

FROM COMPLIANCE TO VALUE:

Leveraging RFID Data for Competitive Advantage

Smart manufacturers are finding ways to use RFID data to transform business processes and deliver value throughout the product lifecycle. Critical for success: robust information infrastructure and services to handle rising demands, reduce deployment risk, and accelerate deployment.

RFID: Tool for Transformation

Customers from areas as diverse as aerospace & defense to packaged goods are asking manufacturers to use radio frequency identification (RFID) tags to identify and track products throughout the supply chain. Retailers such as Wal-Mart, Target, Albertsons and Metro Group require top suppliers to tag certain categories of goods. The US Department of Defense mandates RFID tags, and Unique Identification (UID) codes, for parts and shipments. The US Food and Drug Administration is promoting the use of RFID to help reduce counterfeit drugs. Competitors Boeing and Airbus are so convinced of the business potential of automatic identification technologies that they're creating a common, Electronic Product Code (EPC) compliant standard for RFID data exchange.

Today, leading technology and services companies such as Intel, Oracle and Computer Sciences Corporation (CSC) have collaborated to provide the technologies and infrastructure to develop RFID solutions. These solutions are designed to handle the increased data, computing and integration demand of an RFID deployment with greater flexibility, reliability and efficiency.

More retailers and agencies are instituting their own mandates while existing mandates are spreading to encompass lower-tier suppliers, less expensive products, and finer-grained packaging (for instance, tagging items rather than cases or pallets). As the number of uses for tags and readers continues to expand, both are being manufactured in higher volumes resulting in a decrease of the price for these key RFID technologies.

While RFID has clear value for retailers and "receiving" companies or agencies, many manufacturers are unclear on whether and how they can recoup their RFID investments. Some manufacturers will see immediate return on investment (ROI), resulting from labor savings on inventory control operations. Others will see benefits from reduced loss and obsolescence. But the value comes not in tagging materials but using that information effectively within and between trading partners.

RFID's real value goes well beyond satisfying the requirements of major customers and reducing the labor costs of inventory tagging. The reasons lie in the use of RFID data to impact business processes. Unlike traditional bar codes, RFID tags don't require line-of-sight alignment. They can store much more data than bar code labels, and that data can be changed dynamically as the tagged item moves through manufacturing, distribution, sales and maintenance. By tying that data into back-end information systems, proliferating it throughout the company, sharing it with trading partners, and using it to optimize key business processes, manufacturers can transform their operations. They can create leaner organizations and add value throughout the company and across the supply chain to gain competitive advantage.

Finding the Value

RFID data can provide benefits throughout the product lifecycle, enabling manufacturers and their supply chain partners to streamline processes and reduce the cost of operations. Here are a few major areas of value:

- **Inventory management.** RFID can help enable the long-sought "glass pipeline," giving manufacturers and trading partners up-to-date visibility into the location and movement of assets and material. Manufacturers and hospitals can track expensive equipment, maximizing the use of expensive assets and minimizing theft and loss. Retailers and manufacturers can tighten their demand planning and supply planning, increasing sales and operational effectiveness. Manufacturers can trigger automatic notifications when exceptions occur, allowing the businesses to avoid disruptions and enhance customer service.

RFID VALUE FOR AEROSPACE AND DEFENSE SUPPLIERS

CSC, Intel and Oracle have collaborated to demonstrate RFID/UID value for the aerospace, defense and industrial markets. The demonstration depicts the RFID and UID processes from material receipt through assembly and shipping, and shows that RFID can be much more than a bar code replacement. RFID can add value in all phases of the value chain. And while the demonstration focuses on A&D, the benefits are highly relevant to many other manufacturing industry segments.

Receiving. When material is delivered to the loading dock, items are scanned using an Intel XScale™ technology-based reader that provides immediate visual and auditory feedback on the successful scan. Information received from tags is loaded into the Oracle Warehouse Management System and RFID applications and verified against previous information, including the bill of lading and advanced shipping notice (ASN). The inventory database is automatically updated, and all parts information is readily accessible.

Impact: labor cost savings, timely and accurate data for business processes and documents.

Assembly. When a customer order is received for a build-to-order part, the Oracle Order Management application automatically generates a work order, and the RFID-tagged inventory is pulled and moved to the assembly area for manufacturing. Needed items are scanned using RFID, and all relevant build information, including diagrams and drawings, are presented to assembly technicians. As soon as the part is assembled, the work order is closed, and a new UID is assigned and submitted to the Government Registry.

