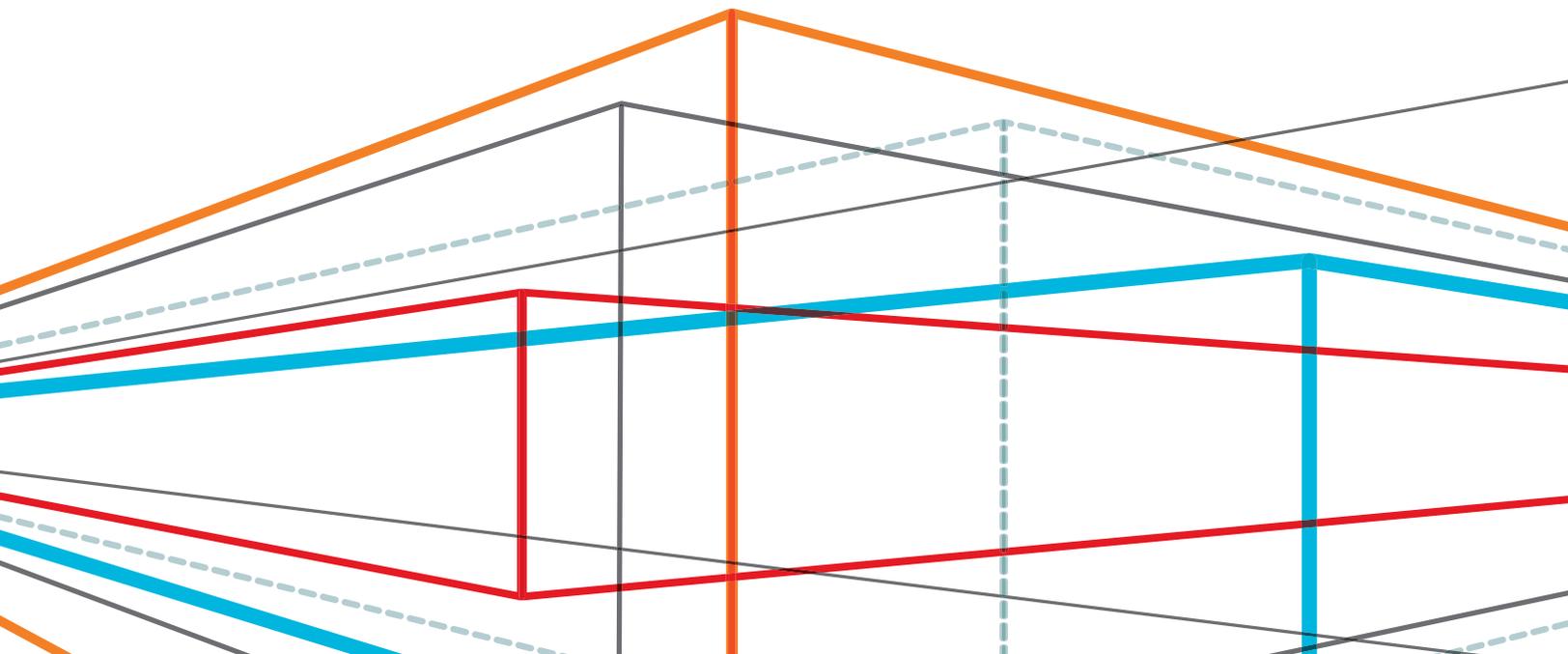


ZEBRA ACCELERATES YOUR PATH TO THE
INTERNET OF THINGS:
Create a Visible Value Chain across your
critical business operations



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ZEBRA ACCELERATES YOUR PATH TO THE INTERNET OF THINGS

CREATE A VISIBLE VALUE CHAIN ACROSS YOUR CRITICAL BUSINESS OPERATIONS

Executive Summary

Enterprises are looking at the advent of Big Data as a vast mine to gain deeper, more actionable insight into their operations and processes, and do more with less. The richness of Big Data is more than just the volume of data, but also the velocity and value of the data. Before organizations can place this data into actionable form, it must be universally accessible throughout the value chain.

