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hide and seek

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Until 2006, Kraft's trailer tracking activities looked more like a game of hide and seek than an orderly yard management process. Some low-cost RFID tags, software, and a GPS changed all that.

It's hard to manage what you can't see. At least that's what food and beverage giant Kraft Foods found when it came to the yards at its distribution centers.

With revenues of more than $37 billion, Kraft is one of the world's largest food and beverage companies, and its yards are a hive of activity. Throughout the day, carriers are constantly dropping off empty trailers, yard tractors are moving those trailers from parking spots to dock doors, and carriers are returning to pick up the trailers, now filled with cases of Kraft Macaroni and Cheese and Cheez Whiz, Nabisco cookies and crackers, Jell-O gelatin, and Oscar Mayer meats.

Up until about two years ago, the company kept track of all these movements with clipboards and spreadsheets. Employees worked as spotters, roaming the yard and writing down the location of each trailer. But with the constant activity, it was impossible to keep up to date on the exact location of every piece of equipment in the yard, let alone ensure that the yard activities were being carried out as efficiently as possible.

"The main issues for us were trying to eliminate the very manual and time-consuming trailer tracking and tracing and yard checks that we were doing," says Kelly Rae, associate director, route to market for Kraft. "Also, we knew there must be some efficiencies around our spotting services and equipment."

View to a move

A chance encounter between managers at Kraft's Stockton, Calif., facility and employees of a newly formed technology company helped point Kraft to a potential solution: a real-time location system (RTLS). An RTLS uses a combination of technology—like radio-frequency identification tags and readers, Wi-Fi, and in some cases, global positioning systems—to track and trace assets (in Kraft's case, trailers) in real time.

The technology vendor in this case was PINC Solutions, a company founded in 2004 specifically to provide solutions to the problem of finding trailers, tractors, and yard trucks in the yard. PINC was not the first company to bring an RTLS-enabled

yard management solution to the market; several other vendors had beaten it to the punch. But PINC was looking to differentiate itself from the rest by offering a more affordable alternative.

What its competitors offered were tracking systems that rely on active RFID tags. With these systems, an RFID tag is attached to each trailer, where it continuously emits a signal, and a network of RFID readers is installed throughout the yard. In order to determine an item's location, the readers simply triangulate the tagged object's position.

The solution PINC proposed for Kraft works somewhat differently. Instead of using active RFID tags on the trailers, PINC's system uses the less-expensive passive RFID tags. (Active tags have a built-in power source that enables them to emit signals, whereas passive tags rely on the power emitted by an RFID reader to transmit data.)

There's another key difference as well. PINC's system does not require the user to set up a network of stationary readers. Instead, the readers are installed on the yard trucks. When a yard truck drives past a trailer or picks it up to move it, the reader "reads" the tag. A GPS transmitter captures information on the trailer's location at the time of the read and then sends that information via Wi-Fi to PINC's Web-based yard management system.

At Kraft's facilities, readers are also posted at each dock door and at all exits and entrances to the yard. When the trailer leaves the yard, the tag is removed and reused. Because the only way that trailers are moved in the yard is by the yard truck, the company is assured of having accurate information on the location of all trailers in the facility at all times.

As for why PINC chose to use passive tags, Aleks Gollu, the company's CEO, says several factors influenced that decision. "It's a mainstream technology that's becoming more and more ubiquitous in the supply chain, which means that hardware is going to become cheaper and more reliable and will be provided by many different vendors," he says. "And we were able to solve the problem with that technology, which is cheaper and simpler than its proprietary and specialized active tag counterparts."

In Kraft's case, at least, it appears that PINC's decision to compete on price paid off. According to Rae, it was the promise of high visibility with low infrastructure requirements combined with the lower cost for passive RFID tags that convinced Kraft to give PINC's solution a shot.

Making the change

In 2006, Kraft began rolling out the solution to its seven distribution centers. Six of the seven DCs have two yards each, which means the PINC solution has been installed in a total of 13 yards.

The implementation consisted of installing RFID readers and antennas on security posts, dock doors, and spotting/yard tractors; and putting computer equipment in security posts and spotting tractors. It also meant ensuring that each yard had 802.11 Wi-Fi service as well as uninterrupted Internet service into the security post—whether it was through a DSL connection, cable Internet, or a T-1 line connection.

The trickiest part for Kraft was getting that all-important uninterrupted Internet service, according to Rae."Having to work with all the correct providers and trying to get them to come and set up the appropriate lines took the longest time," she says. "The other equipment was done within a week."

