neighbor radios</td>
<td>page 19-15</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 19-17</td>
</tr>
<tr>
<td>sensitivity</td>
<td>Configures Smart RF sensitivity</td>
<td>page 19-19</td>
</tr>
<tr>
<td>smart-ocs-monitoring</td>
<td>Applies smart off channel scanning instead of dedicated detectors</td>
<td>page 19-20</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
### 19.1.1 area

#### smart-rf-policy

Configures the channel list and power for a specified area

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

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 [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

rfs7000-37FABE(config-smart-rf-policy-test)#area test channel-list 2.4GHz 1,2,3
rfs7000-37FABE(config-smart-rf-policy-test)#

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

Specifies the power range during power assignment.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 |
|------------------------|------------------------------------------|
| max <1-20>             | Sets the upper limit in the range from 1 dBm - 20 dBm (default is 17 dBm) |
| min <1-20>             | Sets the lower limit in the range from 1 dBm - 20 dBm (default is 4 dBm) |

| 5GHz [max|min] <1-20> | Assigns a power range on the 5.0 GHz band |
|------------------------|------------------------------------------|
| max <1-20>             | Sets the upper limit in the range from 1 dBm - 20 dBm (default is 17 dBm) |
| min <1-20>             | Sets the lower limit in the range from 1 dBm - 20 dBm (default is 4 dBm) |

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 channel-list

Assigns a list of channels, for the selected frequency, used in Smart RF scans

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
channel-list [2.4GHz|5GHz] <WORD>

Parameters
- channel-list [2.4GHz|5GHz] <WORD>

<table>
<thead>
<tr>
<th>2.4GHz &lt;WORD&gt;</th>
<th>Assigns a channel list for the 2.4 GHz band</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.4GHz &lt;WORD&gt;</td>
<td>&lt;WORD&gt; – Specify a comma separated list of channels</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5GHz &lt;WORD&gt;</th>
<th>Assigns a channel list for the 5.0 GHz band</th>
</tr>
</thead>
<tbody>
<tr>
<td>5GHz &lt;WORD&gt;</td>
<td>&lt;WORD&gt; – Specify a comma separated list of channels</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
19.1.4 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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|5GHz] [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 |

| 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 11n users on both the 2.4 GHz and 5.0 GHz radios. If an 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 Automatic 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 5 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

| no       | Resets channel width for the selected frequency to its default |
19.1.5 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.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```bash
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:
    - <1-120> – Specifies the coverage hole recovery interval on the 2.4 GHz band

- **interval**
  - Optional. Specifies the interval at which coverage hole recovery is performed even before a coverage hole is detected
  - 2.4GHz <1-120> The following keywords are common to the ‘coverage-interval’ and ‘interval’ parameters:
    - <1-120> – Specifies the coverage hole recovery interval on the 2.4 GHz band

**Note:** coverage-interval – The default is 10 seconds.
**Note:** interval – The default is 30 seconds.
coverage-hole-recovery

**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.

### Examples

```bash
rfs7000-37FABE(config-smart-rf-policy-test)#coverage-hole-recovery snr-threshold 5GHz 1
```

```bash
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
19.1.6 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

enable

Parameters

None

Examples

rfs7000-37FABE(config-smart-rf-policy-test)#enable

Related Commands

| no | Enables a Smart RF policy |
19.1.7 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

group-by [area|floor]

Parameters

- group-by [area|floor]

<table>
<thead>
<tr>
<th>area</th>
<th>Groups radios based on their area of location</th>
</tr>
</thead>
<tbody>
<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
19.1.8 interference-recovery

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.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

```
channel-switch-delta Optional. Specifies the difference between the current and best channel interference needed to trigger a channel change. If the difference in noise levels on the current channel and a prospective channel is below the configured threshold, the channel is not changed.
```

```
[2.4GHz|5GHz] Selects the band
  • 2.4GHz – Selects the 2.4 GHz band
  • 5GHz – Selects the 5.0 GHz band
```

```
<5-35> Specifies the difference between the current and best channel interference
  • <5-35> – Sets a value from 5 dBm - 35 dBm. The default setting is 20 dBm for both 2.4 GHz and 5.0 GHz bands.
```

```
channel-hold-time <0-86400> Optional. Defines the minimum time between two channel change recoveries
  • <0-86400> – Sets the time, in seconds, between channel change assignments based on interference or noise. The default is 7,200 seconds.
```

```
client-threshold <1-255> Optional. Specifies client thresholds needed to avoid channel change. When the threshold number of clients are connected to a radio, the radio avoids changing channels even if the Smart RF master determines that a channel change is required.
  • <1-255> – Sets the number of clients from 1 - 255. The default is 50.
```
### Examples

```
rfs7000-37FABE(config-smart-rf-policy-test)#interference-recovery channel-switch-delta 5 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><code>no</code></td>
<td>Disables recovery from excessive noise and interference</td>
</tr>
</tbody>
</table>
**19.1.9 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.

Supported in the following platforms:

- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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. Configures dynamic sampling on this Smart RF policy</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>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>
</tbody>
</table>

- **neighbor-recovery {power-hold-time <0-3600>**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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 3600 seconds.</td>
</tr>
</tbody>
</table>

- **neighbor-recovery {power-threshold [2.4Ghz|5Ghz] <-85--55>**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>power-threshold</td>
<td>Optional. Specifies the power threshold based on the recovery performed</td>
</tr>
<tr>
<td>[2.4Ghz</td>
<td>5Ghz]</td>
</tr>
<tr>
<td>2.4Ghz</td>
<td>Selects the 2.4 GHz band</td>
</tr>
<tr>
<td>5Ghz</td>
<td>Selects the 5.0 GHz band</td>
</tr>
</tbody>
</table>
Examples

rfs7000-37FABE(config-smart-rf-policy-test)#neighbor-recovery power-threshold 2.4 -82
rfs7000-37FABE(config-smart-rf-policy-test)#neighbor-recovery power-threshold 5 -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

| no | Disables recovery from faulty neighbor radios |

Specify the threshold value

- `<85--55>` – Sets the power threshold from -85 dBm - -55 dBm. The default is -70 dBm for both the 2.4 GHz and 5.0 GHz bands.
19.1.10 **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
no [area|assignable-power|channel-list|channel-width|coverage-hole-recovery|enable|
   group-by|interference-recovery|neighbor-recovery|smart-ocs-monitoring]
```

**Parameters**

- no [area|assignable-power|channel-list|channel-width|coverage-hole-recovery|enable|
   group-by|interference-recovery|neighbor-recovery|smart-ocs-monitoring]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no area</td>
<td>Removes channel list/ power configuration for an area</td>
</tr>
<tr>
<td>no assignable-power</td>
<td>Resets assignable power to its default</td>
</tr>
<tr>
<td>no auto-assign-sensor</td>
<td>Disables auto assignment of sensor radios to its default</td>
</tr>
<tr>
<td>no channel-list</td>
<td>Resets the channel list for the selected frequency to its default</td>
</tr>
<tr>
<td>no channel-width</td>
<td>Resets channel width for the selected frequency to its default</td>
</tr>
<tr>
<td>no coverage-hole-recovery</td>
<td>Disables recovery from coverage hole errors</td>
</tr>
<tr>
<td>no enable</td>
<td>Disables a Smart RF policy</td>
</tr>
<tr>
<td>no group-by</td>
<td>Removes a Smart RF policy's group settings</td>
</tr>
<tr>
<td>no interference-recovery</td>
<td>Disables recovery from errors due to excessive noise and interference</td>
</tr>
<tr>
<td>no neighbor-recovery</td>
<td>Disables recovery from errors due to faulty neighbor radios</td>
</tr>
<tr>
<td>no smart-ocs-monitoring</td>
<td>Disables off channel monitoring</td>
</tr>
</tbody>
</table>

**Examples**

The following example shows the Smart RF policy 'test' settings before the 'no' commands are executed:

```plaintext
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)#
```
The following example shows the Smart RF policy 'test' settings after the 'no' commands are executed:

```bash
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)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>area</td>
<td>Specifies the channel list and power for a specified area</td>
</tr>
<tr>
<td>assignable-power</td>
<td>Assigns the power range</td>
</tr>
<tr>
<td>channel-list</td>
<td>Assigns the channel list for the selected frequency</td>
</tr>
<tr>
<td>channel-width</td>
<td>Selects the channel width for Smart RF configuration</td>
</tr>
<tr>
<td>coverage-hole-recovery</td>
<td>Enables recovery from coverage hole errors</td>
</tr>
<tr>
<td>enable</td>
<td>Enables the configured Smart RF policy features</td>
</tr>
<tr>
<td>group-by</td>
<td>Configures grouping parameters on this Smart RF policy</td>
</tr>
<tr>
<td>interference-recovery</td>
<td>Enables recovery of errors due to excessive noise and interference</td>
</tr>
<tr>
<td>neighbor-recovery</td>
<td>Enables recovery of faulty neighbor radios</td>
</tr>
<tr>
<td>smart-ocs-monitoring</td>
<td>Applies smart off channel scanning instead of dedicated detectors</td>
</tr>
</tbody>
</table>
19.1.11 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
sensitivity [custom|high|low|medium]

Parameters
- sensitivity [custom|high|low|medium]

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)#
19.1.12 smart-ocs-monitoring

Applies smart Off Channel Scanning (OCS) instead of dedicated detectors

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

smart-ocs-monitoring {awareness-override|client-aware|extended-scan-frequency|frequency|off-channel-duration|power-save-aware|sample-count|voice-aware}

Parameters

- 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 {voice-aware [2.4GHz|5GHz] [disable|dynamic|strict]}

<table>
<thead>
<tr>
<th>awareness-override</th>
<th>Optional. Use this parameter to configure client awareness settings overrides</th>
</tr>
</thead>
</table>
| schedule <1-3> <START-TIME> <END-TIME> <DAY> | Configures a time and day schedule when awareness settings are overridden
- <1-3> – Sets the awareness override schedule index. A maximum of three overrides can be configured.
- <START-TIME> – Sets the override start time in HH:MM format
- <END-TIME> – Sets the override end time in HH:MM format
- DAY – Optional. Set the day when the override is active. Use one of the following formats:
  - all – Override is active on all days
  - sun – Override is active only on Sundays
  - mon – Override is active only on Mondays
  - tue – Override is active only on Tuesdays
  - wed – Override is active only on Wednesdays
  - thu – Override is active only on Thursdays
  - fri – Override is active only on Fridays
  - sat – Override is active only on Saturdays |
**smart-ocs-monitoring** \{**awareness-override threshold <10-10000>**\}

| awareness-override threshold <10-10000> | Optional. Use this parameter to configure client awareness settings overrides  
|                                          | • **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. |

**smart-ocs-monitoring** \{**client-aware [2.4GHz|5GHz] <1-255>**\}

| client-aware | Optional. Enables client aware scanning on this Smart RF policy  
|             | Use this parameter to configure a client threshold number. When the number of clients connected to a radio equals this threshold number, the radio avoids channel scanning.  
|             | This feature is disabled by default.  
| 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. |
| 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. |

**smart-ocs-monitoring** \{**extended-scan-frequency [2.4GHz|5GHz] <0-50>**\}

| extended-scan-frequency | Optional. Enables an extended scan, as opposed to a neighbor only scan, on this Smart RF policy. This is the frequency radios use to scan for non-peer radios. |
| 2.4GHz <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. |
| 5GHz <0-50> | Enables extended scan on the 5.0 GHz band  
|             | • **<0-50>** – Sets the number of trails from 0 - 50. The default is 5. |

**smart-ocs-monitoring** \{**frequency [2.4GHz|5GHz] <1-120>**\}

| frequency | Optional. Specifies the scan frequency. This is the frequency, in seconds, in which smart-ocs-monitoring changes channels for an off channel scan. |
| 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. |
| 5GHz <1-120> | Selects the 5.0 GHz band  
|             | • **<1-120>** – Sets a scan frequency from 1 - 120 sec. The default is 6 seconds. |

**smart-ocs-monitoring** \{**off-channel-duration [2.4GHz|5GHz] <20-150>**\}

| off-channel-duration | Optional. Specifies the duration to scan off channel  
|                      | This is the duration access point radios use to monitor devices within the network and, if necessary, perform self healing and neighbor recovery to compensate for coverage area losses within a RF Domain. |
| 2.4GHz <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** `{voice-aware [2.4GHz|5GHz] [disable|dynamic|strict]}`

| voice-aware | 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. |
### Examples

```plaintext
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables off channel monitoring</td>
</tr>
</tbody>
</table>
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 also allow 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.

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)#
20.1 wips-policy

Table 20.1 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 20-4</td>
</tr>
<tr>
<td>enable</td>
<td>Enables a WIPS policy</td>
<td>page 20-5</td>
</tr>
<tr>
<td>event</td>
<td>Configures events</td>
<td>page 20-6</td>
</tr>
<tr>
<td>history-throttle-duration</td>
<td>Configures the duration event duplicates are omitted from the event history</td>
<td>page 20-10</td>
</tr>
<tr>
<td>interference-event</td>
<td>Specifies events contributing to the Smart RF WiFi interference calculations</td>
<td>page 20-11</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 20-12</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 20-34</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
20.1.1 **ap-detection**

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.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
ap-detection {ageout|wait-time}
ap-detection {age-out <30-86400>|wait-time <10-600>}
```

**Parameters**

- **ap-detection {age-out <30-86400>|wait-time <10-600>}**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>age-out &lt;30-86400&gt;</td>
<td>Optional. Configures the unauthorized AP ageout interval. The WIPS policy uses this value to ageout unauthorized APs.</td>
</tr>
<tr>
<td>wait-time &lt;10-600&gt;</td>
<td>Optional. Configures the wait time before a detected AP is declared as unauthorized and potentially removed</td>
</tr>
</tbody>
</table>

**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-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>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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

enable

Parameters

None

Examples

rfs7000-37FABE(config-wips-policy-test)#enable
rfs7000-37FABE(config-wips-policy-test)#

Related Commands

- no | Disables a WIPS policy
20.1.3 event

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.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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|
on-conforming-data|tkip-mic-counter-measures|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|
impersonation-attack|null-probe-response|transmitting-device-using-invalid-mac|
unencrypted-wired-leakage|wireless-bridge]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ap-anomaly</td>
<td>Enables AP anomaly event tracking. An AP anomaly event refers to suspicious frames sent by neighboring APs. An administrator enables or disables the filtering of each listed event and sets the thresholds for the generation of event notification and filtering.</td>
</tr>
<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 Lightweight Extensible Authentication Protocol (LEAP) 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>
<tr>
<td>null-probe-response</td>
<td>Tracks null probe response attacks</td>
</tr>
<tr>
<td>transmitting-device-using-invalid-mac</td>
<td>Tracks the transmitting device using an invalid MAC attacks</td>
</tr>
<tr>
<td>Event Type</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>unencrypted-wired-leakage</td>
<td>Tracks unencrypted wired leakage</td>
</tr>
<tr>
<td>wireless-bridge</td>
<td>Tracks wireless bridge (WDS) frames</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>client-anomaly</td>
<td>Enables client anomaly event tracking</td>
</tr>
<tr>
<td>dos-broadcast-deauth</td>
<td>Tracks DoS broadcast deauthentication events</td>
</tr>
<tr>
<td>fuzzing-all-zero-macs</td>
<td>Tracks Fuzzing: All zero MAC addresses observed</td>
</tr>
<tr>
<td>fuzzing-invalid-frame-type</td>
<td>Tracks Fuzzing: Invalid frame type detected</td>
</tr>
<tr>
<td>fuzzing-invalid-mgmt-frames</td>
<td>Tracks Fuzzing: Invalid management frame detected</td>
</tr>
<tr>
<td>fuzzing-invalid-seq-num</td>
<td>Tracks Fuzzing: Invalid sequence number detected</td>
</tr>
<tr>
<td>identical-src-and-dest-addr</td>
<td>Tracks identical source and destination addresses detection</td>
</tr>
<tr>
<td>invalid-8021x-frames</td>
<td>Tracks Fuzzing: Invalid 802.1x frames detected</td>
</tr>
<tr>
<td>netstumbler-generic</td>
<td>Tracks Netstumbler (v3.2.0, 3.2.3, 3.3.0) events</td>
</tr>
<tr>
<td>non-conforming-data</td>
<td>Tracks non conforming data packets</td>
</tr>
<tr>
<td>wellenreiter</td>
<td>Tracks Wellenreiter events</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>filter-ageout &lt;0-86400&gt;</td>
<td>The following keywords are common to all of the above client anomaly events:</td>
</tr>
<tr>
<td></td>
<td>• filter-ageout &lt;0-86400&gt; – Optional. Configures the filter expiration interval in seconds</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-86400&gt; – Sets the filter ageout interval from 0 - 86400 seconds. The default is 0 seconds.</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>enable-all-events</td>
<td>Enables tracking of all intrusion events (client anomaly and excessive events)</td>
</tr>
</tbody>
</table>

<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>

<table>
<thead>
<tr>
<th>filter-ageout &lt;0-86400&gt;</th>
<th>The following keywords are common to all excessive events:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• filter-ageout &lt;0-86400&gt; – 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.</td>
<td></td>
</tr>
<tr>
<td>• &lt;0-86400&gt; – Sets a filter ageout interval from 0 - 86400 seconds. The default is 0 seconds.</td>
<td></td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>threshold-client &lt;0-65535&gt;</th>
<th>The following keywords are common to all excessive events:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• threshold-client &lt;0-65535&gt; – Optional. Configures a client threshold value after which the filter is triggered and an event is recorded</td>
<td></td>
</tr>
<tr>
<td>• &lt;0-65535&gt; – Sets a wireless client threshold value from 0 - 65535 seconds</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>threshold-radio &lt;0-65535&gt;</th>
<th>The following keywords are common to all excessive events:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• threshold-radio &lt;0-65535&gt; – Optional. Configures a radio threshold value after which the filter is triggered and an event is recorded</td>
<td></td>
</tr>
<tr>
<td>• &lt;0-65535&gt; – Sets a radio threshold value from 0 - 65535 seconds</td>
<td></td>
</tr>
</tbody>
</table>
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

| no                 | Disables WIPS policy events tracking |
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX6500, NX6524, NX9000, NX9500, NX9510

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
  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

**WIPS-policy**

Specifies events contributing to the Smart RF WiFi interference calculations

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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**

```bash
rfs7000-37FABE(config-wips-policy-test)#interference-event non-conforming-data

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
  interference-event non-conforming-data
  ap-detection-ageout 50
  ap-detection-wait-time 15
rfs7000-37FABE(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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
no [ap-detection|enable|event|history-throttle-duration|interference-event|signature|use]

no [enable|history-throttle-duration]

no ap-detection {ageout|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 enable** Disables a WIPS policy from use with a profile
- **no history-throttle-duration** Resets the history throttle duration to its default (120 seconds). This is the duration event duplicates are omitted from the event history.
- **no ap-detection {ageout|wait-time} {<LINE-SINK>}**
  - **no ap-detection** Disables the detection of unauthorized or unsanctioned APs
  - **ageout <LINE-SINK>** Optional. Resets a rogue device’s ageout interval to its default (300 seconds)
  - **wait-time <LINE-SINK>** Optional. Resets the wait time value to its default (60 seconds)
- **no 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]

<table>
<thead>
<tr>
<th>Event Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no event</td>
<td>Disables WIPS policy event tracking</td>
</tr>
<tr>
<td>ap-anomaly</td>
<td>Disables AP anomaly event tracking</td>
</tr>
<tr>
<td>ad-hoc-violation</td>
<td>Disables ad-hoc network violation event tracking</td>
</tr>
<tr>
<td>airjack</td>
<td>Disables the tracking of AirJack attacks</td>
</tr>
<tr>
<td>ap-ssid-broadcast-in-beacon</td>
<td>Disables the tracking of AP SSID broadcasts in beacon events</td>
</tr>
<tr>
<td>asleap</td>
<td>Disables the tracking of ASLEAP attacks</td>
</tr>
<tr>
<td>impersonation-attack</td>
<td>Disables the tracking of impersonation attacks</td>
</tr>
<tr>
<td>null-probe-response</td>
<td>Disables the tracking of null probe response attacks</td>
</tr>
<tr>
<td>transmitting-device-using-invalid-mac</td>
<td>Disables the tracking of invalid device MAC addresses</td>
</tr>
<tr>
<td>unencrypted-wired-leakage</td>
<td>Disables the tracking of unencrypted wired leakage detection</td>
</tr>
<tr>
<td>wireless-bridge</td>
<td>Disables the tracking of wireless bridge frames</td>
</tr>
</tbody>
</table>

- **no 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>}

<table>
<thead>
<tr>
<th>Event Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no event</td>
<td>Disables WIPS policy event tracking</td>
</tr>
<tr>
<td>client-anomaly</td>
<td>Disables client anomaly event tracking</td>
</tr>
<tr>
<td>dos-broadcast-deauth</td>
<td>Disables DoS broadcast deauthentication event tracking</td>
</tr>
<tr>
<td>fuzzing-all-zero-macs</td>
<td>Disables Fuzzing tracking: All zero MAC addresses observed</td>
</tr>
<tr>
<td>fuzzing-invalid-frame-type</td>
<td>Disables Fuzzing tracking: Invalid frame type detected</td>
</tr>
<tr>
<td>fuzzing-invalid-mgmt-frames</td>
<td>Disables Fuzzing tracking: Invalid management frame</td>
</tr>
<tr>
<td>fuzzing-invalid-seq-num</td>
<td>Disables Fuzzing tracking: Invalid sequence number</td>
</tr>
<tr>
<td>identical-src-and-dest-addr</td>
<td>Disables the tracking of identical source and destination addresses</td>
</tr>
<tr>
<td>invalid-8021x-frames</td>
<td>Disables Fuzzing tracking: Invalid 802.1x frames</td>
</tr>
<tr>
<td>netstumbler-generic</td>
<td>Disables Netstumbler (v3.2.0, 3.2.3, 3.3.0) event tracking</td>
</tr>
<tr>
<td>non-conforming-data</td>
<td>Disables non conforming data packet tracking</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>wellenreiter</td>
<td>Disables Wellenreiter event tracking</td>
</tr>
</tbody>
</table>
| filter-ageout <0-86400>   | The following keywords are common to all client anomaly events:  
|                           | • Optional. Resets the filter expiration interval in seconds  
|                           | • <0-86400> – Resets a filter ageout interval from 0 - 86400 seconds                                                                 |
| no event excessive        | Disables WIPS policy event tracking                                                                                                     |
| 80211-replay-check-failure| Disables the tracking of 802.11 replay check failure                                                                                     |
| aggressive-scanning       | Disables aggressive scanning event tracking                                                                                            |
| auth-server-failures      | Disables the tracking of failures reported by authentication servers                                                                     |
| decryption-failures       | Disables the tracking of decryption failures                                                                                             |
| dos-assoc-or-auth-flood   | Disables DoS association or authentication flood tracking                                                                                   |
| dos-eapol-start-storm     | Disables the tracking of DoS EAPOL start storms                                                                                           |
| dos-unicast-deauth-or-disassoc | Disables DoS disassociation or deauthentication flood tracking                                                                            |
| eap-flood                 | Disables the tracking of EAP floods                                                                                                      |
| eap-nak-flood             | Disables the tracking of EAP NAKfloods                                                                                                   |
| frames-from-unassoc-station | Disables the tracking of frames from unassociated clients                                                                                   |
| filter-ageout <0-86400>   | Optional. Resets the filter expiration interval in seconds. It resets the duration for which a client is filtered. The client is added to a ACL as a special entry and frames received from this client are dropped.  
|                           | • <0-86400> – Resets a filter ageout interval from 0 - 86400 seconds  |
| threshold-client <0-65535> | Optional. Resets a client threshold limit after which the filter is triggered and an event is recorded.  
|                           | • <0-65535> – Resets a wireless client threshold limit from 0 - 65535 seconds                                                               |
| threshold-radio <0-65535>  | Optional. Resets a radio threshold limit after which an event is recorded  
|                           | • <0-65535> – Resets a radio threshold limit from 0 - 65535 seconds  |
| no interference-event     | Disables interference event settings                                                                                                      |
| non-conforming-data       | Does not consider non conforming data packets when calculating Smart RF interference                                                      |
| wireless-bridge           | Does not consider Wireless Bridge frames when calculating Smart RF interference                                                             |
• no signature <WIPS-SIGNATURE>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no signature</td>
<td>Deletes a WIPS policy signature</td>
</tr>
<tr>
<td>&lt;WIPS-SIGNATURE&gt;</td>
<td>Defines the unique name given to a WIPS policy signature</td>
</tr>
</tbody>
</table>

• no use device-categorization

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no use</td>
<td>Disables the use of a device categorization policy with this WIPS policy</td>
</tr>
<tr>
<td>device-categorization</td>
<td>Resets the device categorization name to its default</td>
</tr>
</tbody>
</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 WIPS Policy 'test' settings before the 'no' commands are executed:

```
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
    interference-event non-conforming-data
    ap-detection-ageout 50
    ap-detection-wait-time 15
rfs7000-37FABE(config-wips-policy-test)#
```

```
rfs7000-37FABE(config-wips-policy-test)#no event client-anomaly wellenreiter
rfs7000-37FABE(config-wips-policy-test)#no interference-event non-conforming-data
rfs7000-37FABE(config-wips-policy-test)#no history-throttle-duration
```

The following example shows the WIPS Policy 'test' settings after the 'no' commands are executed:

```
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
    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>ap-detection</td>
<td>Enables the detection of unauthorized or unsanctioned access points</td>
</tr>
<tr>
<td>enable</td>
<td>Enables a WIPS policy for use with a profile</td>
</tr>
<tr>
<td>event</td>
<td>Configures events, filters, and threshold values for a WIPS policy</td>
</tr>
<tr>
<td>history-throttle-duration</td>
<td>Configures the duration event duplicates are omitted from the event history</td>
</tr>
<tr>
<td>interference-event</td>
<td>Specifies events contributing to the Smart RF WiFi interference calculations</td>
</tr>
<tr>
<td>signature</td>
<td>Configures a WIPS policy signature</td>
</tr>
<tr>
<td>use</td>
<td>Enables the categorization of devices on this WIPS policy</td>
</tr>
</tbody>
</table>
**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.

Table 20.2 summarizes WIPS policy signature configuration commands.

<table>
<thead>
<tr>
<th>signature</th>
<th>Configures a WIPS policy signature and enters its configuration mode</th>
<th>page 20-17</th>
</tr>
</thead>
<tbody>
<tr>
<td>signature mode</td>
<td>Summarizes WIPS signature configuration mode commands</td>
<td>page 20-19</td>
</tr>
<tr>
<td>commands</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
20.1.7.1 signature

- signature

Configures a WIPS policy signature

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

signature <SIGNATURE-NAME>

Parameters

- signature <SIGNATURE-NAME>

Examples

rfs7000-37FABE(config-wips-policy-test)#signature test
rfs7000-37FABE(config-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 motorola offset 1
    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>Deletes a WIPS policy signature</td>
</tr>
</tbody>
</table>
20.1.7.2 signature mode commands

Table 20.3 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 20-25</td>
</tr>
<tr>
<td>mode</td>
<td>Enables or disables the signature mode</td>
<td>page 20-26</td>
</tr>
<tr>
<td>payload</td>
<td>Configures payload settings</td>
<td>page 20-27</td>
</tr>
<tr>
<td>src-mac</td>
<td>Configures the source MAC address</td>
<td>page 20-28</td>
</tr>
<tr>
<td>ssid-match</td>
<td>Configures a match based on SSID</td>
<td>page 20-29</td>
</tr>
<tr>
<td>threshold-client</td>
<td>Configures the wireless client threshold limit</td>
<td>page 20-30</td>
</tr>
<tr>
<td>threshold-radio</td>
<td>Configures the radio threshold limit</td>
<td>page 20-31</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 20-32</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

bssid <MAC>

Parameters

- bssid <MAC>

| bssid <MAC> | Configures a BSSID MAC address to match
|            | • <MAC> – Specify the MAC address.