The Internet of Things (IoT) contributes to the stream of data that organizations will store and mine by enabling interconnectivity of Internet-aware devices. This ecosystem of connectivity helps provide enterprises with deep visibility into their organizations' operational events, accessible through the Cloud, anytime, anywhere and in-between. While IoT is gaining momentum, Executive-level decision makers must prepare to address the technology and service implications of deploying IoT solutions.

In doing so, enterprises face several obstacles. First, IT complexity is often a barrier to success and requires a method to connect sensors and actuators to the Cloud in a standard, uniform way. Device management is often cumbersome and often the task requires proprietary tools. Last, connecting legacy devices—the backbone of most organizations—presents unique challenges.

In this paper, Zebra shows how to accelerate the path to IoT through the Visible Value Chain (VVC). It enables organizations to gain real-time visibility into their operations allowing them to be more nimble, agile, and make better-informed business decisions. Once organizations have seamlessly enabled device connection to the data center, they can see events occurring throughout their value chain in real time—and act upon them. Doing so creates new value and intelligence from both legacy and new devices, while mining the vast riches of Big Data.

INTRODUCTION

When it comes to proactive decision making, having access to accurate business intelligence in near real time is vital. Meeting this goal requires connectivity and visibility of smart devices—the Internet of Things (IoT). With the focus on better and more actionable business analytics, interest in IoT solutions is rapidly gaining momentum, especially when they are Cloud-ready and accessible across the enterprise and beyond.

Businesses for the past 15 years have been adopting a wide range of smart device technologies to improve visibility into processes and operations. The vast majority of these devices include barcodes, Radio Frequency Identification (RFID), Global Positioning System (GPS), and environmental sensors. More recently, Real-Time Locating Systems (RTLS) have also joined the IoT mix for monitoring and communicating the status and movement of physical assets to mitigate business problems.

Deep Visibility and Analytics

IoT-enabled devices are becoming a key method for providing “right now” visibility into supply chains, distribution centers, land and seaports, and for helping to secure facilities, indoor and outdoor. These devices are also prevalent in very tight process-driven tasks where instantaneous feedback and control are essential, including the energy sector. Businesses can use this deep visibility to eliminate inefficiencies in industries such as manufacturing, healthcare, transportation, energy, and retail.

IoT can help identify, locate, or measure the condition of assets, people, or transactions within a facility. For example, RFID and RTLS tags allow organizations to quickly track and locate high value items such as tools, large assemblies, and vehicles. Businesses can use this data to optimize processes, reduce shrinkage, and provide better security and safety throughout the workplace. Deep visibility into mission critical opera-

tions provides the measureable metrics enabling the enterprise to make better-informed decisions and inspire innovation.

For an IoT initiative to be successful, accurate, current business data and supply chain events must be visible both internally and through the Cloud. Visibility across

operations, supply chains, and business partners enables streamlined processes and operations that can help drive better customer service and loyalty. Tighter processes can mean faster inventory turns, reducing the need for on-hand inventory. Eliminating waste and improving asset tracking can boost product quality while reducing OPEX and CAPEX.

ACHIEVING DEEP VISIBILITY IS PRIORITY NUMBER ONE

Multiple Industries, Unique Challenges

Manufacturing

In the manufacturing industry, supply chains span geographical regions and depend on a web of suppliers, distributors, and planners. Each link in the supply chain can create inefficiencies and cost challenges that ripple throughout the logistics, warehousing and manufacturing process. Making operations more efficient, especially when related to energy and labor costs, not only requires visibility into individual processes, but also interconnectivity and visibility across the entire business ecosystem.

Manufacturers have materials arriving at multiple sites from suppliers around the world. Likewise, their finished goods ship to retailers and consumers globally. This creates additional logistical visibility requirements that must be met to avoid additional costs, long lead times, and poor customer service. Achieving the visibility goal calls for solutions that reduce IT complexities, connects legacy devices, and that are truly mission-critical ready.

Retail

The retail industry faces logistical difficulties similar to the manufacturing industry, and is even more cost-constrained. Maintaining the right level of inventory while tracking and tracing every product requires real-time visibility into both the supply chain and inventories. For large retail chains, the challenge is even greater. Maximizing inventory turns, improving employee efficiency and sales strategies while enhancing the customer experience requires system collaboration and scalability that can span across geographical regions.