The difficulty was largely a matter of accessibility. "While it's easy to get a DSL or cable connection in residential areas, distribution centers are in very remote locations," explains Gollu. "So sometimes we have no choice but to order a T-1 line to get an Internet connection."

The shift to the new system required several minor process changes. For one thing, the staff members at the security posts are now entering the trailer information on their laptops as opposed to using a manual paper-based system. For another, the yard truck drivers, or "yard jockeys," now receive their notice of truck movements via an onboard computer rather than over a radio.

The transition has been an easy one, by all accounts. The yard employees have welcomed the changes, since the new technology and processes have helped streamline their jobs, according to Rae. "Overall, it's been received well," she says.

The RTLS implementation has brought changes to other areas of the operation as well. For example, the yard management system has made it possible for the staff at Kraft's transportation operations center, which handles transportation planning and scheduling, to view what is happening at the yard in real time. This has greatly reduced the number of phone calls between the site, the operations center, and the carriers. Plus, yard personnel no longer have to field phone calls about the status of loads and trailers. "[People] can see the data exchange going on from wherever they are," says Rae.

The new system has also enabled Kraft to work more efficiently with its carriers. Kraft's carriers can access the yard management system through a Web portal, called "Carrier View," that lets them determine the status of their trailers in the yard. "Ultimately, that will help them be able to manage their own trailer pool, with the anticipation for us that it will lead to overall better rates," Rae says.

Approximately 15 of Kraft's carriers have signed up for Carrier View to date, and Kraft is actively encouraging more of its carriers to participate. "The more of them that are proactively managing [their fleets], the more it helps us on our end to more effectively manage our yard," says Rae.

In addition, Kraft has set up a kind of "express check-in and check-out" program with its key carrier partners. The program allows these carriers to permanently tag trailers that frequently enter and exit Kraft's yards, enabling them to be processed much faster.

A clearer picture

As for the results to date, it appears that the RTLS has done exactly what Kraft hoped it would do: bring order to its chaotic yards. Kraft now knows precisely where trailers are, when they arrived, and when they left. The company also knows, in real time, where its yard trucks are and if they are moving a trailer or are idle. And Kraft no longer has to rely on a manual

yard check process, where a person walks the yard and writes down where a trailer is located. "As opposed to looking for the trailers, the yard truck drivers can now actually drive [straight] to that trailer and move it," adds Gollu.

The yard management system has also made communications more efficient. Instead of radioing back and forth with the site, yard truck drivers receive "move" requests over their onboard computers, and the closest yard truck can be assigned to the move. Communications with carriers have improved as well.

Currently, Kraft is analyzing data from the installed systems in hopes of identifying other opportunities for improving yard tractor utilization and yard spotter productivity. The company has already been able to reduce spotting hours and equipment as well as eliminate one overflow lot.

Perhaps most important of all, the PINC solution is helping Kraft better understand its own operations. "Certainly from a corporate perspective, it helps us get a little bit more of a pulse on what's going on out in the field," says Rae.

before you buy ...

Interested in installing an RTLS in your own operation? Here's some advice from the experts:

- *Don't buy more than you need.* Before you invest, determine the level of tracking precision you require, recommends Sanjay Chatterjee, principal analyst with the consulting and education firm MindCommerce and author of a recent report on RTLS, *Real-time Location Services (RTLS): Applications, Services and Company Analysis*. Without that information, he explains, you might end up buying a more sophisticated (and costly) system than you really need.

  When it comes to matching systems to applications, Chatterjee offers these rough guidelines: If you simply want to confirm that a trailer has entered or left the yard, a system that uses low-cost passive RFID tags will probably do the job. If you need to know the tagged item's general location, say within 300 feet, an active RFID solution might be the right choice for you. If you want to be able to pinpoint an item's location within seven to 16 feet, you'll likely need some combination of RFID tags and GPS.
- *Don't overlook the secondary costs.* Installation may be the biggest expense associated with an RTLS, but deployment might be only part of the picture. There could be some secondary costs as well, says Chatterjee. Give some thought to what ongoing expenses the project might entail. For example, will you be incurring costs every year for your GPS coverage, and what will they be? If you use active RFID tags, what will it cost to replace the tags' batteries?
- *Be realistic about the system's capabilities.* For all their advantages, real-time location systems still have some limitations. "RTLS is only part of an effective yard management strategy," cautions Ian Hobkirk, director of supply chain consulting at Forte, a supply chain consulting and integration firm. While an RTLS is a great solution for those companies that struggle with finding trailers in their yards, he says, there's still a lot of information it cannot provide. "It doesn't give you visibility of what's in the trailers," he says, "and it doesn't correlate that with demand data on what's needed in the warehouse."