



SOLUTION OVERVIEW

DELIVERING AN INTELLIGENT FOUNDATION FOR RFID: MAXIMIZING NETWORK EFFICIENCY WITH CISCO RFID SOLUTIONS

Radio frequency identification (RFID) is one of today's most anticipated technologies for a broad range of enterprises. Based on the promise of lower operating costs combined with more accurate product and asset information, organizations—from manufacturers to government agencies, retailers to healthcare providers—are introducing RFID technologies in the supply chain, for asset tracking and management, and for security and regulatory purposes.

However, as companies explore these significant advantages through pilot programs and departmental deployments, the impact of RFID technologies on the companywide network must be considered. It is certain that RFID tagging will continue to proliferate to the item level, both within and outside the firm. It is therefore essential that, when deploying this expanding technology, organizations take a broad view of the impact of RFID on their networks.

"RFID system expansion is inevitable, as proliferation throughout the supply chain is a core premise for the realization of system benefits," says Duncan Brown, author of IDC's *Planning for Proliferation: The Impact of RFID on the Network*, a report based on interviews with several retail and logistics firms currently using RFID. "It is important for organizations to consider the impact on network infrastructure at the beginning of RFID rollout, and to build in scalability from the start. Adjusting the network design retrospectively will be complex and expensive."

Leading RFID solutions from Cisco Systems® converge tag-based information into the network, adding RFID as another data type to be secured, managed, and scaled based on Cisco's intelligent networking. This powerful solution family optimizes business application performance with intelligence extended to the edge of the network, enabling a robust end-to-end infrastructure with the ability to turn RFID initiatives into a competitive advantage. By driving awareness and visibility of information and enabling localized response, Cisco® solutions boost productivity and customer satisfaction while controlling costs. With Cisco's RFID solutions, enterprises can implement unmatched security, scalability, and flexibility while integrating RFID solutions from the industry's leading networking provider.

ADDRESSING THE CHALLENGES OF RFID DEPLOYMENT

RFID technologies have been in existence since World War II. For decades, they have provided proven and stable functions in a variety of specialized applications. What is new is the introduction of RFID and RF location capabilities as a daily aspect of the business environment. The situation has come to the forefront due to the necessity for manufacturers and suppliers to satisfy the requirements of major customer mandates, through which retailers such as Wal-Mart, Tesco, and Metro are driving implementation of RFID throughout retail supply chains.

The new technologies required by these customer mandates are described as the "EPCglobal Network." This concept, created by the EPCglobal standards body (of which Cisco is a member of the board of governors), embraces the subset of technologies used to actuate RFID information, including the tags, readers, and middleware used to manage incoming data. However, the data collected by these technologies is useless to the organization unless it is also fully integrated with the main corporate networking infrastructure. Companies are seeking ways to perform this integration while avoiding overload, optimizing bandwidth, controlling costs and security, and maintaining reliability.

Cisco addresses these concerns with industry-leading RFID product offerings: Cisco Application-Oriented Networking (AON) for RFID, Cisco Wireless Location Services for Wi-Fi environments, and Cisco RFID Lifecycle and Location Services. These solutions are built on the foundation of the Cisco Intelligent Information Network, which supports the addition of new data types such as RFID. Using the capabilities of RFID technologies, these solutions are integrated directly into the core network, minimizing disruption to business and maximizing administration of RFID traffic.

This approach is supported by the IDC report, which concludes, “Enterprise networks supporting RFID will need to incorporate intelligence and storage capabilities at the network edge, along with integrated management and security at all levels from the RFID layer up to the business process layer of the infrastructure.”

Cisco networks are built on open standards that allow interoperability with multivendor devices that are supported by a global ecosystem of partners with tested interoperability, making the transition to RFID as smooth as possible. These partners include industry leaders such as ConneCTerra and its RFTagAware solution (see more below), readers and reader management from Intermec and ThingMagic, and PanGo Locator’s Wi-Fi applications. These solutions provide a suite of proven, completely interoperable RFID technologies.

Providing intelligent management of RFID information into the core network and across the enterprise, Cisco AON, Cisco Wireless Location, and RFID Lifecycle and Location Services represent the next step in Cisco’s vision of integrating networks with applications and business processes that streamline the network infrastructure while delivering secure, reliable application capabilities.

