



Q&A

CISCO RFID SOLUTIONS

GENERAL

Q. What is RFID?

A. RFID stands for radio frequency identification. It is a wireless technology that uses radio frequency waves to transfer data between a moveable item and a reader to uniquely identify, track, or locate that item.

Q. How is RFID being applied?

A. Cisco Systems® sees RFID technology initially affecting three areas:

- **Supply Chain Management**—Tracking products and containers through the supply chain (pallets, cases, and eventually individual items)
- **Asset Tracking**—Efficiently using expensive assets (tractors, medical equipment, manufacturing equipment, etc.)
- **Security and Regulatory Compliance**—Identifying people, vehicles, and other items

Q. How can customers benefit from RFID?

A. RFID will enable trading partners to minimize shrinkage and shortages, accelerate order processing, and increase responsiveness to consumer demand by enabling real-time information about the goods in their supply chains. It will also provide increased efficiency in handling physical goods during processes such as receiving, counting, sorting, and shipping. In addition, RFID will reduce excess inventory and provide faster response times by providing real-time location capabilities.

Q. Why is this the right time for RFID?

A. Although RFID technology has been available for a long time, it is only recently that industry standards, cost savings, corporate and government mandates, and business-side integration have come together to make RFID solutions viable.

Q. What is Cisco doing in RFID?

A. Taking advantage of industry-leading networking expertise, Cisco provides intelligent IP networks for RFID deployments—enabling business transformation made possible by the benefits of RFID. Cisco is providing intelligence at the edge of the network to collect and filter RFID data, providing additional context (such as location), as well as enabling localized event response. Cisco provides an infrastructure of routers, switches, and specialized appliances that have been optimized to run RFID applications through testing, device integration, operations, and standards development. All of these solutions are supported by Cisco Advanced Services to assist in the design and deployment of RFID networks. Cisco is not delivering RFID tag or reader products.

Q. What plans does Cisco have to implement RFID technology in its own business?

A. Cisco is committed to using RFID in its own business, and is exploring which processes can best take advantage of RFID.

Q. Why should customers choose a Cisco RFID solution?

A. Cisco is the only company to provide a secure, scalable, available, manageable, and flexible end-to-end IP network optimized for RFID traffic—thereby providing the lowest total cost of ownership (TCO). Customers can work with Cisco as a trusted partner focused on delivering intelligent solutions that take advantage of their existing IP networks.

TECHNOLOGY

Q. What are the different types of RFID?

A. RFID can be generally categorized as either passive or active, with active tags using a battery for power, and passive tags using the received signal for power. Passive deployments typically occur in the high-frequency and ultra-high-frequency (HF/UHF) bands, with applications such as vehicle immobilization or tracking goods in the supply chain. Active deployments include high-value asset tracking, shipping container tracking, and automobile toll collection; these deployments use a variety of frequencies as well. Recent developments include active tags based on the 802.11 standard, which can also be used for connecting handheld passive readers to the network via an 802.11 wireless LAN (WLAN).

Q. How is the location of an item determined with RFID?

A. In general, there are two methods to locate an item with RFID. With passive RFID tags, the distance the tag must be from the RFID reader to allow a reliable read is relatively short. Thus, locating a tag requires it to be in, or to pass through, a “portal” of readers. This could occur, for example, at a dock door. Alternatively, a handheld reader could be used as a “Geiger counter” to manually locate an item. The second method to locate tags enables location throughout a wider area by using active RFID tags. Because the active RFID tags have a larger read range, their location can be determined throughout an entire building. Location algorithms, such as closest access point, triangulation, or RF fingerprinting are used to determine the position of the tag within an area with an accuracy of several thousand meters to a few meters.

Q. What is the difference between RFID and bar codes?

A. Passive RFID tags are similar to bar codes in that they both provide a wireless method to identify attributes about an item carrying the tag or bar code. Unlike bar codes that use optical technologies, RFID uses the RF spectrum to enable non-line-of-sight reads of the tags. This enables an automated method of reading tags without uncrating cartons or manual alignment. RFID tags also provide a unique “serial number” for each item, as opposed to bar codes that only provide manufacturer and product category.

STANDARDS

Q. Are there standards for RFID?

A. Yes. Standards have been created to support RFID applications. Numerous industry, state, and international organizations have been involved in the development of RFID standards. Some of the more recent activity has been centered on standardizing the use of RFID in the supply chain.

Q. Is Cisco active in developing RFID-related standards?

A. Yes. Mohsen Moazami, vice president of the Cisco Internet Business Solutions Group, was selected to serve on the Board of Governors for EPCglobal, Inc., the standards body that leads the development of industry-driven standards to support the use of RFID in supply chain applications. In addition, several Cisco employees are participating in various EPCglobal hardware and software action groups, as well as 802.11 task groups.

Q. What is an EPC?

A. An electronic product code (EPC) is the data construct used as the unique universal identifier for products with RFID tags based on the EPCglobal standards. Like many current numbering schemes used in commerce, the EPC is divided into numbers that identify the manufacturer and product type. The EPC uses an extra set of digits—a serial number—to identify unique items.

Q. What is an EPCglobal network?

A. An EPCglobal network is a “stack” of technologies and components that enable immediate, automatic identification and sharing of information about items in various supply chains. The technical standards developed through EPCglobal help to ensure that the “stack” of components and technologies of the EPCglobal network will work together on a global scale.

