



An RF (radio frequency)-enabled WMS (warehouse management system) provides Cardinal Health Medical Products and Services group's Greg Volpentesta with product lot numbers, expiration dates, and special handling requirements in real time.

# Zero In On Inventory Sprawl

▲ By implementing integrated ERP, WMS, and mobile computing applications, \$7 billion Cardinal Health Medical Products and Services group improved warehouse utilization by 10% across 60 distribution centers.

by Jay McCall

**W**hether you're a manufacturer with multiple warehouses dealing with warehouse sprawl or you're a distributor facing sprawl within your distribution chain, you may be tempted to think growth equals building (or buying) more facilities and adding more personnel. Don't be so quick to embrace that idea.

Cardinal Health Medical Products and Services group (Waukegan, IL), a \$7 billion division of \$44 billion Cardinal Health, Inc. (Dublin, OH), faced multiple challenges a few years prior to Y2K. Due to multiple, disparate inventory management systems and paper-based warehouse practices, the company wasn't able to accurately track its stock. To keep its inventory under control, each warehouse had to shut down once a year and take a physical count of its inventory — a process that cost between \$30,000 and \$60,000 per facility in lost productivity. Also, with only paper-based picking,

packing, and putaway processes in place, Cardinal Health was limited to fixed inventory allocation, which meant its DCs (distribution centers) used only 85% of their potential storage capacity.

Besides its concerns at the DC level, Cardinal Health faced challenges at a corporate level. The cost of making its mainframe-based legacy systems Y2K-compliant approached the cost of purchasing a new solution.

No industry leader can continue to run its business in this manner, and Cardinal Health was no exception. In 1997, Cardinal Health formulated a plan that led to a complete IT overhaul. First, it targeted its DCs and selected a WMS (warehouse management system) from Witron (Arlington Heights, IL) called AIMS (Automated Inventory Management System). "We selected AIMS primarily because it was able to facilitate our requirement of mass shipping of small units," says Greg Volpentesta, manager of distribution systems at Cardinal Health Medical Products and Services group. "Also, AIMS was one of the few WMS solutions we found that was designed to integrate with automated storage and retrieval systems [AS/RS], which we wanted to deploy at some of our facilities." The healthcare products provider began a pilot program, which led to an 18-month enterprise rollout at each of its DCs. Learning from past mistakes, the company made sure not to modify the software until after it had been installed at each of its facilities and all managers could be trained on the same standard operating procedures.

## Installation Profile

**Technology User:** Cardinal Health Medical Products and Services group (Waukegan, IL), a division of \$44 billion Cardinal Health, Inc. (Dublin, OH), manufactures and distributes medical products to nearly 6,000 sites of care nationwide via its 60 DCs (distribution centers). Between the products it manufactures and the products it distributes from 2,600 other manufacturers, the company handles more than 150,000 SKUs (stock keeping units).

**Problem:** Disparate legacy systems kept Cardinal Health from being able to integrate applications and optimize its warehouse and labor efficiency. Without a major technology overhaul, the company would continue to increase its data silos and prematurely add DCs and new employees to accommodate a growing customer base.

**Solution:** By rolling out ERP (enterprise resource planning), WMS (warehouse management system), and mobile computing solutions, Cardinal Health was able to improve its warehouse efficiency and bring its data silos together in a single repository. The integrated solution improved DC efficiency by 10% and saved the company more than \$2.5 million per year by eliminating the need to take an annual physical inventory. Electronic order functionality saved the company an additional \$2.4 million.

## Random Putaway Reduces Wasted DC Space

The new solution comprised a client/server architecture with different instances of the application running at each facility. Cardinal Health's paper-based warehouse processes were replaced with RF (radio frequency)-enabled handheld and vehicle-mounted bar code readers from LXE (Norcross, GA). Shortly after the WMS and mobile computing deployment, the company rolled out a centralized SAP (Newtown Square, PA) R/3 ERP (enterprise resource planning) solution, which

Photos by Robert Levy Photography

replaced several legacy mainframe-based applications. The ERP and WMS solutions were integrated via a proprietary EAI (enterprise application integration) tool, which enabled the ERP to communicate ordering information to the WMS and to perform a nightly inventory reconciliation check. The EAI tool also enabled Cardinal Health to share certain fields within its applications with customers and suppliers in real time via a proprietary portal at Cardinal Health's Web site.

