Sterling Commerce **white paper**

Data Synchronization: Laying a Foundation for Efficient Supply Chain Execution Using RFID and EPC

sterling commerce

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Executive Summary

EPCglobal, the organization formed by Uniform Code Council (UCC) and EAN International, has taken over the development of Electronic Product Code (EPC) technology from the Auto ID laboratories of MIT where it was initially developed. This technology has tremendous promise to improve value chain performance across multiple industries. Influential firms and institutions such as Wal-Mart, Procter & Gamble, Gillette, Unilever and the U.S. Department of Defense are investing in the technology through pilot projects, initial deployments and, in the case of Wal-Mart, a mandate for partner adoption. It is important to recognize, however, that RFID/EPC is not a standalone technology. Application integration work is essential to enable business systems to react to and consume EPC-related events in business processes. Moreover, the need for accurate information dictates that the EPC investment be coordinated with deployment of Global Data Synchronization (GDS). The ultimate success of EPC rests on widespread adoption, analysis and revision of internal business processes to exploit the new technology. This paper provides a primer on EPC technology, its expected business benefits, its relationship to GDS and prescriptions for getting started.

GDS and EPC initiatives are designed to work together to improve business performance. The introduction of low-cost EPC tags is tied to the future capability of the EPC Network to store, access and use content about items carrying EPC tags. The item-content requirements of the EPC Network also parallel the content requirements of GDS. To prepare for EPC (and other advanced forms of collaborative commerce), companies must first adopt GDS. EPC investments are of little value if the underlying data being tracked is not synchronized between business partners.

GDS has a value proposition in its own right: elimination of 1 percent to 3 percent of the waste and inefficiency in the value chain before consideration of the benefits from collaborative business processes enabled by GDS. The value of GDS really emerges as businesses deploy higher-value solutions, such as EPC, that use synchronized item information to deliver cutting-edge business performance. A combined GDS/EPC investment uses synchronized information to support a new generation of event-driven business optimization. It is this combined solution that will enable firms to substantively tackle unresolved, longstanding industry problems such as out of stocks or carrying excess inventory.

A number of industries have identified high-value applications of EPC technology; however, much development must be done to perfect its business application. Most of the focus on EPC today is on the development of the business processes, use cases and infrastructure to promote adoption. Although the standards are still evolving, industry leaders are now investing in EPC not only to understand the technology but also to gain insight into the organizational impacts of adoption. This knowledge will, ultimately, help accelerate their EPC deployments.

Technology solutions must address requirements in multiple areas, including secure Internet B2B communication, business-process management and internal business systems integration. Both GDS and EPC represent important applications for the use of integration-platform technology that can handle event tracking, monitoring and routing, data transformation and aggregation, sending notification of EPC events to humans where applicable, and interaction with the EPC network components through Internet-based communications. The higher level of automation achieved will have organizational impacts in terms of work content as well as decision-making.

The bottom line is that EPC technology merits serious consideration. Successful implementation will provide any company with a competitive edge. A GDS initiative is a foundational step, and an EPC initiative can be viewed as parallel and complementary to it. Companies should use pilot programs to proactively investigate and understand the emerging technology and the accompanying process and organizational changes that will be needed. It is also important to select solution partners who not only have a commitment to the industry, but also possess the size and global presence to deliver solutions.

Introduction: Transformative Potential, but Plenty of Groundwork to Be Done

This paper provides prescriptions for getting started with a successful Electronic Product Code (EPC) implementation. It discusses successful Global Data Synchronization (GDS) as a prerequisite for EPC success. Whether EPC is in your company's immediate future, on the horizon, or not in your plans at all, GDS can deliver immediate value — and it is an absolute essential for successful EPC implementation. This paper also provides a look at the emerging landscape of EPC solutions, which include important new B2B messaging capabilities and often-overlooked behind-the-firewall integration capabilities. The ideal solution would provide business-systems integration, B2B data communications and security in a single, flexible package, thereby lowering total cost of ownership and reducing risk.