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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></td>
<td>- &lt;MAC&gt; — 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

signature mode commands

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
  filter-ageout 8
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets a WIPS signature frame type</td>
</tr>
</tbody>
</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX

• Wireless Controllers — RFS4000, RFS6000, RFS7000

• Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 or disables a WIPS policy signature

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
```

| no | Disables a WIPS signature |
20.1.7.2.7 payload

Configures payload settings. The payload command sets a numerical index pattern and offset for this WIPS signature.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
payload <1-3> pattern <WORD> offset <0-255>

Parameters
- payload <1-3> Configures payload settings
  - <1-3> – Sets the payload index
- pattern <WORD> Specifies the pattern to match: hex or string
  - <WORD> – Sets the pattern name
- offset <0-255> Specifies the payload offset to start the pattern match
  - <0-255> – Sets the offset value

Examples
rfs7000-37FABE(config-test-signature-test)#payload 1 pattern motorola 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 motorola 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
src-mac <MAC>
```

**Parameters**

- **src-mac <MAC>**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>src-mac &lt;MAC&gt;</td>
<td>Configures the source MAC address to match</td>
</tr>
<tr>
<td>&lt;MAC&gt;</td>
<td>Specify the source MAC address.</td>
</tr>
</tbody>
</table>

**Examples**

```
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 motorola 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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></th>
<th>Specifies the SSID match string</th>
</tr>
</thead>
<tbody>
<tr>
<td>ssid &lt;SSID&gt;</td>
<td>&lt;SSID&gt; – Specify the SSID string.</td>
</tr>
</tbody>
</table>

Note: Specify the correct SSID to ensure proper filtering.

<table>
<thead>
<tr>
<th></th>
<th>Specifies the length of the SSID</th>
</tr>
</thead>
<tbody>
<tr>
<td>ssid-len &lt;0-32&gt;</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
bsid 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 motorola offset 1
rfs7000-37FABE(config-test-signature-test)#

Related Commands

no

Removes the configured SSID
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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**
threshold-client <1-65535>

**Parameters**

- threshold-client <1-65535>

<table>
<thead>
<tr>
<th>threshold-client</th>
<th>Configures the wireless client threshold limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-65535&gt;</td>
<td>• &lt;1-65535&gt; – Sets the threshold limit for a 60 second window from 1 - 65535</td>
</tr>
</tbody>
</table>

**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 motorola 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, 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> | <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 motorola 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```plaintext
no [bssid|dst-mac|filter-ageout|frame-type|interference-event|mode|payload|src-mac|
    ssid-match|threshold-client|threshold-radio]
```

```plaintext
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 [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]`

<table>
<thead>
<tr>
<th>no bssid</th>
<th>Disables a WIPS signature BSS ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>no dst-mac</td>
<td>Disables a WIPS signature destination MAC address</td>
</tr>
<tr>
<td>no filter-ageout</td>
<td>Removes the filter ageout interval. This is the duration a client, triggering a WIPS event, is excluded from RF Domain manager radio association.</td>
</tr>
<tr>
<td>no frame-type</td>
<td>Removes a WIPS signature frame type</td>
</tr>
<tr>
<td>no interference-event</td>
<td>Disables this WIPS policy signature as a Smart RF interference source</td>
</tr>
<tr>
<td>no mode enable</td>
<td>Disables a WIPS signature</td>
</tr>
<tr>
<td></td>
<td>• <code>enable</code> – Changes the mode from enabled to disabled</td>
</tr>
<tr>
<td>no payload &lt;1-3&gt;</td>
<td>Removes payload index and associated settings. The payload command sets a numerical index pattern and offset for this WIPS signature</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;1-3&gt;</code> – Sets the payload index</td>
</tr>
<tr>
<td>no src-mac</td>
<td>Removes a WIPS signature source MAC address</td>
</tr>
<tr>
<td>no ssid-match [ssid</td>
<td>ssid-len]</td>
</tr>
<tr>
<td></td>
<td>• <code>ssid</code> – Removes the specified SSID match string</td>
</tr>
<tr>
<td></td>
<td>• <code>ssid-len</code> – Removes the specified character length of the SSID</td>
</tr>
<tr>
<td>no threshold-client</td>
<td>Removes the wireless client threshold limit configured with a WIPS policy. When the wireless client exceeds the specified limit, an event is triggered.</td>
</tr>
<tr>
<td>no threshold-radio</td>
<td>Removes a radio threshold limit configured with a WIPS policy. When the radio exceeds the specified threshold limit, an event is triggered.</td>
</tr>
</tbody>
</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:

```
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 motorola offset 1
```

The following is the WIPS signature 'test' settings after the execution of the 'no' command:

```
o mode enable
rfs7000-37FABE(config-test-signature-test)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bssid</td>
<td>Configures a WIPS signature BSSID MAC address</td>
</tr>
<tr>
<td>dst-mac</td>
<td>Configures a destination MAC address for the packet examined for matching</td>
</tr>
<tr>
<td>filter-ageout</td>
<td>Configures the filter ageout interval</td>
</tr>
<tr>
<td>frame-type</td>
<td>Configures the frame type to match with a signature</td>
</tr>
<tr>
<td>interference-event</td>
<td>Specifies events contributing to the Smart RF WiFi interference calculations</td>
</tr>
<tr>
<td>mode</td>
<td>Enables or disables a WIPS signature</td>
</tr>
<tr>
<td>payload</td>
<td>Configures payload settings. The payload command sets a numerical index pattern and offset for this WIPS signature.</td>
</tr>
<tr>
<td>src-mac</td>
<td>Configures a source MAC address for the packet examined for matching</td>
</tr>
<tr>
<td>ssid-match</td>
<td>Configures a SSID for matching</td>
</tr>
<tr>
<td>threshold-client</td>
<td>Configures a wireless client threshold limit</td>
</tr>
<tr>
<td>threshold-radio</td>
<td>Configures a radio threshold limit</td>
</tr>
</tbody>
</table>
20.1.8 use

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

use device-categorization <DEVICE-CATEGORIZATION>

Parameters

- use device-categorization <DEVICE-CATEGORIZATION>

| device-categorization <DEVICE-CATEGORIZATION> | Configures a device categorization list
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;DEVICE-CATEGORIZATION&gt; – Specify the device categorization object name to associate with this profile</td>
<td></td>
</tr>
</tbody>
</table>

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 motorola 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:

```bash
<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 PSP queue. 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.

```bash
rfs7000-37FABE(config-wlan-qos-test)#
```
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.

Table 21.1 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 21-3</td>
</tr>
<tr>
<td>classification</td>
<td>Classifies WLAN traffic based on priority</td>
<td>page 21-5</td>
</tr>
<tr>
<td>multicast-mask</td>
<td>Configures the egress prioritization multicast mask</td>
<td>page 21-7</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 21-8</td>
</tr>
<tr>
<td>qos</td>
<td>Defines the QoS configuration</td>
<td>page 21-11</td>
</tr>
<tr>
<td>rate-limit</td>
<td>Configures the WLAN traffic rate limit using a WLAN QoS policy</td>
<td>page 21-12</td>
</tr>
<tr>
<td>svp-prioritization</td>
<td>Enables Spectralink voice protocol support on a WLAN</td>
<td>page 21-15</td>
</tr>
<tr>
<td>voice-prioritization</td>
<td>Prioritizes voice client over other clients</td>
<td>page 21-16</td>
</tr>
<tr>
<td>wmm</td>
<td>Configures 802.11e/wireless multimedia parameters</td>
<td>page 21-17</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
accelerated-multicast [<IP>|autodetect]

Parameters
- accelerated-multicast [<IP>|autodetect] {classification [background|best-effort|trust|video|voice]}

<table>
<thead>
<tr>
<th>accelerated-multicast</th>
<th>Configures the accelerated multicast stream address and forwarding QoS classification</th>
</tr>
</thead>
<tbody>
<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*

> wlan-qos-policy

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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]**
  - `low` Optimized for background traffic. Implies all traffic on this WLAN is low priority on the radio.
  - `normal` Optimized for best effort traffic. Implies all traffic on this WLAN is prioritized as best effort traffic on the radio.
  - `video` Optimized for video traffic. Implies all traffic on this WLAN is prioritized as video traffic on the radio.
  - `voice` Optimized for voice traffic. Implies all traffic on this WLAN is prioritized as voice traffic on the radio.
  - `wmm` 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.

- **classification non-unicast [voice|video|normal|low|default]**
  - `non-unicast` Optimized for non-unicast traffic. Implies all traffic on this WLAN is designed for broadcast or multiple destinations.
  - `video` Optimized for non-unicast video traffic. Implies all WLAN non-unicast traffic is classified and treated as video packets.
  - `voice` Optimized for non-unicast voice traffic. Implies all WLAN non-unicast traffic is classified and treated as voice packets.
  - `normal` Optimized for non-unicast best effort traffic. Implies all WLAN non-unicast traffic is classified and treated as normal priority packets (best effort).
### classification non-wmm [voice|video|normal|low]

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</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>default</td>
<td>Uses the default classification mode (same as unicast classification if WMM is disabled, normal if unicast classification is WMM)</td>
</tr>
</tbody>
</table>

- **classification non-wmm**
  - voice: Optimized for non-WMM voice traffic. Implies all WLAN non-WMM client traffic is classified and treated as voice packets
  - video: Optimized for non-WMM video traffic. Implies all WLAN non-WMM client traffic is classified and treated as video packets
  - normal: Optimized for non-WMM best effort traffic. Implies all WLAN non-WMM client traffic is classified and treated as normal priority packets (best effort)
  - low: Optimized for non-WMM background traffic. Implies all WLAN non-WMM client traffic is classified and treated as low priority packets (background)

### 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
gos trust dscp
gos trust wmm
accelerated-multicast autodetect classification voice
rfs7000-37FABE(config-wlan-qos-test)#
```
21.1.3 multicast-mask

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
multicast-mask [primary|secondary] <MAC/MASK>

Parameters
- multicast-mask [primary|secondary] <MAC/MASK>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>primary &lt;MAC/MASK&gt;</td>
<td>Configures the primary egress prioritization multicast mask</td>
</tr>
<tr>
<td>secondary &lt;MAC/MASK&gt;</td>
<td>Configures the primary egress prioritization multicast mask</td>
</tr>
</tbody>
</table>

Note: Setting masks is optional and only needed if there are traffic types requiring special handling.

Examples
rfs7000-37FABE(config-wlan-qos-test)#multicast-mask primary 11-22-33-44-55-66/22-33-44-55-66-77
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)#
21.1.4 no

Negates a command or resets settings to their default

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax


Parameters
- no [accelerated-multicast [<IP>|autodetect]|classification {non-unicast|non-wmm}]
- no rate-limit [client|wlan] [from-air|to-air] {max-burst-size|rate|red-threshold}
- no rate-limit [client|wlan] [from-air|to-air] {max-burst-size|rate|red-threshold [background|best-effort|video|voice]}
- no wmm [background|best-effort|power-save|qbss-load-element|video|voice]
- no wmm [power-save|qbss-load-element]
- no wmm [background|best-effort|video|voice] [aifsn|cw-max|cw-min|txop-limit]

| no accelerated-multicast [<IP>|autodetect] | Disables accelerated multicast streams and forwarding QoS classification
| no classification [non-unicast|non-wmm] | Disables WLAN classification scheme
| no multicast-mask [primary|secondary] | Disables the egress prioritization primary or secondary multicast mask
| no qos trust [disquiet] | Disables the QoS service
| no svp-prioritization | Disables Spectralink Voice Protocol (SVP) support on a WLAN
| no voice-prioritization | Disables voice client priority over other clients (applies to non-WMM clients)
### no rate-limit [client|wlan] [from-air|to-air] {max-burst-size|rate|red-threshold [background|best-effort|video|voice]}

**no rate-limit [client|wlan]**
- Disables traffic rate limit parameters
- Disables client traffic rate limits
- Disables WLAN traffic rate limits

**[from-air|to-air]**
- The following are common to the client and WLAN parameters:
  - from-air – Removes client/WLAN traffic rate limits in the up link direction. This is traffic from the wireless client to the network
  - to-air – Removes client/WLAN traffic rate limits in the down link direction. This is traffic from the network to the wireless client

**max-burst-size**
- Optional. Disables the maximum burst size value

**rate**
- Optional. Disables the traffic rates configured for a wireless client or WLAN

**red-threshold**
- Optional. Disables random early detection threshold values configured for the traffic class
  - background – Disables the low priority traffic (background) threshold value
  - best-effort – Disables the normal priority traffic (best effort) threshold value
  - video – Disables the video traffic threshold value
  - voice – Disables the voice traffic threshold value

### no wmm [power-save|qbss-load-element]

**no wmm**
- Disables 802.11e/wireless multimedia parameters

**power-save**
- Disables support for WMM-Powersave (U-APSD)

**qbss-load-element**
- Disables support for the QBSS load information element in beacons and probe responses

### 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)#

  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
```
The following example shows the WLAN QoS Policy ‘test’ settings after the ‘no’ commands are executed:

```
rfs7000-37FABE(config-wlan-qos-test)#show context wlan-qos-policy test
classification non-unicast normal
    no qos trust dscp
    qos trust wmm
    accelerated-multicast autodetect classification voice
rfs7000-37FABE(config-wlan-qos-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>accelerated-multicast</td>
<td>Configures the accelerated multicast streams address and forwards the QoS classification</td>
</tr>
<tr>
<td>classification</td>
<td>Classifies WLAN traffic based on priority</td>
</tr>
<tr>
<td>multicast-mask</td>
<td>Configures the egress prioritization multicast mask</td>
</tr>
<tr>
<td>qos</td>
<td>Defines the QoS configuration</td>
</tr>
<tr>
<td>rate-limit</td>
<td>Configures a WLAN’s traffic rate limits</td>
</tr>
<tr>
<td>svp-prioritization</td>
<td>Enables Spectralink voice protocol support on a WLAN</td>
</tr>
<tr>
<td>voice-prioritization</td>
<td>Prioritizes voice client over other clients</td>
</tr>
<tr>
<td>wmm</td>
<td>Configures the 802.11e/wireless multimedia parameters</td>
</tr>
</tbody>
</table>
### 21.1.5 qos

- **wlan-qos-policy**

 Enables QoS on this WLAN

 Supported in the following platforms:

 - **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
 - **Wireless Controllers** — RFS4000, RFS6000, RFS7000
 - **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

 **Syntax**

```
qos trust [dscp|wmm]
```

**Parameters**

- **qos trust [dscp|wmm]**

| trust [dscp|wmm] | Trusts the QoS values of ingressing packets |
|-----------------|---------------------------------------------|
| 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
    qos trust dscp
    qos 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 traffic).

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rate-limit</td>
<td>Configures traffic rate limit parameters</td>
</tr>
<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</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 is 320 kbytes.</td>
</tr>
</tbody>
</table>

Note: 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.
rate <50-1000000> | 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 is 5000 kbps.

- rate-limit [client|wlan] [from-air|to-air] {red-threshold [background <0-100>|best-effort <0-100>|video <0-100>|voice <0-100>];

| rate-limit | Configures traffic rate limit parameters
| client | Configures traffic rate limiting parameters on a per-client basis
| wlan | Configures traffic rate limiting parameters on a per-WLAN basis
| from-air | Configures traffic rate limiting from a wireless client to the network
| to-air | Configures the traffic rate limit from the network to a wireless client
| red-threshold | Configures random early detection threshold values for a designated traffic class
| background <0-100> | The following is common to the ‘from-air’ and ‘to-air’ parameters:
  Optional. Sets a percentage value for background traffic in the upstream or downstream direction. Background traffic exceeding the defined threshold is dropped and a log message is generated. The default threshold is 50% for traffic in both directions.
| best-effort <0-100> | The following is common to the ‘from-air’ and ‘to-air’ parameters:
  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 is 50% for traffic in both directions.
| video <0-100> | The following is common to the ‘from-air’ and ‘to-air’ parameters:
  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 is 25% for traffic in both directions.
| 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 is 0% for traffic in both directions. 0% means no early random drops will occur.

**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**

Enable 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 enabled by default.

Supported in the following platforms:
- **Access Points** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
svp-prioritization
```

**Parameters**

None

**Examples**

```bash
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 enabled by default.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

voice-prioritization

Parameters

None

Examples

```plaintext
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

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wmm</td>
<td>Configures 802.11e/wireless multimedia parameters</td>
</tr>
<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.</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>
- **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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>wmm</strong></td>
<td>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.</td>
</tr>
<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>
<tr>
<td><strong>aifsn &lt;2-15&gt;</strong></td>
<td>Configures <em>Arbitrary Inter-Frame Space Number</em> (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 • &lt;2-15&gt; – Sets a value from 2 - 15</td>
</tr>
<tr>
<td><strong>cw-max &lt;0-15&gt;</strong></td>
<td>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 • &lt;0-15&gt; – ECW: the contention window. The actual value used is ((2^{\text{ECW}} - 1)). Set a value from 0 - 15.</td>
</tr>
<tr>
<td><strong>cw-min &lt;0-15&gt;</strong></td>
<td>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 • &lt;0-15&gt; – ECW: the contention window. The actual value used is ((2^{\text{ECW}} - 1)). Set a value from 0 - 15.</td>
</tr>
</tbody>
</table>
### Examples

```
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`
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:

```plaintext
<DEVICE>(config)#l2tpv3 policy <L2TPV3-POLICY-NAME>
```

```plaintext
rfs7000-37FABE(config)#l2tpv3 policy L2TPV3Policy1
```

```plaintext
rfs7000-37FABE(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-12-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 acknowledgment
- `tx-window-size` - Number of signaling messages that can be sent without receiving the acknowledgment
- `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-l2tpv3-policy-L2TPV3Policy1)#
```

Table 22.1 summarizes L2TPv3 policy configuration 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-12-path-recovery</td>
<td>Enables the forced detection of servers and gateways behind the L2TPv3 tunnel</td>
<td>page 22-7</td>
</tr>
<tr>
<td>hello-interval</td>
<td>Configures the interval, in seconds, between L2TPv3 “Hello” keep-alive messages exchanged in the L2TPv3 control connection</td>
<td>page 22-8</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>no</td>
<td>Negates or reverts L2TPv3 tunnel commands</td>
<td>page 22-9</td>
</tr>
<tr>
<td>reconnect-attempts</td>
<td>Configures the maximum number of retransmissions for signalling messages</td>
<td>page 22-11</td>
</tr>
<tr>
<td>reconnect-interval</td>
<td>Configures the interval, in seconds, between successive attempts to re-establish a failed tunnel connection</td>
<td>page 22-12</td>
</tr>
<tr>
<td>retry-attempts</td>
<td>Configures the maximum number of retransmissions of signalling messages</td>
<td>page 22-13</td>
</tr>
<tr>
<td>retry-interval</td>
<td>Configures the interval, in seconds, before initiating a retransmission of any L2TPv3 signalling message</td>
<td>page 22-14</td>
</tr>
<tr>
<td>rx-window-size</td>
<td>Configures the number of signalling messages received without sending an acknowledgment</td>
<td>page 22-15</td>
</tr>
<tr>
<td>tx-window-size</td>
<td>Configures the number of signalling messages transmitted without receiving an acknowledgment</td>
<td>page 22-16</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
</tbody>
</table>
22.1.1 cookie-size

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
cookie-size [0|4|8]

Parameters
- cookie-size [0|4|8]

Examples
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#cookie-size 8

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#show context l2tpv3 policy L2TPV3Policy1
cookie-size 8

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets the cookie-field size to its default (0 - no cookie field present in each L2TPv3 data packet)</td>
</tr>
</tbody>
</table>
### 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`fail-over <5-60>`

**Parameters**

- `fail-over <5-60>`

**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-12-path-recovery

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
force-12-path-recovery

Parameters
None

Examples
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#force-12-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-12-path-recovery

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables the forced detection of servers and gateways behind the L2TPv3 tunnel</td>
</tr>
</tbody>
</table>
22.1.4 hello-interval

Configures the interval, in seconds, between L2TPv3 "Hello" keep-alive messages exchanged in a L2TPv3 control connection. Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
hello-interval <1-3600>
```

**Parameters**

- `hello-interval <1-3600>`

**Examples**

```
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
no [cookie-size|failover-delay|force-12-path-recovery|hello-interval|
  reconnect-attempts|reconnect-interval|retry-attempts|retry-interval|rx-window-size|
  tx-window-size]
```

Parameters

- no [cookie-size|failover-delay|force-12-path-recovery|hello-interval|reconnect-
  attempts|reconnect-interval|retry-attempts|retry-interval|rx-window-size|tx-window-
  size]

<table>
<thead>
<tr>
<th>no cookie-size</th>
<th>Resets the cookie-field size to default (0 - no cookie field present in each L2TPv3 data packet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>no fail-over-delay</td>
<td>Resets the failover interval to its default (5 seconds)</td>
</tr>
<tr>
<td>no force-12-path-recovery</td>
<td>Disables the forced detection of servers and gateways behind the L2TPv3 tunnel</td>
</tr>
<tr>
<td>no hello-interval</td>
<td>Resets the “Hello” keep-alive message interval to default (60 seconds)</td>
</tr>
<tr>
<td>no reconnect-attempts</td>
<td>Resets the maximum number of reconnect attempts to default (0 - configures infinite attempts)</td>
</tr>
<tr>
<td>no reconnect-interval</td>
<td>Resets the interval between successive attempts to re-establish a tunnel connection to default (120 seconds)</td>
</tr>
<tr>
<td>no retry-attempts</td>
<td>Resets the maximum number of retransmissions for signalling messages to default (5 attempts)</td>
</tr>
<tr>
<td>no retry-interval</td>
<td>Resets the interval before initiating a retransmission of a L2TPv3 signalling message to default (5 seconds)</td>
</tr>
<tr>
<td>no rx-window-size</td>
<td>Resets the number of packets received without sending an acknowledgment to default (10 packets)</td>
</tr>
<tr>
<td>no tx-window-size</td>
<td>Resets the number of packets transmitted without receiving an acknowledgment to default (10 packets)</td>
</tr>
</tbody>
</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)#
```
The following example shows the L2TPv3 policy ‘L2TPV3Policy1’ settings after the ‘no’ commands are executed:

```
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
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>cookie-size</code></td>
<td>Configures the cookie-field size present in each L2TPv3 data packet</td>
</tr>
<tr>
<td><code>failover-delay</code></td>
<td>Configures the L2TPv3 tunnel failover delay in seconds</td>
</tr>
<tr>
<td><code>force-12-path-recovery</code></td>
<td>Enables the forced detection of servers and gateways behind the L2TPv3 tunnel</td>
</tr>
<tr>
<td><code>hello-interval</code></td>
<td>Configures the interval for L2TPv3 “Hello” keep-alive messages</td>
</tr>
<tr>
<td><code>reconnect-attempts</code></td>
<td>Configures the maximum number of attempts made to reestablish a tunnel connection</td>
</tr>
<tr>
<td><code>reconnect-interval</code></td>
<td>Configures the interval, in seconds, between successive attempts to re-establish a tunnel connection</td>
</tr>
<tr>
<td><code>retry-attempts</code></td>
<td>Configures the maximum number of retransmissions for signalling messages from 1 - 10</td>
</tr>
<tr>
<td><code>retry-interval</code></td>
<td>Configures the interval, in seconds, before initiating a retransmission of any L2TPv3 signalling message</td>
</tr>
<tr>
<td><code>rx-window-size</code></td>
<td>Configures the number of packets received without sending an acknowledgment</td>
</tr>
<tr>
<td><code>tx-window-size</code></td>
<td>Configures the number of packets transmitted without receiving an acknowledgment</td>
</tr>
</tbody>
</table>
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

reconnect-attempts <0-8>

Parameters

- reconnect-attempts <0-8>

| reconnect-attempts <0-8> | Configures the maximum number of attempts made to re-establish a tunnel connection from 0 - 8 (default is 0: configures infinite reconnect attempts) |

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

Configure the interval, in seconds, between two successive attempts to re-establish a failed tunnel connection

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 \textbf{retry-attempts}

\textit{l2tpv3-policy-commands}

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

\textbf{Syntax}

retry-attempts \textless1-10\textgreater

\textbf{Parameters}

- retry-attempts \textless1-10\textgreater

| retry-attempts \textless1-10\textgreater | Configures the maximum number of attempts made to retransmit signalling messages from 1 - 10 (default is 5 attempts) |

\textbf{Examples}

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#retry-attempts 10

rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#show context l2tpv3 policy L2TPV3Policy1
  hello-interval 200
  retry-attempts \textbf{10}
  cookie-size 8
  reconnect-interval 100
  reconnect-attempts 8
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#

\textbf{Related Commands}

\textit{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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`retry-interval <1-250>`

**Parameters**

- `retry-interval <1-250>`

<table>
<thead>
<tr>
<th>retry-interval &lt;1-250&gt;</th>
<th>Configures the interval, in seconds, between two successive retransmission attempts. Specify a value from 1 - 250 seconds (default is 5 seconds).</th>
</tr>
</thead>
</table>

**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

Configures the number of signalling packets received without sending an acknowledgment

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
rx-window-size <1-15>

Parameters
- rx-window-size <1-15>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rx-window-size &lt;1-15&gt;</td>
<td>Configures the number of packets received without sending an acknowledgment. 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
rfs7000-37FABE(config-l2tpv3-policy-L2TPV3Policy1)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</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

Configure the number of signalling packets transmitted without receiving an acknowledgment.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
(tx-window-size <1-15>)
```

Parameters

- `tx-window-size <1-15>`

Examples

```
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

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)#
```

```
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#?
```

L2tpv3 Tunnel Mode commands:
- `establishment-criteria` Set tunnel establishment criteria
- `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
- `show` Show running system information
- `write` Write running configuration to memory or terminal

```
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#
```

Table 22.2 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 22-19</td>
</tr>
<tr>
<td><code>hostname</code></td>
<td>Configures tunnel specific local hostname</td>
<td>page 22-20</td>
</tr>
<tr>
<td><code>local-ip-address</code></td>
<td>Configures the tunnel's IP address</td>
<td>page 22-21</td>
</tr>
<tr>
<td><code>mtu</code></td>
<td>Configures the tunnel's Maximum Transmission Unit (MTU) size</td>
<td>page 22-22</td>
</tr>
<tr>
<td><code>no</code></td>
<td>Negates or reverts L2TPv3 tunnel commands</td>
<td>page 22-23</td>
</tr>
<tr>
<td><code>peer</code></td>
<td>Configures the tunnel's peers</td>
<td>page 22-25</td>
</tr>
<tr>
<td><code>router-id</code></td>
<td>Configures the tunnel's local router ID</td>
<td>page 22-28</td>
</tr>
<tr>
<td><code>session</code></td>
<td>Creates/modifies specified L2TPv3 session</td>
<td>page 22-29</td>
</tr>
<tr>
<td><code>use</code></td>
<td>Configures a tunnel to use a specified L2TPv3 tunnel policy</td>
<td>page 22-31</td>
</tr>
<tr>
<td><code>clrscr</code></td>
<td>Clears the display screen</td>
<td>page 5-3</td>
</tr>
</tbody>
</table>
### Table 22.2 L2TPV3-Tunnel-Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>commit</td>
<td>Commits (saves) changes made in the current session</td>
<td>page 5-4</td>
</tr>
<tr>
<td>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
### 22.2.1 establishment-criteria

#### Syntax

```
establishment-criteria [always|cluster-master|rf-domain-manager|vrrp-master <1-255>]
```

#### Parameters

- **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)
**22.2.2 hostname**

- l2tpv3-tunnel-commands

Configures the tunnel’s local hostname

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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><code>&lt;WORD&gt;</code></td>
<td>Specify the tunnel’s local hostname.</td>
</tr>
</tbody>
</table>

**Examples**

```bash
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)#
```

**Related Commands**

- `no` Removes the tunnel’s local hostname
22.2.3 local-ip-address

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
### 22.2.4 mtu

**l2tpv3-tunnel-commands**

Configures the *Maximum Transmission Unit* (MTU) size for this tunnel. This value determines the packet size transmitted over this tunnel.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`mtu <128-1460>`

**Parameters**

- `mtu <128-1460>`

  **mtu <128-1460>** | Configures the MTU size for this tunnel. Specify a value from 128 - 1460 bytes (default is 1460 bytes).

**Examples**

```plaintext
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)
22.2.5 **no**

- **l2tpv3-tunnel-commands**

Negates or reverts a L2TPv3 tunnel settings to default

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
no [establishment-criteria|hostname|local-ip-address|mtu|peer|router-id|session|use]
```

**Parameters**

- `no [establishment-criteria|hostname|local-ip-address|mtu|peer|router-id|session|use]`

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>establishment-criteria</td>
<td>Resets the tunnel’s establishment criteria to default</td>
</tr>
<tr>
<td>no hostname</td>
<td>Removes the tunnel’s local hostname</td>
</tr>
<tr>
<td>no local-ip-address</td>
<td>Resets the tunnel’s local IP address and re-establishes the tunnel</td>
</tr>
<tr>
<td>no mtu</td>
<td>Resets the MTU size for this tunnel to default (1460 bytes)</td>
</tr>
<tr>
<td>no peer</td>
<td>Removes the peer configured for this tunnel</td>
</tr>
<tr>
<td>no router-id</td>
<td>Removes the tunnel’s router ID</td>
</tr>
<tr>
<td>no session</td>
<td>Removes a session</td>
</tr>
<tr>
<td>no use</td>
<td>Removes the L2TPv3 policy associated with a tunnel and reverts to</td>
</tr>
<tr>
<td></td>
<td>the default tunnel policy</td>
</tr>
</tbody>
</table>

**Examples**

The tunnel settings before the ‘no’ command is executed:

```
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:

```
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)#
```
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>establishment-criteria</code></td>
<td>Configures a L2TPv3 tunnel's establishment criteria</td>
</tr>
<tr>
<td><code>hostname</code></td>
<td>Configures the tunnel's local hostname</td>
</tr>
<tr>
<td><code>local-ip-address</code></td>
<td>Configures the tunnel's source IP address</td>
</tr>
<tr>
<td><code>mtu</code></td>
<td>Configures the MTU size for this tunnel</td>
</tr>
<tr>
<td><code>peer</code></td>
<td>Configures the tunnel's peers</td>
</tr>
<tr>
<td><code>router-id</code></td>
<td>Configures the tunnel's local router ID</td>
</tr>
<tr>
<td><code>session</code></td>
<td>Creates/modifies specified L2TPv3 session</td>
</tr>
<tr>
<td><code>use</code></td>
<td>Associates a specified L2TPv3 tunnel policy with a L2TPv3 tunnel</td>
</tr>
</tbody>
</table>
### 22.2.6 peer

**l2tpv3-tunnel-commands**

Configures the L2TPv3 tunnel’s peers. At least one peer must be specified.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
peer <1-2> {hostname|ip-address|ipsec-secure|router-id|udp}
peer <1-2> {hostname [<HOSTNAME>|any]} {ipsec-secure|router-id|udp}
peer <1-2> {ip-address <IP>} {hostname|ipsec-secure|router-id|udp}
peer <1-2> {ipsec-secure} {gw [<IP>|<WORD> ]}
peer <1-2> {router-id [<IP>|<WORD>|any]} {ipsec-secure|udp}
peer <1-2> {udp} {ipsec-secure|port <1-65535>}
```

**Parameters**

- `peer <1-2>` {hostname [<HOSTNAME>|any]} {ipsec-secure|router-id|udp}

  Configures the tunnel’s peer ID from 1 - 2

  **Note:** At any time the tunnel is established with only one peer.

- `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.

- `ipsec-secure` {gw [<IP>|<WORD> ]}

  After specifying the peer hostname, optionally specify the IPSec settings:
  - ipsec-secure – Optional. Enables auto IPSec
  - gw – Optional. Configures IPSec gateway IP address or hostname
    - `<IP>` – Configures IPSec gateway’s IP address
    - `<WORD>` – Configures IPSec gateway’s hostname

- `router-id` [<IP>|<WORD>|any]

  After specifying the peer hostname, optionally specify router ID settings:
  - router-id – Optional. Configures the peer’s 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.

