

EPC-Enabled Enterprise Mobility: Capture, Move, Manage

Executive Summary

RFID (Radio Frequency Identification) is one of the newest and most promising technologies on the horizon for supply chain applications, holding out the prospect of significant increases in inventory velocity and availability at all stages in the supply chain.

Major retailers and end users are quickly moving to adopt the technology. Some of the leading retailers, including Tesco plc, Metro, Albertsons, Target [®], and the United States Department of Defense, have all publicly begun to require that their suppliers use the technology. While details vary by company - with some more aggressive than others - the overall tone is remarkably similar. Top 100 suppliers to these organizations are being requested to supply RFID tagged materials by anywhere from the end of this year (2004) to the middle of next (2005). Today, these initiatives are focused mainly at the pallet and case level, meaning that tags are to be applied to pallets and the individual cases that are applied to those pallets.

The high-level ROI driving these initiatives is easily understood once the basics of the technology are explained. At a simple level, RFID tags can be thought of as extremely long bar codes that can be read without a line of sight requirement, because they are read using radio waves, instead of the optical waves (light) used to read bar codes. The length affects the business process because it allows a greater degree of unique identification. For example, a typical product bar code today - the Uniform Product Code (UPC) - contains just enough information to identify the class of a product. A typical example would be a can of soda. The bar code on this soda basically says "this is a 12oz can of Brand X soda". The RFID equivalent of this bar code - an Electronic Product Code (EPC) - says "this is a 12 oz can of Brand X soda serial #23676777". The key difference is that each item tagged with an EPC -based RFID tag is uniquely identified - different from every other item in the world. From a supply chain perspective, the implication is that I can now track every individually tagged item throughout the supply chain - from factory to retail store.



Moreover, because I can read these RFID tags without line of sight, I can read them without human intervention with a network of fixed readers installed at key choke points - dock doors, conveyors, fork lifts, etc. The fact that I do not need human intervention lowers my cost to acquire the data - which in turn allows me to acquire a lot more data, with significantly greater timeliness.

The Focus is Clear

There's not a lot of disagreement about where the ROI for RFID will come from. Greater granularity of information combined with its near real -time nature will greatly increase information velocity. Data acquisition costs will decline due to a reduced need for human data gathering. Quality and timeliness of information translate directly into supply chain efficiencies that reduce cost. For retailers, a more efficient supply chain translates into a greater likelihood that goods will be where and when customers want to buy them - i.e. reduced stock-outs.

Moreover, there's not a lot of disagreement as to what the standard will be. In the past, lack of RFID standards has been the single greatest impediment to adoption of the technology in supply chain, even while it has enjoyed great success in other areas such as electronic road tolling and animal tagging.

Today, the focus is clear. For retail and supply chain applications, the standard is EPC (Electronic Product Code). EPC enjoys widespread support, and is the focus of the initiatives and mandates from large retailers which have garnered so much press of late. The success of EPC is rooted in its history. It emerged from an organization known as the MIT AutoID Center. The Center was a private/academic partnership driven by some of the world's largest retailers and CPG (Consumer Packaged Goods) companies, in partnership with a broad spectrum of technology providers, including Symbol Technologies. EPC technology simply works better and is more focused on user requirements than previous generations of RFID technology. As we move forward, management of EPC has transitioned to a non -profit organization associated with the Uniform Code Council (UCC) and EAN International (UCC). This new organization - EPC Global - is expected to continue development of the standards while using UCC/EAN's experience of retail bar code standards to ensure an appropriate support infrastructure is developed.

Finally, it seems clear that RFID/EPC technology works. In response to the retailer initiatives discussed above, a significant number of pilots have already well underway. While difficulties have been encountered - and no doubt more will be - the basics of the technology are proving out. Pallet tags can be read reliably when passing through a dock door portal. Case tags can be read reliably - as long as they are singulated on a material handling system first. Reading many cases simultaneously while on a pallet remains technically challenging, however, and is the area where most improvement is possible.

Overall, however, there is not a lot of disagreement - the ROI is defined, the standards are there, and the technology works. It sounds like there aren't a lot of challenges that remain. Unfortunately, that's not yet quite the case. Everything looks good at a pilot scale, but the real challenge is yet to come - scaling up these pilots to an enterprise scale and ensuring that broad company-wide deployments are not only possible, but also profitable.

Scaling RFID for the Enterprise

So what are the challenges that must be addressed as we change our focus as an industry, and begin to look beyond pilots to full enterprise deployments? Many lessons remain to be learned, but some things are clear:

- ▶ Integration with other data sources and devices such as bar code, wireless networks, and portable data terminals is critical. There will be no RFID islands in the warehouse of tomorrow. RFID data and devices must interact seamlessly with data gathered through other means, including bar code, wireless data networks, and portable data terminals. RFID need to work with and be a part of the overall environment.
- ▶ Solution suppliers with a proven track record will be preferred. One thing that is clear is that when RFID is deployed at scale, that scale will be quite large in scope. Imagine the need to deploy a national or international network of hundreds - or thousands - of RFID readers. Clearly, companies will only be comfortable with providers who have significant experience installing and deploying infrastructure at scale, as opposed to smaller single technology providers. Symbol's own experience as pioneer in deploying 802.11 networks on a global scale has reinforced the criticality of this factor in our view.
- ▶ Manageable and scaleable readers and software infrastructure is key. Once the reading infrastructure is installed, the challenge becomes keeping it running smoothly and efficiently. How do you know whether an RFID reader is working? Is it functioning at full capacity or is it impaired in some fashion? What happens when an RFID reader fails? How often will this happen? All of these questions, and their answers, argue that preferred solutions will be those with industrial levels of ruggedness, and inbuilt management capabilities that lower the labor cost of keeping the network running.
- ▶ Expansion of existing solutions to include EPC will be preferred. IT and operational managers already have a plethora of software, hardware, and technology to manage. Most would argue that they already have far too much complexity on their plates. If RFID is another new "thing" to be managed, it can be viewed as a burden. To the extent that RFID can be implemented as an extension of existing systems - using familiar tools and interfaces - this can go a long way to reducing the operational cost.