With the RF-enabled WMS in place, Cardinal Health was able to change from a fixed inventory model to a random storage model. "The WMS allows us to look at the specific space requirements for each product and put them wherever they best fit, versus putting all like products in the same location," says Volpentesta. "Random putaway capability boosted our space utilization from 85% to 95%." This improvement translates to savings of millions of dollars per year by helping the company postpone adding new DCs.

### WMS Optimizes DCs, ERP Optimizes Enterprise

While WMS shored up business operations and efficiency at the DC level, ERP was the backbone for

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**Cardinal Health Medical Products and Services group**



improved operations at the corporate level. The SAP R/3 allows Cardinal Health to forecast sales, track purchases and inventory across the DCs, measure fill rates, automate order entry, and share order information with customers. For example, if a customer calls with a request for three boxes of sterilized procedural packs, the ERP system is able to select the closest DC with the required products and automatically send notification to the DC. Perhaps the same customer also wants 12 boxes of stainless steel surgical instruments, but the DC doesn't have enough surgical instruments to fill the order. Since ERP is integrated to all the DCs, it can have part of the order sent from another facility. Prior to the SAP deployment, it would have required at least six applications to accomplish the same goal. Because the ERP solution is integrated with the company's WMS,

## Don't Tether DC Optimization

When Cardinal Health Medical Products and Services group, a \$7 billion division of Cardinal Health, Inc., decided to improve its inventory management, it looked at several technologies for assistance. Key to the company's plan to improve efficiency across its 60 DCs (distribution centers) was a WMS (warehouse management system) designed to accommodate AS/RSs (automated storage and retrieval systems) and RF (radio frequency)-based devices with bar code reading capabilities. Cardinal Health found a WMS fit with Witron (Arlington Heights, IL), a vendor that makes WMS software and AS/RSs.

For its RF-based device requirement Cardinal Health selected LXE's (Norcross, GA) VX1 vehicle-mounted terminals and MX3 handheld terminals. Both devices feature half-screen VGAs (video graphics arrays) and specially coated keyboards designed to resist abrasion and damage from harsh chemicals. Cardinal Health uses LXE bar code scanners with its wireless devices and Lucent 2.4 GHz access points, which provide 10 Mbps throughput compared to 900 MHz' 1 Mbps throughput. Additionally, its 2.4 GHz access points support the 802.11 standard, which makes for smoother integration and upgrades to the wireless network.

By rolling out the WMS and using wireless devices Cardinal Health was able to improve its warehouse efficiency by 10% and

improve its warehouse space utilization by 10%, which translated to millions of dollars in annual savings. Additionally, the new level

of inventory automation enabled the company to eliminate its previous practice of taking an annual inventory count, which required each DC to shut down. Depending on the size of the facility, the cost of loss productivity over the shutdown period would range anywhere from \$30,000 to \$60,000 per facility, which translated to about \$2.5 million in annual lost productivity. Since the WMS and mobile computing installation, the annual inventory count has been replaced with ongoing cycle counting, which does not require the DCs to shut down. "The RF-enabled WMS solution provides us with item lot number, expiration dates, and other information such as storage temperatures or special handling requirements — all in real time," says Doug Petersen, director of operating systems at Cardinal Health Medical Products and

Services group. "Additionally, the system has monitoring features that enable us to check our inventory accuracy on a regular basis. For instance, if a worker scans the last item in a lot, the device will prompt the worker to verify the lot is empty before picking the next item on his screen."



