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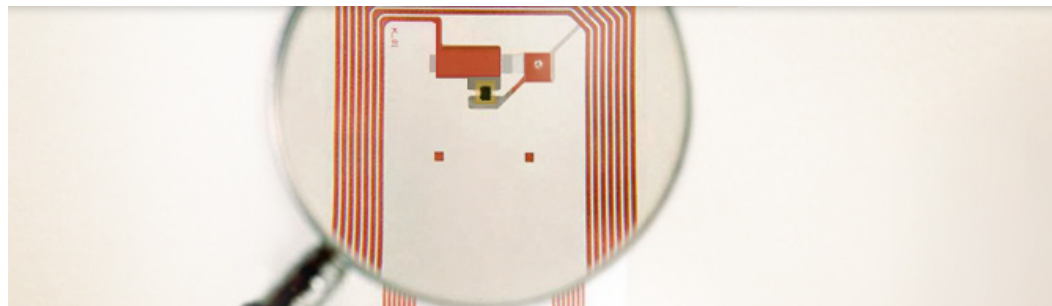
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Keeping tabs on RFID

It's way more than barcodes and it's changing the way the world works



On a snowy slope in Norway, a skier glides to the lift and goes right through the turnstile, without slowing to show a ticket. In a Danish suburb, a woman's blood pressure is monitored as she weeds her garden. And during a safety drill at a Canadian oil refinery, over 200 workers are rapidly evacuated and instantly accounted for.

What do all these scenarios have in common? RFID—radio frequency identification. Across the world and across industries, uses for this continually evolving field of technology expand at an exponential pace. In the last ten years, innovation has focused on capturing accurate information, ensuring tags can be read on boxes or pallettes. But in just the next year or so, the focus will shift to integration of that information—not just throughout the enterprise, but throughout the entire business value chain.

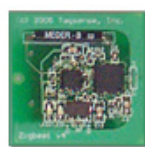
There are three different types of sensors in the marketplace

PASSIVE RFID - "What is it?"



A passive tag does not contain a battery; the power is supplied by the reader. When radio waves from the reader are encountered by a passive tag, the coiled antenna within the tag forms a magnetic field. The tag draws power from it, energizing the circuits in the tag. The tag then sends the information encoded in the tag's memory.

ACTIVE RFID - "Where is it?"



An active RFID tag is equipped with a battery that can be used as a partial or complete source of power for the tag's circuitry and antenna. Some active tags contain replaceable batteries for years of use; others are sealed units.

CONDITION SENSORS - "How is it?"



Condition sensing tags not only have a battery, but also include circuitry that reads and transmits diagnostics back to its sensor system. The tags monitor the environmental conditions, communicate with other items and collaborate to collect data that no single sensor would be able to detect. The information is then fed into back-end systems using the network software.

Adoption rates

When RFID first became a buzz word, the main question from early adopters was, "Can I get the beep?" or will the tag even work? And so began a period of trials and pilot implementations. Once the technology proved trustworthy, users realized they had a new bounty of data coming in, but no way to put it to work beyond the initial capability. Now, the innovation focus has shifted to transforming that data into business insights that can drive further innovation in process and strategy.

Adoption rates vary across industries, but to date the real innovation in application has been in consumer driven supply chains—particularly the retail space. But cross-industry investments in extended Internet technologies—such as RFID and sensor networks—fuel what will be an \$11.6 billion global market by 2012. [Global Extended Internet Forecast 2006-2012, Forrester Research, Inc., September 2006] Driving this steady rate of adoption is the equally steady decline in technology costs, with tag prices dropping 60 to 70 percent and reader prices dropping 40 percent over the last year.



School bus routes should be predictable, but they always need optimization while making safety the top priority. An RFID implementation can help a school board validate whether a bus is following its preset route and determine metrics around schedule adherence. In addition, they can access telemetry functions that determine how many times the safety arms on the front of the buses are raised and lowered.

- An RFID solution can provide better safety for students and drivers alike, greater route optimization and efficiency, improved communications with parents in the event of a bus breakdown.
- Better route optimization can reduce costs on gas consumption, maintenance and insurance.
- A fleet management solution can also be integrated with an RFID student card system. The system would record when and where students boarded and disembarked from a school bus, thereby preventing students getting on the wrong bus, accidentally dropped at the wrong stop or, most importantly, left behind on an empty bus.

Tracking drugs

Counterfeit drugs are a very expensive and potentially deadly problem. One way to combat the issue is to track and trace legitimate drugs using RFID tags, keeping a record of the chain of custody all the way from manufacturing floor to pharmacy shelf. Track-and-trace implementations are now required in the states of Florida and California.