Impact: Faster and more accurate assembly, cost and time efficiencies and increased data accuracy for inventory tracking.

Shipping. When finished parts arrive on the shipping dock, their RFID tags are scanned, and information is pulled from the Oracle Order Management application to create and submit the appropriate forms for payment. The scan also triggers the creation of shipping documentation, and the parts are shipped to customers.

Impact: faster, more accurate shipping bills and invoices, faster delivery to customer.

- **Shop floor control.** Manufacturers in the automotive and aerospace industries are using RFID data to track work-in-process inventory, thus minimizing assembly line interruptions, making the process more fail-safe and enhancing product quality.
- **Distribution and transportation management.** With unique identification of each case and pallet, manufacturers can more easily consolidate shipments, enabling more efficient use of vehicles and containers. Manufacturers can also gain more accurate information on the location of goods and material in transit. This can make it possible to identify where load tampering is occurring and take actions to reduce theft.
- **Safety and security.** RFID tags are being used to enhance safety by tracking hazardous materials and to bolster security by monitoring the movement of people and equipment through both secure and hazardous areas.
- **Lifecycle management.** Aerospace and defense manufacturers can enhance quality and reduce maintenance and repair operations costs by tagging critical components of complex systems, then updating the tags as service and repair tasks are performed. Maintenance workers can use handheld wireless devices to read the service record of each part, and access instructions, schematics and procedure descriptions via e-documents. Digitizing the paper process can eliminate maintenance manuals, saving time and increasing service quality.

Expanding Your Information Architecture to Meet RFID's Demands

For all its promise, RFID creates significant demands on your information architecture. Since achieving RFID's business value depends on modifying business processes, companies will need to rethink new applications and usage models. RFID capture generates massive quantities of data that must be filtered and consolidated at the point of origin to avoid flooding the network and databases. Then, it must be analyzed, rationalized and made available to users who can benefit from it, whether they're within your organization or at a trading partner's or customer's organization. The proven efficiency of newer technologies such as service oriented architectures, the Internet and the Extensible Markup Language (XML) are helping to lead the proliferation of this information exchange.

A service oriented architecture built around Web services, Oracle software and Intel platform technologies, backed by services from CSC, meets these challenges while increasing the flexibility and utility of the overall information architecture. A service oriented architecture based on Oracle and Intel solutions enables rapid changes to applications, promoting efficient and cost-effective application integration and enhancing the ability to utilize RFID data.

In contrast to a monolithic, proprietary information infrastructure, a service oriented architecture based on Intel and Oracle technologies improves collaboration by enabling services across the enterprise firewall. Through virtualization, it also reduces the costs of the infrastructure build-out required for RFID success. And, through support for open standards and careful attention to security, it protects valuable corporate data while making it available to authorized users. By working with Intel, Oracle and CSC, companies can build a powerful, standards-based service oriented enterprise that speeds implementation and enables RFID data to drive business transformation.

CSC, Oracle and Intel work closely to improve the performance, compatibility and cost-effectiveness of their solutions, enabling customers to deploy industrial-strength technology at a fraction of the cost of proprietary platforms. These solutions assist manufacturers with the full range of RFID-related information tasks:

- **Data filtering at the enterprise edge.** Oracle Sensor Edge Server, running on the Intel® Xeon™ processor, simplifies data collection and management tasks including device integration, cleansing sensor data and delivering it to back-end systems. This approach accelerates information flow and avoids needlessly burdening enterprise networks and storage systems.
- **Application integration.** Oracle Integration running on Intel Xeon processor-based servers provides a unified architecture on a standards-based platform for integrating people, processes and information. It provides industry-leading technology for connectivity data integration, process automation, business-to-business integration and business activity monitoring.

- **Business process management.** Oracle BPEL Process Manager, running on Intel Xeon processor-based servers, gives developers an easy-to-use and highly effective GUI tool to orchestrate and execute business processes using Web services. Oracle BPEL Process Manager is based on the industry-standard Business Process Execution Language (BPEL).
- **Business intelligence.** Oracle Business Intelligence 10g provides a complete and integrated solution to develop and deploy data warehouses and data marts with an array of reporting, querying and analytic capabilities. This enables analysis of data and events in real-time to provide business insight and business activity monitoring for continuous process improvement.
- **Scalable data management.** Oracle Database 10g running on servers based on the Intel Itanium 2 processor delivers the power, security and scalability to handle growing volumes of RFID data and rising numbers of users and applications utilizing the data.