- `udp` {ipsec-secure gw|port <1-65535> {ipsec-secure}}

  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.
**peer <1-2> {ip-address <IP>} {hostname/ipsec-secure/router-id|udp}**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>peer &lt;1-2&gt;</code></td>
<td>Configures the tunnel’s peer ID from 1 - 2. At any time the tunnel is established with only one peer.</td>
</tr>
<tr>
<td><code>ip-address &lt;IP&gt;</code></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></td>
<td>Optional. Configures the peers’ hostname. The hostname options are:</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;FQDN&gt;</code> – Specifies the hostname as FQDN or partial DN</td>
</tr>
<tr>
<td></td>
<td>- <code>any</code> – 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.</td>
</tr>
<tr>
<td>`ipsec-secure {gw [&lt;IP&gt;</td>
<td>&lt;WORD&gt;]}`</td>
</tr>
<tr>
<td></td>
<td>- <code>ipsec-secure</code> – Optional. Enables auto IPsec</td>
</tr>
<tr>
<td></td>
<td>- <code>gw</code> – Optional. Configures IPsec gateway IP address or hostname</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;IP&gt;</code> – Configures IPsec gateway’s IP address</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;WORD&gt;</code> – Configures IPsec gateway’s hostname</td>
</tr>
<tr>
<td>`router-id [&lt;A.B.C.D&gt;</td>
<td>&lt;WORD&gt;</td>
</tr>
<tr>
<td></td>
<td>- <code>router-id</code> – Optional. Configures the peer’s router-id in one of the following formats:</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;A.B.C.D&gt;</code> – Peer router ID in the IP address (A.B.C.D) format</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;WORD&gt;</code> – Peer router ID range (for example, 100-120)</td>
</tr>
<tr>
<td></td>
<td>- <code>any</code> – Peer router ID is not specified. This allows incoming connection from any router ID.</td>
</tr>
<tr>
<td>`udp {ipsec-secure gw</td>
<td>port &lt;1-65535&gt;</td>
</tr>
<tr>
<td></td>
<td>The UDP option configures the encapsulation mode for this tunnel.</td>
</tr>
<tr>
<td></td>
<td>- <code>UDP</code> – Optional. Configures UDP encapsulation (default encapsulation is IP)</td>
</tr>
<tr>
<td></td>
<td>- <code>ipsec-secure gw</code> – Optional. Enables auto IPsec</td>
</tr>
<tr>
<td></td>
<td>- <code>port &lt;1-65535&gt;</code> – 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.</td>
</tr>
</tbody>
</table>

**peer <1-2> {ipsec-secure} {gw [<IP>|<WORD>]}**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>peer &lt;1-2&gt;</code></td>
<td>Configures the tunnel’s peer ID from 1 - 2. At any time the tunnel is established with only one peer.</td>
</tr>
<tr>
<td>`ipsec-secure {gw [&lt;IP&gt;</td>
<td>&lt;WORD&gt;]}`</td>
</tr>
<tr>
<td></td>
<td>- <code>gw</code> – Optional. Configures IPsec gateway IP address or hostname</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;IP&gt;</code> – Configures IPsec gateway’s IP address</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;WORD&gt;</code> – Configures IPsec gateway’s hostname</td>
</tr>
</tbody>
</table>

**peer <1-2> {router-id [<IP>|<WORD>|any]} {ipsec-secure|udp}**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>peer &lt;1-2&gt;</code></td>
<td>Configures the tunnel peer ID from 1 - 2. At any time the tunnel is established with only one peer.</td>
</tr>
<tr>
<td>`router-id [&lt;A.B.C.D&gt;</td>
<td>&lt;WORD&gt;</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;A.B.C.D&gt;</code> – Peer router ID in the IP address (A.B.C.D) format</td>
</tr>
<tr>
<td></td>
<td>- <code>&lt;WORD&gt;</code> – Peer router ID range (for example, 100-120)</td>
</tr>
<tr>
<td></td>
<td>- <code>any</code> – Peer router ID is not specified. This allows incoming connection from any router ID.</td>
</tr>
</tbody>
</table>
### L2TPv3-Policy 22 - 27

**ipsec-secure**

```
{gw [<IP>|<WORD>]|ipsec-secure}
```

After specifying the peer's router ID, optionally specify the IPSec settings.
- **ipsec-secure** – Optional. Enables auto IPSec
  - gw – Optional. Configures IPSec gateway IP address or hostname
    - <IP> – Configures IPSec gateway’s IP address
    - <WORD> – Configures IPSec gateway’s hostname

**udp**

```
{ipsec-secure gw|port <1-65535>|ipsec-secure}
```

After specifying the peer's router ID, optionally specify the IPSec 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> – 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.

- **peer <1-2> {udp| {ipsec-secure| port <1-65535>}}**

<table>
<thead>
<tr>
<th>peer &lt;1-2&gt;</th>
<th>Configures the tunnel peer ID from 1 - 2. At any time the tunnel is established with only one peer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>udp {ipsec-secure</td>
<td>port &lt;1-65535&gt;</td>
</tr>
<tr>
<td></td>
<td>- ipsec-secure – Optional. Configures IPSec gateway on this peer UDP port</td>
</tr>
<tr>
<td></td>
<td>- port &lt;1-65535&gt; – 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.</td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#peer 2
hostname tunnellpeer1 udp port 100
```

```
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#show context l2tpv3 tunnel Tunnel1
    peer 2 hostname tunnellpeer1 udp port 100
    establishment-criteria cluster-master
```

**Related Commands**

- **no**
  - Removes the peer configured for this tunnel


22.2.7 router-id

* l2tpv3-tunnel-commands
Configure the tunnel’s local router ID

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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
e1 peer 2 hostname tunne1peer1 udp port 100
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#router-id 2000
establishment-criteria cluster-master
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the tunnel’s router ID</td>
</tr>
</tbody>
</table>
### 22.2.8 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### 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> traffic-source**
  - **vlan <VLAN-ID-RANGE> {native-vlan <1-4094>}**

<table>
<thead>
<tr>
<th>session  &lt;L2TPV3-SESSION-NAME&gt;</th>
<th>Configures this session’s name</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;L2TPV3-SESSION-NAME&gt;</td>
<td>– 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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pseudowire-id &lt;1-4294967295&gt;</th>
<th>Configures the pseudowire ID for this session from 1-4204067295</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

<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;</td>
<td>– Configures VLAN range list of traffic source. Specify the VLAN IDs as a range (for example, 10-20, 25, 30-35).</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;</td>
<td>– Specify the native VLAN ID from 1-4094.</td>
</tr>
</tbody>
</table>

- **session <L2TPV3-SESSION-NAME> rate-limit [egress|ingress] rate <50-1000000> max-burst-size <2-1024>**

<table>
<thead>
<tr>
<th>session  &lt;L2TPV3-SESSION-NAME&gt;</th>
<th>Configures this session’s name</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;L2TPV3-SESSION-NAME&gt;</td>
<td>– 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.</td>
</tr>
</tbody>
</table>
### 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

```bash
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

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-tunnel-Tunnel1)#
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>rate</strong></td>
<td>Configures the rate for incoming and/or outgoing traffic on this L2TPv3 tunnel. When configured, this option limits the rate at which data is sent to or received from L2TPv3 tunnel members.</td>
</tr>
<tr>
<td><strong>rate-limit</strong></td>
<td><strong>[egress][ingress]</strong> &lt;50-1000000&gt; Configures a rate for incoming and/or outgoing traffic on this L2TPv3 tunnel. When configured, this option limits the rate at which data is sent to or received from L2TPv3 tunnel members.</td>
</tr>
<tr>
<td></td>
<td>• egress – Applies the specified rate to outbound traffic, from the L2TPv3 tunnel (going out from access points, wireless controllers, and service platforms) to the network</td>
</tr>
<tr>
<td></td>
<td>• ingress – Applies the specified rate to inbound traffic, from the network to the L2TPv3 tunnel (coming in to access points, wireless controllers, and service platforms)</td>
</tr>
<tr>
<td><strong>max-burst-size</strong></td>
<td>&lt;2-1024&gt; Configures the maximum burst size, in kilobytes, for incoming/outgoing traffic rate limiting (depending on the direction selected) on a L2TPv3 tunnel.</td>
</tr>
<tr>
<td></td>
<td>• &lt;2-1024&gt; – Specify the maximum burst size from 2 - 1024 kbytes. Smaller the burst size, lesser are the chances of the upstream packet transmission resulting in congestion of the L2TPv3 tunnel traffic. The default setting is 320 kbytes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Removes a session</td>
</tr>
</tbody>
</table>
22.2.9 use

- **l2tpv3-tunnel-commands**

Configures a tunnel to use a specified L2TPv3 tunnel policy and specified critical resources

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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
  
  
  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.

**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 tunnel1peer1 udp port 100
use l2tpv3-policy L2TPV3Policy1
session tunnel1peer1session1 pseudowire-id 5000 traffic-source vlan 10-20 native-vlan 1 router-id 2000
establishment-criteria cluster-master
```

**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)#
```

L2tpv3 Manual Session Mode commands:
- **local-cookie** - The local cookie for the session
- **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
- **local-session-id** - Local session id for the session
- **mtu** - Configure the mtu size for the tunnel
- **no** - Negate a command or set its defaults
- **peer** - Configure L2TPv3 manual session peer
- **remote-cookie** - The remote cookie for the session
- **remote-session-id** - Remote session id for the session
- **traffic-source** - Traffic that is tunneled

```
clrscr
commit
end
exit
help
revert
service
show
write
```

```
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#
```

Table 22.3 summarizes L2TPv3 manual session configuration commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>local-cookie</td>
<td>Configures the manual session’s local cookie field size</td>
<td>page 22-34</td>
</tr>
<tr>
<td>local-ip-address</td>
<td>Configures the manual session’s local source IP address</td>
<td>page 22-35</td>
</tr>
<tr>
<td>local-session-id</td>
<td>Configures the manual session’s local session ID</td>
<td>page 22-36</td>
</tr>
<tr>
<td>mtu</td>
<td>Configures the MTU size for the manual session tunnel</td>
<td>page 22-37</td>
</tr>
<tr>
<td>no</td>
<td>Negates or reverts L2TPv3 manual session commands to default</td>
<td>page 22-23</td>
</tr>
<tr>
<td>peer</td>
<td>Configures the manual session’s peers</td>
<td>page 22-40</td>
</tr>
<tr>
<td>remote-cookie</td>
<td>Configures the remote cookie for the manual session</td>
<td>page 22-41</td>
</tr>
<tr>
<td>remote-session-id</td>
<td>Configures the manual session’s remote session ID</td>
<td>page 22-42</td>
</tr>
<tr>
<td>traffic-source</td>
<td>Configures the traffic source tunneled by the manual session</td>
<td>page 22-43</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Reference</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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                                          |

<table>
<thead>
<tr>
<th>&lt;1-4294967295&gt;</th>
<th>Configures the local cookie value first word. Applies to both the 4 byte and 8 byte local cookies</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-4294967295&gt;</td>
<td>Optional – Configures the local cookie value second word. Applicable to only 8 byte cookies. This parameter is ignored for 4 byte cookies.</td>
</tr>
</tbody>
</table>

**Examples**

```
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
local-ip-address <IP>
```

**Parameters**

- `local-ip-address <IP>`

---

### Examples

```
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**

- `no`
  
  Resets the manual session’s local source IP address. This re-establishes the session.
22.3.3 local-session-id

Configures the manual session’s local session ID

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
local-session-id <1-63>

Parameters
- local-session-id <1-63>

| local-session-id <1-63> | Configures this manual session’s local session 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. |

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

- l2tpv3-manual-session-commands

Configures the *Maximum Transmission Unit* (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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

mtu <128-1460>

**Parameters**

- mtu <128-1460>

  | mtu <128-1460> | Configures the MTU size for this manual session tunnel. Specify a value from 128 - 1460 bytes (default is 1460 bytes). |

**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
```

**Related Commands**

- *no* Resets the MTU size for this manual session to default (1460 bytes)
22.3.5 no

Negates or reverts L2TPv3 manual session settings to default

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [local-cookie|local-ip-address|local-session-id|mtu|peer|remote-cookie|remote-session-id|traffic-source]

Parameters

- no [local-cookie|local-ip-address|local-session-id|mtu|peer|remote-cookie|remote-session-id|traffic-source]

<table>
<thead>
<tr>
<th>no local-cookie</th>
<th>Removes the local cookie size configured for a manual session</th>
</tr>
</thead>
<tbody>
<tr>
<td>no local-ip-address</td>
<td>Resets the manual session's local source IP address and re-establishes the tunnel</td>
</tr>
<tr>
<td>no local-session-id</td>
<td>Removes the manual session's local session ID</td>
</tr>
<tr>
<td>no mtu</td>
<td>Resets the manual session's MTU size to default (1460 bytes)</td>
</tr>
<tr>
<td>no peer</td>
<td>Removes the peer configuration from this tunnel</td>
</tr>
<tr>
<td>no remote-cookie</td>
<td>Removes the remote cookie field size</td>
</tr>
<tr>
<td>no remote-session-id</td>
<td>Removes the manual session's remote session ID</td>
</tr>
<tr>
<td>no traffic-source</td>
<td>Removes the configured traffic source</td>
</tr>
</tbody>
</table>

Examples

The following example shows the manual session ‘test’ settings before the ‘no’ commands are executed:

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#show context l2tpv3 manual-session test
l2tp 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)#

rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#no local-ip-address
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#no local-session-id
rfs7000-37FABE(config-profile default-rfs7000-l2tpv3-manual-session-test)#no remote-session-id
The following example shows the manual session ‘test’ settings after the ‘no’ commands are executed:

```
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)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>local-cookie</code></td>
<td>Configures the local cookie field size for the manual session</td>
</tr>
<tr>
<td><code>local-ip-address</code></td>
<td>Configures the manual session’s local source IP address</td>
</tr>
<tr>
<td><code>local-session-id</code></td>
<td>Removes the manual session’s local session ID</td>
</tr>
<tr>
<td><code>mtu</code></td>
<td>Configures the manual session’s MTU size</td>
</tr>
<tr>
<td><code>peer</code></td>
<td>Configures the manual session’s peers</td>
</tr>
<tr>
<td><code>remote-cookie</code></td>
<td>Configures the manual session’s remote cookie field size</td>
</tr>
<tr>
<td><code>remote-session-id</code></td>
<td>Configures the manual session’s remote session ID</td>
</tr>
<tr>
<td><code>traffic-source</code></td>
<td>Configures the traffic source tunneled in this session</td>
</tr>
</tbody>
</table>
### 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
peer ip-address <IP> {udp {port <1-65535>}}
```

**Parameters**
- `peer ip-address <IP> {udp {port <1-65535>}}` (Optional. Configures the peer's UDP port running the L2TPv3 service. Specify a value from 1 - 65535.)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>peer ip-address &lt;IP&gt;</td>
<td>Configures the tunnel's peer IP address in the A.B.C.D format</td>
</tr>
<tr>
<td>udp {port &lt;1-65535&gt;}</td>
<td>Optional. Configures the UDP encapsulation mode for this tunnel (default encapsulation is IP)</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
local-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

- **`l2tpv3-manual-session-commands`**

Configures the manual session's remote cookie field size

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```
remote-cookie size [4|8] <1-4294967295> {<1-4294967295>}
```

#### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>remote-cookie size [4</td>
<td>8] &lt;1-4294967295&gt; {&lt;1-4294967295&gt;}</td>
</tr>
<tr>
<td></td>
<td>- 4 – 4 byte remote cookie field</td>
</tr>
<tr>
<td></td>
<td>- 8 – 8 byte remote cookie field</td>
</tr>
<tr>
<td>&lt;1-4294967295&gt;</td>
<td>Configures the remote cookie value first word. Applies to both the 4 byte and 8 byte local cookies</td>
</tr>
<tr>
<td>&lt;1-4294967295&gt;</td>
<td>Optional – Configures the remote cookie value second word. Applicable to only 8 byte cookies. This parameter is ignored for 4 byte cookies.</td>
</tr>
</tbody>
</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
    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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the manual session's remote cookie field size</td>
</tr>
</tbody>
</table>
**22.3.8 remote-session-id**

- **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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

remote-session-id <1-4294967295>

**Parameters**

- remote-session-id <1-4294967295>

**Examples**

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

**Related Commands**

- **no**

  Removes the manual session's remote ID
22.3.9 traffic-source

- 2tpv3-manual-session-commands

Configures the traffic source tunneled by this session.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
traffic-source vlan <VLAN-ID-RANGE> {native-vlan <1-4094>}
```

Parameters

- `traffic-source vlan <VLAN-ID-RANGE>`
  - Configures VLAN as the traffic source for this tunnel.
  - `<VLAN-ID-RANGE>` — Configures VLAN range list of traffic source. Specify the VLAN IDs as a range (for example, 10-20, 25, 30-35).

- `native-vlan <1-4094>`
  - Optional — Configures the native VLAN ID for this session, which is not tagged.
  - `<1-4094>` — Specify the native VLAN ID from 1-4094.

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
  remote-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
- end: End current mode and change to EXEC mode
- exit: End current mode and down to previous mode
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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-profile default-rfs7000-router-ospf)#
23.1 router-mode

Table 23.1 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>
23.1.1 area

- router-mode

Configures OSPF network area (OSPF enabled interfaces) settings.

Table 23.2 lists the OSPF Area configuration mode 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

 configurations 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
 - Wireless Controllers — RFS4000, RFS6000, RFS7000

 Syntax

 area [<0-4294967295>|<IP>]

 Parameters

 - area [<0-4294967295>|<IP>]

 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><code>no</code></td>
<td>Removes area configuration settings</td>
</tr>
</tbody>
</table>
23.1.1.2 OSPF-area-mode

Table 23.3 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 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```plaintext
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 | default-cost <0-16777215> | no-summary | translate-always | translate-candidate | translate-never | translate-never | (default-cost <0-16777215> | no-summary)}
area-type stub {default-cost <0-16777215> | no-summary | default-cost <0-16777215> | no-summary | translate-always | translate-candidate | translate-never | translate-never | (default-cost <0-16777215> | no-summary)}
```

**Parameters**

- **area-type [nssa|stub]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nssa</td>
<td>Configures the OSPF area as NSSA</td>
</tr>
<tr>
<td>stub</td>
<td>Configures the OSPF area as <em>Stubby Area</em> (STUB)</td>
</tr>
<tr>
<td>default-cost &lt;0-16777215&gt;</td>
<td>Specifies the default summary cost that will be advertised, if the OSPF area is a STUB or NSSA</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 <em>Link State Advertisements</em> (LSAs) into type-5 LSAs</td>
</tr>
<tr>
<td>Parameters</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**

```bash
rfs7000-37FABE(config-profile default-rfs7000-router-ospf-area-0.0.0.1)#area-type stub
default-cost 1
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>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```
authentication [message-digest|simple-password]
```

**Parameters**

- `authentication [message-digest|simple-password]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>message-digest</td>
<td>Configures the message-digest (MD-5) authentication scheme</td>
</tr>
<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
```

**Related Commands**

```
no
```

Removes the authentication scheme.
23.1.2.3 range

Ap OSPF-area-mode

Specifies a range of addresses for routes matching address/mask for OSPF summarization.

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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 Area Border Router (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

Negates a command or set its defaults

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000

Syntax

no [area-type|authentication|range]

Parameters

- no [area-type|authentication|range]

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)#

Related Commands

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>area-type</td>
<td>Configures a particular OSPF area as STUB, Totally STUB, NSSA or Totally NSSA</td>
</tr>
<tr>
<td>authentication</td>
<td>Specifies the authentication scheme used for an OSPF area</td>
</tr>
<tr>
<td>range</td>
<td>Specifies the routes matching address/mask for summarization</td>
</tr>
</tbody>
</table>
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: ref-bw divided by the bandwidth.

Use the 'no auto-cost reference-bandwidth' to configure default metrics calculation based on interface type.

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```
auto-cost reference-bandwidth <1-4294967>
```

**Parameters**

- **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; – Specify the reference bandwidth value from 1 - 4294967.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#auto-cost reference-bandwidth 1
```

Please make sure that 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

default-information originate {always|metric|metric-type}  

default-information originate {always|metric <0-16777214>|metric-type [1|2]}  

{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.
  - Optional. Specifies OSPF metric value for redistributed routes (this value is used to generate the default route). Specify a value from 0 - 16777214.

- **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**

```bash
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#default-information originate metric-type 2 metric 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
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#
```

**Related Commands**

- **no**
  - Disables advertising of default route information available in the routing table
23.1.4 ip

Configures IP default gateway priority

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000

Syntax

```
ip default-gateway priority <1-8000>
```

Parameters

- `ip default-gateway priority <1-8000>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>default-gateway</td>
<td>Configures the default gateway</td>
</tr>
<tr>
<td>priority &lt;1-8000&gt;</td>
<td>Sets the priority for the default gateway acquired via OSPF. Specify an integer from 1 - 8000. The default is 7000.</td>
</tr>
</tbody>
</table>

Note: Lower the value, higher is the priority.

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

- **router-mode**

Assigns networks to specified areas (defines the OSPF interfaces and their associated area IDs)

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

network <IP/M> area [<0-4294967295>|<IP>]

**Parameters**

- network <IP/M> area [<0-4294967295>|<IP>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP/M&gt;</td>
<td>Specifies an OSPF network address/mask value. Defines networks (IP addresses and mask) participating in OSPF.</td>
</tr>
<tr>
<td>area</td>
<td>Specifies an OSPF area, associated with the OSPF address range, in one of the following formats:</td>
</tr>
<tr>
<td></td>
<td>• &lt;0-4294967295&gt; – Specifies a 32 bit OSPF area ID from 0 - 4294967295</td>
</tr>
<tr>
<td></td>
<td>• &lt;IP&gt; – Defines an OSPF area ID in the form of an IPv4 address</td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the OSPF network to area ID association</td>
</tr>
</tbody>
</table>
23.1.6 ospf

Enables OSPF routing on a profile or device

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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>ospf enable</td>
<td>Enables OSPF routing on devices using this profile. This option is disabled by default.</td>
</tr>
</tbody>
</table>

Examples
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#ospf enable
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#show context
routers 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000

**Syntax**

```plaintext
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>&lt;WORD&gt;</td>
<td>Enables the OSPF passive mode on the interface specified by the &lt;WORD&gt; parameter</td>
</tr>
<tr>
<td>all</td>
<td>Enables the OSPF passive mode on all the L3 interfaces</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>Enables the OSPF passive mode on the specified VLAN interface</td>
</tr>
<tr>
<td></td>
<td>• <code>&lt;1-4094&gt;</code> – Specify the VLAN interface ID from 1 - 4094.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#passive vlan 1
rfs7000-37FABE(config-profile default-rfs7000-router-ospf)#show context
default-rfs7000-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**

- `no` Disables the OSPF passive mode on a specified interface
23.1.8 redistribute

Specifies the route types redistributed by OSPF

Supported in the following platforms:
- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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>]
```

Parameters

- **num-routes <DYNAMIC-ROUTE-LIMIT>**
  - Specifies the maximum number of non self-generated Link State Advertisements (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. 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. 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. 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- 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><code>&lt;IP&gt;</code> – Specify the router ID in the IP &lt;A.B.C.D&gt; format</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```
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

```
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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000

Syntax

no [area|auto-cost|default-information|ip|network|ospf|passive|redistribute|route-limit|router-id]

Parameters
- no [area|auto-cost|default-information|ip|network|ospf|passive|redistribute|route-limit|router-id]

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)#
```

The following example shows the OSPF router interface settings after the ‘no’ commands are executed:

```
  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)#
```
<table>
<thead>
<tr>
<th>Related Commands</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>area</strong></td>
<td>Configures OSPF network areas (OSPF enables interfaces)</td>
</tr>
<tr>
<td><strong>auto-cost</strong></td>
<td>Configures the reference bandwidth in terms of megabits per second</td>
</tr>
<tr>
<td><strong>default-information</strong></td>
<td>Controls the distribution of default route information</td>
</tr>
<tr>
<td><strong>ip</strong></td>
<td>Configures IP default gateway priority</td>
</tr>
<tr>
<td><strong>network</strong></td>
<td>Assigns networks to specified areas</td>
</tr>
<tr>
<td><strong>ospf</strong></td>
<td>Enables OSPF</td>
</tr>
<tr>
<td><strong>passive</strong></td>
<td>Configures a specified OSPF interface as passive</td>
</tr>
<tr>
<td><strong>redistribute</strong></td>
<td>Specifies the route types redistributed by OSPF</td>
</tr>
<tr>
<td><strong>route-limit</strong></td>
<td>Limits the number of routes managed by OSPF</td>
</tr>
<tr>
<td><strong>router-id</strong></td>
<td>Specifies the router ID for OSPF</td>
</tr>
</tbody>
</table>
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 policies facilitate 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:

```
<DEVICE>(config)#routing-policy <ROUTING-POLICY-NAME>
rfs7000-37FABE(config)#routing-policy testpolicy
```

rfs7000-37FABE(config)#

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)#
```
24.1 routing-policy-commands

Table 24.1 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/disables PBR for locally generated packets</td>
<td>page 24-3</td>
</tr>
<tr>
<td>logging</td>
<td>Enables/disables logging for a specified route map</td>
<td>page 24-4</td>
</tr>
<tr>
<td>route-map</td>
<td>Creates a route map entry</td>
<td>page 24-5</td>
</tr>
<tr>
<td>use</td>
<td>Defines default settings to use</td>
<td>page 24-15</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its defaults</td>
<td>page 24-16</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
24.1.1 apply-to-local-packets

Enables/disables 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
```
apply-to-local-packets
```

Parameters
None

Examples
```
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/disables 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

logging

**Parameters**

None

**Examples**

```bash
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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables route map logging</td>
</tr>
</tbody>
</table>
24.1.3 **route-map**

*routing-policy-commands*

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
  - Wireless Controllers — RFS4000, RFS6000, RFS7000
  - Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
route-map <1-100>
```

**Parameters**

- **route-map <1-100>**

<table>
<thead>
<tr>
<th>route-map &lt;1-100&gt;</th>
<th>Creates a route map entry and enters the route map configuration mode. Specify a precedence value from 1-100.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Note:</strong> Lower the sequence number, higher is the precedence.</td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

```bash
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

```bash
rfs7000-37FABE(config-routing-policy-testpolicy-route-map-1)#
```

**Related Commands**

| no | Removes a route map |
24.1.4 route-map-mode

Table 24.2 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 24-8</td>
</tr>
<tr>
<td>fallback</td>
<td>Configures a fallback to the next destination</td>
<td>page 24-9</td>
</tr>
<tr>
<td>mark</td>
<td>Marks action clause for packets satisfying match criteria</td>
<td>page 24-10</td>
</tr>
<tr>
<td>match</td>
<td>Sets match clauses for the route map</td>
<td>page 24-11</td>
</tr>
<tr>
<td>next-hop</td>
<td>Sets the next hop for packets satisfying match criteria</td>
<td>page 24-13</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or sets its default</td>
<td>page 24-14</td>
</tr>
</tbody>
</table>
24.1.4.1 default-next-hop

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
default-next-hop [<IP>|<ROUTER-IF-NAME>|pppoe1|vlan <1-4094>|wwan1]
```

Parameters

- `default-next-hop [<IP>|<ROUTER-IF-NAME>|pppoe1|vlan <1-4094>|wwan1]`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;IP&gt;</code></td>
<td>Specifies next hop router’s IP address</td>
</tr>
<tr>
<td><code>&lt;ROUTER-IF-NAME&gt;</code></td>
<td>Specifies the outgoing interface name (router interface name)</td>
</tr>
<tr>
<td>pppoe1</td>
<td>Specifies the PPPoE interface</td>
</tr>
<tr>
<td>vlan &lt;1-4094&gt;</td>
<td>Specifies a VLAN interface ID from 1 - 4094</td>
</tr>
<tr>
<td>wwan1</td>
<td>Specifies the WAN interface</td>
</tr>
</tbody>
</table>

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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

- route-map-mode

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6552, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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**

- **route-map-mode**

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 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*.