CISCO APPLICATION-ORIENTED NETWORKING (AON)

Cisco AON technology is the foundation for a new class of network-embedded products and solutions that help converge intelligent networks with an application infrastructure based on either service-oriented or traditional architectures. With Cisco’s AON family of products and services, organizations can embed a new class of application message-level intelligence into the network to better meet the underlying needs of applications for real-time visibility, security, event-based messaging, optimized delivery, and other core integration and deployment services. Cisco AON technology can natively understand the content and context of application messages such as advanced shipping notices, stock allocations, or purchase orders, and can conduct operations on those messages in transit according to business policies.

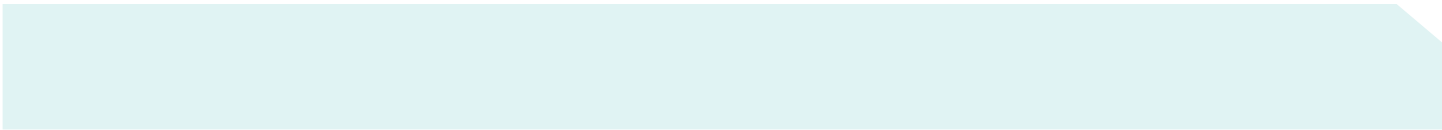
Why Cisco RFID AON Solutions?

- Fully integrated into existing Cisco router and switch technology
- Based on the EPCglobal standard
- Allows for centralized management and monitoring of devices
- Effectively manages RFID and regular traffic and bandwidth from end to end
- Cisco’s experienced consultants work with each enterprise to find an optimal RFID solution

Cisco AON is the only solution available today that integrates RFID management and data distribution directly into the network hardware and software, making it a true part of your daily business processes. So flexible is this technology that enterprises already owning a Cisco integrated services router or Cisco Catalyst® 6500 Series switch can upgrade their current hardware to an RFID-capable system by simply adding an additional blade or module.

Lowers the Cost of RFID Deployments—Cisco AON significantly lowers the cost and complexity of deploying and managing an RFID infrastructure at the network edge. Designed for remote configuration and management, Cisco AON offers RFID-specific functions and value-added message routing capabilities in an integrated edge device that includes packet-level routing. Cisco AON enables companies to centrally define RFID-specific policies that are automatically propagated to edge devices for enforcement, eliminating capital costs and the need to deploy expensive IT personnel for installation and ongoing maintenance of general-purpose servers tasked with managing RFID traffic. In addition, by offering filtering and collection of RFID events at the edge, Cisco AON optimizes bandwidth usage between outlying enterprise locations (where most RFID events occur) and data centers (where RFID information can be best utilized). Cisco AON helps ensure that only relevant RFID events are passed back to the data center. This is critical since network bandwidth to edge collection points can often be limited.

Increases Flexibility in Capturing, Filtering, Aggregating, Transforming, Securing, and Routing RFID Events—Cisco AON not only captures a wide variety of RFID events, but can also act upon those events, either locally at the source, at the data center, or in conjunction with other enterprise systems. Once RFID events are captured, Cisco AON can route these events throughout the enterprise—providing message-level security and encryption, transforming the messages to different formats (such as SKU numbers), bridging to different protocols, and helping to ensure



reliability. In addition, Cisco AON can locally respond to RFID events where appropriate (when a light bar on a receiving floor needs to be set from red to green or a supervisor needs to be paged due to an exception condition, for example). And with Cisco AON's powerful policy-based approach, all of this can be easily reconfigured without rewriting application code.

Provides a Superior Platform for Growth—By enabling RFID at the enterprise edge, Cisco AON introduces application infrastructure functions to remote locations for the first time. Once in place, the same AON platform can be used to support application security, business-to-business gateways, and Extensible Markup Language (XML) message processing.

CISCO RFID LIFECYCLE SERVICES OFFERING

Cisco applies a unique systems perspective to approaching an AON RFID solution by coupling its deep understanding of robust network architectures with application-layer expertise. RFID Lifecycle Services extend beyond tags, readers, and middleware to assess the impact of RFID on the system architecture, as well as guide customers through a robust pilot program and production rollout. There are three critical components to this offering.

RFID Network Readiness Assessment—Provides visibility into the current network design and analyzes the proposed RFID solution in determining the readiness to support RFID traffic flows. It also identifies potential risks and challenges while providing technical recommendations to address them. Based on this assessment, an optimal infrastructure is developed to support RFID criteria while remaining transparent to other business applications. Cisco also provides best practices based on validated reference architectures.