Radio Frequency Identification (RFID) technology has been around since World War II and has been applied to areas as varied as manufacturing process control and traffic toll collection. The recent development of EPC and the supporting EPC Network lower the cost of RFID technology and can therefore promote large-scale adoption. Wal-Mart and the U.S. Department of Defense (DoD) have emerged as early adopters of this technology, and are quickly moving to require the use of RFID tags to transform their value chains. Other retailers in the US, such as Albertsons and Target, are following suit and looking at mandating that suppliers tag their shipments. In Europe, Metro is making a similar move with its suppliers. Widespread use of RFID by retail, consumer packaged goods (CPG) manufacturers, and in the pharmaceutical and other industries is rapidly advancing from discussion to reality all around the globe, especially in China and Japan. While Wal-Mart and the DoD are initially targeting select suppliers, many other retailers are eager to exploit the benefits of wireless sensor tags, and many smaller manufacturers are concluding that soon they too will need to become EPC-capable.

EPC Overview: A New Method for Value-Chain Transformation

The EPC standard represents a revolutionary advance in product identification and tracking. It extends today's bar code methodology to enable automated tracking of pallet, case and individual item information throughout the distribution/value chain. A smart tag — an intelligent microchip and wireless antenna — is embedded in a product, case or pallet of products. The tag transmits an EPC that an RFID reader captures without human intervention. The reader does not require a line of sight and can be placed anywhere from store shelves to a distribution center's exits, lending itself to a wide variety of usage models.

The EPC standard and the supporting EPC Network are a subset of RFID technology developed at the Auto ID labs at MIT. Like the UPC/EAN codes, the EPC is a license plate or record key. In contrast to the UPC/EAN codes, which can only identify individual items, the EPC is much more robust and can identify an instance of an individual item (pallets, cases or items) at a specific location and at a specific point in time. Like license plates, EPCs are linked to a shared network-based content repository called the EPC Network. The EPC network provides detailed information about tagged items on demand. The information actually stored on a tag is minimal. This significantly lowers the cost of the tag, minimizes communications overhead and is intended to promote broad commercial adoption.

The work at MIT took the EPC technology through large-scale field trials and major consumer goods companies including Gillette, Unilever, and Procter & Gamble to validate its commercial value. In mid-2003, EAN International (EAN) and the Uniform Code Council (UCC) announced the acquisition of the EPC technology from MIT to provide the infrastructure to bring the EPC Network to scale across a number of vertical markets. EAN-UCC launched a new division, EPCglobal, on November 1, 2003, complete with a new executive leadership team to manage this process. The Auto ID labs will continue R&D with the EPC.

The EPC Network

The EPC Network is a network infrastructure that can track and trace items in a value chain. As illustrated below, a manufacturer applies an RFID tag (chip plus antenna) to a product instead of a bar code, or in conjunction with a bar code (depending upon the application). The chip is part of a tag that attaches to a product. The chip can receive a radio wave from a tag reader and transmit a response containing key information lodged in the chip. The reader passes the information via RFID to a local computer. The local computer transmits the EPC data to the Internet, where much more information about the product is available. The EPC data itself contains minimal identification and location data, thereby helping to keep the size and cost of the tags down. That information can then be retrieved on demand to provide whatever anyone needs to know about that product.

The Object Naming Services (ONS), which is similar to the Internet's Domain Name System, tells the local computer where to find information about any object that carries an EPC, pinpointing a Web server address (URL). A software technology called EPC Middleware uses a network of computers distributed across stores, headquarters and warehouses, rather than one central computer, to manage the flow of information and prevent overloading of corporate and public networks. Finally, the EPC Information Service (EPCIS) depicted in Figure 1 is the network of certified solution partners offering business solutions enabled by the EPC.

Widespread adoption of EPC therefore requires much more than simply deploying tags and readers. In addition:

1. Suppliers must provide accurate, synchronized item information to the EPC Network.

2. Users of EPC data must implement standards-based methods of communicating and synchronizing their data across their value chain as a foundation for an EPC implementation.