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
match [incoming-interface|ip|ip-access-list|wireless-client-role|wlan]
mach incoming-interface [<ROUTER-IF-NAME>|pppoe1|vlan <1-4094>|wwan1]
mach ip dscp <0-63>
mach ip-access-list <IP-ACCESS-LIST-NAME>
mach wireless-client-role <ROLE-POLICY-NAME> <ROLE-NAME>
mach wlan <WLAN-NAME>
```

**Parameters**

- **match incoming-interface [<ROUTER-IF-NAME>|pppoe1|vlan <1-4094>|wwan1]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>incoming-interface</td>
<td>Sets the incoming SVI match clause. Specify an interface name.</td>
</tr>
<tr>
<td>&lt;ROUTER-IF-NAME&gt;</td>
<td>Specifies the layer 3 interface name (route interface)</td>
</tr>
</tbody>
</table>
### Examples

```bash
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Disables match clause settings for this route map</td>
</tr>
</tbody>
</table>
## 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** — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- **Wireless Controllers** — RFS4000, RFS6000, RFS7000
- **Service Platforms** — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

### Syntax

```
next-hop [<IP>|<ROUTER-IF-NAME>|pppoe1|vlan <1-4094>|wwlan1]{<IP>|<ROUTER-IF-NAME>|pppoe1|vlan <1-4094>|wwlan1}
```

### Parameters

- **next-hop** `<IP>|<ROUTER-IF-NAME>|pppoe1|vlan <1-4094>|wwlan1>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;IP&gt;</code></td>
<td>Specifies the primary and secondary next hop router’s IP address</td>
</tr>
<tr>
<td><code>&lt;WORD&gt;</code></td>
<td>Specifies the layer 3 Interface name (router interface)</td>
</tr>
<tr>
<td>pppoe1</td>
<td>Specifies the PPP over Ethernet interface</td>
</tr>
<tr>
<td>vlan <code>&lt;1-4094&gt;</code></td>
<td>Specifies the VLAN interface. Specify a VLAN ID from 1 - 4094. The VLAN interface should be a DHCP client.</td>
</tr>
<tr>
<td>wwan1</td>
<td>Specifies the WAN interface</td>
</tr>
</tbody>
</table>

### 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
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><strong>no</strong></td>
<td>Disables the next hop router settings</td>
</tr>
</tbody>
</table>
24.1.4.6 no

Negates a command or sets its defaults

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [default-next-hop|fallback|mark|match|next-hop]

Parameters

- no [default-next-hop|fallback|mark|match|next-hop]

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:

```
  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)#
```

```
  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:

```
  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)#
```

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>default-next-hop</td>
<td>Sets the next hop for packets satisfying match criteria</td>
</tr>
<tr>
<td>fallback</td>
<td>Configures a fallback to the next destination</td>
</tr>
<tr>
<td>mark</td>
<td>Marks an action for a route map</td>
</tr>
<tr>
<td>match</td>
<td>Sets match clauses for a route map</td>
</tr>
<tr>
<td>next-hop</td>
<td>Sets the next hop for packets satisfying match criteria</td>
</tr>
</tbody>
</table>
24.1.5 use

* routing-policy-commands

Uses Critical Resource Management (CRM) to monitor link status

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

use critical-resource-monitoring

Parameters

- use critical-resource-monitoring

| use critical-resource-monitoring | Uses CRM to monitor the status of a link. Selecting this option determines the disposition of the route-map next hop via monitored critical resources. Link monitoring is the function used to determine a potential fail over to the secondary next hop. This option is enabled by default. |

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### Syntax

```
no [apply-to-local-packets|logging|route-map|use]
```

#### Parameters

- `no [apply-to-local-packets|logging|route-map|use]`

<table>
<thead>
<tr>
<th><code>no &lt;PARAMETER&gt;</code></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 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)#
```

The following example shows the routing policy 'testpolicy' settings after the 'no' commands are executed:

```
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
```

#### Related Commands

<table>
<thead>
<tr>
<th><strong>apply-to-local-packets</strong></th>
<th>Enables/disables PBR for locally generated packets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>logging</strong></td>
<td>Enables logging for a specified route map</td>
</tr>
<tr>
<td><strong>route-map</strong></td>
<td>Creates a route map entry and enters the route map configuration mode</td>
</tr>
<tr>
<td><strong>use</strong></td>
<td>Uses CRM to monitor the status of a link</td>
</tr>
</tbody>
</table>
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:

```
<DEVICE>(config)#aaa-tacacs-policy <POLICY-NAME>
```

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

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)#
```
25.1 aaa-tacacs-policy

Table 25.1 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>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
### 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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

#### 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>Description</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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>auth-fail</td>
<td>Enables accounting for authentication fail details. This option is disabled by default.</td>
</tr>
<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]

<table>
<thead>
<tr>
<th>server</th>
<th>Configures a TACACS accounting server</th>
</tr>
</thead>
<tbody>
<tr>
<td>preference</td>
<td>Configures the accounting server preference (specifies the method of selecting a server, from the pool, to send the request)</td>
</tr>
<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>

| server <1-2> | Configures an accounting server. Up to 2 accounting servers can be configured |
| retry-timeout-factor <50-200> | Sets the scaling factor for retry timeouts |
| - <50-200> – Specify a value from 50 - 200. The default 15 100. |
| 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>]}

| server <1-2> | Configures an accounting server. Up to 2 accounting servers can be configured |
| host <IP/HOSTNAME> | Configures the accounting server’s IP address or hostname |
| 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. |
| 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. |

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, FNX9000, NX9500, NX9510

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|retry-timeout-factor|timeout] {port <1-65535>}
authentication server <1-2> host <IP/HOSTNAME> {secret [0 <SECRET> | 2 <SECRET> | <SECRET>]} {port <1-65535>}
authentication server <1-2> retry-timeout-factor <50-200>
authentication server <1-2> timeout <3-60> {attempts <1-10>}
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**
  - Configures a TACACS authentication server. Up to 2 TACACS servers can be configured
  - **<1-2>** — Specify the TACACS server index from 1 - 2.

- **host**
  - 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.

### 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> {protocol <AUTHENTICATION-PROTO-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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
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]
authorizationserver <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**

- `authorization access-method [all|console|telnet|ssh] {(console|ssh|telnet)}`

<table>
<thead>
<tr>
<th>access-method</th>
<th>Configures the access method for command authorization</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>Authorizes commands from all access methods</td>
</tr>
<tr>
<td>console</td>
<td>Authorizes commands from the console only</td>
</tr>
<tr>
<td>telnet</td>
<td>Authorizes commands from Telnet only</td>
</tr>
<tr>
<td>ssh</td>
<td>Authorizes commands from SSH only</td>
</tr>
<tr>
<td>{console</td>
<td>ssh</td>
</tr>
</tbody>
</table>

- `authorization allow-privileged-commands`

| allow-privileged-commands | Allows privileged commands execution without command authorization. This option is disabled by default. |

- `authorization 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 a TACACS authorization server. Up to 2 TACACS servers can be configured</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-2&gt;</td>
<td>Specify the TACACS server index from 1 - 2.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>host &lt;IP/HOSTNAME&gt;</th>
<th>Sets the TACACS server’s IP address or hostname</th>
</tr>
</thead>
</table>
### secret [0 <SECRET>|2 <SECRET>] [<SECRET>]
Optional. Configures the secret used to authorize 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 authorization port from 1 - 65535. The default port is 49.

### authorization server preference [authenticated-server-host|authenticated-server-number|none]
Configures the authorization server preference
- authenticated-server-host
  - Sets the authentication server as the authorization server
  - This parameter indicates the same server is used for authentication and authorization. The server is referred to by its hostname.
- authenticated-server-number
  - Sets the authentication server as the authorization server
  - This parameter indicates the same server is used for authentication and authorization. The server is referred to by its index or number.
- none
  - Indicates the authorization server is independent of the authentication

### server <1-2>
Configures a TACACS authorization server. Up to 2 TACACS servers can be configured
- <1-2> – Specify the TACACS server's index from 1 - 2.

### retry-timeout-factor <50-200>
Configures the scaling of timeouts between consecutive TACACS authorization 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.

### server <1-2> retry-timeout-factor <50-200>

### server <1-2> timeout <3-5> {attempts <1-3>}
Configures the timeout, in seconds, for each request sent to the TACACS server. This is the time allowed to elapse before another request is sent to the TACACS server. If a response is received from the TACACS 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. Indicates the number of retry attempts to make before giving up
- <1-3> – Specify a value from 1 - 3. The default is 3.
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

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

Related Commands

| **no**    | Resets values or disables commands |
25.1.4 no

Negates a AAA TACACS policy command or sets its default

Supported in the following platforms:

- Access Points — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [accounting|authentication|authorization]

Parameters

- no <PARAMETER>

| no <PARAMETER> | Provide the parameters needed to reset or disable the desired AAA-TACACS policy setting. |

Examples

The following example shows the AAA-TACACS policy ‘test’ settings before the ‘no’ commands are executed:

```
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)#
```

```
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:

```
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

| accounting | Configures TACACS accounting parameters |
| authentication | Configures TACACS authentication parameters |
| authorization | Configures TACACS authorization parameters |
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
The meshpoint-config-instance section of WiNG 5.6 CLI Reference Guide provides information and commands for configuring mesh points in a mesh networking environment. The section explains the MeshConnex (MCX) mesh networking technology, its compatibility with MiNT-Based meshing, and its design for large-scale, high-mobility outdoor mesh deployments.

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:

```plaintext
rfs7000-37FABE(config)#meshpoint <MESHPOINT-NAME>
```

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
- **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

```plaintext
rfs7000-37FABE(config)#meshpoint test
rfs7000-37FABE(config-meshpoint-test)#
```

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:

```plaintext
rfs7000-37FABE(config)#meshpoint <MESHPOINT-NAME>
```

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
- **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

```plaintext
rfs7000-37FABE(config-meshpoint-test)#
```
Table 26.1 summarizes meshpoint configuration commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>allowed-vlans</td>
<td>Configures VLANs allowed on the meshpoint</td>
<td>page 26-4</td>
</tr>
<tr>
<td>beacon-format</td>
<td>Configures the beacon format for the meshpoint AP</td>
<td>page 26-5</td>
</tr>
<tr>
<td>control-vlan</td>
<td>Configures the VLAN where meshpoint control traffic traverses</td>
<td>page 26-6</td>
</tr>
<tr>
<td>data-rates</td>
<td>Configures the data rates supported per frequency band</td>
<td>page 26-7</td>
</tr>
<tr>
<td>description</td>
<td>Configures a human friendly description for this meshpoint</td>
<td>page 26-11</td>
</tr>
<tr>
<td>meshid</td>
<td>Configures a unique ID for this meshpoint</td>
<td>page 26-12</td>
</tr>
<tr>
<td>neighbor</td>
<td>Configures the neighbor inactivity time out for this meshpoint</td>
<td>page 26-13</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 26-14</td>
</tr>
<tr>
<td>root</td>
<td>Configures a meshpoint as the root meshpoint</td>
<td>page 26-17</td>
</tr>
<tr>
<td>security-mode</td>
<td>Configures the security mode on the meshpoint.</td>
<td>page 26-18</td>
</tr>
<tr>
<td>service</td>
<td>Allows only 802.11n capable neighbors to create a mesh connection</td>
<td>page 26-19</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down the meshpoint</td>
<td>page 26-20</td>
</tr>
<tr>
<td>use</td>
<td>Configures a QoS policy for use with this meshpoint</td>
<td>page 26-21</td>
</tr>
<tr>
<td>wpa2</td>
<td>Configures WPA2 encryption settings</td>
<td>page 26-22</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug ( config-if ) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
26.1.1 allowed-vlans

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, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>Parameter</th>
<th>Description</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>
<tr>
<td>add &lt;VLAN&gt;</td>
<td>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).</td>
</tr>
<tr>
<td>remove &lt;VLAN&gt;</td>
<td>Removes a single VLAN or a range of VLANs from the list of allowed VLANs.</td>
</tr>
</tbody>
</table>

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

*meshpoint-config-instance*

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, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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**

```
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)
```
26.1.3 control-vlan

Mesh management traffic can be sent over a dedicated VLAN. This dedicated VLAN is known as a control VLAN. This command configures a VLAN as the dedicated control VLAN.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
control-vlan <1-4094>

Parameters
- control-vlan <1-4094>

<table>
<thead>
<tr>
<th>control-vlan</th>
<th>Configures a VLAN as a dedicated carrier of mesh management traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-4094&gt;</td>
<td>The VLAN used as the control VLAN. The default is VLAN 1.</td>
</tr>
</tbody>
</table>

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.

Supported in the following platforms:
- Access Points — AP6522, AP6531, AP6562, AP71XX, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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|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 [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|mcs8-15|basic-mcs0-7)
```

**Parameters**

- **data-rates 2.4GHz**
  - b-only
    - Configures data rate for the meshpoint using 802.11b only rates.
  - bg
    - Configures data rate for the meshpoint using 802.11b and 802.11g rates.
  - default
    - Configures data rate for the meshpoint at a pre-configured default rate for this frequency.
  - g-only
    - Configures data rate for the meshpoint using 802.11g only rates.
  - gn
    - Configures data rate for the meshpoint using 802.11n rates.

- **data-rates 2.4GHz custom**
  - 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. Mesh points can communicate as long as they support the same basic MCS (as well as non-11n basic rates). The selected rates apply to associated client traffic within this mesh point only.
data-rates 5GHz [a-only|an|default]

<table>
<thead>
<tr>
<th>data-rates 5GHz</th>
<th>Configures the preset data rates for the 5.0 GHz frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>a-only</td>
<td>Configures the data rate for the meshpoint using 802.11a only rates</td>
</tr>
<tr>
<td>bn</td>
<td>Configures the data rate for the meshpoint using 802.11a and 802.11n rates</td>
</tr>
<tr>
<td>default</td>
<td>Configures the data rate for the meshpoint at a pre-configured default rate for this frequency</td>
</tr>
<tr>
<td>g-only</td>
<td>Configures the data rate for the meshpoint using 802.11g only rates</td>
</tr>
<tr>
<td>gn</td>
<td>Configures the data rate for the meshpoint using 802.11g and 802.11n rates</td>
</tr>
</tbody>
</table>

Note: Multiple choices can be made from the above list of rates

custom
(1|11|12|18|24|36|48|5.5|54|6|9|basic-1|basic-11|basic-12|basic-2|basic-18|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
- 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
- **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)

<table>
<thead>
<tr>
<th>data-rates 5GHz</th>
<th>Configures the preset data rates for the 5.0 GHz frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>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-11n basic rates). The selected rates apply to associated client traffic within this mesh point only.</td>
</tr>
</tbody>
</table>

| 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

<table>
<thead>
<tr>
<th>command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets data rates for each frequency band for this meshpoint</td>
</tr>
</tbody>
</table>
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, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

description <DESCRIPTION>

Parameters

- description <DESCRIPTION>

| description | Configures a description for this meshpoint |
| <DESCRIPTION> | The text describing this meshpoint |

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 |
26.1.6 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, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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 |
26.1.7 **neighbor**

```
>>> meshpoint-config-instance
This command configures the inactivity time out 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, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
neighbor inactivity-timeout <60-86400>
```

**Parameters**

- `neighbor inactivity-timeout <60-86400>`

<table>
<thead>
<tr>
<th>neighbor inactivity-timeout &lt;60-86400&gt;</th>
<th>Configures the neighbor inactivity timeout in seconds. This represents the allowed interval between frames received from a neighbor before their client privileges are revoked.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <code>&lt;60-86400&gt;</code> – Specify a value from 60 - 86400 seconds. The default is 120 seconds.</td>
</tr>
</tbody>
</table>

**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 time out value for this meshpoint
```
Negates meshpoint commands or resets their values to default

Supported in the following platforms:

- Access Points — AP6522, AP6532, AP6562, AP71XX, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
no [allowed-vlans|beacon-format|control-vlan|description|meshid|root|security-mode|shutdown]

no data-rates [2.4GHz|5GHz]
no neighbor inactivity-timeout
no use meshpoint-gos-policy

no wpa2 [key-rotation|psk]
no wpa2 key-rotation [broadcast|unicast]
no wpa2 psk

no service allow-ht-only
```

**Parameters**

- **no [allowed-vlans|beacon-format|control-vlan|description|meshid|root|security-mode|shutdown]**
  - **no allowed-vlans** Removes all VLANs from the allowed VLANs list
  - **no beacon-format** Resets the beacon format on this meshpoint to its default of meshpoint
  - **no control-vlan** Removes the configured control VLAN
  - **no description** Removes the defined description for this meshpoint
  - **no meshid** Removes the configured mesh id for this meshpoint
  - **no root** Removes the configuration of this meshpoint as a root meshpoint
  - **no security-mode** Removes the configuration of security mode to use on this meshpoint to its default of “none”
  - **no shutdown** Enables the use of this meshpoint

- **no data-rates [2.4GHz|5GHz]**
  - **no data-rates** Resets data rate configuration to its default
  - **2.4GHz** Resets data rate configuration for the 2.4 GHz radio
  - **5GHz** Resets data rate configuration for the 5.0 GHz radio

- **no neighbor inactivity-timeout**
  - **no neighbor** Resets the neighbor related configuration
  - **inactivity-timeout** Resets the inactivity timeout to its default
- **no use meshpoint-qos-policy**

  `no use meshpoint-qos-policy` resets the mesh-qos-policy to default mesh-qos-policy

- **no wpa2 key-rotation [broadcast|unicast]**

  `no wpa2 key-rotation` resets the WPA2 encryption key rotation configuration for this meshpoint

  - broadcast resets the WPA2 key rotation configured for broadcast packets to its default
  - unicast resets the WPA2 key rotation configured for unicast packets to its default

- **no wpq2 psk**

  `no wpq2 psk` removes the pre shared key configured for the meshpoint

- **no service allow-ht-only**

  `no service allow-ht-only` resets the restriction that only 802.11n capable neighbor devices can associate with this meshpoint

### Examples

```
rfs7000-37FABE(config-meshpoint-test)#show context
meshpoint test
description "This is an example of a meshpoint description"
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 MotorolaSolutions
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 MotorolaSolutions
  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 MotorolaSolutions
  wpa2 key-rotation unicast 1200
  wpa2 key-rotation broadcast 600
  no root
rfs7000-37FABE(config-meshpoint-test)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>allowed-vlans</td>
<td>Configures the VLANs allowed on the meshpoint</td>
</tr>
<tr>
<td>beacon-format</td>
<td>Configures the beacon format for the meshpoint AP</td>
</tr>
<tr>
<td>control-vlan</td>
<td>Configures the VLAN on which meshpoint control traffic traverses</td>
</tr>
<tr>
<td>data-rates</td>
<td>Configures the data rates supported per frequency band</td>
</tr>
<tr>
<td>description</td>
<td>Configures a human friendly description for this meshpoint</td>
</tr>
<tr>
<td>meshid</td>
<td>Configures a unique ID for this meshpoint</td>
</tr>
<tr>
<td>neighbor</td>
<td>Configures the neighbor inactivity time out for this meshpoint</td>
</tr>
<tr>
<td>root</td>
<td>Configures a meshpoint as the root meshpoint</td>
</tr>
<tr>
<td>security-mode</td>
<td>Configures the security mode to use on the meshpoint</td>
</tr>
<tr>
<td>service</td>
<td>Allows only 802.11n capable neighbors to create a mesh connection</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down the meshpoint</td>
</tr>
<tr>
<td>use</td>
<td>Configures using a QoS policy along with this meshpoint</td>
</tr>
<tr>
<td>wpa2</td>
<td>Configures WPA2 encryption settings</td>
</tr>
</tbody>
</table>
26.1.9 root

meshpoint-config-instance
Configs this meshpoint as the root meshpoint. Root meshpoints are generally tied to an Ethernet backhaul for wired connectivity.

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax
root

Parameters
None

Examples
rfs7000-37FABE(config-meshpoint-test)#root
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
root
rfs7000-37FABE(config-meshpoint-test)#

Related Commands

| no | Removes the configuration of this meshpoint as a root meshpoint |
26.1.10 security-mode

meshpoint-config-instance

Configures the security mode for this meshpoint

Supported in the following platforms:
- Access Points (as root APs only) — AP650, AP622
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP8132
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

security-mode [none|psk]

Parameters

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>security-mode</td>
<td>Configures the security mode for this meshpoint</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 wpa2 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

```
> 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)#
```

Related Commands

<table>
<thead>
<tr>
<th>command</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</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>
26.11 service

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, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

service [allow-ht-only|show cli]

Parameters

- service [allow-ht-only|show cli]

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 MotorolaSolutions
wpa2 key-rotation unicast 1200
wpa2 key-rotation broadcast 600
root

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
### 26.1.12 shutdown

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, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
shutdown
```

**Parameters**

None

**Examples**

```plaintext
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>
**26.1.13 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, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

`use meshpoint-qos-policy <MESHPOINT-QOS-POLICY-NAME>`

**Parameters**

- `use meshpoint-qos-policy <MESHPOINT-QOS-POLICY-NAME>`

<table>
<thead>
<tr>
<th>use meshpoint-qos-policy</th>
<th>Configures this meshpoint to use a predefined meshpoint QoS policy</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;MESHPOINT-QOS-POLICY-NAME&gt;</code></td>
<td>Defines the meshpoint QoS policy to use with this meshpoint</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
  use meshpoint-qos-policy test
rfs7000-37FABE(config-meshpoint-test)#
```

**Related Commands**

<table>
<thead>
<tr>
<th>no</th>
<th>Removes the meshpoint QoS policy associated with this meshpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>meshpoint-qos-policy-config-instance</td>
<td>Creates and configures a meshpoint QoS policy</td>
</tr>
</tbody>
</table>
**26.1.14 wpa2**

- `meshpoint-config-instance`

This command sets the pre-shared keys and key rotation duration.

Supported in the following platforms:

- Access Points — AP6522, AP6532, AP6562, AP71XX, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
wpa2 [psk|key-rotation]
wpa2 key-rotation [broadcast|unicast] <30-86400>
wpa2 psk [0 <SECRET>|2 <SECRET>|<SECRET>]
```

**Parameters**

- **wpa2 key-rotation [broadcast|unicast] <30-86400>**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>broadcast</td>
<td>Configures key rotation interval for broadcast packets</td>
</tr>
<tr>
<td></td>
<td>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>unicast</td>
<td>Configures key rotation interval for unicast packets</td>
</tr>
<tr>
<td>&lt;30-86400&gt;</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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>secret</td>
<td>Configures the PSK used to authenticate this meshpoint with other meshpoints in the network</td>
</tr>
<tr>
<td>0 &lt;SECRET&gt;</td>
<td>Configures a clear text secret</td>
</tr>
<tr>
<td>2 &lt;SECRET&gt;</td>
<td>Configures an encrypted secret</td>
</tr>
<tr>
<td>&lt;SECRET&gt;</td>
<td>Specify the secret key. The shared key should not exceed 127 characters.</td>
</tr>
</tbody>
</table>
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 MotorolaSolutions

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 MotorolaSolutions
  wpa2 key-rotation unicast 1200
  wpa2 key-rotation broadcast 600
  root

rfs7000-37FABE(config-meshpoint-test)#

Related Commands

| no | Resets PSK configuration and key rotation duration |
26.2 meshpoint-qos-policy-config-instance

Mesh Quality of Service (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:

```bash
<DEVICE>(config)#meshpoint-qos-policy <POLICYNAME>
```

```bash
rfs7000-37FABE(config)#meshpoint-qos-policy test
rfs7000-37FABE(config-meshpoint-qos-test)#
```

Mesh Point QoS Mode commands:
- `accelerated-multicast`: Configure accelerated multicast parameters.
- `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.

```bash
rfs7000-37FABE(config-meshpoint-qos-test)#
```

Table 26.2 summarizes the mespoint-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 26-26</td>
</tr>
<tr>
<td>no</td>
<td>Negates a command or reverts settings to their default</td>
<td>page 26-28</td>
</tr>
<tr>
<td>rate-limit</td>
<td>Configures the rate limits for this QoS policy</td>
<td>page 26-30</td>
</tr>
<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>end</td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td>exit</td>
<td>Ends the current mode and moves to the previous 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>revert</td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
</tbody>
</table>
### Table 26.2 Meshpoint-QoS-Policy Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>service</td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</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, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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>]</td>
</tr>
<tr>
<td>autodetect</td>
<td>Lets the system to automatically detect multicast streams to be accelerated</td>
</tr>
<tr>
<td></td>
<td>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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Resets accelerated multicast configurations for this meshpoint QoS policy</td>
</tr>
</tbody>
</table>
26.2.2 no

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, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

no [accelerated-multicast|rate-limit]

no accelerated-multicast [<MULTICAST-IP>|autodetect]
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 accelerated-multicast [<MULTICAST-IP>|autodetect]

  accelerated-multicast | Resets the accelerated multicast stream address and forwarding QoS classification
  <MULTICAST-IP> | Defines the IP address of the multicast stream to be reset
  autodetect | Lets the system automatically detect multicast streams to be reset

- no rate-limit [meshpoint|neighbor] [from-air|to-air] {max-burst-size|rate}

  meshpoint | Resets rate limit parameters for a meshpoint
  neighbor | Resets rate limit parameters for neighboring meshpoint devices
  from-air | Resets rate limit value for traffic from the wireless neighbor to the network.
  to-air | Resets the rate limit value for traffic from the network to the wireless neighbor.
  max-burst-size | Optional. Resets the maximum burst size in kilobytes
  rate | Optional. Configures the maximum traffic rate in kilobytes.

- no rate-limit [meshpoint|neighbor] [from-air|to-air] {red-threshold [background|
best-effort|video|voice]}

  meshpoint | Resets rate limit parameters for a meshpoint
  neighbor | Resets rate limit parameters for neighboring meshpoint devices
  from-air | Resets the rate limit value for traffic from the wireless neighbor to the network
  to-air | Resets the rate limit value for traffic from the network to the wireless neighbor
red-threshold

<table>
<thead>
<tr>
<th>red-threshold</th>
<th>Optional. Resets the random early detection (RED) threshold for traffic class. The options are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• background – Resets the threshold for low priority traffic</td>
</tr>
<tr>
<td></td>
<td>• best-effort – Resets the threshold for best effort traffic</td>
</tr>
<tr>
<td></td>
<td>• video – Resets the threshold for video traffic</td>
</tr>
<tr>
<td></td>
<td>• voice – Resets the threshold for voice traffic</td>
</tr>
</tbody>
</table>

**Examples**

```bash
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
```

```bash
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
```

```bash
rfs7000-37FABE(config-meshpoint-qos-test)#show context
meshpoint-qos-policy test
accelerated-multicast 224.0.0.1 classification video
```

```bash
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, consider defining 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, AP8132
- Access Points (as root APs only) — AP650, AP622
- Wireless Controllers — RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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> ]}

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. 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. 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. 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 the 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>]]**

<p>| <strong>meshpoint</strong> | Configures rate limit parameters for a meshpoint |
| <strong>neighbor</strong> | Configures rate limit parameters for neighboring meshpoint devices |
| <strong>from-air</strong> | Configures rate limits for traffic from the wireless neighbor to the network |
| <strong>to-air</strong> | Configures rate limit value for traffic from the network to the wireless neighbor |
| <strong>red-threshold</strong> | Optional. Configures random early detection threshold (RED threshold) for traffic class |
| <strong>background &lt;0-100&gt;</strong> | The following keyword is applicable to the ‘from-air’ and ‘to-air’ traffics. Configures the threshold for low priority (background) traffic. 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%. |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>best-effort &lt;0-100&gt;</code></td>
<td>Configures the threshold for best effort traffic. 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%.</td>
</tr>
<tr>
<td><code>video &lt;0-100&gt;</code></td>
<td>Configures the threshold for video traffic. 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%.</td>
</tr>
<tr>
<td><code>voice &lt;0-100&gt;</code></td>
<td>Configures the threshold for voice traffic. 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.</td>
</tr>
</tbody>
</table>

