ZEBRA CASE STUDY

Wireless printing and data collection give construction equipment maker something to build on

Challenge

Heavy transaction volume, large coverage areas and interference from metal are some of the toughest challenges that wireless bar code data collection systems may have to overcome. Equipment must be durable enough to function in busy industrial environments yet fast and flexible enough to support business operations. Distribution operations for Caterpillar, the world's largest manufacturer of construction and mining equipment, provide all these challenges and more. A secure, standards-based wireless data collection system from Zebra Technologies and LXE makes sure operations never slow down.

LXE and Zebra systems are installed throughout Caterpillar's global network of distribution centers, which stock everything customers could need, from nuts and bolts to large engines to power earthmovers. The mass of metal creates potential coverage hazards for the wireless LAN. Parts flow in and out of some distribution centers 24 hours a day, so potential sources of interference are constantly changing, adding to the wireless coverage challenge.

"The site survey at one distribution center took about a month. Usually we're in and out in a couple days," said Steve Christ, the LXE account representative for the project. "It was an extremely challenging installation. Besides covering between four and five million square feet and supporting up to 350 concurrent users, there is multi-floor storage, and thousands of thick metal racks and shelves that can make it tricky to provide coverage."

Equipment selected to replace the legacy data collection system had to meet many challenging performance requirements. First and foremost, equipment had to perform reliably in this wireless environment and stand up to the rigors of heavy use. Wireless devices had to be 802.11b compliant and support the company's corporate wireless security standard, and had to require minimal development to interface with the legacy warehouse management system. Project plans called for use of wireless printers for the first time, so print jobs for picking and putaway labels could be sent over the wireless network. This meant the number of devices on the network would double.

The high-volume operation means that incremental increases in performance add up to significant time savings. Because there is little or no down time, equipment breakdowns can lead to replenishment and picking delays that threaten order fulfillment. Durability and power management were therefore important equipment features. Ease of integration was the most important criteria, so the new system could be implemented with minimal impact on operations. The company would not consider new printing systems that would require the company to redevelop its existing label formats.

Finally, the new system had to meet Six Sigma quality standards and earn the confidence of the workers who would use it every day.

Solution

Distribution center workers use LXE's MX3 and MX1 mobile computers with bar code scanners to record all picking and putaway activity, and four-inch-wide mobile printers from Zebra Technologies to produce labels that associate picked products with orders. All of the products connect to the enterprise wireless network through 802.11b-standard radio cards that conform to Cisco's LEAP wireless security protocol. The 802.11b and LEAP security support built into the printer enables them to be managed like any other devices on the network, and did not require special software development or networking support.

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Most operations are done with paperback book-sized MX3 computers, which have a wide, 1/2 VGA screen and full keyboard. At some facilities, replenishment is done during the third shift by workers using pistol-grip MX1 wireless computers. When labels are needed, the mobile computer sends the print request to the central server over the wireless network, which relays the job to the Zebra printer.

The project team developed customized carts to enhance the performance of its mobile equipment. The computers and printers are mounted on cradles and plugged into a DC power supply on the cart. "By using a cradle, workers can use their MX3s both on and off the carts, eliminating the need to purchase permanently mounted full-screen computers. Using a $400 cradle compared to $6,000 computers produced some big cost savings very quickly," said Christ. Using the cart-mounted DC power supply to power the computers and printers ensures workers won't run out of battery power before their shift is over.

"The cradle and cart is really an excellent setup and makes operations very convenient," he added. "Users just pop the MX3 out of the cradle and carry it around. The MX3 has a unique form factor; it is the only computer in the industry with this design. It's got a full screen, easy access to keys and other features that make it easy for workers to use. Those little things add up and help productivity when you're talking about 350 people using the computers simultaneously during one shift."

Results

The new equipment is faster and more durable, which translates to improved productivity. It also has resulted in less maintenance, and will provide lower total cost of ownership than the computers and printers it replaced. Running the equipment from a DC power source and taking advantage of cable-free wireless printing provide significant cost and time savings.

In the previous system, the mobile printers and computers were connected with a cable. But the heavy use and rough conditions within the distribution centers made the cables prone to damage resulting in replacement about once a year. That expense is now completely avoided because of the wireless interface. The printers also help users be more productive because there is no need to adjust cables or install fresh batteries, which previously took place several times each shift. Now, the only time users need to handle the printers is to change media. Reduced handling has led to a reduction in maintenance issues.

Because of the extensive site survey and pre-installation work done by LXE's team, workers enjoy sub-second response time despite the added traffic on its wireless network. Throughput has never been a problem. Because LXE and Zebra both support LEAP encryption and 802.11 standards, integrating the new wireless gear to support the corporate security standard was not too challenging.

Tough environments require tough equipment. LXE computers and Zebra printers provide reliable, fast and secure performance for customers to build on.

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