



December 16th 2010

ARTICLE: RFID INVENTORY TRACKING

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HEADLINE

Goodbye, databases

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RFID has created substantial supply chain efficiencies. But there's a bigger shift coming: what if logistics management didn't require the use of databases because inventory tracked itself? And what if goods could intelligently reroute based on need and efficiency? It would make no difference whether products were warehoused on another continent, rolling down the highway on a tractor-trailer, or deep in the bowels of a container ship. In seconds, you could account for every single product anywhere between manufacture and customer purchase.

It may sound like science fiction, but it's not far off, according to Jorma Lalla, CEO of Salo, Finland-based RFID handset manufacturer Nordic ID. "As the technology becomes more ubiquitous, a stable international standard emerges and the cost of active RFID tags continues to decrease, we're seeing a lot of supply chains now using RFID end-to-end. The detail of data available is incredible. And while to my knowledge no supply chain yet has the ability to interrogate tags throughout a product's entire journey, that day is only two to five years away."



RFID key to object-driven data

Unlike barcodes, RFID tags can store item-specific information. Tag information can be very detailed, and information can be added along the product's journey—time, temperature, inspection, modification, etc.—from creation or harvest to its final destination. Tags come in all shapes and sizes. They can be tiny or large, rugged or pliable. And because ultra-high frequency (UHF) RFID tags can be read through cartons and walls from distances of 8 meters or more, interrogators can be mounted in truck chassis, ceilings or walls.

“Not requiring line of sight to read tags is an important part of quickly accounting for or accessing goods when you need them within a warehouse, container or elsewhere,” says Lalla. “An employee can walk along quite briskly with a handset and read all tags, or find the package they're looking for. With barcode, you have to scan each package—often a painstaking process.”

Professor Al Segars, Director of the University of North Carolina's Technology Research Center, shares Lalla's vision of end-to-end RFID trackability. In fact Segars, whom the United States Department of Defense and Fortune 500 companies come to for advice, sees RFID as a critical components of the next big step in the evolution of logistics and consulting.

“Barcode technology hit the mainstream about 25 years ago,” says Segars. “The next step, RFID, came along roughly 15 years after that. But we're still caught in a machine paradigm, which is prone to inaccuracies. It stands to reason that the best source of information about an object is the object itself, and object-driven data is where we're headed.”

The concept of object-driven data involves pervasive computing, whereby information processing has been integrated into everyday objects and activities. “In practice, this works in much the same way as taking roll call at school,” says Segars. “When the teacher calls out each name, the student puts up their hand. With RFID interrogation and response, streams of real time data are transmitted to and from points across the world to build a complete and accurate logistics picture, rather than relying on sporadically updated databases.”



Fewer databases, more efficiencies

There are several reasons why object-driven data management is an improvement on conventional database-driven logistics controls.

“Granted that we have yet to move beyond databases, object-driven data is an exciting concept for three reasons: accuracy, cost and visibility, says Lalla. “Doing away with databases would reduce error. The more databases you have, the more duplication and inaccuracies you get, especially if goods travel across disparate systems, as they do for example when the journey involves a manufacturer, a logistics supplier, a wholesaler and a retailer.

Another big reason,” continues Lalla, “is cost. Provisioning resource management systems is expensive. And as you add on duplicate systems in different locations, not only does the cost of provisioning and maintaining systems themselves increase, but the cost of managing the data climbs upwards as well. Finally, object-driven data would improve visibility and so allow administrators to increase the efficiency of material flow.”

While RFID is now primarily a means of identification, it will soon evolve into a processing mechanism. As an example, a procurement request for a tractor part can be matched with availability across the entire supply chain consisting of several companies: a manufacturer, a logistics company and a wholesaler, for instance. The inventory signals its location and availability, and intelligent agent software presents the best options. Add another variable such as end use location, for instance in a disaster relief operation where end user locations are constantly changing, and more efficiencies accrue.

Automatic, intelligent rerouting

To take it a step further, tags could be enabled to intelligently reroute when needed. Professor Segars believes that in this regard, logistics management is going to follow the same path as data management. “About ten years ago the IT world came out with intelligent data transfer protocols for information networks like MPLS,” says Segars. “These protocols permit faster data processing at nodes thanks to efficient labeling, and they enable data packets to self-reroute when they encounter ‘traffic jams’ on the network. We are now experimenting with the same concept, only applied to logistics.”



Intelligent routing capability would require another layer of information—routing intelligence—on RFID tags, something that Segars believes is technically possible right now. “RFID technology is now sufficiently mature that tags could be programmed to capture intelligent logistics information,” he says. “What we don’t have yet is the capability to manipulate that information to get tags to change the routing of products upstream. When that happens, I would guess within the next five years, we’re really going to see efficiencies skyrocket.”

Paradigm shift required

Object-driven data management may be a better way of controlling the flow of goods, but adoption will require a paradigm shift. Logisticians will likely be loath to relinquish their databases, relying instead on objects’ ability to transmit their location and status.

As with the adoption of any brand new technology, we are likely to see dual systems deployed in the early days. Then object-driven data management will prove itself and become generally adopted, likely first by defense organizations—the most common early adopters—and then by high-value and/or high-security logistics chains, such as the pharmaceutical industry.

Next step: nanotech

But this new method of data management is only the beginning, according to Segars. “The step after RFID tags is where it’s going to really get interesting,” he forecasts. “Nanotechnology is eventually going to take over, with products and even organic matter created with trackability built right in. And with pervasive computing, we will have the capability of tracking everything produced or consumed on earth.”

[photo] Jorma Lalla is CEO of Nordic ID, a leading manufacturer of handsets for mobile data collection based in Salo, Finland’s Silicon Valley and home to mobile phone giant Nokia.

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