**Examples**

```bash
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Resets traffic rate limit settings for this meshpoint QoS policy</td>
</tr>
</tbody>
</table>
26.3 meshpoint-device-config-instance

Table 26.3 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, AP8132
- Access Points (as root APs only) — AP650, AP622

Syntax

meshpoint-device <MESHPOINT-NAME>

Parameters

- meshpoint-device <MESHPOINT-NAME>

Examples

rfs7000-37FABE(config)#profile ap71xx AP71XXTestProfile
rfs7000-37FABE(config-profile-AP71XXTestProfile)#meshpoint-device test
rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#af

rfs7000-37FABE(config-profile-AP71XXTestProfile-meshpoint-test)#af? 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)#af
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
26.3.2 meshpoint-device-commands

Table 26.4 lists the meshpoint-device configuration mode commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>acs</td>
<td>Enables <em>Automatic Channel Selection</em> (ACS) on this meshpoint device (access point)</td>
<td>page 26-38</td>
</tr>
<tr>
<td>exclude</td>
<td>Excludes neighboring mesh devices</td>
<td>page 26-42</td>
</tr>
<tr>
<td>hysteresis</td>
<td>Configures path selection SNR hysteresis values on this meshpoint-device (access point)</td>
<td>page 26-43</td>
</tr>
<tr>
<td>monitor</td>
<td>Enables monitoring of critical resource and primary port links on a meshpoint device</td>
<td>page 26-45</td>
</tr>
<tr>
<td>path-method</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>preferred</td>
<td>Configures the preferred path parameters for a meshpoint device</td>
<td>page 26-47</td>
</tr>
<tr>
<td>root</td>
<td>Configures a meshpoint device as the root meshpoint</td>
<td>page 26-48</td>
</tr>
<tr>
<td>root-select</td>
<td>Configures this meshpoint device as the cost root</td>
<td>page 26-50</td>
</tr>
<tr>
<td>no</td>
<td>Negates the commands for a meshpoint device or resets values to default</td>
<td>page 26-51</td>
</tr>
</tbody>
</table>
26.3.2.1 acs

*meshpoint-device-commands*

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, AP8132
- Access Points (as root APs only) — AP650, AP622

**Syntax**

acs [channel-hold-time|channel-switch-delta|channel-width|ocs-duration|ocs-frequency|path-min|path-threshold|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|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 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>

<table>
<thead>
<tr>
<th>acs</th>
<th>Configures ACS settings and overrides on the selected meshpoint-device</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-hold-time [2.4GHz</td>
<td>5GHz] &lt;0-86400&gt;</td>
</tr>
<tr>
<td></td>
<td>• 2.4 GHz — Configures the channel hold interval for the 2.4 GHz radio band</td>
</tr>
<tr>
<td></td>
<td>• 5.0 GHz — Configures the channel hold interval for the 5.0 GHz radio band</td>
</tr>
</tbody>
</table>

The following keyword is common to the ‘2.4 GHz’ and ‘5.0 GHz’ bands:
- <0-86400> — Specify a value from 0 - 86400 seconds. The default is 1800 seconds.

**Note:** A value of ‘0’ disables periodic channel assessment.
### acs channel-switch-delta [2.4GHz|5GHz] <5-35>

| acs channel-switch-delta [2.4GHz|5GHz] <5-35> | Configures ACS settings and overrides on the selected meshpoint-device |
|---------------------------------------------|---------------------------------------------------------------------|
| channel-switch-delta [2.4GHz|5GHz] <5-35> | 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. |
| 2.4 GHz – Configures the channel switch delta for the 2.4GHz radio band |
| 5.0GHz – Configures the channel switch delta for the 5.0 GHz radio band |
| The following keyword is common to the '2.4 GHz' and '5.0 GHz' bands: |
| <5-35> – Specify a value from 5 - 35 dBm. The default is 10 dBm. |

### acs channel-width [2.4GHz|5GHz] [20MHz|40MHz|auto]

| acs channel-width [2.4GHz|5GHz] [20MHz|40MHz|auto] | Configures ACS settings and overrides on the selected meshpoint-device |
|------------------------------------------------|---------------------------------------------------------------------|
| channel-width [2.4GHz|5GHz] [20MHz|40MHz|auto] | Configures the channel width that meshpoint auto channel selection assigns to the radio |
| 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 |
| auto – Selects and assigns the best possible channel from the 20/40 MHz width. This is the default setting. |

### acs ocs-duration [2.4GHz|5GHz] <20-250>

| acs ocs-duration [2.4GHz|5GHz] <20-250> | Configures ACS settings and overrides on the selected meshpoint-device |
|------------------------------------------|---------------------------------------------------------------------|
| ocs-duration [2.4GHz|5GHz] <20-250> | Configures the duration, in milliseconds, of off-channel scans (OCSs) |
| 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>

| acs ocs-frequency [2.4GHz|5GHz] <1-60> | Configures ACS settings and overrides on the selected meshpoint-device |
|------------------------------------------|---------------------------------------------------------------------|
| ocs-frequency [2.4GHz|5GHz] <1-60> | Configures the interval, in seconds, at which off-channel scan is performed. An ocs-frequency of 10 seconds means that an off-channel scan will be performed once every 10 seconds. |
| 2.4 GHz – Configures the ocs-frequency for the 2.4 GHz radio band |
| 5.0 GHz – Configures the ocs-frequency for the 5.0 GHz radio band |
| The following keyword is common to the '2.4 GHz' and '5.0 GHz' bands: |
| <1-60> – Specify a value form 1 - 60 seconds. The default is 6 seconds. |
- **acs path-min [2.4GHz|5GHz] <100-20000>**
  - **acs** Configures ACS settings and overrides on the selected meshpoint-device
  - **path-min [2.4GHz|5GHz] <100-20000>** Configures the minimum root path metric needed for auto channel selection. This is the acceptance root path metric value to consider a root as a possible candidate mesh node.
    - **2.4 GHz** – Configures the minimum root path metric for the 2.4 GHz radio band
    - **5.0 GHz** – Configures the minimum root path metric for the 5.0 GHz radio band
  The following keyword is common to the ‘2.4 GHz’ and ‘5.0 GHz’ bands:
    - **<100-20000>** – Specify a value from 100 - 20000. The default is 1000.

- **acs path-threshold [2.4GHz|5GHz] <800-65535>**
  - **acs** Configures ACS settings and overrides on the selected meshpoint-device
  - **path-threshold [2.4GHz|5GHz] <800-65535>** Configures the root path metric threshold for auto channel selection. This is the acceptance root path metric threshold beyond which the root bound to is considered as bad.
    - **2.4 GHz** – Configures the root path metric threshold for the 2.4 GHz radio band
    - **5.0 GHz** – Configures the root path metric threshold for the 5.0 GHz radio band
  The following keyword is common to the ‘2.4 GHz’ and ‘5.0 GHz’ bands:
    - **<800-65535>** – Specify a value from 800 -65535. The default is 1500.

- **acs priority-meshpoint [2.4GHz|5GHz] <MESHPOINT-NAME>**
  - **acs** Configures ACS settings and overrides on the selected meshpoint-device
  - **priority-meshpoint [2.4GHz|5GHz] <MESHPOINT-NAME>** 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** Configures ACS settings and overrides on the selected meshpoint-device
  - **sample-count [2.4GHz|5GHz] <1-10>** 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** Configures ACS settings and overrides on the selected meshpoint-device
snr-delta [2.4GHz|5GHz] <1-100>

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 Configures ACS settings and overrides on the selected meshpoint-device

signal-threshold [2.4GHz|5GHz] <-100-0>

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:
- <1-100> – Specify a value from -100 - 0 dB. The default is -65 dB.

acs tolerance-period [2.4GHz|5GHz] <10-600>

acs Configures ACS settings and overrides on the selected meshpoint-device

tolerance-period [2.4GHz|5GHz] <10-600>

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)#

rfs4000-229D58 (config-profile-testAP71XX-meshpoint-test)#acs ocs-duration 2.4GHz 30
rfs4000-229D58 (config-profile-testAP71XX-meshpoint-test)#

rfs4000-229D58 (config-profile-testAP71XX-meshpoint-test)#acs ocs-frequency 2.4GHz 1
rfs4000-229D58 (config-profile-testAP71XX-meshpoint-test)#

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

no

Reverts the configured ACS settings to default
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, AP8132
- 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 MiNT level-1 link</td>
</tr>
<tr>
<td>When enabled, all neighboring wired mesh devices are excluded from mesh links.</td>
<td></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)#
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, AP8132
- Access Points (as root APs only) — AP650, AP622

**Syntax**

```
hysteresis [min-threshold|period|root-sel-snr-delta|snr-delta]
```

```
<-
```

**Parameters**

- **hysteresis [min-threshold <100-0>|period <0-600>|root-sel-snr-delta <1-100>|snr-delta <1-100>]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>min-threshold &lt;100-0&gt;</td>
<td>Configures the minimum signal strength that a device should have to be considered a likely candidate in the mesh route (to the mesh root node) selection process.</td>
</tr>
<tr>
<td>period &lt;0-600&gt;</td>
<td>Configures the interval, in seconds, for which a likely candidate's path method hysteresis is sustained. In other words a device capable of sustaining the signal strength for the specified period of time is a likely candidate in the mesh route (to the mesh root node) selection process.</td>
</tr>
<tr>
<td>root-sel-snr-delta &lt;1-100&gt;</td>
<td>Configures the signal strength, in dB, that a device has to sustain, within the delta range, to be considered a likely candidate in the mesh route (to the mesh root node) selection process.</td>
</tr>
<tr>
<td>snr-delta &lt;1-100&gt;</td>
<td>Configures the SNR delta. The device with must have a SNR of a greater delta than its current neighbor to be considered a likely candidate in the mesh route (to the mesh root) selection process.</td>
</tr>
</tbody>
</table>

**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
```
rfs4000-229D58(config-profile-testAP71XX-meshpoint-test)#show context
  meshpoint-device test
    hysteresis period 15
    hysteresis snr-delta 3
    hysteresis min-threshold -65
    hysteresis root-sel-snr-delta 12
rfs4000-229D58(config-profile-testAP71XX-meshpoint-test)#

Related Commands

<table>
<thead>
<tr>
<th><strong>no</strong></th>
<th>Removes the configured path selection SNR hysteresis values</th>
</tr>
</thead>
</table>
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, AP8132
- Access Points (as root APs only) — AP650, AP622

Syntax

monitor [critical-resource|primary-port-link-loss]
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</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, AP8132
- 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)#

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, AP8132
- 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]]

| preferred | Configures the preferred path parameters |
| neighbor <MAC> | Adds the MAC address of a neighbor meshpoint as a preferred neighbor |
| root <MAC> | Adds the MAC address of a root meshpoint as a preferred root |
| interface [2.4GHz|4.9GHz|5GHz] | Sets the preferred interface |

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, AP8132
- 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>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>root</td>
<td>Configures this meshpoint device as the root meshpoint.</td>
</tr>
<tr>
<td>select-method auto-mint</td>
<td>Optional. Enables or disables dynamic mesh selection. When enabled, this option overrides root or no-root configuration and chooses the selection method.</td>
</tr>
</tbody>
</table>

- auto-mint – Enables dynamic root selection using Auto-MiNT (based on path cost)

**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)#
```
ap7131-11E6C4(config-device-00-23-68-11-E6-C4-meshpoint-test)#root select-method auto-mint

ap7131-11E6C4(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>
26.3.2.8 root-select

meshpoint-device-commands

Configures this meshpoint device as the cost root

Supported in the following platforms:
- Access Points — AP6522, AP6532, AP6562, AP71XX, AP8132
- Access Points (as root APs only) — AP650, AP622

Syntax
root-select cost-root

Parameters
- root-select cost-root

| root-select cost-root | Configures this meshpoint device as the cost root. This is necessary for dynamic root selection process. Select this option to set the meshpoint as the cost root for meshpoint root selection. This setting is disabled by default. |

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
- no | Removes this meshpoint-device as the cost-root
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, AP8132
- 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|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 acs [channel-hold-time|channel-switch-delta|channel-width|ocs-duration|ocs-frequency|path-min|path-threshold|priority-meshpoint|sample-count|snr-delta|signal-threshold|tolerance-period] [2.4GHZ|5GHz]

no acs

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel-hold-time</td>
<td>Reverts channel hold time to default (1800 seconds)</td>
</tr>
<tr>
<td>channel-switch-delta</td>
<td>Reverts channel switch delta to default (10 dBm)</td>
</tr>
<tr>
<td>channel-width</td>
<td>Reverts channel width to default (auto)</td>
</tr>
<tr>
<td>ocs-duration</td>
<td>Reverts off-channel scan duration to default (50 milliseconds)</td>
</tr>
<tr>
<td>ocs-frequency</td>
<td>Reverts off-channel scan frequency to default (6 seconds)</td>
</tr>
<tr>
<td>path-min</td>
<td>Reverts the minimum root path metric to default (1000)</td>
</tr>
<tr>
<td>path-threshold</td>
<td>Reverts the root path metric threshold to default (1500)</td>
</tr>
<tr>
<td>priority-meshpoint</td>
<td>Disables the priority meshpoint configuration</td>
</tr>
<tr>
<td>sample-count</td>
<td>Reverts the sample count to default (5 samples)</td>
</tr>
<tr>
<td>snr-delta</td>
<td>Reverts the channel SNR delta to default (5 db)</td>
</tr>
<tr>
<td>signal-threshold</td>
<td>Reverts the signal strength threshold to default (-65 dB)</td>
</tr>
<tr>
<td>tolerance-period</td>
<td>Reverts the tolerance period to default (60 seconds)</td>
</tr>
</tbody>
</table>

- no exclude wired-peer mint-level-1

no exclude wired-peer

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>disable exclusion</td>
<td>Disables exclusion of wired peers (wired mesh devices) with MiNT level-1 link</td>
</tr>
</tbody>
</table>
- **no hysteresis** [min-threshold|period|root-sel-snr-delta|snr-delta]
  
  **no** hysteresis [min-threshold|period|root-sel-snr-delta|snr-delta]
  
  Removes the configured path selection SNR hysteresis values

- **no monitor** [critical-resource|primary-port-link-loss]
  
  no monitor [critical-resource|primary-port-link-loss]
  
  Disables critical resource down event monitoring

- **no root select-method**
  
  no root select-method
  
  Removes the configuration of this meshpoint device as a root meshpoint. Also allows you to disable dynamic mesh selection (if enabled).

- **no path-method**
  
  no path-method
  
  Resets the path selection method (path to the root node) to default (uniform)

- **no root-select cost-root**
  
  no root-select cost-root
  
  Removes the selected meshpoint-device as the cost-root

- **no preferred** [interface|root|neighbor]
  
  no preferred [interface|root|neighbor]
  
  Resets the preferred path configuration

  Interface
  
  Resets the preferred interface

  Root
  
  Resets the preferred root to none

  Neighbor
  
  Resets the preferred neighbor to none

**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 5.6 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)#
```
27.1 passpoint-policy

Table 27.1 summarizes passpoint policy configuration mode commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3gpp</strong></td>
<td>Configures a 3rd Generation Partnership Project (3GPP) Public Land Mobile Network (PLMN) ID</td>
<td>page 27-5</td>
</tr>
<tr>
<td><strong>access-network-type</strong></td>
<td>Configures the access network type element in this hotspot</td>
<td>page 27-6</td>
</tr>
<tr>
<td><strong>connection-capability</strong></td>
<td>Configures the connection capability element in this passpoint policy</td>
<td>page 27-7</td>
</tr>
<tr>
<td><strong>domain-name</strong></td>
<td>Configures the RF Domains to which this hotspot is applicable</td>
<td>page 27-9</td>
</tr>
<tr>
<td><strong>hessid</strong></td>
<td>Configures the Homogeneous Extended Service Set Identifier (HESSID) for a specified hotspot zone</td>
<td>page 27-10</td>
</tr>
<tr>
<td><strong>internet</strong></td>
<td>Advertises the availability of Internet access in this hotspot</td>
<td>page 27-11</td>
</tr>
<tr>
<td><strong>ip-address-type</strong></td>
<td>Advertises the IP address type used in this hotspot.</td>
<td>page 27-12</td>
</tr>
<tr>
<td><strong>nai-realm</strong></td>
<td>Configures a Network Access Identifier (NAI) realm name and enters its configuration mode</td>
<td>page 27-14</td>
</tr>
<tr>
<td><strong>net-auth-type</strong></td>
<td>Configures the network authentication type used in this hotspot</td>
<td>page 27-20</td>
</tr>
<tr>
<td><strong>no</strong></td>
<td>Removes or reverts passpoint policy configuration</td>
<td>page 27-21</td>
</tr>
<tr>
<td><strong>operator</strong></td>
<td>Configures the operator friendly name for this hotspot</td>
<td>page 27-23</td>
</tr>
<tr>
<td><strong>osu</strong></td>
<td>Configures an online sign up (OSU) SSID/provider and enters its configuration mode</td>
<td>page 27-24</td>
</tr>
<tr>
<td><strong>pfroam-consortium</strong></td>
<td>Configures the list of Roaming Consortium Organization Identifiers (OIs) supported on this hotspot</td>
<td>page 27-35</td>
</tr>
<tr>
<td><strong>venue</strong></td>
<td>Configures the venue group and type for this passpoint policy</td>
<td>page 27-36</td>
</tr>
<tr>
<td><strong>wan-metrics</strong></td>
<td>Configures the WAN performance metrics for this hotspot</td>
<td>page 27-40</td>
</tr>
<tr>
<td><strong>clrscr</strong></td>
<td>Clears the display screen</td>
<td>page 5-3</td>
</tr>
<tr>
<td><strong>commit</strong></td>
<td>Commits (saves) changes made in the current session</td>
<td>page 5-4</td>
</tr>
<tr>
<td><strong>end</strong></td>
<td>Ends and exits the current mode and moves to the PRIV EXEC mode</td>
<td>page 4-117</td>
</tr>
<tr>
<td><strong>exit</strong></td>
<td>Ends the current mode and moves to the previous mode</td>
<td>page 5-5</td>
</tr>
<tr>
<td><strong>help</strong></td>
<td>Displays the interactive help system</td>
<td>page 5-6</td>
</tr>
<tr>
<td><strong>revert</strong></td>
<td>Reverts changes to their last saved configuration</td>
<td>page 5-14</td>
</tr>
<tr>
<td><strong>service</strong></td>
<td>Invokes service commands to troubleshoot or debug (config-if) instance configurations</td>
<td>page 5-15</td>
</tr>
</tbody>
</table>
Table 27.1 Hotspot-Policy-Config Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>show</td>
<td>Displays running system information</td>
<td>page 6-5</td>
</tr>
<tr>
<td>write</td>
<td>Writes information to memory or terminal</td>
<td>page 5-50</td>
</tr>
</tbody>
</table>
27.1.1 3gpp

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, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

Syntax
3gpp mcc <MOBILE-COUNTRY-CODE> mnc <MOBILE-NETWORK-CODE> {description <LINE>}

Parameters
- 3gpp <1-20> 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 &lt;MOBILE-COUNTRY-CODE&gt;</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 &lt;MOBILE-NETWORK-CODE&gt;</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). Note: 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)#

rfs4000-229D58(config-passpoint-policy-test)#3gpp mcc 310 mnc 970
rfs4000-229D58(config-passpoint-policy-test)#

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

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, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

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]

access-network-type

Select the access network type for this hotspot. The options are:
- chargeable-public – The network type is a chargeable public network
- emergency-services – The network is used to provide emergency services only
- experimental – The network is used for test or experimental purposes only
- free-public – The network type is a free public
- personal-device – The network is used for personal devices only
- private – The network is a private network
- private-guest – The network is a private network with guest access (default setting)
- wildcard – Includes all access network types

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)#

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

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, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

**Syntax**

```
connection-capability [ftp|http|icmp|ipsec-vpn|pptp-vpn|sip|ssh|tls-vpn]  
connection-capability [ftp|http|icmp|ipsec-vpn|pptp-vpn|sip|ssh|tls-vpn]  
[open|closed|unknown]

connection-capability ip-protocol <0-255> port <0-65535> [open|closed|unknown]
```

**Parameters**

- **connection-capability [ftp|http|icmp|ipsec-vpn|pptp-vpn|sip|ssh|tls-vpn]**
- **connection-capability [ftp|http|icmp|ipsec-vpn|pptp-vpn|sip|ssh|tls-vpn]**
  - 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.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ftp</td>
<td>Specifies the protocol type as FTP. Configures TCP port 20.</td>
</tr>
<tr>
<td>http</td>
<td>Specifies the protocol type as HTTP. Configures TCP port 80.</td>
</tr>
<tr>
<td>icmp</td>
<td>Specifies the protocol type as ICMP</td>
</tr>
<tr>
<td>ipsec-vpn</td>
<td>Specifies the protocol type as IPSEC VPN. Configures ESP and UDP ports 500 and 4500.</td>
</tr>
<tr>
<td>pptp-vpn</td>
<td>Specifies the protocol type as PPTP VPN. Configures TCP port 1723.</td>
</tr>
<tr>
<td>sip</td>
<td>Specifies the protocol type as SIP. Configures TCP port 5060 and UDP port 5060.</td>
</tr>
<tr>
<td>ssh</td>
<td>Specifies the protocol type as SSH. Configures TCP port 20</td>
</tr>
<tr>
<td>tls-vpn</td>
<td>Specifies the protocol type as TLS VPN. Configures TCP port 443.</td>
</tr>
<tr>
<td>port &lt;0-65535&gt;</td>
<td>After specifying the protocol type, specify the port (associated with the selected protocol) and its status.</td>
</tr>
<tr>
<td>[open</td>
<td>closed</td>
</tr>
</tbody>
</table>

- **connection-capability ip-protocol <0-255> port <0-65535> [open|closed|unknown]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip-protocol &lt;0-255&gt;</td>
<td>Identifies the IP protocol by the protocol’s number. For example, for simple message protocol (SMP) specify 121.</td>
</tr>
<tr>
<td>port &lt;0-65535&gt;</td>
<td>After specifying the IP protocol type, specify the port number.</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>[closed</td>
<td>open</td>
</tr>
<tr>
<td></td>
<td>After specifying the port number, specify the port status.</td>
</tr>
<tr>
<td></td>
<td>• closed – Specifies that the port(s) is/are closed</td>
</tr>
<tr>
<td></td>
<td>• open – Specifies that the port(s) is/are open</td>
</tr>
<tr>
<td></td>
<td>• unknown – Specifies that the port(s) status is not known</td>
</tr>
</tbody>
</table>

**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.

**Examples**

```
rfs4000-229D58(config-passpoint-policy-test)#connection-capability 1 ip-protocol 2 port 10 closed
rfs4000-229D58(config-passpoint-policy-test)#
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**

| no | Removes the configured connection capability element on the passpoint policy |
27.1.4 **domain-name**

- **passpoint-policy**

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, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

**Syntax**

```
domain-name <DOMAIN-NAME>
```

**Parameters**

- `domain-name <DOMAIN-NAME>`

**Examples**

```
rfs4000-229D58(config-passpoint-policy-test)#domain-name TechPubs
rfs4000-229D58(config-passpoint-policy-test)#
```

```
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**

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 behaviour. 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, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

**Syntax**

```
hessid <MAC>
```

**Parameters**

- `hessid <MAC>`

<table>
<thead>
<tr>
<th>hessid &lt;MAC&gt;</th>
<th>Specify a unique 6 (six) byte identifier for this passpoint policy.</th>
</tr>
</thead>
</table>

**Examples**

```
rfs4000-229D58 (config-passpoint-policy-test)#hessid 00-23-68-88-0D-A7
rfs4000-229D58 (config-passpoint-policy-test)#

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, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

**Syntax**

```plaintext
internet
```

**Parameters**

None

**Examples**

```plaintext
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><strong>no</strong></td>
<td>Removes Internet access on this passpoint policy</td>
</tr>
</tbody>
</table>
27.1.7 ip-address-type

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 — AP300, AP621, AP622, AP650, ES6510, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```plaintext
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 ipv4** Configures the IPv4 address type availability information
  - **double-nat** Specifies double NATed private IPv4 address is available
  - **not-available** Specifies IPv4 address is not available
  - **port-restricted** Specifies port-restricted IPv4 address is available
  - **port-restricted-double-nat** Specifies port-restricted IPv4 address and double NATed IPv4 address is available
  - **port-restricted-single-nat** Specifies port-restricted IPv4 address and single NATed IPv4 address is available
  - **public** Specifies public IPv4 address is available
  - **single-nat** Specifies single NATed IPv4 address is available
  - **unknown** Specifies no information configured regarding the IPv4 address availability

- **ip-address-type ipv6 [available|not-available|unknown]**
  - **ip-address-type ipv6** Configures the IPv6 address type availability information
  - **available** Specifies IPv6 address is available
  - **not-available** Specifies IPv6 address is not available
  - **unknown** Specifies no information configured regarding the IPv6 address availability
Examples

```
rfs4000-229D58(config-passpoint-policy-test)#ip-address-type ipv6 available
rfs4000-229D58(config-passpoint-policy-test)#
```

```
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the IP address type configured for this passpoint policy</td>
</tr>
</tbody>
</table>
```
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.

Table 27.2 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 27-15</td>
</tr>
<tr>
<td>nai-realm-config-mode commands</td>
<td>Invokes the NAI realm configuration mode commands</td>
<td>page 27-17</td>
</tr>
</tbody>
</table>
27.1.8.1 nai-realm

- **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, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

**Syntax**

```
nai-realm <HOTSPOT2-NAI-REALM-NAME>
```

**Parameters**

- `nai-realm <HOTSPOT2-NAI-REALM-NAME>`

**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.testrealm.com
rfs4000-229D58(config-passpoint-policy-test-nai-realm-mail.testrealm.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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the NAI realm name configured for this passpoint policy</td>
</tr>
</tbody>
</table>
27.1.8.2 nai-realm-config-mode commands

Table 27.3 summarizes NAI realm configuration mode commands.

Table 27.3 NAI-Realm-Config-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 Extensible Authentication Protocol (EAP) authentication</td>
<td>page 27-18</td>
</tr>
<tr>
<td></td>
<td>mechanisms supported by each of the service providers associated with this</td>
<td></td>
</tr>
<tr>
<td></td>
<td>passpoint policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></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, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

#### 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]
```

#### Parameters

- **eap-method <1-10>**
  - `<1-10>` — Specify an identifier for this EAP method from 1 - 10.
  - **Note:** A maximum of 10 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)

- **tls**
  - Specifies the EAP authentication method type as *Transport Layer Security* (TLS)
### 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)#

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)#

rfs4000-229D58(config-passpoint-policy-test-nai-realm-mail.example.com)#eap-method 3
otp auth-param credential username-password
rfs4000-229D58(config-passpoint-policy-test-nai-realm-mail.example.com)#

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)#
```

```
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
rfs4000-229D58(config-passpoint-policy-test-nai-realm-mail.example.com)#
```
### 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, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

**Syntax**

```
net-auth-type [accept-terms|dns-redirect|http-redirect|online-enroll] {url <URL>}
```

**Parameters**

- `net-auth-type [accept-terms|dns-redirect|http-redirect|online-enroll] {url <URL>}`

<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.</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**

```
rfs4000-229D58(config-passpoint-policy-test)#net-auth-type accept-terms url "www.zebra.com"
rfs4000-229D58(config-passpoint-policy-test)#
```

```
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 ttl 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.zebra.com
3gpp mcc 310 mnc 970
3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#
```

**Related Commands**

```
no
```

Removes the network authentication type configured with this passpoint policy.
27.1.10 no

Removes or reverts the passpoint policy settings

Supported in the following platforms:

- Access Points — AP621, AP622, AP650, AP6511, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

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 [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]

<table>
<thead>
<tr>
<th>no 3gpp</th>
<th>Removes the specified 3GPP PLMN ID and its corresponding MCC/MNC settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>no access-network-type</td>
<td>Reverts to the default access network type setting (private)</td>
</tr>
<tr>
<td>no connection-capability</td>
<td>Removes the configured connection capability element on the hotspot</td>
</tr>
<tr>
<td>no domain-name</td>
<td>Removes the RF Domain mapped to the hotspot</td>
</tr>
<tr>
<td>no hessid</td>
<td>Removes the HESSID configured on the hotspot and reverts back to using the radio’s BSSID</td>
</tr>
<tr>
<td>no internet</td>
<td>Removes Internet access on this hotspot</td>
</tr>
<tr>
<td>no ip-address-type</td>
<td>Removes the IP address type applicable on this hotspot</td>
</tr>
<tr>
<td>no nai-realm</td>
<td>Removes the NAI realm name configured for this hotspot</td>
</tr>
<tr>
<td>no net-auth-type</td>
<td>Removes the network authentication type configured with this hotspot</td>
</tr>
<tr>
<td>no operator</td>
<td>Removes the operator friendly name configured for this hotspot</td>
</tr>
<tr>
<td>no osu</td>
<td>Removes the online sign up WLAN/provider configured for this passpoint</td>
</tr>
<tr>
<td>no roam-consortium</td>
<td>Removes the Roaming Consortium OIs supported on this hotspot</td>
</tr>
<tr>
<td>no venue</td>
<td>Removes the venue group and type configured with this hotspot</td>
</tr>
<tr>
<td>no wan-metrics</td>
<td>Removes the WAN metrics configuration on this hotspot</td>
</tr>
</tbody>
</table>

Examples

The following example shows the passpoint policy ‘test’ settings before the ‘no’ commands are executed:

```
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.zebra.com
3gpp mcc 310 mnc 970
3gpp mcc 505 mnc 14
rfs4000-229D58(config-passpoint-policy-test)#

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 mai.testrealm.com
  net-auth-type accept-terms url www.zebra.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, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

**Syntax**

```
operator name [<OPERATOR-NAME>|iso-lang <ISO-LANG-CODE>]
operator name <OPERATOR-NAME>
operator name iso-lang <ISO-LANG-CODE> <OPERATOR-NAME>
```

**Parameters**

- `name <OPERATOR-NAME>`: Configures the operator's name in English
  - `<OPERATOR-NAME>` – Specify the operator friendly name in ASCII format.

- `operator name iso-lang <ISO-LANG-CODE> <OPERATOR-NAME>`: Configures a non-English operator’s 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’)
  - `<OPERATOR-NAME>` – Specifies the operator’s name as a hexadecimal code

**Examples**

```
rfs4000-229D58(config-passpoint-policy-test)#operator name emergencieservices
rfs4000-229D58(config-passpoint-policy-test)#
```

```
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.zebra.com
  operator name emergencieservices
  3gpp 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 **osu**

Table 27.4 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 <em>online sign up</em>(OSU) SSID/provider and enters its configuration mode</td>
<td>page 27-25</td>
</tr>
<tr>
<td>osu-config-mode</td>
<td>Summarizes the OSU SSID/provider configuration mode commands</td>
<td>page 27-26</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, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

**Syntax**

```osu [provider <PASSPOINT-OSU-PROVIDER>|ssid <SSID>]```

**Parameters**

- **osu [provider <PASSPOINT-OSU-PROVIDER>|ssid <SSID>]**
  - **provider <PASSPOINT-OSU-PROVIDER>** — Creates an OSU provider for this passpoint and enters its configuration mode
  - **<PASSPOINT-OSU-PROVIDER>** – Specify an identification for this OSU passpoint provider.
  - **ssid <SSID>** — Configures an OSU WLAN’s SSID. This is the open authentication SSID that a user can use to obtain credentials for the passpoint SSID.
    - **<SSID>** – Specify the SSID.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>osu</td>
<td>Use this command to configure an online sign up (OSU) SSID/OSU provider. In the OSU SSID/provider configuration mode, specify OSU details, such as names, descriptions, servers, methods, and icons available. This information is returned in response to a station’s Hotspot 2.0 query. When configured, this option enables a station to obtain credentials for an Hotspot 2.0 enabled SSID.</td>
</tr>
<tr>
<td>provider &lt;PASSPOINT-OSU-PROVIDER&gt;</td>
<td>Creates an OSU provider for this passpoint and enters its configuration mode</td>
</tr>
<tr>
<td>ssid &lt;SSID&gt;</td>
<td>Configures an OSU WLAN’s SSID. This is the open authentication SSID that a user can use to obtain credentials for the passpoint SSID.</td>
</tr>
</tbody>
</table>

**Examples**

```
x9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#
x9500-6C8809(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** — 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 configuration to memory or terminal

```
x9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#
```

**Related Commands**

- **no** — Removes the OSU WLAN/provider configured with this passpoint policy
### 27.1.12.2 osu-config-mode commands

#### osu

Table 27.5 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 27-27</td>
</tr>
<tr>
<td>icon</td>
<td>Adds the OSU provider’s icon</td>
<td>page 27-28</td>
</tr>
<tr>
<td>method</td>
<td>Configures the open sign up methods available on this OSU</td>
<td>page 27-29</td>
</tr>
<tr>
<td>nai</td>
<td>Configures the OSU provider’s NAI</td>
<td>page 27-30</td>
</tr>
<tr>
<td>name</td>
<td>Configures the OSU provider’s name</td>
<td>page 27-31</td>
</tr>
<tr>
<td>no</td>
<td>Removes the settings configured for this OSU provider</td>
<td>page 27-32</td>
</tr>
<tr>
<td>server-url</td>
<td>Configures the OSU provider server’s URL</td>
<td>page 27-34</td>
</tr>
</tbody>
</table>
### 27.12.2.1 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, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