- **RFID-enabled business processes.** Oracle E-Business Suite enables enterprises to transform and automate their business processes by taking advantage of RFID and sensor-based information. Oracle Warehouse Management includes out of the box RFID capabilities to improve inventory control and extend supply chain visibility
- **Web services infrastructure support.** Oracle Application Server 10g Portal and Oracle Application Server 10g Wireless, running on the Intel Xeon processor, provide services to widely distributed devices and systems. Oracle and Intel solutions deliver infrastructure support for grid computing, location-based computing, and the full range of Intel platform-based PCs, devices and servers.

RFID Technology Center Infrastructure

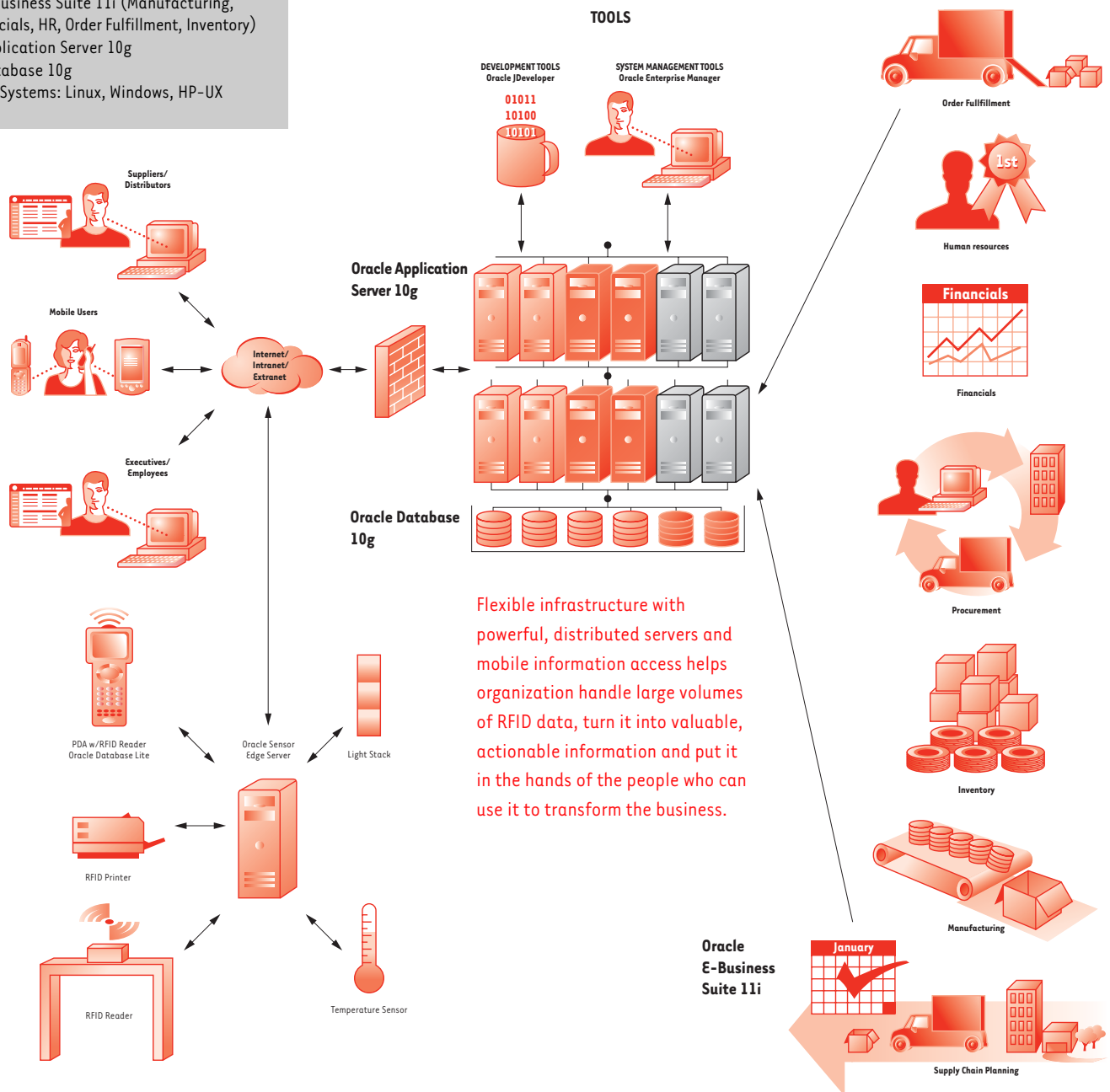
Hardware

- 4-way Itanium® 2 processor server
- Intel® Xeon™ DP blades
- 4-way Intel® Xeon™ MP server
- Intel® XScale™ Technology PDAs
- Intel® Centrino™ Mobile Technology based Notebooks and Tablet PCs
- Gate-, Table- and handheld RFID readers

Software

- Oracle E-Business Suite 11i (Manufacturing, SCM, Financials, HR, Order Fulfillment, Inventory)
- Oracle Application Server 10g
- Oracle Database 10g
- Operating Systems: Linux, Windows, HP-UX

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In addition, RFID readers designed around Intel XScale® technology offer extensive capabilities for RFID data capture and initial data processing. To assist users in leveraging RFID data, handheld devices based on Intel XScale® technology and notebook PCs based on Intel® Centrino™ mobile technology offer flexible, convenient access to applications and data from wherever they need to work. Desktops powered by the Intel Pentium® 4 processor enable employees to analyze complex data sets and act on information and events.

Moving Forward

For many manufacturers, RFID by itself is perceived simply as an added cost of doing business. By focusing on the value of RFID information, however, manufacturers have a powerful lever through which they can transform business processes and impact key performance indicators. Realizing this potential must begin by creating a vision and a strategy for RFID. Look beyond compliance and examine business processes to identify places where RFID presents a clear improvement over current methods. Look for areas of your supply chain or your own operations that are affected by fluctuations and uncertainty—where concrete, up-to-date information about inventory levels, workflow, service records or forecasting can deliver business value.