What's more, retailers are seeking better ways to bridge their online presence with traditional bricks-and-mortar stores through cross-channel selling. Having the ability to collect information, at every point when-

ever data changes status—from the manufacturer, through the distributor, to the sales floor—is significant. Coupling this data with sales and marketing metrics collected from point-of-sale (POS) devices and smartphones can pay big dividends in driving customer loyalty programs. When properly implemented, retailers can link their smart devices together with their data center and capitalize on each facet of Big Data.

Healthcare

Heavily regulated and moving to further digitization, the healthcare industry faces major hurdles in the drive to improve patient safety, enhance worker efficiency, and rein in costs. Electronic Health Records (EHRs) adoption paves the way for maintaining detailed, accurate, and life-long individual patient records. In addition, medical facilities leverage RFID tags to achieve 100 percent asset visibility, which helps reduce theft, optimize response times, and improve asset utilization by medical staff.

Healthcare staff increasingly use the data generated from barcodes on patient wristbands, medications, laboratory orders/results and other diagnostic tests in various hospital departments to positively verify patient identity. Ensuring the right medication dose to the right patient at the right time requires verifiable visibility and precise accuracy. With the right IoT solution, healthcare professionals can integrate with EHR systems, minimizing medication and laboratory errors, while maximizing patient safety and improving the quality of care.

A recent survey reported that 85 percent of respondents agreed that smart interconnected devices provide the necessary visibility to drive more effective, timely business decisions and improve customer interactions.¹ The Big Data information collected from IoT solutions can enable more informed decision-making, improve operational processes through real-time analytics, and keep IT costs in check.

¹ Forrester Research, Inc., "Building Value from Visibility," October 2012.

FIRST, ENTERPRISES MUST ADDRESS SEVERAL IOT CHALLENGES

With 53 percent of surveyed enterprises planning to implement IoT solutions within the next 24 months, it is clear IoT momentum is reaching critical mass. However, a successful IoT deployment must address several challenges to return the most value from Big Data.

Complexity

An IoT deployment is similar to any other complex set of technology—but with potentially more moving parts. Planning, integrating, and testing the ecosystem and ensuring it is mission-critical ready is no easy task. Specifying and connecting sensors and actuators to the Cloud in a standard, uniform way is difficult because device manufacturers often use protocols and firmware optimized for that particular device. This complexity is often a barrier to success, and adds risk and costs.

Connectivity and Legacy Devices

Forrester Research points out that there is no unified interconnection standard to enable seamless integration across IoT devices, applications, and services in all vertical markets.² While a growing range of sophisticated sensors and actuators are now capable of connecting to Wi-Fi®, ZigBee®, Bluetooth®, and other networks by design, the vast majority of devices in the field are capable of only very basic LAN connectivity. And very few of these devices are truly Internet-aware. These at-the-edge legacy devices include hard-wired sensors, PLCs using their own communication protocols, and often form the backbone of large-scale operations in heavy industries, energy production and distribution, and transportation and logistics. Integrating legacy devices to an IoT ecosystem and the Cloud requires intermediate-edge boxes, which upgrade the capabilities of legacy devices without replacing them.

Device Management

The growing availability of devices at-the-edge creates a need to manage many different types of information sources, with different formats, frequency of updates, quality, and reliability. Device management is often cumbersome and complex, performing service and maintenance tasks online requires proprietary tools. Currently, applications can only consume specific data feeds from the field and support only specific process needs. The result falls far short of providing end-to-end visibility. There is a clear need to add a layer of middleware that simplifies and streamlines all this information, creates a “single pane of glass” interface for all IoT devices, and securely provides it to enterprise applications.

Teaming with the Right IoT Solution Partner

Most IT departments simply do not have the resources or expertise to enable a complete IoT solution that scales and delivers top value. In addition, enterprises are looking for pricing and business flexibility, with proven CAPEX/OPEX models that are applicable to their unique needs. Rather than risk failure, forward-thinking enterprises are seeking IoT solution implementation assistance from device manufacturers.