**Syntax**
```
description [<DESCRIPTION>|iso-lang <ISO-LANG-CODE>]
```

**Parameters**
- **description [<DESCRIPTION>|iso-lang <ISO-LANG-CODE>]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;DESCRIPTION&gt;</code></td>
<td>Provides a description for the OSU provider. It should not exceed 253 characters in length.</td>
</tr>
<tr>
<td>iso-lang <code>&lt;ISO-LANG-CODE&gt;</code></td>
<td>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.</td>
</tr>
</tbody>
</table>

**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
27.1.12.2.2 icon

Adds the OSU provider’s icon. 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, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

Syntax
icon iso-lang <ISO-LANG-CODE> width <0-65535> height <0-65535> mime-type <FILE-MIME-TYPE> file [<IMAGE-FILE-NAME/PATH>|<FILE-NAME>]

Parameters
- icon iso-lang <ISO-LANG-CODE> width <0-65535> height <0-65535> mime-type <FILE-MIME-TYPE> file [<IMAGE-FILE-NAME/PATH>|<FILE-NAME>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>iso-lang &lt;ISO-LANG-CODE&gt;</td>
<td>Configures an icon representing the OSU provider. This parameter 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.</td>
</tr>
<tr>
<td>width &lt;0-65535&gt;</td>
<td>Configures the icon’s width in pixels. This parameter specifies a value from 0 - 65535 pixels.</td>
</tr>
<tr>
<td>height &lt;0-65535&gt;</td>
<td>Configures the icon’s height in pixels. This parameter specifies a value from 0 - 65535 pixels.</td>
</tr>
<tr>
<td>mime-type &lt;FILE-MIME-TYPE&gt;</td>
<td>Configures a string describing the icon’s standard mime type. For example, image/png. This parameter specifies the icon’s mime type.</td>
</tr>
<tr>
<td>file [&lt;IMAGE-FILE-NAME/PATH&gt;</td>
<td>&lt;FILE-NAME&gt;]</td>
</tr>
</tbody>
</table>

Examples

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

Related Commands

no

Removes this OSU provider’s icon
27.12.2.3 method

Osu-config-mode commands

Configures the online sign up methods supported by 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, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

Syntax

```
method [oma-dm|soap-xml-spp] priority <1-2>
```

Parameters

- method [oma-dm|soap-xml-spp] priority <1-2>

<table>
<thead>
<tr>
<th>method [oma-dm] soap-xml-spp priority &lt;1-2&gt;</th>
<th>Configures the online sign up methods supported by this OSU provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>oma-dm — Configures the OSU method used as Open Mobile Alliance (OMA) device management</td>
<td></td>
</tr>
<tr>
<td>soap-xml-spp — Configures the OSU method used as Soap-xml subscription provisioning protocol</td>
<td></td>
</tr>
<tr>
<td>priority &lt;1-2&gt; — Sets the priority of the specified method. Select a value from 1 - 2. The default is one (1).</td>
<td></td>
</tr>
</tbody>
</table>

Examples

```
nx9500-6C8809(config-passpoint-policy-test-osu-provider-WiFi)#method soap-xml-spp priority 1
```

```
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
27.12.2.4 nai

Uses 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, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

Syntax
nai <WORD>

Parameters
- nai <WORD>

<table>
<thead>
<tr>
<th align="center">nai &lt;WORD&gt;</th>
<th align="left">Configures the OSU provider’s NAI</th>
</tr>
</thead>
<tbody>
<tr>
<td align="center">&lt;WORD&gt;</td>
<td align="left">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 |
### 27.1.12.2.5 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, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

**Syntax**

```
name [<NAME>|iso-lang <ISO-LANG-CODE>]
```

**Parameters**

- `name` [<NAME>|iso-lang <ISO-LANG-CODE>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;NAME&gt;</td>
<td>Configures the OSU provider’s name. It should not exceed 253 characters in length.</td>
</tr>
<tr>
<td>iso-lang</td>
<td>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 name in any language other than English, specify the ISO language code.</td>
</tr>
</tbody>
</table>

**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
### 27.1.12.2.6 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, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

#### Syntax

```
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 [description|icon|name] {iso-lang <ISO-LANG-CODE>}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no [description</td>
<td>icon</td>
</tr>
<tr>
<td></td>
<td>• description – Removes the OSU provider’s description</td>
</tr>
<tr>
<td></td>
<td>• icon – Removes the OSU provider’s icon</td>
</tr>
<tr>
<td></td>
<td>• name – Removes the OSU provider’s name</td>
</tr>
<tr>
<td>no method [oma-dm</td>
<td>soap-xml-spp]</td>
</tr>
<tr>
<td></td>
<td>• oma-dm – Removes OMA device management as the method used</td>
</tr>
<tr>
<td></td>
<td>• soap-xml-spp – description – Removes Soap-xml subscription provisioning protocol as the method used</td>
</tr>
<tr>
<td>no [nai</td>
<td>server-url]</td>
</tr>
<tr>
<td>no server-url</td>
<td>Removes the OSU provider’s server URL</td>
</tr>
</tbody>
</table>

#### Examples

```
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)#
```

```
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)#
27.12.2.7 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, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

Syntax
server-url <URL>

Parameters
- server-url <URL>

| server-url <URL> | Configures the OSU provider server’s URL
|------------------|--------------------------------------------------|
| <URL> – Specify the server’s url.

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

`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, AP6521, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

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>&lt;WORD&gt;</td>
<td>• &lt;WORD&gt; – Specify the Roaming Consortium OI in hexadecimal format (should not exceed 128 characters)</td>
</tr>
</tbody>
</table>

hex <WORD>  

- Configures a hexadecimal input

<table>
<thead>
<tr>
<th>hex &lt;WORD&gt;</th>
<th>Specifies the Roaming Consortium OI in hexadecimal format (should not exceed 128 characters)</th>
</tr>
</thead>
</table>

Examples

rfs4000-229D58(config-passpoint-policy-test)#roam-consortium hex 223344
rfs4000-229D58(config-passpoint-policy-test)#

rfs4000-229D58(config-passpoint-policy-test)#show context hotspot2-policy test
  connection-capability ip-protocol 2 port 10 closed
  domain-name TechPubs
  ip-address-type ipv6 available
  nai-realm mai.testrealm.com
  net-auth-type accept-terms url www.zebra.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

- passpoint-policy

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, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

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>venue group</th>
<th>Configures the venue group associated with this hotspot</th>
</tr>
</thead>
<tbody>
<tr>
<td>assembly type</td>
<td>Configures the venue group as assembly (1). This hotspot type is applicable to public assembly venues.</td>
</tr>
</tbody>
</table>

- type – Specifies the venue type for this group. The options are:
  - <0-255> – Specifies an unlisted venue type number from 0 - 255
  - amphitheater – Specifies the venue type as amphitheater (4)
  - amusement-park – Specifies the venue type as amusement park (5)
  - arena – Specifies the venue type as arena (1)
  - bar – Specifies the venue type as bar (12)
  - coffee-shop – Specifies the venue type as a coffee shop (13)
  - convention-centre – Specifies the venue type as a convention center (7)
  - emergency-coordination-center – Specifies the venue type as an emergency coordination center (15)
  - library – Specifies the venue type as a library (8)
  - museum – Specifies the venue type as a museum (9)
  - passenger-terminal – Specifies the venue type as a passenger terminal (3)
  - place-of-worship – Specifies the venue type as a place of worship (6)
  - restaurant – Specifies the venue type as a restaurant (10)
  - stadium – Specifies the venue type as a stadium (2)
  - theater – Specifies the venue type as a theater (11)
  - unspecified – Specifies the venue type as not specified (0)
  - zoo – Specifies the venue type as a zoo (14)
<table>
<thead>
<tr>
<th>Type</th>
<th>Configures the venue group as business (2). This hotspot type is applicable to business venues.</th>
<th>type – Specifies the venue type for this group. The options are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>business</td>
<td></td>
<td>• <code>&lt;0-255&gt;</code> – Specifies an unlisted venue type number from 0 - 255</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• attorney – Specifies the venue type as the attorney’s office (9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• bank – Specifies the venue type as a bank (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• doctor – Specifies the venue type as a doctor or dentist’s office (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• fire-station – Specifies the venue type as a fire station (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• police-station – Specifies the venue type as a police station (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• post-office – Specifies the venue type as a post office (5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• professional-office – Specifies the venue type as a professional office (7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• research-and-development-facility – Specifies the venue type as a research facility (8)</td>
</tr>
<tr>
<td></td>
<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>
<td>type – Specifies the venue type for this group. The options are:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <code>&lt;0-255&gt;</code> – Specifies an unlisted venue type number from 0 - 255</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• school-primary – Specifies the venue type as a primary school (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• school-secondary – Specifies the venue type as a secondary school (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• university – Specifies the venue type as a university or college (3)</td>
</tr>
<tr>
<td></td>
<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>
<td>type – Specifies the venue type for this group. The options are:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <code>&lt;0-255&gt;</code> – Specifies an unlisted venue type number from 0 - 255</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• factory – Specifies the venue type as a factory (1)</td>
</tr>
<tr>
<td></td>
<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>
<td>type – Specifies the venue type for this group. The options are:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <code>&lt;0-255&gt;</code> – Specifies an unlisted venue type number from 0 - 255</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• group-home – Specifies the venue type as a group-home (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• hospital – Specifies the venue type as a hospital (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• long-term-care – Specifies the venue type as a long term care facility (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• prison – Specifies the venue type as a prison or jail (5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• rehab – Specifies the venue type as a rehabilitation facility (3)</td>
</tr>
<tr>
<td></td>
<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>
<td>type – Specifies the venue type for this group. The options are:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <code>&lt;0-255&gt;</code> – Specifies an unlisted venue type number from 0 - 255</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• automotive – Specifies the venue type as a automotive service center (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• gas-station – Specifies the venue type as a gas station (5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• grocery – Specifies the venue type as a grocery store (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• mall – Specifies the venue type as a shopping mall (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• retail – Specifies the venue type as a retail store (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• unspecified – Specifies the venue type as not specified (0)</td>
</tr>
<tr>
<td>Type</td>
<td>Configuration Details</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<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>
<td></td>
</tr>
<tr>
<td></td>
<td>- type – Specifies the venue type for this group. The options are:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- &lt;0-255&gt; – Specifies an unlisted venue type number from 0 -255</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- bus-stop – Specifies the venue type as a bus stop (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- city-park – Specifies the venue type as a city park (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- kiosk – Specifies the venue type as a kiosk (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- muni-mesh – Specifies the venue type as a muni-mesh (municipal wireless Wi-Fi) (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- rest-area – Specifies the venue type as a rest area (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- traffic-control – Specifies the venue type as a traffic control area (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- unspecified – Specifies the venue type as not specified (0)</td>
<td></td>
</tr>
<tr>
<td>residential</td>
<td>Configures the venue group as residential (7). This hotspot type is applicable to residential complexes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- type – Specifies the venue type for this group. The options are:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- &lt;0-255&gt; – Specifies an unlisted venue type number from 0 -255</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- boarding-house – Specifies the venue type as a boarding-house (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- dorm – Specifies the venue type as a dormitory (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- hotel – Specifies the venue type as a hotel or motel (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- private – Specifies the venue type as a private residence (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- unspecified – Specifies the venue type as not specified (0)</td>
<td></td>
</tr>
<tr>
<td>storage</td>
<td>Configures the venue group as storage (8). This hotspot type is applicable to storage groups.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- type – Specifies the venue type for this group. The options are:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- &lt;0-255&gt; – Specifies an unlisted venue type number from 0 -255</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- unspecified – Specifies the venue type as not specified (0)</td>
<td></td>
</tr>
<tr>
<td>unspecified</td>
<td>Configures the venue group as unspecified (0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- type – Specifies the venue type for this group. The options are:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- &lt;0-255&gt; – Specifies an unlisted venue type number from 0 -255</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- unspecified – Specifies the venue type as not specified (0)</td>
<td></td>
</tr>
<tr>
<td>utility-and-misc</td>
<td>Configures the venue group as utility and miscellaneous (8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- type – Specifies the venue type for this group. The options are:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- &lt;0-255&gt; – Specifies an unlisted venue type number from 0 -255</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- unspecified – Specifies the venue type as not specified (0)</td>
<td></td>
</tr>
<tr>
<td>vehicular</td>
<td>Configures the venue group as vehicular (7). This hotspot type is applicable to mobile venues.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- type – Specifies the venue type for this group. The options are:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- &lt;0-255&gt; – Specifies an unlisted venue type number from 0 -255</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- airplane – Specifies the venue type as an airplane (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- auto – Specifies the venue type as an automobile or truck (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- bus – Specifies the venue type as a bus (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- ferry – Specifies the venue type as a ferry (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- motor-bike – Specifies the venue type as a motor bike (7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- ship – Specifies the venue type as a ship or boat (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- train – Specifies the venue type as a train (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- unspecified – Specifies the venue type as not specified (0)</td>
<td></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)#
```

```
rfs4000-229D58(config-passpoint-policy-test)#venue group assembly type coffee-shop
rfs4000-229D58(config-passpoint-policy-test)#
```

```
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
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**

- **passpoint-policy**

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, AP6521, AP6522, AP6562, AP71XX, AP81XX, AP82XX
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX9000

**Syntax**

```
wan-metrics down-speed <0-4294967295> up-speed <0-4294967295>
```

**Parameters**

- **wan-metrics down-speed <0-4294967295> up-speed <0-4294967295>**

<table>
<thead>
<tr>
<th>wan-metrics</th>
<th>Specifies the WAN metrics for the up and down traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>down-speed</td>
<td>Configures the down stream traffic speed</td>
</tr>
<tr>
<td>&lt;0-4294967295&gt;</td>
<td>• &lt;0-4294967295&gt; – Specify a value from 0 - 4294967295 Kbps</td>
</tr>
<tr>
<td>up-speed</td>
<td>Configures the up stream traffic speed</td>
</tr>
<tr>
<td>&lt;0-4294967295&gt;</td>
<td>• &lt;0-4294967295&gt; – Specify a value from 0 - 4294967295 Kbps</td>
</tr>
</tbody>
</table>

**Examples**

rfs4000-229D58(config-passpoint-policy-test)#wan-metrics down-speed 2000 up-speed 2000
rfs4000-229D58(config-passpoint-policy-test)#

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.zebra.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
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`
28.1 bgp-ip-prefix-list-config commands

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>
```

```
<DEVICE>(config-bgp-ip-prefix-list-test)#?
```

BGP IP Prefix List Mode commands:

- **deny**: IP Prefix deny rule to specify packets to reject
- **no**: Negate a command or set its defaults
- **permit**: IP Prefix permit rule to 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

```
<DEVICE>(config-bgp-ip-prefix-list-test)#
```

**Table 28.1** 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 an 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

**Syntax**

deny prefix-list <1-4292967294> 

Parameters

- deny prefix-list <1-4292967294> 
- deny prefix-list <1-4292967294> [{ge <0-32>|le <0-32>}|any]  

**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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes a deny prefix-list rule from this IP prefix list</td>
</tr>
</tbody>
</table>

Note: The 'ge' and 'le' options specify an IP prefix length range. Use these options to specify a more specific (granular) prefix match criteria.
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

**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**

- `no` Removes a permit prefix rule from this IP prefix list
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

**Syntax**

```
no [deny|permit]
no [deny|permit] prefix-list <1-4294967295> {<PREFIX-TO-MATCH/MASK>|any}
```

**Parameters**

- `no [deny|permit] prefix-list <1-4294967295> {<PREFIX-TO-MATCH/MASK>|any}`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no [deny</td>
<td>permit]</td>
</tr>
</tbody>
</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

BORDER GATEWAY PROTOCOL

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>
```

```
<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

```
<DEVICE>(config-bgp-ip-access-list-<IP-ACL-NAME>)#
```

Table 28.2 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 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

**Syntax**

deny access-list [<PREFIX-TO-MATCH/MASK> {exact-match}|any]

**Parameters**

- deny access-list [<PREFIX-TO-MATCH/MASK> {exact-match}|any]

| deny access-list [<PREFIX-TO-MATCH/MASK> {exact-match}|any] | Creates and configures a deny entry for this BGP IP ACL |
|-------------------------------------------------------------|--------------------------------------------------------|
| • <PREFIX-TO-MATCH/MASK> – Specify the prefix to match.    | • <PREFIX-TO-MATCH/MASK> – Specify the prefix to match. |
| • exact-match – Optional. Enables an exact match of the   | • exact-match – Optional. Enables an exact match of the |
| prefix provided in the previous step. When configured,     | prefix provided in the previous step. When configured,   |
| the route is denied only in case of an exact match.       | the route is denied only in case of an exact match.     |
| • any – Specifies the prefix to match as ‘any’.            | • any – Specifies the prefix to match as ‘any’.         |

**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

Syntax

permit access-list [<PREFIX-TO-MATCH/MASK>|any]

Parameters
- permit access-list [<PREFIX-TO-MATCH/MASK> {exact-match}|any]

| permit access-list [<PREFIX-TO-MATCH/MASK> {exact-match}|any] | Creates and configures a permit entry for this BGP IP ACL |
|----------------------------------------------------------|----------------------------------------------------------|
| - <PREFIX-TO-MATCH/MASK> – Specify the prefix to match. | - <PREFIX-TO-MATCH/MASK> – Specify the prefix to match. |
| - exact-match – Optional. Enables an exact match of the prefix provided in the previous step. | - exact-match – 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. | When configured, the route is permitted only in case of an exact match. |
| - any – Specifies the prefix to match as ‘any’. | - any – Specifies the prefix to match as ‘any’. |

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

no | Removes the specified the permit entry in this IP BGP ACL
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

**Syntax**

```
no [deny|permit]
no [deny|permit] access-list [<PREFIX-TO-MATCH/MASK>|any]
```

**Parameters**

- `no [deny|permit] access-list [<PREFIX-TO-MATCH/MASK>|any]`

| **no [deny|permit]** | **access-list [<PREFIX-TO-MATCH/MASK>|any]** | **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)#
```

```
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)#
```
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 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:

<DEVICE>(config)#bgp as-path <AS-PATH-LIST-NAME>

<DEVICE>(config-bgp-as-path-list-<AS-PATH-LIST-NAME>)#?

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

<DEVICE>(config-bgp-as-path-list-<AS-PATH-LIST-NAME>)#

Table 28.3 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

**Syntax**

deny as-path <REG-EXP>

**Parameters**

- deny as-path <REG-EXP>

<table>
<thead>
<tr>
<th>deny as-path &lt;REG-EXP&gt;</th>
<th>Configures a match criteria (regular expression).</th>
</tr>
</thead>
<tbody>
<tr>
<td>•  &lt;REG-EXP&gt; — Specify the regular expression to match (should not exceed 64 characters and should be unique to the AS path list rule)</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Regular expressions are treated as a ‘ASCII string’ and not as a sequence of numbers. Create a regular expression ideally suited to filter the required AS paths.

**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

Syntax
permit as-path <REG-EXP>

Parameters
- permit as-path <REG-EXP>

Usage Guidelines

<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, &quot;_ _&quot;.</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

**Syntax**

```
no as-path-list [deny|permit] <REG-EXP>
```

**Parameters**

- `no as-path [deny|permit] <REG-EXP>`

**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>)#
Table 28.4 summarizes the BGP community 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 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

**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-bgp-community-list-test)#

nx9500-6C8809(config)#show context

! Configuration of NX9500 version 5.6.0.0-037B
!
! version 2.3
!

------------------------------------------
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
deny community expanded 100
!
--More--
nx9500-6C8809(config)#

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</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

**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

bgp community-list test

permit community expanded 300
deny community expanded 100

nx9500-6C8809(config-bgp-community-list-test-2)#

nx9500-6C8809(config-bgp-community-list-test1)#permit community standard no-export

nx9500-6C8809(config-bgp-community-list-test1)# show context

bgp community-list test1

permit community standard no-export

nx9500-6C8809(config-bgp-community-list-test1)#

nx9500-6C8809(config)# show context

! Configuration of NX9500 version 5.6.0.0-037B
!
!
version 2.3
!
!
......................
!
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

**Syntax**

- `no [deny|permit] community expanded <LINE>`
- `no [deny|permit] community standard [AA:NN|internet|local-AS|no-advertise|no-export]`

**Parameters**

- **no [deny|permit] community expanded <LINE>**
  - Removes a deny or permit expanded community rule from this community list
  - `<LINE>` — Specify the regular expression associated with the rule.

- **no [deny|permit] community standard [AA:NN|internet|local-AS|no-advertise|no-export]**
  - Removes a deny or permit standard community rule from this community list. Specify the community type: The options are:
    - **aa:nn** — Specify the community number. The first part (aa) represents the AS number. The second part (nn) represents a 2-byte number.
    - **internet** — Specifies the community is an internet community
    - **local-AS** — Specifies the community is a local AS
    - **no-advertise** — Specifies the community is a no advertisement community
    - **no-export** — Specifies the community is a no export community AS

**Examples**

The following example shows the settings of the community list ‘test’ before the ‘no’ command is executed:

```
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)#
```

```
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:

```
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

Create an and configures a named 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:

```plaintext
<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

To navigate to the extended community configuration instance, use the following command:

```plaintext
<DEVICE>(config)#bgp extcommunity-list <EXTCOMMUNITY-LIST-NAME>
```

**Table 28.5 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>deny</td>
<td>Creates and configures a deny extended community (expanded or standard) rule</td>
<td>page 28-23</td>
</tr>
<tr>
<td>permit</td>
<td>Creates and configures a permit extended community (expanded or standard) rule</td>
<td>page 28-25</td>
</tr>
<tr>
<td>no</td>
<td>Removes an existing deny or permit extended community rule from this extcommunity list</td>
<td>page 28-27</td>
</tr>
</tbody>
</table>
### 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

**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**

```
x9500-6C8809(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 5.6.0.0-037B
  !
  ! version 2.3
  !
  ! ngx9500-6C8809(config-bgp-extcommunity-list-test) #

--More--
```

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></td>
<td>Removes the specified deny extended community rule from this extcommunity list</td>
</tr>
</tbody>
</table>
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

#### 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.
  - `<COMMUNITY-NUMBER>` – Specify the community number in one of the following formats: `AA:NN` or `A.B.C.D:NN`.

#### Examples

```bash
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)##show context

! Configuration of NX9500 version 5.6.0.0-037B
!
| version 2.3
|
| 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)##
```
**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</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

**Syntax**

no [deny|permit] extcommunity expanded <LINE>

no [deny|permit] extcommunity standard [rt|soo] <COMMUNITY-NUMBER>

**Parameters**

- no [deny|permit] extcommunity expanded <LINE>

- no [deny|permit] extcommunity standard [rt|soo] <COMMUNITY-NUMBER>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no [deny</td>
<td>permit] extcommunity expanded &lt;LINE&gt;</td>
</tr>
<tr>
<td>no [deny</td>
<td>permit] extcommunity standard [rt</td>
</tr>
<tr>
<td>- rt</td>
<td>Specify the RT extended community attribute associated with the rule</td>
</tr>
<tr>
<td>- soo</td>
<td>Specify the SOO extended community attribute associated with the rule</td>
</tr>
<tr>
<td>&lt;COMMUNITY-NUMBER&gt;</td>
<td>Specify the community number in one of the following formats: AA:NN or A.B.C.D:NN</td>
</tr>
</tbody>
</table>

**Examples**

The following example shows the extended community ‘test’ settings before the ‘no’ command is executed:

```bash
nx9500-6C8809(config-bgp-extcommunity-list-test)#show context
bgp extcommunity-list test
  deny extcommunity standard rt 192.168.13.13:12
  deny extcommunity standard rt 200:12
nx9500-6C8809(config-bgp-extcommunity-list-test)#
```

The following example shows the extended community ‘test’ settings after the ‘no’ command is executed:

```bash
nx9500-6C8809(config-bgp-extcommunity-list-test)#show context
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)#permit route-map 1
<DEVICE>(config-dr-route-map-test)#deny 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
Table 28.6 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><strong>description</strong></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 28-30</td>
</tr>
<tr>
<td><strong>match</strong></td>
<td>Configures the match criteria associated with this deny or permit BGP route map</td>
<td>page 28-31</td>
</tr>
<tr>
<td><strong>no</strong></td>
<td>Removes or reverts the settings defined for a deny or permit route-map rule</td>
<td>page 28-34</td>
</tr>
<tr>
<td><strong>set</strong></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 28-36</td>
</tr>
</tbody>
</table>
### 28.6.1 description

<table>
<thead>
<tr>
<th>bgp-route-map-config commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configures a description for this route map rule (deny or permit) that uniquely distinguishes it from others with similar access permissions</td>
</tr>
</tbody>
</table>

Supported in the following platforms:
- Wireless Controllers — RFS4000, RFS6000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**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

Configure 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

**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>]
matic metric <0-4294967295>
matic origin [egp|igp|incomplete]
matic tag <0-65535>
```

**Parameters**

- **match [as-path <AS-PATH-LIST-NAME>|community <COMMUNITY-LIST-NAME> {exact-match}|
extcommunity <EXTCOMMUNITY-LIST-NAME>]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>as-path &lt;AS-PATH-LIST-NAME&gt;</td>
<td>Configures a BGP AS path list to match. An AS path is a list of ASs a packet traverses to reach its destination.</td>
</tr>
<tr>
<td></td>
<td>• &lt;AS-PATH-LIST-NAME&gt; – Specify the AS path list name (should be existing and configured)</td>
</tr>
<tr>
<td>community &lt;COMMUNITY-LIST-NAME&gt; {exact-match}</td>
<td>Configures the AS community list string to match.</td>
</tr>
<tr>
<td></td>
<td>• &lt;COMMUNITY-LIST-NAME&gt; – Specify the AS community list name (should be existing and configured)</td>
</tr>
<tr>
<td></td>
<td>• exact-match – Optional. Does an exact match when matching the specified AS community string. This option is disabled by default.</td>
</tr>
<tr>
<td>extcommunity &lt;EXTCOMMUNITY-LIST-NAME&gt;</td>
<td>Configures the external community list string to match.</td>
</tr>
<tr>
<td></td>
<td>• &lt;EXTCOMMUNITY-LIST-NAME&gt; – Specify the external community list name (should be existing and configured)</td>
</tr>
</tbody>
</table>

- **match [ip-address|ip-next-hop|ip-route-source] [BGP-IP-ACCESS-LIST <BGP-ACL-NAME>|
prefix-list <PREFIX-LIST-NAME>]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip-address [BGP-IP-ACCESS-LIST &lt;BGP-ACL-NAME&gt;</td>
<td></td>
</tr>
</tbody>
</table>
prefix-list <PREFIX-LIST-NAME>] | Configures a string of IP addresses, in the route, to match. The IP Address is a list of IP addresses in the route used to filter the route. Use one of the following options to provide a list of IP addresses: |
<p>|                          | • BGP-IP-ACCESS-LIST &lt;BGP-ACL-NAME&gt; – Associates an existing BGP ACL with this BGP route map. Specify the BGP ACL name (should be existing and configured). |
|                          | • prefix-list &lt;PREFIX-LIST-NAME&gt; – 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). |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ip-next-hop</code></td>
<td>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:</td>
</tr>
<tr>
<td>[BGP-IP-ACCESS-LIST &lt;BGP-ACL-NAME&gt;]</td>
<td>– Associates an existing BGP ACL with this BGP route map. Specify the BGP ACL name (should be existing and configured).</td>
</tr>
<tr>
<td></td>
<td>[prefix-list &lt;PREFIX-LIST-NAME&gt;]</td>
</tr>
<tr>
<td><code>ip-route-source</code></td>
<td>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:</td>
</tr>
<tr>
<td>[BGP-IP-ACCESS-LIST &lt;BGP-ACL-NAME&gt;]</td>
<td>– Associates an existing BGP ACL with this BGP route map. Specify the BGP ACL name (should be existing and configured).</td>
</tr>
<tr>
<td></td>
<td>[prefix-list &lt;PREFIX-LIST-NAME&gt;]</td>
</tr>
<tr>
<td><code>match metric &lt;0-4294967295&gt;</code></td>
<td>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.</td>
</tr>
<tr>
<td>`match origin [egp</td>
<td>igp</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>incomplete – Matches if the origin of the route is not identifiable</td>
</tr>
<tr>
<td><code>match tag &lt;0-65535&gt;</code></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>&lt;0-65535&gt; – Specify the iBGP route’s tag from 0 - 65535.</td>
</tr>
</tbody>
</table>
Examples
The following examples show the configuration of match criteria for the deny route-map rule 1:

```plaintext
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
nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-2)#show context
permit route-map 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 test
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

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes match criteria associated with a deny or permit route-map rule</td>
</tr>
</tbody>
</table>
### 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

**Syntax**