3. Users must deploy solutions to integrate with the EPC Network to share information and connect disparate back-end systems, and suppliers and retailers must be able to use EPC information in their business processes.
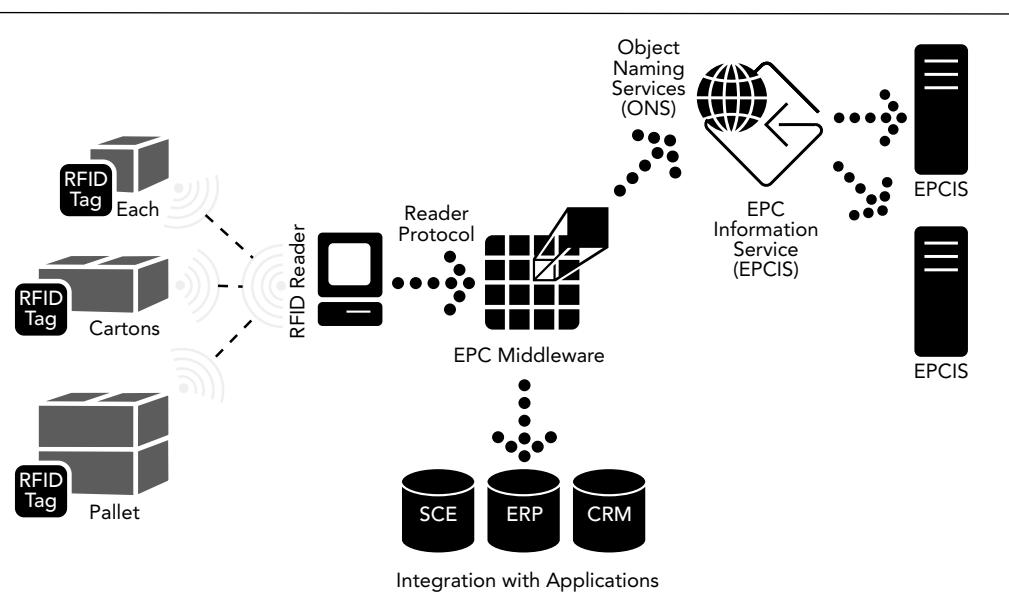

Figure 1: Electronic product codes, unique to each individual item, case or pallet, are broadcast by an RFID tag and read by an RFID reader. The descriptive content about the tagged items is retrieved from the EPC Network.

What is the Value Proposition of EPC?

The EPC standard and EPC Network provide four basic capabilities:

⟶ Serialization of items in a value chain, or the ability to identify an instance of an item.

⟶ Elimination of line-of-sight requirements coupled with the ability to read multiple products simultaneously. This eliminates the time and labor cost to scan bar codes in a value chain, since the EPC code can be read at a warehouse or loading dock without incurring labor costs. As an example, Wal-Mart receives about 15,000 pallets a month from several major suppliers that ultimately will be received and recorded automatically in inventory with only minimal labor costs for forklift operation. This is the clearest, least-complex value proposition of the EPC.

⟶ The EPC Network can help trace items in a value chain. Each time an item is read in the value chain, the ECP Network will record its location. Collecting these instances or reads of movement will provide a map of a product's movement in a value chain. The ability to trace products from the final customer back to the source will provide an electronic solution to support emerging food-safety concerns by identifying food sources, and could also support product recalls. The strongest value proposition for tracing has emerged in the pharmaceutical market for authenticating drugs and preventing the distribution of counterfeit drugs.

⟶ The EPC Network can help track items in a value chain. The data on each instance of a product recorded in the EPC Network will also provide a picture of a product movement from the source to the end user or customer. (Track is the reverse of trace.) The ability to track product movement will provide complete value chain visibility of demand and supply. Complete visibility will provide information to help support perfect orders and eliminate chronic out-of-stock and excess inventory problems in the value chain. This capability has broad appeal; however, the uses case and business processes supporting deployment of tracking capability need considerable development.

The State of the Art: Summer 2004

Today, the EPC Network, its components, certification and a formal solution-partner program are still in development. These programs will evolve over the next 12 to 18 months. EPCglobal is sponsoring work with customers and future solution partners to define requirements for certified solutions, and Sterling Commerce plans to participate in this work in 2004.

The data requirements, business processes and technical standards to support the interaction of GDS and the EPC Network are not yet defined. The business requirement for accurate synchronized item data is acknowledged and on the agenda of the EAN-UCC standards groups in 2004/05.

In the meantime, many organizations are not waiting. They have undertaken EPC pilots because the applications of this technology are compelling. Figure 2 summarizes an early assessment by Sterling Commerce of potential applications of EPC technology, ranking them as either high (H), medium (M) or low (L) value. This information may change as the technology matures.

Going forward, there are both technological and business-process hurdles to overcome before reaching broad adoption. EAN-UCC and its user community are very focused on overcoming these hurdles and launching a commercial version of this technology. The growing list of companies engaged with EPC pilot activities are working to learn the organizational and business process changes required to succeed. The output from these pilots will be a series of use cases and ROI models to support the investment required to build a community of users in 2005/06.