C-level decision makers realize that firms specializing in the design and creation of enabling technologies such as barcodes, sensors, RFID tags, and GPS devices are the optimal partners for IoT solution implementations. Research demonstrates that 66 percent of surveyed organizations turn to device manufacturers for help with implementing IoT solutions.³ Achieving the IoT vision requires a solution provider that understands the complexities of diverse component integration, and brings to the table proven domain expertise from a wide range of vertical markets.

² Forrester Research, Inc., “Prepare I&O For The ‘Internet Of Things’,” April 11, 2013.

³ Forrester Research, Inc., “Building Value from Visibility,” October 2012.

THE VISIBLE VALUE CHAIN CREATES INSIGHTS, INNOVATION, AND NEW VALUE

When it comes to operations across all industries and organizational sizes, systems that are mission critical and mission ready are what help you move your enterprise forward. Meeting that objective calls for an IoT ecosystem that serves your unique business needs and works with all classes of wireless and wired devices.

The IoT ecosystem must connect to the Cloud seamlessly, securely—anytime, anywhere and in-between. It should support applications for all tasks, on all devices, and reduce, not increase, complexity. It should also drive innovation by allowing developers to connect to the system and create their own applications, in total freedom and independence.

Zebra Allows You to See More and Do More

Zebra's 40-year history and resulting network of trusted partners positions Zebra squarely in place to help pave your path to IoT success. Zebra's extensive portfolio of asset-tracking, location, and printing technologies, including barcode, passive and active RFID, and RTLS—along with unmatched domain expertise—turns the physical into the digital to give operational events a virtual voice. This enables you to know the real-time location, condition, timing and accuracy of the events occurring throughout your value chain. Once you can see the events, you have the opportunity to create new value from what is already there. We call it the Visible Value Chain.

Consider some of the benefits of IoT built upon the Visible Value Chain foundation:

- Improve quality with prediction of failure feedback and analysis
- Create a standards-based integration platform that delivers faster time to market and value
- Develop pre-built integrations for business intelligence and real-time analytics

- Optimize lifecycle management while lowering operational costs
- Reduce product testing costs
- Accelerate the innovation cycle for new smart devices, device-to-device (D2D) and Telematics services
- Protect critical data and comply with regulatory requirements
- Build a comprehensive security framework for writing applications, and a set of tools to securely manage applications including secure communication, authentication, and access control
- Rapidly deploy applications, which enables organizations to reduce development and operational costs across a wide range of device/OS combinations and data centers

Uniquely poised to bring the connected world to enterprise, Zebra Technologies translates this data into functionality that reflects known business needs. It also addresses critical concerns like enterprise-level security and the adoption of the most up-to-date standards applied by banks and government agencies, or compliance mandates that uniquely impact your organization.

A successful IoT deployment requires solid connectivity, simple scalability, and collaboration at every point. To help you choose the right IoT-enabling solution, Zebra has identified four essentials to consider:

- **Connected Devices** – IoT systems should support both legacy and new smart devices. They should work with diverse wireless and wired devices that connect to the Cloud directly through WAN or through LAN.

- **Internet Access Everywhere** – The system should deliver seamless support of multiple connectivity options, such as wired and wireless, and increasingly 4G plus LTE wide-area environments.
- **Easy Remote Device Management** – The system should offer centralized and remote device management through easy-to-use tools that allow provisioning, device setup, and maintenance tasks.
- **Application Connectivity** – The system should offer consistent, open application programming interfaces (API's) between a wide range of devices, while affording easy scalability and connectivity to the data center.

The IoT can help your organization breathe new value into legacy devices. It illuminates operational events involving assets, people, and transactions, enabling the enterprise to realize the true promise of Big Data, while providing visibility both internally and from the Cloud.

Once organizations can see the events happening in their value chain in real time, they can act upon them, creating new value from what is already there. This new business intelligence provides fresh insight to inspire innovation throughout the organization, and helps them find new ways to operate more efficiently, more cost-effectively, and ultimately build stronger customer loyalty.

SUMMARY AND CONCLUSION

Everyone wants to be connected, to live in a world where systems work seamlessly together to save time and where enterprises have an omniscient view and can leverage the full potential of Big Data. When decision makers have access to accurate business intelligence in near real time, they can take proactive action, optimize processes, and accelerate innovation. The result is a more agile enterprise that can boost efficiencies, improve quality and customer loyalty, and drive revenue.