```plaintext
no [description|match <PARAMETERS>|set <PARAMETERS>]
```

**Parameters**

- **no [description|match <PARAMETERS>|set <PARAMETERS>]**

<table>
<thead>
<tr>
<th>no description</th>
<th>Removes the description configured for a deny or permit route-map rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>no match &lt;PARAMETERS&gt;</td>
<td>Removes the match criteria associated with a deny or permit route-map rule</td>
</tr>
<tr>
<td></td>
<td>- &lt;as-path&gt; – Removes the as-path list</td>
</tr>
<tr>
<td></td>
<td>- community – Removes the community list</td>
</tr>
<tr>
<td></td>
<td>- extcommunity – Removes the external community list</td>
</tr>
<tr>
<td></td>
<td>- ip-address – Removes the IP address list</td>
</tr>
<tr>
<td></td>
<td>- prefix-list – Optional. Removes the IP address prefix list</td>
</tr>
<tr>
<td></td>
<td>- ip-next-hop – Removes the IP next hop list</td>
</tr>
<tr>
<td></td>
<td>- prefix-list – Optional. Removes the IP next hop prefix list</td>
</tr>
<tr>
<td></td>
<td>- ip-route-source – Removes the advertised route source IP address</td>
</tr>
<tr>
<td></td>
<td>- prefix-list – Optional. Removes the IP route source prefix list</td>
</tr>
<tr>
<td></td>
<td>- metric – Removes the route metric</td>
</tr>
<tr>
<td></td>
<td>- origin – Removes the BGP route origin type (eBGP, iBGP, or not-identifiable</td>
</tr>
<tr>
<td></td>
<td>- tag – Removes the route tag</td>
</tr>
</tbody>
</table>

- **no set <PARAMETERS>**

<table>
<thead>
<tr>
<th>no set &lt;PARAMETERS&gt;</th>
<th>Removes the attributes configured for this route map</th>
</tr>
</thead>
<tbody>
<tr>
<td>aggregator-as – Removes the BGP aggregator’s attributes (ASN and IP address)</td>
<td></td>
</tr>
<tr>
<td>as-path – Removes the BGP transform AS path attribute</td>
<td></td>
</tr>
<tr>
<td>atomic-aggregate – Removes BGP atomic aggregate attributes</td>
<td></td>
</tr>
<tr>
<td>comm-list – Removes the community list name string to match</td>
<td></td>
</tr>
<tr>
<td>community – Removes the community attribute</td>
<td></td>
</tr>
<tr>
<td>extcommunity – Removes the extended community attribute</td>
<td></td>
</tr>
<tr>
<td>ip – Removes the next hop’s IP address</td>
<td></td>
</tr>
<tr>
<td>local.preference – Removes the BGP local preference attribute</td>
<td></td>
</tr>
<tr>
<td>metric – Removes the route map’s metric</td>
<td></td>
</tr>
<tr>
<td>origin – ‘Removes this BGP route map’s origin code</td>
<td></td>
</tr>
<tr>
<td>originator-id – Removes this route map’s originator IP address</td>
<td></td>
</tr>
<tr>
<td>source-ip – Removes this route map’s source IP address</td>
<td></td>
</tr>
<tr>
<td>tag – Removes this route map’s tag</td>
<td></td>
</tr>
<tr>
<td>weight – Removes the weighted priority configured for this route map</td>
<td></td>
</tr>
</tbody>
</table>
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"
   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

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 'deny route-map rule-1' settings after 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"
   match 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

nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#
```

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"
      match 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

**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>**

```
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>}**

  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**

  Enables BGP atomic aggregate attributes
  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.

- **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]**

  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>**

  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]

  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>

  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
  - `<0-4294967295>` – Specify the preference value from 0 - 4294967295.

- set metric <0-4294967295>

  Configures a metric for the route
  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 metric from 0 - 4294967295.

- 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>

  Configures this route map’s originator IP address

- set source-ip <IP>

  Configures this route map’s source IP address
  - `<IP>` – Specify the IP address in the A.B.C.D format.

- set tag <0-65535>

  Configures this route map’s tag value
  The Tag is a way to preserve a route’s AS path information for routers in iBGP.
  - `<0-65535>` – Specify a tag value from 1 - 65535.

- set weight <0-4294967295>

  Enables assignment of a weighted priority to the aggregate route
  - `<0-4294967295>` – Specify a value from 0 - 4294967295.
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

nx9500-6C8809(config-dr-route-map-test-dr-route-map-rule-1)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Removes the attributes configured for this route map</td>
</tr>
</tbody>
</table>
28.7 bgp-router-config commands

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:

```plaintext
<DEVICE>(config)#self
<DEVICE>(config-device-<MAC>)#router bgp
<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:

```plaintext
<DEVICE>(config)#profile <DEVICE-TYPE> <PROFILE-NAME>
<DEVICE>(config-profile-<PROFILE-NAME>)#router bgp
<DEVICE>(config-profile <PROFILE-NAME>-router-bgp)#
```

When configured as a profile, the router settings are applied to all devices using the profile.

```plaintext
<DEVICE>(config-device <MAC>-router-bgp)#
```
Table 28.7 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 28-42</td>
</tr>
<tr>
<td>asn</td>
<td>Configures this BGP router’s ASN</td>
<td>page 28-43</td>
</tr>
<tr>
<td>bgp</td>
<td>Configures BGP router parameters</td>
<td>page 28-44</td>
</tr>
<tr>
<td>bgp-route-limit</td>
<td>Configures the BGP route limit parameters</td>
<td>page 28-49</td>
</tr>
<tr>
<td>distance</td>
<td>Configures administrative distance parameters</td>
<td>page 28-50</td>
</tr>
<tr>
<td>ip</td>
<td>Configures the BGP default gateway’s priority</td>
<td>page 28-51</td>
</tr>
<tr>
<td>network</td>
<td>Configures the local network IP addresses and masks</td>
<td>page 28-52</td>
</tr>
<tr>
<td>no</td>
<td>Removes the BGP router settings</td>
<td>page 28-53</td>
</tr>
<tr>
<td>route-redistribute</td>
<td>Enables redistribution of routes learnt from other routing protocols into BGP</td>
<td>page 28-55</td>
</tr>
<tr>
<td>timers</td>
<td>Enables adjustment of keepalive and holdtime intervals</td>
<td>page 28-57</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

Syntax

aggregate-address <IP/M> {as-set {summary-only}|summary-only}

Parameters

- aggregate-address <IP/M> {as-set {summary-only}|summary-only}

  | aggregate-address <IP/M> | Specify the aggregate IP address and mask |
  | as-set {summary-only} | Optional. Summarizes the AS_PATH attributes of the individual routes aggregated |
  | summary-only | summary-only – Optional. Filters more specific routes from updates |

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 100000
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

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

Syntax

asn <1-4294967295>

Parameters
- asn <1-4294967295>

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

**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.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>enforce-first-as</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>fast-external-failover</strong></td>
<td>Enables/disables 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.</td>
</tr>
<tr>
<td><strong>best-path</strong></td>
<td>Modifies the bestpath selection algorithm. The route selection algorithm uses the following criteria when selecting the preferred route: as-path, router-id, and med.</td>
</tr>
</tbody>
</table>
| **as-path**                  | Enables/disables 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.  
  - ignores – 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/disables 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**                      | Enables/disables 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/disables 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/disables 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. |

- `bgp best-path [as-path [confed|ignore]] | compare-router-id | med {confed {missing-as-worst}|missing-as-worst}`
### bgp cluster <IP>

| 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>

| 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. |
| Note: Forming AS confederation reduces iBGP mesh inside an AS. |
| • 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>

<table>
<thead>
<tr>
<th>bgp dampening {&lt;1-45&gt;} {&lt;1-20000&gt;} &lt;1-20000&gt; &lt;1-255&gt;</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt;1-45&gt; – 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.</td>
<td></td>
</tr>
<tr>
<td>• &lt;1-20000&gt; – 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.</td>
<td></td>
</tr>
<tr>
<td>• &lt;1-20000&gt; – 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.</td>
<td></td>
</tr>
<tr>
<td>Note: The maximum duration to suppress a stable route, is the next set of value configured in this command from 1 - 255.</td>
<td></td>
</tr>
<tr>
<td>• &lt;1-255&gt; – 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.</td>
<td></td>
</tr>
</tbody>
</table>

### bgp default [ipv4-unicast|local-preference <0-4294967295>]

| default | Configures the following defaults for BGP neighbor-related parameters: IPv4 unicast and local preference |
ipv4-unicast  Enable/disables IPv4 unicast traffic for neighbors. This option is enabled by default.

local-preference  Configures a local preference for the neighbor. Higher the value higher is the preference.

<0-4294967295> – Specify a value from 1 - 4294967295.

bgp graceful-restart  Enables/disables 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.

default graceful-restart  Enables/disables 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  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.

network import-check  Enables checking of the existence of BGP network route in IGP before importing.

bgp router-id  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.

scan-time  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

**Syntax**

```
bgp-route-limit [num-routes <VALUE>|reset-time <1-86400>|retry-count <1-32>|retry-timeout <1-3600>]
```

**Parameters**
- bgp-route-limit [num-routes <VALUE>|reset-time <1-86400>|retry-count <1-32>|retry-timeout <1-3600>]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>num-routes &lt;VALUE&gt;</td>
<td>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).</td>
</tr>
<tr>
<td></td>
<td>• &lt;VALUE&gt; – Specify a value from 1 - 4,294,967,295. The default is 9216 routes.</td>
</tr>
<tr>
<td>reset-time &lt;1-86400&gt;</td>
<td>Configures the reset time in seconds. This is the time after which the retry count value is set to Zero (0).</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-86400&gt; – Specify a value from 1 - 86,400 seconds. The default is 360 seconds.</td>
</tr>
<tr>
<td>retry-count &lt;1-32&gt;</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-32&gt; – Specify a value from 1 - 32. The default is 5 routes.</td>
</tr>
<tr>
<td>retry-timeout &lt;1-3600&gt;</td>
<td>Configures the duration, in seconds, the BGP process is temporarily shut down, before a reset of the process is attempted.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-3600&gt; – Specify a value from 1 - 3600 seconds. The default is 60 seconds.</td>
</tr>
</tbody>
</table>

**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
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-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

**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>]

<table>
<thead>
<tr>
<th>distance &lt;IP/M&gt; &lt;1-255&gt; &lt;BGP-ACL-NAME&gt;</th>
<th>Configures the default administrative distance, specified by the &lt;1-255&gt; parameter, when the route's source IP address matches the specified IP prefix.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;IP/M&gt; – Specify the IP source prefix and prefix length.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-255&gt; – Specify the distance from 1 - 255.</td>
</tr>
<tr>
<td></td>
<td>• &lt;BGP-ACL-NAME&gt; – Optional. Specify the BGP access list name.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>bgp &lt;1-255&gt; &lt;1-255&gt; &lt;1-255&gt;</th>
<th>Configures the default administrative distance for different route types</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &lt;1-255&gt; – Configures the default administrative distance for routes external to this AS. Specify a value from 1 - 255.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-255&gt; – Configures the default administrative distance for routes internal to this AS. Specify a value from 1 - 255.</td>
</tr>
<tr>
<td></td>
<td>• &lt;1-255&gt; – Configures the default administrative distance for local routes. Specify a value from 1 - 255.</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
nx9500-6C8809(config-profile NX45XXProfile-router-bgp)#distance bgp 200 100 200

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
gbgp neighbor 192.168.13.99
remote-as 199
maximum-prefix 9999 80 restart 50
gbgp-route-limit num-routes 10
```

**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

Syntax

ip default-gateway priority <1-8000>

Parameters

- ip default-gateway priority <1-8000>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>default-gateway priority &lt;1-8000&gt;</td>
<td>Configures the default gateway’s (acquired through BGP) priority</td>
</tr>
</tbody>
</table>

- <1-8000> – Specify a value from 1 - 8000. The default is 7500.

Note: Lower the value, higher is the priority.

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

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|route-map}

<table>
<thead>
<tr>
<th>network &lt;IP/M&gt;</th>
<th>Configures the local network’s address in the A.B.C.D/M format</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;IP/M&gt;</td>
<td>Specify the network address.</td>
</tr>
</tbody>
</table>

backdoor

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.
- pathlimit <1-255> – Specify the hop count limit from 1 - 255.

pathlimit

Optional. Configures the maximum path limit for this AS
- <1-255> – Specify the hop count limit from 1 - 255.

route-map

Optional. Associates a BGP route map with this local network. When applied, the route-map values take precedence

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

**Syntax**

no [aggregate-address|bgp|bgp-route-limit|distance|ip|network|route-redistribute|timers]

**Parameters**

- no [aggregate-address|bgp|bgp-route-limit|distance|ip|network|route-redistribute|timers]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no aggregate-address</td>
<td>Removes the aggregate address entry</td>
</tr>
<tr>
<td>no bgp</td>
<td>Removes BGP router related parameters. The no bgp enable command disables BGP.</td>
</tr>
<tr>
<td>no bgp-route-limit</td>
<td>Removes the route limits applied for BGP</td>
</tr>
<tr>
<td>no distance</td>
<td>Removes the administrative distance associated with the IP prefix source. Also removes BGP distance attributes</td>
</tr>
<tr>
<td>no ip</td>
<td>Removes BGP default gateway settings</td>
</tr>
<tr>
<td>no route-redistribute</td>
<td>Removes route redistribute settings</td>
</tr>
<tr>
<td>no timers bgp</td>
<td>Reverts BGP timers to default</td>
</tr>
</tbody>
</table>

**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:

```bash
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

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 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

Syntax
```
routing redistribution [connected|kernel|ospf|static] {metric <0-4294967295>|route-map <ROUTE-MAP-NAME>}
```

Parameters
- `route-redistribution [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><code>connected</code></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 <code>match</code>.</td>
</tr>
<tr>
<td><code>kernel</code></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 <code>match</code>.</td>
</tr>
<tr>
<td><code>ospf</code></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 <code>match</code>.</td>
</tr>
<tr>
<td><code>static</code></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 <code>match</code>.</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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables redistribution of routes learnt from other routing protocols into BGP</td>
</tr>
</tbody>
</table>
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

**Syntax**

```
timers bgp <0-65535> <0-65535>
```

**Parameters**

- `timers bgp <0-65535> <0-65535>`

<table>
<thead>
<tr>
<th>timers bgp &lt;0-65535&gt; &lt;0-65535&gt;</th>
<th>Configures the keepalive and holdtime interval in seconds</th>
</tr>
</thead>
<tbody>
<tr>
<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>
<td></td>
</tr>
<tr>
<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>
<td></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
  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
  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 (EXPERIMENTAL)
- **advertisement-interval**: Minimum interval between BGP routing updates
- **allowas-in**: Accept as-path with my AS present in it (EXPERIMENTAL)
- **attribute-unchanged**: BGP attribute is propagated unchanged to this neighbor (EXPERIMENTAL)
- **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 (EXPERIMENTAL)
- **dont-capability-negotiate**: Do not perform capability negotiation (EXPERIMENTAL)
- **ebgp-multihop**: Allow EBGP neighbors not on directly connected networks
- **enforce-multihop**: Enforce EBGP neighbors perform multihop (EXPERIMENTAL)
- **local-as**: Specify a local-as number (EXPERIMENTAL)
- **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 (EXPERIMENTAL)
- **port**: Neighbor's BGP port (EXPERIMENTAL)
- **remote-as**: Specify a BGP neighbor
- **remove-private-as**: Remove private AS number from outbound updates (EXPERIMENTAL)
- **route-server-client**: Configure a neighbor as Route Server client (EXPERIMENTAL)
- **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 (EXPERIMENTAL)
- **timers**: BGP per neighbor timers
- **unsuppress-map**: Route-map to selectively unsuppress suppressed
BORDER GATEWAY PROTOCOL 28 - 59

<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 28-61</td>
</tr>
<tr>
<td>advertisement-interval</td>
<td>Configures the minimum interval between two consecutive BGP router updates</td>
<td>page 28-62</td>
</tr>
<tr>
<td>allowas-in</td>
<td>Enables re-advertisement of all prefixes containing duplicate ASNs</td>
<td>page 28-63</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 28-64</td>
</tr>
<tr>
<td>capability</td>
<td>Enables/disables the advertisement of capability (dynamic and ORF) to BGP peers</td>
<td>page 28-65</td>
</tr>
<tr>
<td>default-originate</td>
<td>Enables/disables the sending of the default route to BGP neighbors. It also allows the configuration of the default route.</td>
<td>page 28-66</td>
</tr>
<tr>
<td>description</td>
<td>Configures a description for a BGP neighbor device</td>
<td>page 28-67</td>
</tr>
<tr>
<td>disabled-connected-check</td>
<td>Enables/disables one-hop away EBGP peer using loop back address</td>
<td>page 28-68</td>
</tr>
<tr>
<td>dont-capability-negotiate</td>
<td>Disables capability negotiation with BGP neighbors (EXPERIMENTAL)</td>
<td>page 28-69</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 28-70</td>
</tr>
<tr>
<td>enforce-multihop</td>
<td>Forces EBGP neighbors to perform multi-hop checks (EXPERIMENTAL)</td>
<td>page 28-71</td>
</tr>
<tr>
<td>local-as</td>
<td>Configures this neighbor's local AS number. Also enables/disables the prepending of this AS number in route updates. (EXPERIMENTAL)</td>
<td>page 28-72</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 28-73</td>
</tr>
<tr>
<td>next-hop-self</td>
<td>Enables next-hop calculation for this neighbor</td>
<td>page 28-74</td>
</tr>
<tr>
<td>no</td>
<td>Removes this BGP neighbor's settings, or reverts them back to default</td>
<td>page 28-75</td>
</tr>
</tbody>
</table>

<DEVICE>(config-profile <PROFILE-NAME>-router--bgp-neighbor-<IP>)#

Table 28.8 summarizes BGP deny/permit route map rules configuration mode commands.

Table 28.8 BGP-Neighbor-Config-Mode Commands
## 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>override-capability</td>
<td>Enables the overriding of capability negotiation results</td>
<td>page 28-76</td>
</tr>
<tr>
<td>passive</td>
<td>Enables this BGP neighbor device (or devices using this profile) as passive</td>
<td>page 28-77</td>
</tr>
<tr>
<td>password</td>
<td>Sets a password for this BGP neighbor device (or devices using this profile)</td>
<td>page 28-78</td>
</tr>
<tr>
<td>peer-group</td>
<td>Sets the peer group for this BGP neighbor device (or devices using this profile)</td>
<td>page 28-79</td>
</tr>
<tr>
<td>port</td>
<td>Configures a non-standard BGP port for this BGP neighbor (EXPERIMENTAL)</td>
<td>page 28-80</td>
</tr>
<tr>
<td>remote-as</td>
<td>Configures the ASN for this neighbor BGP device (or devices using this profile)</td>
<td>page 28-81</td>
</tr>
<tr>
<td>remove-private-as</td>
<td>Removes the private ASN from outbound updates (EXPERIMENTAL)</td>
<td>page 28-82</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 28-83</td>
</tr>
<tr>
<td>send-community</td>
<td>Enables sending of the community attribute to the BGP neighbor</td>
<td>page 28-84</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down this BGP neighbor device (or devices using this profile)</td>
<td>page 28-85</td>
</tr>
<tr>
<td>soft-reconfiguration</td>
<td>Enables storing of updates for inbound soft reconfiguration</td>
<td>page 28-86</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 28-87</td>
</tr>
<tr>
<td>timers</td>
<td>Configures this BGP neighbor’s keepalive and holdtime durations</td>
<td>page 28-88</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 28-90</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 28-91</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 28-92</td>
</tr>
<tr>
<td>weight</td>
<td>Configures a weight for all routes learned from this BGP neighbor</td>
<td>page 28-93</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

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

Syntax
advertisement-interval <0-600>

Parameters
- advertisement-interval <0-600>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>advertisement-interval &lt;0-600&gt;</td>
<td>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.</td>
</tr>
<tr>
<td>&lt;0-600&gt;</td>
<td>Specify a value from 0 - 600 seconds. The default is 5 seconds.</td>
</tr>
</tbody>
</table>

Examples
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)# advertisement-interval 100

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)# show context bgp neighbor 192.168.13.99 advertisement-interval 100

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

**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>⋆&lt;1-10&gt;</td>
<td>⋆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
```

**Related Commands**

| no | Disables re-advertisement of all prefixes containing duplicate ASNs |
28.8.4 attribute-unchanged

- **bgp-neighbor-config commands**

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

**Syntax**

```
attribute-unchanged {as-path|med|next-hop}
```

**Parameters**

- attribute-unchanged {as-path|med|next-hop}

<table>
<thead>
<tr>
<th>attribute-unchanged</th>
<th>Enables the propagation of the following BGP attribute values unchanged:</th>
</tr>
</thead>
<tbody>
<tr>
<td>as-path</td>
<td>Optional. Enables propagation of AS path BGP attribute unchanged to this neighbor BGP device. This option is disabled by default.</td>
</tr>
<tr>
<td>med</td>
<td>Optional. Enables propagation of MED BGP attribute unchanged to this neighbor BGP device. This option is disabled by default</td>
</tr>
<tr>
<td>next-hop</td>
<td>Optional. Enables propagation of the next-hop BGP attribute value unchanged to this neighbor BGP device. This option is disabled by default.</td>
</tr>
</tbody>
</table>

**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
  bgp neighbor 192.168.13.99
  advertisement-interval 100
  allowas-in 10
  attribute-unchanged as-path

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#

**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

**Syntax**

```
capability [dynamic|orf]
capability dynamic
capability orf prefix-list [both|receive|send]
```

**Parameters**

- **capability dynamic**

  Enables/disables 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/disables 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 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

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

Syntax
default-originate {route-map <BGP-ROUTE-MAP-NAME>}

Parameters
- default-originate {route-map <BGP-ROUTE-MAP-NAME>}

<table>
<thead>
<tr>
<th>default-originate {route-map &lt;BGP-ROUTE-MAP-NAME&gt;}</th>
<th>Enables default originate on this BGP neighbor. This option is disabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• route-map &lt;BGP-ROUTE-MAP&gt; – Optional. Use this keyword to specify a route map to use as the default originate route</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> If no route-map is specified, the default route 0.0.0.0 is sent.</td>
</tr>
</tbody>
</table>

Examples
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)# default-originate

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

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#

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

**Syntax**

description neighbor <LINE>

**Parameters**
- description neighbor <LINE>

<table>
<thead>
<tr>
<th>neighbor &lt;LINE&gt;</th>
<th>Specify a description for this BGP neighbor device (should not exceed 80 characters).</th>
</tr>
</thead>
</table>

**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 disabled-connected-check

- **bgp-neighbor-config commands**

  Enables/disables 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

**Syntax**

disabled-connected-check

**Parameters**

None

**Examples**

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)# disable-connected-check

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" disabled-connected-check

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#

**Related Commands**

<table>
<thead>
<tr>
<th>no</th>
<th>Disables one-hop away eBGP peer using loop back address</th>
</tr>
</thead>
</table>
28.8.9 dont-capability-negotiate

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

Syntax

dont-capability-negotiate

Parameters

None

Examples

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
dont-capability-negotiate

   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

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>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

**Syntax**
```
ebgp-multihop <1-255>
```

**Parameters**
- `ebgp-multihop <1-255>`

| `ebgp-multihop <1-255>` | Configures the maximum number of hops that can be between eBGP neighbors not directly connected to each other.
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><code>{&lt;1-255&gt;}</code></td>
<td>- <code>&lt;1-255&gt;</code> — Specify a value from 1 - 255. The default is 255.</td>
</tr>
</tbody>
</table>

**Examples**
```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#ebgp-multihop 20
```
```
  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

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

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

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 enforcement of multihop route checks</td>
</tr>
</tbody>
</table>
## 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

### Syntax

`local-as <1-4294967295> {no-prepend}

### Parameters

- `local-as <1-4294967295> {no-prepend}

### Examples

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
  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

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 prepping).
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

Syntax

```
maximum-prefix <1-4294967295> {(<1-100>|restart <1-65535>|warning-only)}
```

Parameters

- `maximum-prefix <1-4294967295>`
  - `<1-4294967295>` – Specify a value for 1 - 4294967295.
  - `<1-100>` – 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.
  - `restart <1-65535>` – 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.
  - `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.

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 config
  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
  max```

```
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

`bgp-neighbor-config commands`

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

**Syntax**

`next-hop-self`

**Parameters**

None

**Examples**

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#next-hop-self

  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-multipath 20
enforce-multipath
local-as 20 no-prepend
maximum-prefix 400 50 warning-only
next-hop-self
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>no</code></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

Syntax
no <PARAMETER>

Parameters
- no <PARAMETER>

no <PARAMETER> Specify the parameter details to remove or revert to default

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

nx95500-6C8809(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
```

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

**Syntax**

```
override-capability
```

**Parameters**

None

**Examples**

```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)# override-capability
```

```
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**

| **no**           | Disables the overriding of capability negotiation results |
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

**Syntax**

`passive`

**Parameters**

None

**Examples**

```plaintext
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**

| no | Disables this BGP neighbor device (or devices using this profile) as passive |
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

Syntax
password neighbor <LINE>

Parameters
- password neighbor <LINE>

Examples
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
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

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

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

**Syntax**

```
port <0-65535>
```

**Parameters**

- `port <0-65535>`

<table>
<thead>
<tr>
<th>port &lt;0-65535&gt;</th>
<th>Specify a value from 1 - 65535.</th>
</tr>
</thead>
</table>

**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

**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

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)# show context
ggp 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
```

```
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

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 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 remove-private-AS nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#
```

Related Commands

```
no
```
Includes private ASNs in outbound updates (this is the default setting)
28.8.23 **route-server-client**

- *bgp-neighbor-config commands*

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

**Syntax**
route-server-client

**Parameters**
None

**Examples**
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)#route-server-client

**Related Commands**

| **no** | Disables this BGP neighbor device (or devices using this profile) to act as a route server client |
28.8.24 send-community

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

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]                                  | both — Sends extended and standard community attributes       |
| [extended]                              | extended — Sends extended community attributes only            |
| [standard]                              | standard — Sends standard community attributes only            |

Examples

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

no

Disables sending of the community attribute to the BGP neighbor
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

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)#show context
gp neighbor 192.168.13.99
remove-private-AS
route-server-client
shutdown

nx9500-6C8809(config-profile testNX500-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 administrative shut down of this neighbor</td>
</tr>
</tbody>
</table>
28.8.26 soft-reconfiguration

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

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

**Syntax**
```
strict-capability-match
```

**Parameters**
None

**Examples**
```
nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)# strict-capability-match
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>no</strong></td>
<td>Disables a strict capability match before allowing a connection with this neighbor</td>
</tr>
</tbody>
</table>
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

**Syntax**
```
timers [<0-65535> <0-65535>|connect <0-65535>]
```

**Parameters**
- `timers [<0-65535>|connect <0-65535>]`

<table>
<thead>
<tr>
<th><code>timers &lt;0-65535&gt;</code></th>
<th>Sets the keepalive and holdtime intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;0-65535&gt;</code></td>
<td>Specifies the keepalive interval from 1 - 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><code>&lt;0-65535&gt;</code></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><code>timers connect &lt;0-65535&gt;</code></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><code>&lt;0-65535&gt;</code></td>
<td>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
```
```
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 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

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

nx9500-6C8809(config-device B4-C7-99-6C-88-09-router-bgp-neighbor-192.168.13.99#

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

**Syntax**

update-source <IPv4>

**Parameters**

- update-source <IPv4>

| update-source <IPv4> | Specify the BGP enabled neighbor’s IPv4 address. |

**Examples**


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
  strict-capability-match
  timers connect 20
  timers 20 40
  allows-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**

| 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

### Syntax

```
```

### Parameters


<table>
<thead>
<tr>
<th>Description</th>
<th>Use Case</th>
</tr>
</thead>
</table>
| Uses predefined and configured filters with this neighbor                   | `uses [distribute-list <BGP-IP-ACL-NAME>]|filter-list <AS-PATH-LIST-NAME>|prefix-list <IP-PREFIX-LIST-NAME>|route-map <BGP-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
```

### 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

Syntax

weight <0-65535>

Parameters

- weight <0-65535>

| weight <0-65535> | Specifies a relative weightage for all routes learned from this neighbor. Specify a value from 0 - 65535. |

Examples

nx9500-6C8809(config-profile testNX45XX-router-bgp-neighbor-192.168.13.99)# weight 10

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 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 weight 10

Related Commands

| no | Reverts to default value |
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.

The 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)#
```

CMP Policy Mode commands:
```
cmp ca-server              CMP CA Server configuration commands
cert-renewal-timeout      Trigger a cert renewal request on timeout
cert-update               Enable cert renewal of certificate when about to expire
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`
29.1 crypto-cmp-policy-instance

Table 29.1 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-renewal-timeout</td>
<td>Configures a certificate renewal timeout in days</td>
<td>page 29-5</td>
</tr>
<tr>
<td>cert-update</td>
<td>Enables/disables certificate renewal on a device whose certificate is about to expire</td>
<td>page 29-6</td>
</tr>
<tr>
<td>subjectAltName</td>
<td>Configures an alternate subject name for this CMP policy</td>
<td>page 29-7</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 29-8</td>
</tr>
<tr>
<td>use</td>
<td>Associates a device’s autogen-uniqueid with this crypto CMP policy</td>
<td>page 29-10</td>
</tr>
<tr>
<td>no</td>
<td>Removes the crypto CMP policy settings</td>
<td>page 29-11</td>
</tr>
</tbody>
</table>
29.1.1 ca-server

Configures the primary and secondary CA server details.

A CA is a network authority that generates and issues digital certificates in response to requests received from network devices.

The CA is an external, trusted third-party server. 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, AP81XX, AP82XX, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
ca-server [primary|secondary] host <IP/HOSTNAME> port <PORT-NUMBER> path <PATH>
```

Parameters

- `ca-server [primary|secondary] host <IP/HOSTNAME> port <PORT-NUMBER> path <PATH>`

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`ca-server [primary</td>
<td>secondary]`</td>
</tr>
<tr>
<td><code>host &lt;IP/HOSTNAME&gt;</code></td>
<td>Configures IP address or hostname of the device hosting the primary/secondary CA server</td>
</tr>
<tr>
<td><code>port &lt;PORT-NUMBER&gt;</code></td>
<td>Configures the port on which the primary/secondary CA server can be reached</td>
</tr>
<tr>
<td><code>path &lt;PATH&gt;</code></td>
<td>Configures the path or filename of the primary/secondary CA certificate. Enter the complete relative path to the file on the server.</td>
</tr>
</tbody>
</table>

Note: The secondary CA is used in case the primary CA server is not reachable. CA server settings are required to complete CMP requests.