Benefit	CPG	Retail	Distribution	Pharma	Telco
Tracking Inventory	H	H	H	H	H
Tracking Counterfeits	H	H	H	H	L
Shrinkage	M	H	M	H	L
Locating Inventory	H	H	H	H	H
Effective Replenishments	H	H	H	H	M
Inventory Re-Deployment	H	M	H	M	M
Managing Expirations	M	H	M	H	L
Better Merchandising	M	H	L	H	L
Pricing Effectiveness	H	H	L	M	L
Manage Recalls Effectively	M	M	M	L	M
Manage Returns Effectively	M	M	M	L	L
Labor Productivity	H	H	H	H	H

Figure 2: Sterling Commerce ranking of potential applications of EPC technology.

Global Data Synchronization: Automated Data Exchange

The compelling benefits of EPC applications will help drive organizations to complete Global Data Synchronization (GDS) initiatives. The need for accurate data within the EPC Network to drive a new generation of business practices makes GDS a prerequisite for realizing the benefits of RFID. EAN-UCC and its user community have identified the linkage between GDS and accurate data in the EPC Network as a critical path item to global adoption. The linkage and interoperation of the GDS solutions developed by EAN-UCC, and the information requirements of the EPC Network, will be a subject of intense activity in 2004/05.

Deploying GDS solutions is the focus of the Global Commerce Initiative (GCI) and EAN-UCC. Data synchronization today is primarily a manual process — slow, repetitive and error-prone. In addition, data synchronization is local, not global. GDS provides a framework for automating this process, facilitating collaboration between retailers and suppliers and delivering value throughout the enterprise and across the retail value chain. Using new global standards from EAN-UCC provides a common solution for global trade.

EAN-UCC and its Solution Partners are providing a single, standards-based platform for data synchronization among retailers, suppliers, distributors and other parties worldwide. The Global Data Synchronization Network (GDSN) of standards-compliant, interoperable data pools will provide the scalable global solution needed to support the global rollout of the EPC Network. EAN-UCC has established a central global registry — named the GLOBALregistry — that acts like a phone book for the members of the GDSN, and through which suppliers and retailers can publish and subscribe to item identification and attribute data using their chosen data pool. (See Figure 3.)

A data pool is an application that uses a standards-based approach to exchange information between trading partners in the GDSN. Data pools were conceived to support the business processes and messages required for global data synchronization. UCCnet, the major data pool in the United States, will migrate to the EAN-UCC-sponsored GDSN model in 2005 to meet demands for expanded services and global scale.

Figures 3: Global Data Synchronization
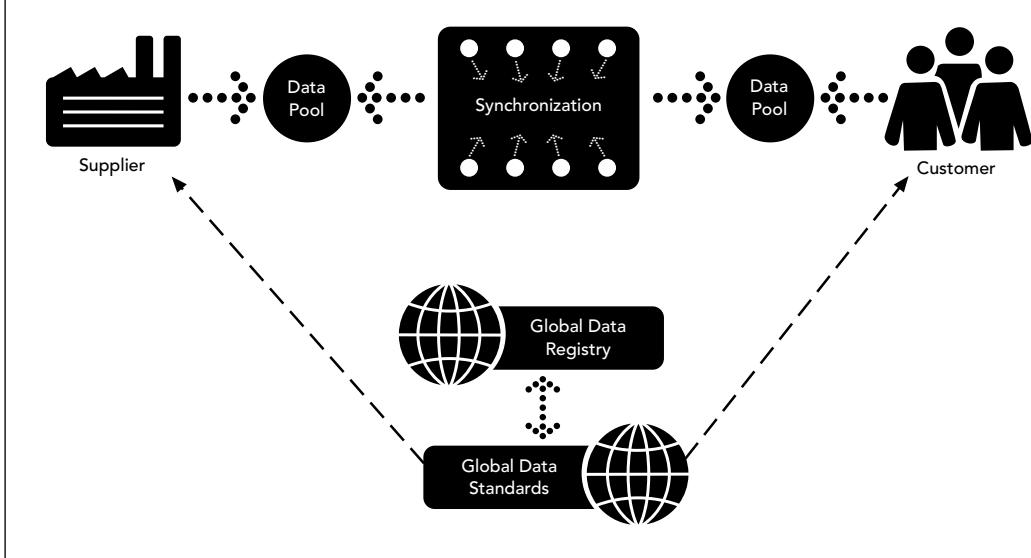
The first step to making standards global is to remove the differences between UPC codes used in the United States and EAN codes deployed in the balance of the EAN Member Organizations. The need to expand the numbering pool and facilitate global commerce is driving the UCC's 2005 Sunrise initiative. U.S. and Canadian companies have traditionally scanned and processed 12-digit UPC symbols, while the rest of the world has used eight- and 13-digit EAN codes. Beyond these technical issues, the 2005 Sunrise project is an opportunity for companies to re-examine their data and the business practices surrounding assigning UPCs to products, while verifying that they are compliant with new Global Trade Identification Number (GTIN) allocation rules that specify the circumstances under which companies are required to issue new GTINs.