**Cardinal Health uses LXE's vehicle-mounted and handheld terminals in its warehouses.**

**For More Info. On LXE**

**Go To [www.lxe.com](http://www.lxe.com)**

Cardinal Health salespeople don't have to make dozens of calls to try to figure which DC is able to fulfill customers' requests.

## Integrated Applications Boost CRM

By optimizing its DCs and improving its inventory visibility, Cardinal Health

Medical Products and Services group isn't just helping itself. Customers are also reaping the benefits of this new level of automation. The company has a responsive EDI (electronic data interchange) system, which enables customers to check pricing and place orders without human intervention. Customers without EDI capability can interface with Cardinal Health's order system via the [cardinal.com](http://cardinal.com) Web site. "About 92% of all purchase order line

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Cardinal Health Medical Products and Services group*

items come to us electronically," says Richard Gius, senior VP of IT at Cardinal Health Medical Products and Services group. "Electronic order functionality has shortened the purchase-order-to-invoice turnaround time by 35% and contributes to annual savings of nearly \$2.4 million."

Customers are further empowered by the company's SAP CRM (customer relationship management) solution, which features self-help functionality available at the company's Web site. Prior to Cardinal Health's IT overhaul, customers would have to phone the call center and inquire about late orders, billing issues, and products. Now, customers are able to log on to [cardinal.com](http://cardinal.com) and check order status, resolve billing issues, and research products themselves because they have access to the same information as Cardinal Health's CSRs (customer service representatives).

## STORAGE SOUND BYTE

### Put Your Transaction-Rich Apps On A SAN

Just because Cardinal Health, Inc. (Dublin, OH) invested \$100 million in technology doesn't mean the company takes a frivolous approach to running its business. For example, at Cardinal Health Medical Products and Services group (Waukegan, IL), a \$7 billion division of Cardinal Health, the company doesn't migrate applications to its HP SAN (storage area network) willy-nilly. There are certain criteria that have to be met to cost-justify the move. "We use SAN technology when fast I/O [input/output] response time, high I/O throughput, or large storage capacities are required for a particular application," says Richard Gius, senior VP of IT at Cardinal Health Medical Products and Services group. Two applications that meet this requirement are Cardinal Health's data warehouse and its ERP (enterprise resource planning) solution. The data warehouse, which is a combination of software from Oracle, Business Objects, and SAS, hosts about 1 TB of data and supports scores of business intelligence and data management initiatives. The ERP, a solution from SAP, is the master application for Cardinal Health Medical Products and Services group. The application houses well over 1 TB of data and is used for several accounting and purchasing functions, which, if left on the company's LAN, would bottleneck traffic over the network. By moving these applications to a SAN, Cardinal Health is able to avoid network bottlenecks and allocate more storage for its applications as needed without having to add more hardware.

The company monitors various hardware components of its SAN — such as its Brocade switches, HP StorageWorks devices, and HP StorageWorks HSG80 controllers — for errors using Computer Associates' CommandIT storage management software. On the software side, however, Cardinal Health monitors storage usage, capacity, and software errors via homegrown UNIX scripts.

As Cardinal Health's storage becomes more complex, the company plans to add additional management capabilities to help offset costs. One other change the company will incorporate is adding its tape backup devices to its SAN to avoid purchasing additional backup hardware and better use its storage infrastructure.

### Unlimited Funds Not Needed For Enterprise Optimization

Maybe your company doesn't have 60 DCs or \$100 million to spend on a major IT rollout. But, that doesn't mean you can't learn from Cardinal Health's example and take a phased approach toward the same end result. Some of the system upgrades and proprietary application integrations Cardinal Health deployed are now part of many off-the-shelf solutions. Consequently, rolling out the same ERP, WMS, and mobile computing solutions today that Cardinal Health deployed in 1997 should prove to be less expensive. But, don't wait too long for prices to drop and vendors to make more improvements to their software offerings. If you do, you may find yourself building more warehouses and adding more personnel to manage your inefficiency. □



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