- When fully implemented, an RFID solution for even a single brand could provide benefits estimated at \$11 million per \$1 billion of drugs per year, according to the Healthcare Distribution Management Association.
- RFID tagging can aid law enforcement. If a thief is caught with a bottle that has been tagged, the authenticity of the drug, its origin, and possibly the source from which the thief acquired it, can be identified.
- RFID tagging can also potentially aid in case of a product recall. Instead of pulling every bottle of a product off the shelves, the tags will allow retailers or pharmacies to identify which bottles are from the affected lot, and pull only the suspect ones.
- Finally, RFID can help the pharmaceutical company manage its supply chain more efficiently, with its ability to provide real-time updates to inventory systems.



AMR Research has found that for most grocers, fresh items make up 50 percent of profits, but account for 60 percent of shrinkage—items lost to spoilage or theft. Tracking the temperature of perishable products as they move through the cold chain can improve the quality and lengthen the shelf life of fresh products, such as fruits and vegetables. From the farm to the processing center to the truck bed to the delivery dock, an RFID solution can help grocers identify places within the supply chain where produce are allowed to get too warm or too cold and adjust accordingly.

- RFID can potentially save a large grocery store chain hundreds of millions of dollars annually and cut the 60 percent loss in half.
- The grocer can know the precise amount and grade of products, say tomatoes, in its supply chain at any given time, and therefore respond immediately to individual store needs.
- With RFID, grocers can purchase inventory via a variable cost structure related to the actual yield of tomatoes after processing.
- Volume may increase and packing times decrease—allowing grocers to redeploy staff more efficiently.



In a volatile environment, such as an oil refinery or gas facility, disaster is just a split-second away. Whether natural or manmade, the first priority is always employee safety. An RFID system can offer instant identification and an accurate headcount of evacuated employees. And with the possibility of terrorist attack, tracking people in and around sensitive areas of the facility is critical to protecting people and assets alike.

- RFID transponders can help guide rescue teams to injured or trapped employees.
- Control systems can authorize or de-authorize individuals or vehicles for different areas of the plant, with real-time alerts for violation of rules.
- Tracking systems offer frame-by-frame instant replay of past events for post analysis.
- In addition to locating people, RFID allows instant identification of high-value equipment and strategic production materials.



For many years, RFID systems have kept track of where patients are in a hospital environment. But new systems can help report on how they are as well. RFID tags can be integrated with medical monitoring equipment to remotely transmit patient health data and emergency alerts. And nurses carrying wireless voice-over-IP (VoIP) phones can instantly access patient information from the monitoring equipment, including blood pressure, oxygen level and even electrocardiogram images.

- RFID systems can dramatically reduce medication errors, representing between \$25 million and \$50 million in associated annual costs.
- Remote systems can reduce the number of in-patient appointments to record diagnostic information, freeing up providers and improving patient flow.
- Tracking systems can also improve asset utilization and reduce future expenditures on tagged equipment, such as IV pumps, via real-time wireless tracking capability.



Using RFID solutions within the four walls of a factory can transform the way manufacturers do business. Automakers, electronics manufacturers and aerospace and defense companies are among the leaders in implementation. The technology can minimize rework, reduce line stoppages and make it possible to replenish just-in-time materials to the production line. RFID tags and readers can even automate assembly line processes—helping to reduce labor, costs and errors on the plant floor.

- With the use of RFID tags and readers, manufacturers can automatically detect the whereabouts of tools and assets, improving efficiency and reducing loss.
- Manufacturers using RFID for inventory control can benefit from a reduction in labor in retrieving production batches, which bar codes cannot do.
- Factory-floor efficiency can be improved by getting materials to the right place at the right time. This can reduce mistakes and labor costs, improve routing information support, enhance assembly—line flexibility for custom orders, and eliminate manual barcode scanning—boosting productivity and potential profits.

Conclusion

The marketplace has evolved in its approach to and implementation of RFID technology. Today, the goal is more than just the accurate location of an item during its lifecycle. The real value stems from the insight that stands to be gained from the identification, location and subsequent control of that item and applying that insight to business.

Yet still the marketplace hears 'RFID' and thinks 'retail.' And that is a costly mistake. RFID is not industry specific—it's business value specific. RFID is more than a locator beacon. It's an illuminating technology, offering new visibility into areas of your operations, either in facilities, processes or trading partners, to identify issues as well as new opportunities that can help you strengthen your business. RFID is an enabling tool that is not only a source of powerful information, but a source of true business innovation.