So how can companies move towards solutions that address these issues? In Symbol's view it all starts with one thought: "Point solutions are not adequate - only integrated architectures can provide the value that EPC promises."

Capture, Move, Manage

Symbol's own enterprise mobility architecture is built on the premise that any solution must address three needs in an integrated fashion. It must:

Capture information in real time at the point of business activity,

Move information instantly to and from the point of greatest impact, and

Manage the unimpeded flow of information and the devices that supply it with exceptional efficiency and security.

These fundamental functions - capture, move, and manage, form the core of Symbol's **cm2** enterprise mobility architecture:

Capture - Enterprise mobility begins with the ability to capture information at the point of business activity. In this core mobile competency, Symbol has a 30-year track record of product innovation driven by customer needs. Data capture solutions include handheld and hands-free laser bar code scanners, RFID readers, imagers and kiosks, and modular, handheld, and ruggedized mobile computing systems with convergent data/voice/video capabilities. From RFID to locationing, VoIP to biometrics, Symbol delivers a complete set of integrated data capture solutions.

Move - More than a decade ago, Symbol pioneered standards-based wireless communications, networking and mobility. Today, Symbol provides complete, cost-efficient, field proven mobility infrastructure solutions encompassing wireless LANs, WAN, and PAN connectivity, and relevant standards and technologies including Bluetooth, WiFi, 802.11x, CDMA, GPRS, and GSM. Symbol's centralized wireless infrastructure solutions feature easy network integration, simplified management, and easier and more cost effective migration/upgrade

Manage - To achieve the productivity and competitive advantage inherent in mobility, you need the ability to efficiently manage the real time capture and movement of information. Symbol literally invented many of the technologies and protocols that enable enterprise mobility management. These all come together in the market's first unified mobility platform - the Symbol Mobility Software Suite. A turnkey Web-based management appliance (Mobility Services Platform), software monitoring agents, and application development tools all combine to provide a complete management, development, and deployment solution.

The message of experience to date is simple - EPC will deliver its greatest value, and realize its true business potential only when its deployed as part of an overall architecture that integrates all of a corporation's data and mobility needs: i.e. one that captures mission critical data, moves it to where it is needed, and manages the data and data acquisition infrastructure. At Symbol, we refer to this as an EPC-Enabled Enterprise Mobility Architecture.

EPC-Enabled Integrated Architectures Deliver Value

A key element of this architecture is not just that these layers - capture, move, manage - exist, but that they interact in an integrated fashion to optimize business value. How can an integrated architecture deliver value? Let's look at a few examples.

Imagine a scenario where some portion of your wireless LAN bandwidth is dedicated to the receiving function in a warehouse, through a VPN or other mechanism. What happens when exceptionally heavy inbound loads occur? In an integrated architecture, this can be detected and the Class of Service (CoS) for that VPN can be upgraded, making more bandwidth available to the receiving function.

What happens in a realistic warehouse scenario, where a worker may be moving dynamically between items that are tagged with EPC tags and items in an adjacent aisle or storage bin that are tagged with bar code. In an integrated architecture, devices would be capable of switching quickly between bar code and RFID on a transaction-by-transaction basis, meeting the needs of the real-world environment.

What happens when an administrator needs to manage a wide variety of mobile and fixed devices, including 802.11 wireless infrastructure and a geographically disseminated network of RFID readers? In a non-integrated architecture it's time to break open two, three, four or more manuals. In an integrated architecture, a single interface for managing a wide variety of devices is available, reducing complexity, cost, and training requirements.

Moreover, this trend towards integrated architectures is likely to pick up steam. In particular, over time the market is likely to move towards an increasingly integrated product strategy that seeks to exploit convergence between wireless data and RFID infrastructures wherever possible. At some point, this may even result in a unitary infrastructure, where the difference between these components is no longer relevant. While it can be difficult to predict the pace and direction of technical innovation, it is clear that only companies like Symbol Technologies with primary technical expertise in both RFID and wireless 802.11 systems will be in a position to drive this convergence.

Closing Thoughts

There is simply no disagreement any more - RFID in general and EPC in particular are going to become a central part of the supply chain technology infrastructure. Business Integration Journal stated the case succinctly in their January 2004 issue: "Widespread RFID adoption is inevitable and will have a transformational impact on supply chain execution." As RFID evolves from pilots to enterprise rollouts, point products will quickly give way to RFID integrated with end-to-end enterprise solutions. Companies will need to ask themselves how RFID solution providers will meet this need. Symbol's answer is clear: an EPC-Enabled Enterprise Mobility Architecture that integrates the ability to Capture, Move, and Manage a variety of data and devices - including RFID.