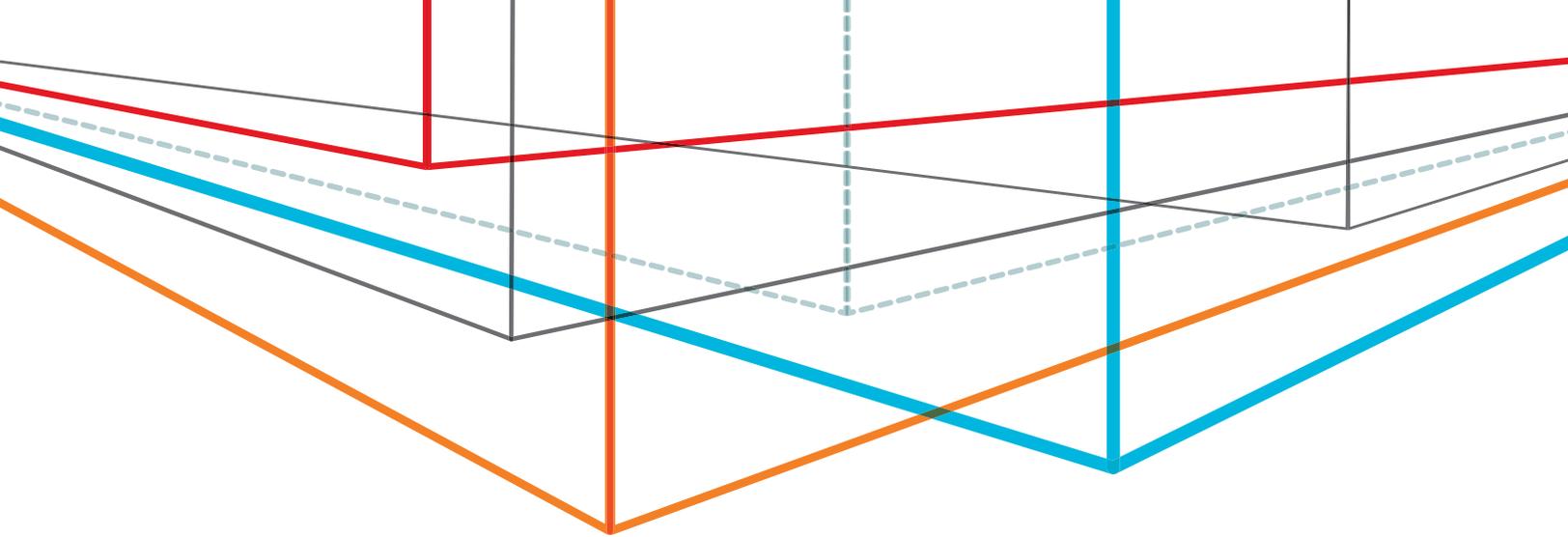
Enterprises are looking for a seamless, rapid, simple way to create visibility throughout their value chain without massive multi-year IT deployments. Organizational leaders are struggling to do more with less and to be more productive. They crave not only smarter ways to track and manage assets but also gain insights from Big Data that can drive new, breakthrough ideas.

IoT provides the critical linkage and visibility into Big Data. However, businesses must first address the technology and service implications of deploying IoT-enabled solutions from at-the-edge devices,

through the data center, to the Cloud. With a growing range of devices available, there is an enormous need to manage them in a simple and standardized way. Once solved, businesses can leverage deep visibility to eliminate inefficiencies across a wide range of industries and processes.

A global leader respected for innovation and reliability, Zebra offers technologies that illuminate organizations' operational events involving their assets, people and transactions, allowing them to see opportunities to create new value. We call it the Visible Value Chain.

Zebra's extensive portfolio of marking and printing technologies, including barcode, RFID, GPS and sensing, turns the physical into the digital to give operational events a virtual voice. This enables organizations to know in real-time the location, condition, timing and accuracy of the events occurring throughout their value chain. Once the events are seen, organizations can create new value from what is already there. For more information about Zebra's solutions visit www.zebra.com.



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