

BWH News Letter

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Radio Frequency Identification Primer

RFID in General

RFID refers to the ability to process data stored in a "tag" that is either attached to or imbedded in an object, using radio waves. This can be done without needing to orient the object in front of a scanner. RFID applications range from parkway toll tags mounted on the windshield to unit tags imbedded in the labels on each can of product in a Supermarket.

Critical factors in the choice of tags are things like cost, power requirements, frequency, operating distance, etc. Tags are generally available for 50 cents and the industry goal is 5 cents read only tags. Power can be supplied by an internal battery (active tags) or "induced" by radio waves from a nearby reader (passive tags). Operating distances range from a few inches to several feet depending on the power level and frequency. The goal is for the cheapest (5 cents) passive tags to have an operating distance of 4 feet.

For tracking cases of inventory, the primary tag format is a passive tag that can be programmed with the container type, the GTIN, and a serial number. The tag actually consists of a tiny computer with an antenna attached. The type of antenna usually determines the operating frequency.

There are many hurdles to implementing unit level tagging. I don't believe we will see unit level tagging for quite a while (more than 4 years). The only exception might be pharmaceuticals, where tracking of individual containers can be very important. Consumer reaction to unit level tagging has been mixed. Some consumers are very concerned about post-sale readers that could detect what products they are using. This concern has prompted the addition of a "kill switch" in tag standards that can be set during check-out to prevent further reads. This complicates one of the major benefits of RFID because the tag could not be used to validate returns.

EPC Electronic Product Code

The EPC is a forward looking implementation of RFID. It refers not only to the Tag, but to a whole environment that includes specifications for Internet Access, Tag Features and Data Content, and Tag Readers. The goal is to minimize the cost of the tags by keeping their features and data to a minimum. Additional information about an object would be obtained by accessing a central data base through the internet. Internet access is achieved through special software agents or "middleware" that access the central data base. Two versions of Tag data now exist. One version contains an unintelligent key. Another version contains the object type, GTIN, and serial number. Tag readers must demonstrate their ability to read the tags, filter on specified values, and eliminate duplicate occurrences of the same tag. Most tag readers also have the ability to write to tags that support it.

IT Implications

The IT implications for EPC are huge. They range from putting in place the infrastructure to support tag readers at various points along the supply chain, to providing a data base large enough to hold a record for every object (can, case, pallet, etc.) in the stores and warehouses. It is still not clear how much caching of data will be necessary to make EPC resolution quick enough to avoid impact on operations.

Strict standards for the interaction of the various EPC components have been developed. The standards establish the interface to the Savants from application software and between the Savants and the Internet and the Tag Readers.

One huge implication is a complete change in the way applications are "driven". The new paradigm will have objects (cases of product) talking directly to the Tag Readers as they move from one location to another. As this movement occurs, the middleware will be issuing messages. Application Software will have to recognize when cases move from "Reader A" to "Reader C" that they have gone from inventory

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to a trailer parked in the loading dock. The trailer (with its own tag) is headed to a particular store. Instead of being "process driven", applications will become "message driven". This transition may need to be done in phases.

It is most likely that certain product categories will be tagged first, either because they have a higher cost or because regulation is put in place (pharmaceuticals, meat, etc.) that requires traceability of containers as they move through the supply chain. One of the goals of traceability is to catch counterfeiting.

Business Implications

Full implementation of EPC will primarily impact operations. By tracking each individual case and ultimately each unit, shrink calculations will become instantaneous. Detection equipment may even eliminate many forms of shrink caused by theft. At the case level, EPC can be used to enforce product rotation at the store, resolve selecting errors, and trace objects to a particular store. Warehouse operations will no longer have to manually scan cases of variable weight objects as they are selected for shipment.

Traceability will allow determination of who handled product on the way from the manufacturer to the store. Recalls will become automatic as the remaining containers can be located and removed from the selling area. Recalls that are based on specific food handlers (infectious diseases) can be limited to just the particular cases that were touched by that person.

What must IT Do Now?

I don't think there is anything IT can do at this point because there are so many open questions. The best thing to do is stay on top of the latest trends. I have included links at the end for some websites that I have found helpful.

Walmart is the 800 pound gorilla who has implemented RFID on inbound cases received from the top 100 suppliers. But the Walmart experiment is limited to a few distribution centers in the southwest and the jury is still out.

Infrastructure issues will be the major headache as hardware vendors (Tag Readers and Tags) get their products working and software vendors address the API and internet access issues.

Since many IT and store equipment purchases have an expected life span of 5 to 10 years, it may be time to begin allocating the in-store radio spectrum in order to minimize interference down the road or expensive equipment upgrades.

What must the Business Do Now

I believe business is in the same position as IT. The best thing to do is stay in touch with trade organizations and publications to monitor the progress of the "first adopters". Use some of the links I have attached (remember these are organizations with a stake in the Technology) to monitor activity in the FMCG (Fast Moving Consumer Goods as UCC calls it) industry.

Links

This link is for the RFID Journal. They seem to be the most up to date on recent announcements in the field.
<http://www.rfidjournal.com/>

This link is for EPCGlobal, which is the new organization under the Uniform Code Council and EAN Organizations that will be moving forward with the EPC.
<http://www.epcglobalus.org>