



HP and radio frequency identification (RFID):
enabling the next-generation
supply chain today

“HP is very qualified to address RFID. We produce RFID-enabled retail goods and are an early adopter of RFID in our own operations, and we use this experience in our end-to-end solution portfolio. In addition, we’ve made investments in RFID both as a participant in global standards, and through our own work in HP Labs. All of this offers perspective, expertise, partnerships, and dedication at a lower cost and risk to companies looking to employ RFID.” Ulrich van der Meer,
Vice President, Manufacturing Industries,
Hewlett-Packard Company



Radio frequency identification: a revolution in progress

The Pentagon uses radio frequency identification (RFID) technology to keep troops in the field from receiving rations that have exceeded their shelf life. Drivers use RFID to buy gas and pay tolls. Marathon officials use it to monitor runners' times. The State of Michigan uses RFID to track livestock. And RFID technology may even help to prevent tampering with the seven million shipping containers that enter U.S. ports annually.

RFID is essentially in the same position occupied by mobility and wireless technology a few years ago. It is poised to spark a global revolution—in supply chain visibility and management, and in other areas as yet unimagined.

By some estimates, as much as \$45 billion of excess inventory in retail supply chains is unaccounted for at any given moment. This inventory may be lost, stolen, or simply on the wrong shelf, but there is no effective way to track it after it has left manufacturing. Similar inventory management problems beset other industries.

RFID can change all that—and change it dramatically, at first co-existing with bar code identification and ultimately, in many applications, replacing it.

HP Services is well positioned to help companies start small—but start today—with low-risk RFID solutions that enable standards-based, next-generation supply chain functionality in industries as diverse as consumer packaged goods, retail, automotive, pharmaceuticals, and high technology.

Embracing RFID to increase manufacturing efficiency and enable customer compliance

In 2003, Wal-Mart, British retailer Tesco, and the U.S. Department of Defense (DoD) all directed their top suppliers—including HP—to begin, by January 2005, RFID tagging of any goods delivered to certain sites. German retailer Metro issued the same mandate, to take effect in November 2004.

For suppliers, these directives and the others that will inevitably follow raise important questions such as these:

- Which products must we tag?
- What combination of tags, readers, antennas, and software should we use?
- What roadmap should we follow?
- Which equipment vendors and system integrators should we choose?
- How can we measure the return on investment (ROI) provided by these solutions?
- How will achieving compliance affect our supply chain management and our relationships with trading partners?
- How can we build an agile IT infrastructure that will enable business change?



How RFID works

A basic RFID system has three components:

- The tag, an RF transponder programmed with information unique to the object being tracked
- The reader, a transceiver that decodes the information stored on the tag
- An antenna on either the tag or the reader

Tags that contain internal batteries are “active” tags. Tags activated by a power source in the reader are “passive.”

Because RFID technology uses radio waves rather than light, readers need not be close enough to “see” tags. Nor is human intervention necessary, because tags are read automatically.

The more powerful the tag, the farther away the reader can be placed. However, a more powerful tag is also a more expensive one. Thus, RFID tags are usually attached to cases of pallets of lower-value goods, such as razor blades or Army boots, and individually to high-value objects, such as cars and military equipment.

Tags can be tiny enough to identify the family cat or large enough to label railroad cars. The larger the tag, the more information it can store—such as when an object was moved, the temperatures to which it was subjected, and how hard it was bumped.

HP is embracing RFID not only to increase manufacturing efficiencies in its global supply chain operations, but also to assure leadership in enabling customer compliance with directives such as these. HP’s broad, deep understanding of the technology enables us to provide answers to these RFID implementation questions now, not only for our own vast corporate supply chain, but also for our customers and *their* customers as well.



HP understands that change drives progress, and companies that embrace change are well on the way to becoming the agile, adaptive enterprises their customers will look to for the right solutions. We help customers envision what they want to achieve with RFID. And then we help to make it happen.

Uniquely qualified to deliver RFID technology and solutions

With more than 60 years of experience in the design, deployment, and support of high-technology solutions, HP is a seasoned partner. Our experts can help your enterprise explore the benefits that RFID technology and solutions offer today.

- **HP understands RFID business requirements.** HP is a producer of RFID-enabled consumer goods such as printers and print cassettes.
- **HP is an experienced early adopter of RFID.** In our own internal global operations, HP is an early adopter of RFID, and we are working to achieve both complete customer compliance leadership and greater efficiency in the global supply chain.
- **HP is participating in the future of RFID.** HP’s wholehearted commitment to RFID includes membership in EPCglobal—a body that develops and promotes worldwide acceptance of an electronic product code (EPC) standard, a critical strategy for RFID adoption.

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- **HP is investing in the future of RFID.** HP Labs has devoted considerable investment and resources to researching, developing, and deploying RFID environments, including both technologies and secure end-to-end network architectures, with a goal of creating RFID environments that are more adaptive, have a lower cost of deployment, and offer lower overall maintenance.
- **HP offers tested RFID solutions today.** HP's key partnerships help assure delivery of end-to-end RFID solutions and services—from exploration to pilot testing, execution, implementation, and results—that take into account current business processes as well as HP's own best practices and lessons learned.

A firm understanding of RFID business requirements

HP's Imaging and Printing Group (IPG), which produces printers and ink cartridges, is one of the four major business groups within HP. A multi-billion-dollar business, IPG is, all by itself, the equivalent of a Fortune 500 company. IPG's goal is to operate profitably with a competitive cost structure, discrete manufacturing operations, and unique supply chain characteristics. There is strong support within IPG for RFID capabilities to improve supply chain management and drive down operating costs.