Q. What are the components of an EPCglobal network?

A. The components of the EPCglobal network architecture include:

- **RFID Tags**—Hold EPC information.
- **RFID Readers**—Read information from and write information to RFID tags.

- **RFID Middleware**—Typically implements the Application-Level Events (ALE) layer that provides aggregation, counting, and filtering of tag reads from individual readers.
- **EPC Information Services (EPCIS) Layer**—Makes tag data available to enterprise applications (enterprise resource planning [ERP] and warehouse management system [WMS], for example) and trading partners, enabling track-and-trace and other higher-order functions.
- **Object Name Service (ONS)**—Provides name resolution services for EPC data, similar to a domain name system (DNS). In this case, the EPC itself resolves to a location that contains further information about the product specified by the EPC.

PRODUCTS

Q. What are the components of Cisco RFID solutions?

A. Cisco RFID Solutions consist of: Cisco Application-Oriented Networking (AON) for RFID, the Cisco Wireless Location Service, and Cisco Services for RFID. These solutions are augmented by Cisco switching, routing, WLAN, and other product offerings.

Q. What is the Cisco AON for RFID Solution, and what are its benefits?

A. The Cisco AON for RFID Solution is a package of Cisco AON software, hardware, and service offerings designed for RFID deployments. It can be installed throughout an enterprise's network—at the edge for RFID event capture and filtering, or in the data center for data authentication, additional filtering and aggregation, and application protocol switching in front of a target destination. In addition, the same AON devices can perform additional tasks such as outbound encryption, digital signature, and content-based routing when sharing data with external business partners.

Benefits include:

- **Lower Cost**—Integrated device means lower total cost of ownership
- **Flexible Message Routing**—Captures, filters, secures, transforms, and routes RFID-related application messages
- **Future-Proof**—Designed to work with other network-based applications and emerging sensor networks

Q. What are Cisco Wireless Location Services, and what are the benefits?

A. Cisco Wireless Location Services deliver 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. Cisco Wireless Location Services are based on the Cisco Wireless Location Appliance, 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.

Benefits include:

- Increased asset visibility and control of the air space.
- Transparent integration directly into the WLAN infrastructure, delivering 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.
- Recording of rich historical location information that can be used for location trending, rapid problem resolution, and RF capacity management.
- Advanced WLAN security features that quickly and accurately locate security threats, such as rogue access points and devices.
- A rich and open application programming interface (API) that facilitates the deployment of applications that can take advantage of location-based information such as E911, asset management, ERP tools, and workflow and automation systems.

Q. What are the Cisco Services for RFID, and what are the benefits?

A. Cisco Services for RFID extend beyond tags, readers, and middleware to optimize the system architecture in preparation for RFID by using network and application expertise. There are three focused services within the Cisco Services for RFID portfolio. The RFID Network Readiness Assessment analyzes and provides recommendations for optimal RFID data flow within the network infrastructure. The Pilot Service Offering helps ensure that pilot validations adequately model product systems that include optimal network and AON configurations. The Production Implementation Support Service provides a transparent migration to large-scale RFID deployments over the corporate network

Q. What other products are part of Cisco RFID solutions?

A. Initial passive RFID deployments are projected to be standalone “islands” within enterprise networks, primarily using wired, Ethernet-attached RFID readers. The Cisco products providing access-layer network connectivity for RFID readers include Cisco Catalyst® desktop switch platforms (Cisco Catalyst 2940, 2950, 2955, 2970, 3550, 3560, and 3750 platforms). Cisco Catalyst 4500 and 6500 series platforms provide distribution-layer connectivity for Cisco Catalyst desktop switch platforms to increase scalability and availability of the deployment. As deployments evolve to include handheld wireless readers, Cisco Aironet® technology will be used to connect these readers to the network.

Q. Is Cisco building an RFID reader or tags?

A. No. Cisco does not currently plan to manufacture readers or tags. Cisco will partner with industry leaders in these areas to provide a complete solution for customers.

PARTNERS

Q. Whom is Cisco partnering with for RFID?

A. Cisco is partnering with companies that produce RFID devices and applications that interoperate with Cisco networks. These companies will become Cisco Technology Developer Program partners. The Cisco Technology Developer Program unites Cisco with vendors of complementary network-enabling technologies to deliver interoperable products, solutions, and services for customers in all industries.

Q. What products are included in the Cisco Technology Developer Program?

A. Wired RFID readers that read passive RFID tags, active RFID devices based on the 802.11 standard, middleware, and location applications are available from partners under the Cisco Technology Developer Program.

Q. How can I find out which partners and products are approved?

A. Partners and their products can be found via an online tool at http://www.cisco.com/en/US/partners/pr46/tdp/find_partner.shtml. Passive RFID readers can be found in the RFID solution category. Active RFID devices based on the 802.11 standard and wireless location services applications can be found in the wireless networking solution category. Middleware software can be found in the AON solution category. In addition, look for the Cisco Compatible logo when researching partner RFID products.

Q. What are the benefits of choosing RFID products that are in the Cisco Technology Developer Program?

A. By choosing RFID products in the Cisco Technology Developer Program, customers are assured of compatibility with Cisco networks. This compatibility is provided by an independent third-party test house. In addition, Cisco and the partner provide coordinated support to help ensure that customers receive consistent levels of service and support for interoperable applications and services.

FOR MORE INFORMATION

For more information about Cisco RFID Solutions, visit: <http://www.cisco.com/go/rfid>

For more information about the Cisco Technology Developer Program, visit: <http://www.cisco.com/go/ctdp>

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