RFID Pilot Service Offering—Supports RFID pilot programs to assess business and technical impact. For one month, Cisco network and application experts assist and advise on framing RFID integration use cases and integration of AON RFID solutions with reader and system infrastructures. The program includes a tested and working AON RFID solution in a key lab or limited production environment, as well as use case scope and analysis, test plan, and network deployment plan.

RFID Production Implementation Support—Once RFID pilot objectives have been validated and you are ready to start a limited rollout into the production network, Cisco staff is on hand to ensure a smooth project plan with minimal impact to the network or other applications. A production-deployed AON RFID solution is deployed in up to 10 sites, integrated with RFID readers and data center systems. Cisco also provides planning for maintenance and support, production management, and full network deployment.

With this service, you may rest assured that, as your organization transitions to a production deployment, all the critical aspects of the RFID AON solution have been completely examined, documented, and accommodated. Cisco has an extensive background in converging complex technologies onto the network, including its industry-leading voice and wireless solutions. Through RFID Lifecycle Services, Cisco's RFID Solution Team uses a knowledge base of network infrastructure and AON expertise to provide a comprehensive approach towards RFID deployments.

You may also take advantage of service credits, which can be applied against any orderable, pre-packaged advanced service; and solution toolkits, which include solution training, design, and implementation patterns and libraries.

CISCO WIRELESS LOCATION SERVICES

Asset tracking, network management, and security are major concerns for enterprises in every industry that uses wireless and RFID. A lack of visibility into the location of valuable assets and important people is leading to inefficient allocation of resources in the enterprise. Security issues linked to the lack of insight into the movement of wireless equipment, people, and rogue devices are putting Wi-Fi networks at risk. In hospitals, warehouses, and distribution centers; on the manufacturing floor; in retail environments; in shipments to theaters of war; and elsewhere, loss and mismanagement of assets is leading to significant costs increases, time delays, and overall strategic setbacks.

Why Cisco Wireless Location Services?

- Easy-to-use, flexible tracking of Wi-Fi active RFID tags and 802.11 devices
- Business operations are enhanced through real-time location services
- Fully integrated location solution using existing WLAN infrastructure
- Foundation for location-based security
- Support for third-party location applications and Wi-Fi tags

Cisco Wireless Location Services address these problems by providing the industry's first location solution that simultaneously tracks thousands of active RFID and Wi-Fi devices from directly within the WLAN infrastructure. This solution brings the power of cost-effective, high-resolution location services to critical applications such as high-value asset tracking, IT management, and location-based security. It increases asset visibility and control of the air space while recording rich historical location information that can be used for location trending, rapid problem resolution, and RF capacity management. Cisco Wireless Location Services are based on the Cisco Wireless Location Appliance.

Visibility, Security, Manageability with Cisco Wireless Location Appliance—The Cisco Wireless Location Appliance is an innovative, easy-to-deploy solution that uses Cisco's patent-pending RF fingerprinting technology to simultaneously track thousands of 802.11 active RFID tags, active RFID devices, and wireless devices to within a few meters. This appliance integrates directly into the WLAN infrastructure and delivers a lower total cost of ownership by using the same Cisco access points that deliver data traffic to locate active RFID tags and wireless devices. It supports enhanced capacity management and advanced WLAN security

features that quickly and accurately locates security threats, such as rogue access points and devices. With its rich and open API, this appliance facilitates the deployment of applications that can take advantage of location-based information such as E911, asset management, enterprise resource planning (ERP) tools, and workflow and automation systems that can be used with active RFID devices.

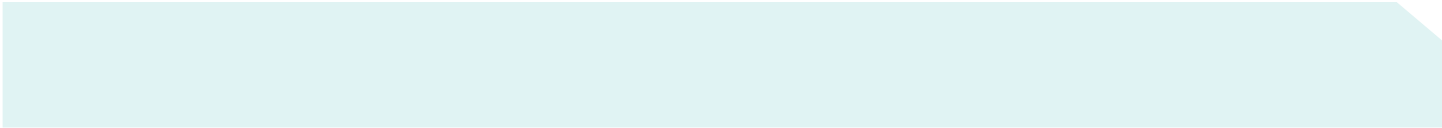
Location tracking is a critical component of enterprise-class WLANs today. By identifying and tracking the location of active RFID tags, active RFID devices, and Wi-Fi devices, companies can improve the accuracy of WLAN planning and deployment to optimize ongoing network performance, enhance wireless security, and improve both the usefulness and value of important business applications. Location tracking provides visibility and control of the air space, helping IT staff deploy wireless networks that are as easy to manage and as effective to deploy as traditional wired networks.