An experienced early adopter of RFID

HP has taken an aggressive approach to pilot testing RFID in live production within HP IPG. Our goals are to comply fully with mandates from customers such as Wal-Mart, Tesco, and the U.S. Department of Defense (DoD); to increase manufacturing efficiencies; and to play a leadership role for our customers as they explore and implement RFID.

HP's live pilots have yielded a rich store of expertise in RFID tags, antennas, readers, and middleware; RFID interaction with servers and large IT infrastructures; and RFID interactions with IT execution and enterprise-level systems.

The efficiencies expected to result from pilot testing include reduced cycle time through automation as well as more accurate inventory at various stages in the production process, including transfer from manufacturing facility to distribution center, "shelf-pick," and shipping. Benefits should also accrue to downstream processes—such as customer returns, warranty issues, and ultimately the retirement and recycling of products.

In addition, through its work with a broad cross section of experienced solution partners, HP is developing best practices that our customers can incorporate into their own RFID assessments, pilot tests, and deployments.



A key participant in the future of RFID

HP is a charter member of EPCglobal, a 100-company consortium that is developing global RFID use standards and the technical framework to move RFID into the mainstream. Membership on the EPCglobal board empowers HP to participate actively in RFID action groups.

EPCglobal has developed a network comprising the electronic product code (EPC), a unique identifier in RFID tags; an ID system for EPC tags and readers; the Object Name Service (ONS); Physical Markup Language (PML); and Savant, the reference software architecture.

A major investor in RFID's future

HP Labs is conducting RFID research in areas that go far beyond simply achieving compliance with the Wal-Mart and DoD directives. These areas of focus include:

- End-to-end network architectures for locating, tracking, and monitoring objects and their interactions
- The use of RFID to handle the enormous amounts of information generated in data management applications
- Sentient environments that combine RFID with sensors, cameras, and other equipment to provide a much richer picture of goods stored in warehouses and distribution centers than is now possible
- Nanotechnology and next-generation sensing technologies
- Innovations in business processes and in integrating RFID into adaptive infrastructure solutions
- Enterprise security

HP Labs also funds external RFID research at leading business and engineering schools. As RFID technology and applications evolve, HP will be ready.

Tested RFID solutions that are available today

Start with a strategy that meets your needs

Many of the companies that seek to benefit from RFID are at the early stages of a solution lifecycle that encompasses discovery, proof of concept, pilot testing, initial deployment, rollout, and ongoing management and support. Wherever you are in this lifecycle, HP Services can productively engage with your enterprise. You can choose from a range of strategies:

- Low-cost early implementation
- Leveraging HP internal experience to attain faster compliance and reduced risk
- Exploring other uses of RFID where opportunities to increase return on investment (ROI) may exist

Adapt your strategy easily to new business requirements

HP Services' approach to solution enablement is solidly based on the principles of the adaptive enterprise—our vision of an agile organization that is capable of reacting quickly to new business challenges as they arise. As applied to the RFID environment, this vision is particularly important because tag, reader, and middleware vendors are expected to consolidate as the technology evolves over the coming years. Accordingly, it will be greatly to the advantage of our customers to deploy an RFID architecture that is flexible, scalable, and responsive to change.

Lower your RFID implementation risks, leverage our proven approaches to change, achieve your business goals faster, reduce your costs, and improve the total customer experience of your business.



Start small, but start now

HP RFID solutions and services are based on unique industry and business needs. Solution entry points can begin at any level and can include the following HP RFID services:

- **RFID discovery**—Designed for companies that want to develop their own RFID vision, these services can include education, consulting, and evaluation to identify next steps in program and project planning.
- **RFID assessment**—HP Services consultants work with you to define the scope and goals of your RFID project, based on your business requirements. By reviewing and assessing your business processes, applications, and infrastructure, we develop a blueprint that becomes your RFID deployment roadmap.
- **RFID proof of concept**—HP helps you to justify an investment in an RFID solution by conducting a proof of concept, either at your location or an HP location. Or, visit an HP RFID Center of Excellence, where HP customers can attend workshops; develop an RFID vision; share HP lessons learned; attend HP Labs briefings; conduct trials and proofs of concept; and purchase scalable, upgradable RFID solutions.

- **RFID pilot**—HP experts collaborate with your staff to develop and implement a cost-effective pilot project that includes thorough testing for integration and compliance, impact analysis, scoping, cost/benefit analysis, and a strategy for future phases.
- **RFID training**—HP can train your staff in the basics of RFID and familiarize them with the terminology of RFID, including Savant, PML, electronic product code information systems (EPC IS), and ONS.
- **RFID implementation**—HP offers implementation services, including the integration of RFID technology and solutions into supply chain operations. These services are designed to help you to reduce the human element in locating, tracking, recording, and communicating information about objects in the warehouse or distribution center.

Explore RFID technology and solutions with HP

Every day HP helps forward-looking companies to seize innovative practices and technology that drive higher business and competitive results. HP would like to help you lower your RFID implementation risks, leverage our proven approaches to change, achieve your business goals faster, reduce your costs, and improve the total customer experience of your business. Let HP help you see the benefits of RFID technology today.

For more information

For more information about a flexible, customized RFID solution, please contact HP Services at rf.id@hp.com.



To learn more, visit www.hp.com

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5982-5448EN, 04/2004