Develop a roadmap of process and technology changes that will be robust enough to accommodate RFID's many demands and flexible enough to handle unforeseen new uses. Then, begin moving your information infrastructure toward a service oriented enterprise based on solutions from Intel, Oracle and CSC. And be ready to transform your business as you transform your information architecture. Work with CSC, Oracle and Intel to reduce costs, accelerate time-to-value, increase business velocity and compete more effectively in the emerging world of RFID-enabled supply chain visibility.

To learn more, contact your local CSC, Intel or Oracle representatives, or visit us on the web:

www.csc.com/industries/aerospacedefense

www.intel.com/go/manufacturing

www.oracle.com/rfid

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SOLUTIONS AND SERVICES FOR RFID SUCCESS

Oracle, Intel and CSC have joined forces to develop cost-effective RFID solutions and services designed to reduce time-to-value and meet manufacturers' needs. Whether the task is analyzing where to place tags and readers or revamping your information infrastructure, CSC, Intel and Oracle can help you develop your RFID vision, translate it into a strategy, and work through tactical challenges, to help your organization realize RFID's full potential.

Computer Sciences Corporation. A global leader in systems integration, CSC can help you integrate RFID data and applications with your back-end systems, to maximize the value of your RFID data. CSC also provides flexible managed services for UID/RFID, designed to help reduce implementation costs while meeting business needs. CSC also understands RFID physics and can help minimize compliance costs and deploy RFID quickly.

Oracle Corporation. For nearly three decades, Oracle, the world's largest enterprise software company, has provided software to enable organizations to get the most up-to-date and accurate information from their business systems. Oracle provides sophisticated information management software to help manufacturers derive maximum business value from RFID data. Oracle solutions deliver customer-centric and product-centric views of RFID data, to help manufacturers increase productivity by automating and connecting their business processes.

Intel Corporation. Intel platforms provide robust, flexible and cost-effective infrastructure at every stage of RFID deployment. Powered by Intel's extensive R&D investments, Intel technologies offer an aggressive roadmap to continuing increases in performance and capabilities, helping to preserve previous investments while meeting companies' toughest IT challenges. End-to-end Intel architecture-based solutions include a choice of two 64-bit server architectures with servers based on the Intel® Xeon™ processor MP and Intel® Itanium™ 2 processor.