THE CISCO WIRELESS LOCATION SERVICES OFFERING

Cisco can work with your organization to assess your physical environment, determine your wireless coverage needs, and help you plan your wireless LAN integration with active RFID devices to deliver secure wireless access. The following services are available from Cisco to assist with Cisco Wireless Location Services and Cisco WLAN deployments.

Wireless LAN Radio Frequency Assessment Service—The Cisco team performs a site survey of the physical location and radio environment for location coverage and accuracy, measuring radio frequency propagation and detecting sources of interference. Recommendations are then made for locating access points, selecting antennas, and specifying power and cabling. The assessment and resulting recommendations provide you with location information that helps you to mitigate risk by addressing coverage challenges and interference concerns that may occur during later design development.

Wireless LAN Architecture Service—Cisco offers a comprehensive set of methodologies that help manage your wireless technical and application requirements while providing a variety of architectural options. Cisco helps to ensure that your wireless deployment will be aligned with your business requirements and your RFID device needs. By analyzing business, technical, and application requirements and providing comparisons of alternative high-level designs, Cisco can help you fully understand the tradeoffs of your wireless architectural decisions. This improves your ability to establish goals and expectations for your WLAN design. It also helps you mitigate risk by avoiding architectural pitfalls and reducing the need for solution redesign.



Wireless LAN Deployment Planning Service—Cisco can help you achieve a reliable and scalable location design that includes explicit deployment details and supports your planned RFID devices. Working with you to model bandwidth, plan capacity, and develop an addressing and routing strategy and security specification, Cisco provides a well-engineered detailed design early in the solution lifecycle. These efforts help minimize expensive, time-consuming, network-intrusive redesign and improve system performance, resiliency, and availability. Cisco also collaborates with your team to develop a site-specific implementation plan that defines the activities, configurations, and commissioning test plans required for implementation.

By helping to ensure that your network implementation plan is complete and contains the critical elements required for a predictable deployment, Cisco accelerates a successful location solution deployment. These efforts help prevent disruption to your existing network and reduce costly delays and problems during the implementation.

POWERFUL CORE NETWORKING FOR YOUR RFID ENVIRONMENT

The RFID solution family is built on the foundation of Cisco's global-class networking technologies. By integrating its solutions directly into the world's most powerful routers, switches, and appliances, Cisco provides your enterprise with the most "hands-off, business-on" RFID solutions available. With these capabilities incorporated throughout the enterprise environment, companies can fully capture all the benefits of complete RFID information access, high performance, and efficient tag data management.

Based on this secure network, customers can take advantage of full protection for sensitive RFID traffic and secure access to data—using the most scalable networking environment available, with investment protection from pilot program to full deployment. In such a manageable and flexible environment, administrators may also rest assured that the network's high-availability capabilities will prevent RFID traffic from impinging upon other business applications.

Optimized to meet the demands of RFID and RFID location solutions, Cisco networks are built on open standards that allow interoperability with multivendor devices. They are also optimized by the company's expertise in converging diverse applications and emerging technologies. Cisco networks lead the world in the convergence of voice, video, data, and emerging technologies on one network. As a result, enterprises gain the ability to use their existing infrastructures instead of buying expensive overlay networks, while lowering TCO by operating on a single network.

WHY CISCO?

Cisco RFID solutions drive awareness and visibility, boosting productivity, customer satisfaction, and cost control throughout the enterprise. A free flow of RFID information gives access to data where it is needed, enabling faster decision making thanks to real-time data visibility. Information sharing between trading partners also benefits from improved supply chain visibility, supporting such clear gains as having fewer out-of-stock items without maintaining excess inventory.

At the same time, Cisco RFID solutions help enterprises to lower operating cost and total cost of ownership. With all devices, users, applications, and information on a single network, your company functions more efficiently and effectively. The ability to track and locate assets further reduces labor costs, enables faster service delivery, improves customer satisfaction, and reduces inventory excess.

Cisco RFID solutions are developed to meet the specific needs of today's enterprise. Providing the ability to optimize network performance as well as maximum network value, Cisco supports your enterprise with the expertise to enable faster deployments and a powerful knowledge of RFID best practices. Cisco combines end-to-end security, scalability, interoperability, traffic management, and a forward-looking networking infrastructure that allows you to deploy current and future RFID applications to trim operating costs, improve productivity, and increase customer satisfaction across the enterprise.

FOR MORE INFORMATION

For more information on Cisco RFID solutions, please visit <http://www.cisco.com/go/rfid> or contact your local account representative.

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