Examples

```
ap6522-D8273A(config-cmp-policy-CMP)#ca-server primary host 192.168.8.74 port 8 path cmp
nap6522-D8273A(config-cmp-policy-CMP)#show context
crypto-cmp-policy CMP
crypto-cmp-policy-CMP primary host 192.168.8.74 port 8 path cmp
nap6522-D8273A(config-cmp-policy-CMP)#
```

Related Commands

```
no
```
Removes the configured primary/secondary CA server details
29.1.2 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, AP81XX, AP82XX, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

cert-renewal-timeout <DAYS>

Parameters
- cert-renewal-timeout <DAYS>

<table>
<thead>
<tr>
<th>cert-renewal-timeout &lt;DAYS&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;DAYS&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

ap6522-D8273A(config-cmp-policy-CMP)#cert-renewal-timeout 60
ap6522-D8273A(config-cmp-policy-CMP)#

ap6522-D8273A(config-cmp-policy-CMP)#show context
crypto-cmp-policy CMP
  cert-renewal-timeout 60
  ca-server primary host 192.168.8.74 port 8 path cmp
ap6522-D8273A(config-cmp-policy-CMP)#

Related Commands

no | Reverts the certificate renewal timeout to default (14 days)
29.1.3 cert-update

crypto-cmp-policy-instance

Enables/disables certificate renewal on a device whose certificate is about to expire

Supported in the following platforms:

- Access Points — AP622, AP650, AP6522, AP6532, AP71XX, AP81XX, AP82XX, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

cert-update

Parameters

None

Examples

ap6522-D8273A(config-cmp-policy-CMP)#cert-update
ap6522-D8273A(config-cmp-policy-CMP)#

ap6522-D8273A(config-cmp-policy-CMP)#show context
crypto-cmp-policy
  cert-update
  ca-server primary host 192.168.8.74 port 8 path cmp
  cert-renewal-timeout 60
ap6522-D8273A(config-cmp-policy-CMP)#

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disables certificate renewal</td>
</tr>
</tbody>
</table>
29.1.4 subjectAltName

Cryptograms the subjectAltName identity for this CMP policy.

Supported in the following platforms:

- Access Points — AP622, AP650, AP6522, AP6532, AP6562, AP71XX, AP81XX, AP82XX, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

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>]

Examples

ap6522-D8273A(config-cmp-policy-CMP)#subjectAltName dn TechPubsCA
ap6522-D8273A(config-cmp-policy-CMP)#

ap6522-D8273A(config-cmp-policy-CMP)#show context
crypto-cmp-policy CMP
cert-update
cert-renewal-timeout 60
cache-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.
29.1.5 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, AP81XX, AP82XX, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

Syntax

```
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=MOTOROLASOLUTIONS.COM,O=Motorola Solutions" secret 0 test-secret reference-id 123456 sender-name "CN=MOTOROLASOLUTIONS.COM,O=Motorola Solutions" recipient-name "O=Motorola Solutions, CN=Moto.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
ca-server primary host 192.168.8.74 port 8 path cmp
trustpoint cmp-test subject-name "CN=MOTOROLASOLUTIONS.COM,O=Motorola Solutions" secret 0 test-secret reference-id 123456 sender-name "CN=MOTOROLASOLUTIONS.COM,O=Motorola Solutions" recipient-name "O=Motorola Solutions, CN=Moto.com"
subjectAltName dn TechPubsCA
ap6522-D8273A(config-cmp-policy-CMP)#

Related Commands

| no | Removes the trustpoint associated with this crypto CMP policy |
29.1.6 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 5.5 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:

```
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, AP81XX, AP82XX, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
use autogen-uniqueid
```

**Parameters**
- `use autogen-uniqueid`

**Examples**

```
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
cia-server primary host 192.168.8.74 port 8 path cmp
trustpoint cmp-test subject-name "CN=MOTOROLASOLUTIONS.COM,O=Motorola Solutions" secret
0 test-secret reference-id 123456 sender-name "CN=MOTOROLASOLUTIONS.COM,O=Motorola Solutions" recipient-name "O=Motorola Solutions, CN=Moto.com"
subjectAltName dn TechPubsCA
```

**Related Commands**

```
no
```

Removes the device’s autogen-uniqueid associated with this crypto CMP policy.
29.1.7 **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, AP81XX, AP82XX, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```plaintext
no [ca-server|cert-renewal-timeout|cert-update|subjectAltName|trustpoint|use]
```

**Parameters**

- no [ca-server|cert-renewal-timeout|cert-update|subjectAltName|trustpoint|use]

<table>
<thead>
<tr>
<th>no ca-server</th>
<th>Removes the configured CA server</th>
</tr>
</thead>
<tbody>
<tr>
<td>no cert-renewal-timeout</td>
<td>Reverts the certificate renewal timeout to default (14 days)</td>
</tr>
<tr>
<td>no cert-update</td>
<td>Disables certificate renewal on a device’s whose certificate is about to expire</td>
</tr>
<tr>
<td>no subjectAltName</td>
<td>Removes the configured subjectAltName identity used with this certificate renewal request</td>
</tr>
<tr>
<td>no trustpoint</td>
<td>Removes the trustpoint associated with this crypto CMP policy</td>
</tr>
<tr>
<td>no use</td>
<td>Removes the device’s autogen-uniqueid associated with this crypto CMP policy</td>
</tr>
</tbody>
</table>

**Examples**

```plaintext
ap6522-D8273A(config-cmp-policy-CMP)# show context
cert-update
cert-renewal-timeout 60
use autogen-uniqueid
cascade primary host 192.168.8.74 port 8 path cmp
default trustpoint cmp-test subject-name "CN=MOTOROLASOLUTIONS.COM,O=Motorola Solutions" secret 0 test-secret reference-id 123456 sender-name "CN=MOTOROLASOLUTIONS.COM,O=Motorola Solutions" recipient-name "O=Motorola Solutions, CN=Moto.com"
sbjectAltName dn TechPubsCA
```

```plaintext
ap6522-D8273A(config-cmp-policy-CMP)# no cert-renewal-timeout
ap6522-D8273A(config-cmp-policy-CMP)# no subjectAltName
```

**Related Commands**

<table>
<thead>
<tr>
<th><strong>ca-server</strong></th>
<th>Configures the CA server details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>cert-renewal-timeout</strong></td>
<td>Configures a certificate renewal timeout in days.</td>
</tr>
<tr>
<td><strong>cert-update</strong></td>
<td>Enables/disables certificate renewal on a device whose certificate is about to expire</td>
</tr>
<tr>
<td><strong>subjectAltName</strong></td>
<td>Configures the subjectAltName identity for the certificate renewal request</td>
</tr>
</tbody>
</table>
### trustpoint

<table>
<thead>
<tr>
<th>trustpoint</th>
<th>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</th>
</tr>
</thead>
</table>

### use

| use | Associates a device's autogen-uniqueid with this crypto CMP policy |
29.2 other-cmp-related-commands

Table 29.2 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><code>use</code></td>
<td>Associates a crypto CMP policy with a device</td>
<td>page 29-14</td>
</tr>
<tr>
<td><code>show</code></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, AP81XX, AP82XX, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
use crypto-cmp-policy <CRYPTO-CMP-POLICY-NAME>
```

**Parameters**

- `use crypto-cmp-policy <CRYPTO-CMP-POLICY-NAME>`

**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 write
```
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, AP81XX, AP82XX, WiMod
- Wireless Controllers — RFS4000, RFS6000, RFS7000
- Service Platforms — NX4500, NX4524, NX6500, NX6524, NX9000, NX9500, NX9510

**Syntax**

```
show crypto [cmp|pki]
show crypto cmp request status
show crypto pki trustpoints
```

**Parameters**

- `show crypto cmp request status`
- `show crypto pki trustpoints`

**Examples**

```
ap6522-D8273A#show crypto pki trustpoints
---------------------------------------------------------------------------------------
---------------------------------
TRUSTPOINT                     KEY NAME                               VALID UNTIL
---------------------------------------------------------------------------------------
---------------------------------
cmp-test                           cmp-test-key                      Fri May  9 09:44:22 2014 GMT
default-trustpoint               default_rsa_key                   Fri Dec 30 00:00:40 2022 GMT
---------------------------------------------------------------------------------------

ap6522-D8273A#
ap6522-D8273A(config)#show crypto cmp request status
CMP Request Status:   cmp-complete
```

```
This chapter summarizes firewall logging commands in the CLI command structure.

The firewall uses logging to send system messages to one or more logging destinations, where they can be collected, archived and reviewed.

Set the logging level to define which messages are sent to each of the target destinations.

Logging messages can be sent to any of the following destinations:

- The firewall console
- Telnet or SSH session to the firewall
- A temporary buffer internal to the firewall
- Syslog server
- E-mail addresses
- An FTP server
### 30.1 Firewall Log Terminology and Syslog Severity Levels

<table>
<thead>
<tr>
<th><strong>Abbreviation</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>FTP</td>
<td>File transfer protocol</td>
</tr>
<tr>
<td>ACL</td>
<td>Access control list</td>
</tr>
<tr>
<td>Src MAC</td>
<td>Source MAC address</td>
</tr>
<tr>
<td>Dest MAC</td>
<td>Destination MAC address</td>
</tr>
<tr>
<td>LOGRULEHIT</td>
<td>ACL rule applied</td>
</tr>
<tr>
<td>PKT DROP</td>
<td>Packet drop</td>
</tr>
<tr>
<td>Src IP</td>
<td>Source IP address</td>
</tr>
<tr>
<td>Dest IP / Dst IP</td>
<td>Destination IP address</td>
</tr>
<tr>
<td>FWSTARTUP</td>
<td>Firewall enabled</td>
</tr>
<tr>
<td>DP</td>
<td>Destination port</td>
</tr>
<tr>
<td>SP</td>
<td>Source port</td>
</tr>
<tr>
<td>Matched Temporary Rule</td>
<td>This is an internal rule created to allow data traffic</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Syslog Severity Level as Message</strong></th>
<th><strong>Severity Level as Numeric</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>emergency</td>
<td>0</td>
<td>System is unusable</td>
</tr>
<tr>
<td>alert</td>
<td>1</td>
<td>Immediate action needed</td>
</tr>
<tr>
<td>critical</td>
<td>2</td>
<td>Critical condition</td>
</tr>
<tr>
<td>error</td>
<td>3</td>
<td>Error condition</td>
</tr>
<tr>
<td>warning</td>
<td>4</td>
<td>Warning condition</td>
</tr>
<tr>
<td>notification</td>
<td>5</td>
<td>Normal but significant condition</td>
</tr>
<tr>
<td>informational</td>
<td>6</td>
<td>Informational message</td>
</tr>
<tr>
<td>debugging</td>
<td>7</td>
<td>Debugging message</td>
</tr>
</tbody>
</table>

#### 30.1.1 Date format in Syslog messages

The following output displays the wireless controller date in proper format:

```
**rfs7000-37FABE(config)#Feb 07 11:09:00 2013: USER: cfgd: deleting session 4**
rfs7000-37FABE
**rfs7000-37FABE#**
rfs7000-37FABE(config)#Feb 07 11:09:17 2013: USER: cfgd: deleting session 5
```

The date format is Month <MMM> Date <DD> Time <HH:MM:SS> Year <YYYY>

- Month is Feb
- Date is 07
- Time is 11:09:00
- Year is 2013
To generate a date log, enable logging

For example, the following command has to be executed:

```
rfs7000-37FABE#clock set 11:09:17 07 Feb 2013
rfs7000-37FABE#
```

### 30.1.2 FTP data connection log

An ACL rule has to be applied and logging has to be enabled to generate a FTP data collection log.

**The FTP connection is Control Connection**

Feb 07 11:10:17 2013: %DATAPLANE-5-LOGRULEHIT: Matched ACL:ftpuser:ip Rule:0 Disposition:Allow Packet  Src MAC:<00-19-B9-6B-DA-77> Dst MAC:<00-15-70-81-91-6A> Ethertype:0x0800 Src IP:192.168.1.99 Dst IP:192.168.2.102 Proto:6 Src Port:3014 Dst Port:21 Date is Feb 07 Time is 11:10:17 Year is 2013 Module name is DATAPLANE Syslog Severity level is 5 Log ID is LOGRULEHIT Log Message is Matched ACL The Matching ACL is FTPuser IP Rule sequence number is 0 Disposition is Allow Packet Source MAC Address is 00-19-B9-6B-DA-77 Destination MAC Address is <00-15-70-81-91-6A> Ethertype is 0x0800 Source IP Address is 192.168.1.99 Destination IP Address is 192.168.2.102 Protocol Type is 6 Source Port is 3014 D Destination Port is 21

**The Data Connection in Active Mode**


**The Data Connection in Passive Mode**


For example,

```
rfs7000-37FABE(config-mac-acl-test)#permit any any log rule-precedence 25
rfs7000-37FABE(config-mac-acl-test)#
```

### 30.1.3 UDP packets log

In both DHCP release and DHCP renew scenarios, the destination port 67 is logged.

**DHCP Release**


---

**NOTE:** The same terminology is used across all logs.
DHCP Renew
To generate a UDP packet log, an ACL rule has to be applied to UDP packets, and logging has to be enabled.
For example,
rfs7000-37FABE(config-ip-acl-test)#permit udp any any log rule-precedence 20
rfs7000-37FABE(config-ip-acl-test)#

30.1.4 ICMP type logs
The example below displays an ICMP Type as 13 and an ICMP Code as 0:
The below example displays an ICMP Type as 15 and an ICMP Code as 0:
The below example displays an ICMP Type as 17 and an ICMP Code as 0:
The below example displays an ICMP Type as 18 and an ICMP Code as 0:
Feb 07 12 01:00:24 2013: %DATAPLANE-5-ICMPPKTDROP: Dropping ICMP Packet from 192.168.1.104 to 192.168.2.102, with ProtocolNumber:1 ICMP code 0 and ICMP type 18. Reason: no flow matching payload of ICMP Reply.
Module name is DATAPLANE
Syslog Severity level is 5
Log ID is ICMPPKTDROP
Log Message is Dropping ICMP Packet
To generate an ICMP log, an ACL rule has to be applied on ICMP packets, and logging has to be enabled.
For example, the following commands have to be executed:
rfs7000-37FABE(config-ip-acl-test)#permit icmp any any log rule-precedence 20
rfs7000-37FABE(config-ip-acl-test)#

30.1.5 ICMP type logs
The following example displays an ICMP Type as 3 and a Code as 3:
Feb 07 12:03:00 2013: %DATAPLANE-5-ICMPPKTDROP: Dropping ICMP Packet from 192.168.1.104 to 192.168.2.102, with ProtocolNumber:1 ICMP code 3 and ICMP type 3. Reason: no flow matching payload of ICMP Error.
Module name is DATAPLANE
Syslog Severity level is 5
Log ID is ICMPPKTDROP
Log Message is Dropping ICMP Packet
The following example displays an ICMP Type as 4 and a Code as 0:

Feb 07 12:04:06 2013: %DATAPLANE-5-ICMPPKTDR: Dropping ICMP Packet from 192.168.1.104 to 192.168.2.102, with ProtocolNumber:1 ICMP code 0 and ICMP type 4. Reason: ICMP dest IP does not match inner source IP.

The following example displays an ICMP Type as 5 and a Code as 0:

Feb 07 12:05:00 2013: %DATAPLANE-5-ICMPPKTDR: Dropping ICMP Packet from 192.168.1.104 to 192.168.2.102, with ProtocolNumber:1 ICMP code 0 and ICMP type 5. Reason: ICMP dest IP does not match inner source IP.

The following example displays an ICMP type as 11 and a Code as 0:

Feb 07 12:06:00 2013: %DATAPLANE-5-ICMPPKTDR: Dropping ICMP Packet from 192.168.2.102 to 192.168.1.103, with ProtocolNumber:1 ICMP code 0 and ICMP type 11. Reason: ICMP dest IP does not match inner source IP.

The following example displays an ICMP type as 14 and a Code as 0:


The following example displays an ICMP type as 16 and a Code as 0:


To generate an ICMP log, logging has to be enabled.

For example, the following command has to be executed:

```
rfs7000-37FABE(config-fw-policy-default)# logging icmp-packet-drop all
```

### 30.1.6 Raw IP Protocol logs

The following example displays a TCP header length as less than 20 bytes:


Module name is DATAPLANE
Syslog Severity level is 4
Log ID is DOSATTACK
Log Message is INVALID PACKET


Module name is DATAPLANE
Syslog Severity level is 5
Log ID is MALFORMEDIP
Log Message is Dropping IPv4Packet

To generate a raw IP protocol log, logging has to be enabled.

For example, the following commands have to be executed:

```
rfs7000-37FABE(config-fw-policy-default)# logging verbose
```

```
rfs7000-37FABE(config-fw-policy-default)# logging malformed-packet-drop all
```

When logging verbose is enabled, the log is displayed as:
30.1.7 Raw IP Protocol logs

The following example displays TCP without data:


To generate a raw IP protocol log, logging has to be enabled.

For example, the following commands have to be executed:

rfs7000-37FABE(config-fw-policy-default)# logging verbose
rfs7000-37FABE(config-fw-policy-default)# logging rawip-packet-drop all

When logging verbose is enabled, the log is displayed as:


Module name is DATAPLANE
Syslog Severity level is 4
Log ID is DOSATTACK
Log Message is INVALID PACKET

30.1.8 Firewall startup log

The following example displays an enabled firewall. A firewall enabled message is displayed in bold.

System bootup time (via /proc/uptime) was 93.42 42.52
Please press Enter to activate this console. Feb 07 12:25:09 2013: %NSM-4-IFUP: Interface vlan2 is up
Feb 07 12:25:09 2013: %NSM-4-IFUP: Interface vlan172 is up
Feb 07 12:25:09 2013: %PM-6-PROCSTART: Starting process "/usr/sbin/lighttpd"
Feb 07 12:25:09 2013: %FILEMGMT-5-HTTPSTART: lighttpd started in external mode with pid 0
Feb 07 12:25:09 2013: %USER-5-NOTICE: FILEMGMT[1086]: FTP: ftp server stopped
Feb 07 12:25:09 2013: %DAEMON-3-ERR: dhcrelay: interface allocate : vlan1
Feb 07 12:25:09 2013: %DAEMON-3-ERR: dhcrelay: interface allocate : vlan1
Feb 07 12:25:09 2013: %DAEMON-3-ERR: dhcrelay: interface allocate : vlan2
Feb 07 12:25:09 2013: %DOT11-5-COUNTRY_CODE: Country of operation configured to in [India]
Feb 07 12:25:09 2013: %DIAG-6-NEW_LED_STATE: LED state message AP_LEDS_ON from module DOT11
Feb 07 12:25:09 2013: %PM-6-PROCSTART: Starting process "/usr/sbin/telnetd"
Feb 07 12:25:09 2013: %AUTH-6-INFO: sshd[1422]: Server listening on 0.0.0.0 port 22.
dataplane enabled
CCB:21:Firewall enabled
Feb 07 12:25:09 2013: %KERN-4-WARNING: dataplane enabled.
Feb 07 12:25:09 2013: %DATAPLAN-5-FWSTARTUP: Firewall enabled.
Feb 07 12:25:09 2013: %PM-6-PROCSTART: Starting process "/usr/sbin/sshd"

30.1.9 Manual time change log
The following example displays the manual time change log. The clock is manually set to Feb 07 12:25:33 2013.
Log change in time
rfs7000-37FABE#show clock
2013-02-07 12:25:33 UTC
rfs7000-37FABE#

rfs7000-37FABE#clock set 12:25:33 07 Feb 2013
Feb 07 12:25:33 2013: %S1]CFGD-6-SYSTEM_CLOCK_RESET: System clock reset, Time: 2013-02-07 12:45:00[S2]

rfs7000-37FABE#show clock
Feb 07 12:45:00 UTC 2013
rfs7000-37FABE#

To generate a time log, logging has to be enabled
For example, the following command has to be executed:

rfs7000-37FABE#clock set 12:45:00 07 Feb 2013
rfs7000-37FABE#

30.1.10 Firewall ruleset log
The following example displays the log changes as 'ACL_ATTACHED_ALTERED' when an ACL Rule is applied/removed on
WLAN, VLAN, GE, and PORT-CHANNEL:

IP ACL IN on WLAN Attach
Feb 07 12:48:40 2013: %CFGD-6-ACL_ATTACHED_ALTERED: USER: root session 3: ACL attached to wlan ICSA-testing is
getting altered

USER: The user who is doing the change
session: means the session id of the user - one user can have multiple sessions running, so this explains from which session
this change was done
ACL: Name of the ACL that has rules added/deleted
IP ACL IN on WLAN Remove

IP ACL OUT on WLAN Attach

IP ACL OUT on WLAN Remove

MAC ACL IN on WLAN Attach

MAC ACL IN on WLAN Remove

MAC ACL OUT on WLAN Attach
Feb 07 12:49:00 2013: %CFGD-6-ACL_ATTACHED_ALTERED: USER: root session 3: ACL attached to wlan ICSA-testing is getting altered.

MAC ACL OUT on WLAN Remove
Feb 07 12:49:06 2013: %CFGD-6-ACL_ATTACHED_ALTERED: USER: root session 3: ACL attached to wlan ICSA-testing is getting altered.

IP ACL on VLAN Attach

IP ACL on VLAN Remove

IP ACL on GE Port Attach

IP ACL on GE Port Remove

MAC ACL on GE Port Attach

MAC ACL on GE Port Remove

IP ACL on Port-Channel Attach
Feb 07 12:49:30 2013: %CFGD-6-ACL_ATTACHED_ALTERED: USER: root session 3: ACL attached to interface port-channel1 is getting altered.

**IP ACL on Port-Channel Remove**

Feb 07 12:50:00 2013: %CFGD-6-ACL_ATTACHED_ALTERED: USER: root session 3: ACL attached to interface port-channel1 is getting altered.

**MAC ACL on Port-Channel Attach**

Feb 07 12:50:01 2013: %CFGD-6-ACL_ATTACHED_ALTERED: USER: root session 3: ACL attached to interface port-channel1 is getting altered.

**MAC ACL on Port-Channel Remove**

Feb 07 12:50:05 2013: %CFGD-6-ACL_ATTACHED_ALTERED: USER: root session 3: ACL attached to interface port-channel1 is getting altered.

**Rule added / deleted from IP/MAC ACL**

Feb 26 20:32:56 2013: %CFGD-6-ACL_RULE_ALTERED: USER: admin session 3: ACL foo rule is getting altered.

### 30.1.11 TCP Reset Packets log

For any change in the TCP configuration, a TCP reset log is generated. The following example displays the initial TCP packets permitted before the session timedout:


### 30.1.12 ICMP Destination log

The following example displays an ICMP destination as unreachable when no matching payload is found:


To generate an ICMP protocol log, an ACL rule has to be applied and logging has to be enabled.

For example, the following command has to be executed:

```
rfs7000-37FABE(config-ip-acl-test)#permit icmp any any log rule-precedence 20
rfs7000-37FABE(config-ip-acl-test)#
```

### 30.1.13 ICMP Packet log


For example, the following ICMP command has to be executed:
To generate an ICMP protocol log, an ACL rule has to be applied and logging has to be enabled:

```
rfs7000-37FABE(config-ip-acl-test)#permit icmp any any log rule-precedence 20
rfs7000-37FABE(config-ip-acl-test)#
```

### 30.1.14 SSH connection log

A SSH connection is enabled on the wireless controller using factory settings.

Running primary software, version 5.5.1.0-149320X
Alternate software secondary, version 5.5.0.0-048D
Software fallback feature is enabled
System bootup time (via /proc/uptime) was 126.10 92.38
Please press Enter to activate this console. Feb 07 20:47:33 2013: %DOT11-5-COUNTRY_CODE: Country of operation configured to in [India]
Feb 07 20:47:34 2013: %DIAG-6-NEW_LED_STATE: LED state message AP_LEDS_ON from module DOT11
Feb 07 20:47:34 2013: KERN: vlan1: add 01:00:5e:00:00:01 mcast address to master interface.
Feb 07 20:47:34 2013: %NSM-4-IFUP: Interface vlan2 is up
Feb 07 20:47:34 2013: KERN: vlan2: add 01:00:5e:00:00:01 mcast address to master interface.
Feb 07 20:47:34 2013: %NSM-4-IFUP: Interface vlan172 is up
Feb 07 20:47:34 2013: KERN: vlan172: add 01:00:5e:00:00:01 mcast address to master interface.
Feb 07 20:47:34 2013: %DAEMON-3-ERR: dhcrelay: interface allocate: vlan1
Feb 07 20:47:34 2013: %PM-6-PROCSTART: Starting process "/usr/sbin/sshd"
Feb 07 20:47:34 2013: %DAEMON-3-ERR: dhcrelay: idataplane enabled
Interface allocatCCB:21:Firewall enabled
Interface : vlan1
Feb 07 20:47:34 2013: %DAEMON-3-ERR: dhcrelay: interface allocate : vlan2
Feb 07 20:47:34 2013: %KERN-4-WARNING: dataplane enabled.
Feb 07 20:47:34 2013: %DATAPLANE-5-FWSTARTUP: Firewall enabled.

### 30.1.15 Allowed/Dropped Packets Log

The following example displays disposition information regarding allow/deny packets:

**Allow Packets**

```
```

Drop/Deny Packets


To generate an allow/deny protocol log, an ACL rule has to be applied and logging has to be enabled.

For example, the following commands have to be executed:

```bash
rfs7000-37FABE(config-ip-acl-test)#permit ip any any log rule-precedence 20
rfs7000-37FABE(config-ip-acl-test)#
rfs7000-37FABE(config-ip-acl-test)#deny ip any any log rule-precedence 20
rfs7000-37FABE(config-ip-acl-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

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 wireless controller has the latest firmware version.
- It is assumed the AP650 and AP71XX access points also have the latest firmware version.
- 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.

![Network Design Diagram]

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

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

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: motorola

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

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)#
```

```bash
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
```

---

**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
```

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
```

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
```

```bash
rfs4000(config-profile-RFS4000_UseCase1)#
```
Exit the profile and save it.

```
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.

```
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:

```
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.

```
rfs4000(config-wlan-1)#ssid WLAN_USECASE_01
```

Enable the SSID to be broadcast so wireless clients can find it and associate.

```
rfs4000(config-wlan-1)#broadcast-ssid
```

Associate VLAN 2 to the WLAN and exit.

```
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.

```
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:

```
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.

```
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.

```
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.

```
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.

```
rfs4000(config-profile-AP650_UseCase1)#interface radio 1
rfs4000(config-profile-AP650_UseCase1-if-radio1)#wlan 1
rfs4000(config-profile-AP650_UseCase1-if-radio1)#exit
rfs4000(config-profile-AP650_UseCase1)#interface radio 2
rfs4000(config-profile-AP650_UseCase1-if-radio2)#wlan 1
rfs4000(config-profile-AP650_UseCase1-if-radio2)#exit
rfs4000(config-profile-AP650_UseCase1)#
```

Commit the changes made to this profile and exit.

```
rfs4000(config-profile-AP650_UseCase1)#commit write
rfs4000(config-profile-AP650_UseCase1)#exit
```

**Apply this Profile to the Discovered AP650**

Access the discovered access point using the following command. The discovered device's MAC address is used to access its context.

```
rfs4000(config)#ap650 00-A0-F8-00-00-01
rfs4000(config-device-00-A0-F8-00-00-01)#
```

Assign the AP profile to this AP650 access point.

```
rfs4000(config-device-00-A0-F8-00-00-01)#use profile AP650_UseCase1
rfs4000(config-device-00-A0-F8-00-00-01)#commit write
```

**Apply the RF Domain profile to the AP**

Apply the previously created RF Domain to enable a country code to be assigned to the discovered access point. A discovered access point only works properly if its country code is the country code of its associated wireless controller.

```
rfs4000(config-device-00-A0-F8-00-00-01)#use rf-domain RFDOMAIN_UseCase1
rfs4000(config-device-00-A0-F8-00-00-01)#commit write
rfs4000(config)#
```

### A.1.3.4.2 Creating an AP71XX Profile

**Creating an AP Profile**

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
rfs4000(config-profile-AP7131_UseCase1-if-radio1)#exit
rfs4000(config-profile-AP7131_UseCase1)#interface radio 2
rfs4000(config-profile-AP7131_UseCase1-if-radio2)#wlan 1
rfs4000(config-profile-AP7131_UseCase1-if-radio2)#exit
```

Commit the changes made to the profile and exit this context.

```
rfs4000(config-profile-AP7131_UseCase1)#commit write
rfs4000(config-profile-AP7131_UseCase1)#exit
```

**Apply this Profile to the Discovered AP71XX**

Access the discovered access point using the following command. The discovered device's MAC address is used to access its context.

```
rfs4000(config)#ap7131 00-23-68-16-C6-C4
```

Assign the AP profile to this access point.

```
rfs4000(config-device-00-23-68-16-C6-C4)#use profile AP7131_UseCase1
```

**Apply the RF Domain profile to the AP**

Apply the previously created RF Domain to enable a country code to be assigned to the discovered access point. A discovered access point only works properly if its country code is the same as its associated wireless controller.

```
rfs4000(config-device-00-23-68-16-C6-C4)#use rf-domain RFDOMAIN_UseCase1
```

**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)#
```
Table A.1 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-pool-DHCP_POOL_USECASE1_01)#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 these products:

**Access Points**
- AP8232
- AP8222
- AP8132
- AP8122
- AP7181
- AP7161
- AP7131
- AP6562
- AP6532
- AP6521
- AP6522
- AP6511
- AP650
- AP622
- AP621

**Wireless Switches**
- NX9510
- NX9500
- NX9000
- NX6500
- NX6524
B.2 Open Source Software Used

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(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.

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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.

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.

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.

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.

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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.)

Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a
copy of the library already present on the user's computer system, rather than copying library functions into the executable,
and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is
interface-compatible with the version that the work was made with.

Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in
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If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above
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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.

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Version 2.1, February 1999

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For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users’ freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

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"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.

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   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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5. 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.

6. 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.

7. 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.

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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. Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at runtime a copy of the library already present on the user’s computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.
c. 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.

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e. 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.

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Version 3, 29 June 2007

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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
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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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.

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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.

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   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.

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* 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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