RFID – What's it all about?

By Bruce McGregor, Director

RFID or Radio Frequency Identification consists of tags, readers and a range of applications which track, monitor and manage items, e.g. retail stock items, as they move between locations. RFID is a technology for identifying assets and enabling computer systems to identify objects and their attributes. Tags themselves contain a unique identification number or Electronic Product Code (EPC) and also potentially other useful information of interest to the organisation(s) interfacing with them. It is this later point which makes RFID different to the unique barcode number we are all used to. Many supporters believe that no technology since the Internet has held so much potential for businesses, consumers and governments.

So why are they so much better than a standard barcode?

There are a number of significant reasons, including: the ability to read many tags simultaneously (each individually tagged item does not need to be presented to the scanner but can simply be read as groups of items which pass within scanner range); RFID also eliminates the need for line of sight reading which barcode readers depend on and can also work in harsh environments where barcodes would not be suitable. Due to their electronic nature data can also be changed on an RFID tag as it proceeds through a process and thus provide 'feedback' on an items status, for example within a manufacturing process.

The technology was first used way back in World War II to track military vehicles and is now becoming widely available to mainstream manufactures and suppliers. There are already a huge number of applications for RFID with an even greater potential presenting itself as the technologies and implementation trials progress. Some of these uses include: Controls for people to gain access to facilities or services e.g. secure access to a work place or access to travel on trains or buses (as with the Oyster smart card used on the London Underground which has embedded RFID technology or the Oysters older brother the Octopus card where in Hong Kong ~9 million such cards are already in circulation); Access controls for vehicles e.g. road tolling; Manufacturing automation; Logistics and distribution e.g. parcel tracking; Tracking of reusable containers, Retail - in supply chain management, Stock taking, Reducing loss through theft; Maintenance and Product security. To list but a few!!

So, why use RFID?

Many supply chain efficiencies originate from inaccurate data about where products are in the supply chain and the use of RFID's can significantly improve these efficiencies and so benefit both the organisations who use them. Organisations will be able to check inventory levels in real-time and automate the replenishment process. Marks and Spencer's trials of RFID clearly identified benefits in the stock taking process, what took eight hours a week could be done in less than 1 hour with the use of RFID's. Also, the 'fully automated supermarket checkout' is

increasingly becoming a possibility for the future, enabling additional efficiencies at the point of sale.

But, as with all new technologies, what about standards?

EPC Global has proposed a global standard for RFID in the supply chain which covers, not only the communication protocol between the reader and the tag, but also very importantly the data structures and the way in which RFID technology will interface with IT Systems. Where data has been synchronised effectively business partners will be able to identify items and share information relating to them. The Electronic Product Code (EPC) is a key element of the RFIC network as it is the unique identifier which allows for the recognition of specific items as they travel between locations. Where as barcodes refer to a category of product the EPC code also refers to specific events related to a product. As a result the retailer has far greater awareness of what they are selling and where and the resulting stock levels, consequently they can react to demands to enhance the customer experience and also increase the effectiveness of loyalty schemes.

As with all such emerging technologies its not just simply a case of buying equipment and installing it, careful consideration needs to be made, not least, in ensuring a clear understanding of the business case and what changes to current business processes and infrastructure will be required. Although RFID devices have the potential to provide very valuable information they can also produce incredible data volumes. As each real-time scan takes place information systems and their associated data stores will need to be able to fulfil near real-time data requests for each item as its scanned. In complex supply chain environments the infrastructure used must be able to protect the data owned by the different business partners while still facilitating correct levels of interoperability. Interoperability is an important factor for organisations wishing to get the best out of the use of RFID, in for example a supply chain environment, so systems must be compliant with EPC global standards for defining product attributes and exchanging data. Solutions used should be built on highly scaleable systems which are themselves built on open standards such as XML. In this way, as with the use of XML within the Internet, business can rapidly create interfaces to enable the real-time data exchange between internal and external business systems.

There are of course some concerns?

Although there are a significant number of apparent benefits of the use of RFID, organisations who use it must be mindful of privacy issues and consequent concerns. At present most implementations of RFID are within the supply-chain such as tagging palettes for delivery and as such do not associate Personally Identifiable Information with the tag identification (EPC) codes. Consumers are, however, aware that item-level tagging could bring about such associations at the Point of Sale when for example a customer purchases an item of clothing. Because gathering of RFID information requires no user direct physical interaction and RFID can be read through materials then some consumers are becoming increasingly concerned over there use and what data may be being gathered and stored about them. One of the much touted pluses and high profile potential uses of RFID's would be to banish the supermarket checkout queue as RFID tags on items could be instantly read and so add up the cost of all our

shopping in seconds. However, the information they store could also, in theory, be read by others. If tags are to be used on manufactured goods, credit cards and even money and one only has to assume that this is a ‘when’ and not an ‘if’, then what will they communicate about us to others who want to read the information?

In order to alleviate many of the fears in relation to the use of data collected by RFID systems organisations must ensure that initiatives are in place to educate the public on the realities and myths of RFID. In most cases RFID is simply used to track products and not people and in most use cases only has a range of a few meters and so it is simply not the case that people can be tracked. People also face more potential intrusion on their privacy through the use of their mobile phones which can continuously track their whereabouts, a factor which hasn’t stopped people using their mobiles. Fears can also be alleviated as RFID tags can be placed inside labels which are either disabled before the customer leaves the store, as in the case of the security tag which we are all used to, or simply removed by the customer on removing the label. Legislation is already in place in the USA which requires all goods carrying a functioning RFID to be clearly labelled as such.

Although there has been much in the press about consumers concerns of ‘big brother at the supermarket checkout’ or concerns of the ability to ‘track consumers via their product purchases’ acceptance of new technologies always has a ‘tipping point’ at which consumers believe the benefits out way the concerns. Take mobile phones for example, there has been plenty in the press about possible health concerns in relation to mobile phone use but we all continue to use them everyday and buy them in their millions. As a technology they have already reached this acceptance ‘tipping point’. The current EU data protection laws also provide some comfort. If an application involves the processing of personal data, which can be used directly or indirectly to identify an individual, that application will be subject to certain core data protection principles.

Current estimates are that consumer goods are unlikely to be tagged on any scale until 2010 so we have to hope that in the meantime the use of secure data standards and legal controls as part of or extensions of the Data Protection laws will keep up with the pace of the technologies and their implementations.

Many supporters of RFID believe that it will be readily accepted as a technology once people are better educated about it and particularly when they perceive any direct benefit to themselves like, very well stocked stores or no supermarket check out queues.

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