To achieve global scale, both the GDSN and the EPC Network must employ global standards, beginning with the Global Trade Identification Number (GTIN) and the Global Location Number (GLN). Where the GTIN describes the "what" of product item data, the GLN specifies the "who" and the "where." The GLN describes parties and locations within a company, such as distribution centers and even individual loading docks, opening the door to "party synchronization," which identifies sending and receiving parties as well as location codes. The GLN is also a reference to additional information, such as the vendor's address and hours of operations. Both GTINs and GLNs are stored in the trading partner's local system for direct access, and can be exchanged with trading partners with standard message sets via the GLOBALregistry.

In addition to common data standards (GTIN and GLN) and a single global registry, the GDSN provides message-based processes to enable synchronization of item and organization data. Synchronization of pricing data is on the horizon. Within the GDSN framework for synchronization services, manufacturers will publish master data describing items to data pools that are connected to the registry. Retailers will subscribe to the data, which will be synchronized on an ongoing basis. Companies can use messaging, such as catalog item notification (telling retailers that a new item has been added) and catalog item confirmation (acknowledgment of receipt and processing of new item data from the retailer), to create a foundation for higher-level collaborative activities.

The launch of the GDSN has legacy issues to overcome just like the GTIN. There are country catalogs such as ECCnet in Canada and SINFOS in Germany that offer local market-data synchronization solutions based on current EDI standards. These legacy deployments have announced plans to move to the GDSN model over the next few years. The long-term plan is for
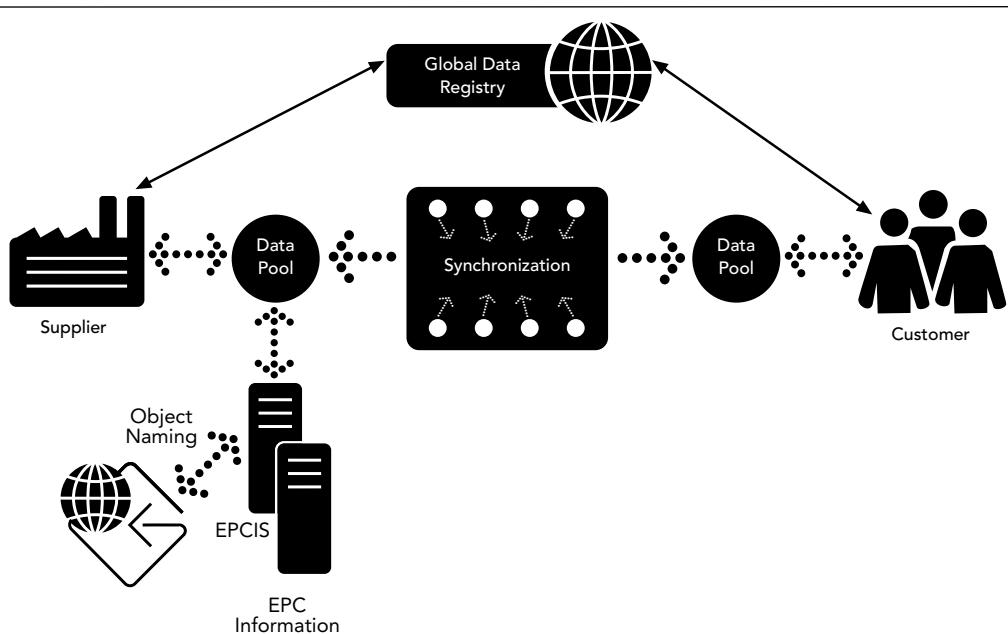
Figure 4: The global data synchronization network is the foundation that allows suppliers and retailers to exchange product and location data, drawn from their master databases and stored in the GDSN and use within the EPC Network.

all these services to interoperate so they seamlessly exchange information through the GLOBALregistry. However, until the vision is fulfilled and based on each company's trading partners, it may be necessary to synchronize with more than one registry to achieve true GDS.

With EPC, GTINs, GLNs and GDS in place, companies can coordinate and synchronize product data and identify, track and locate assets anywhere, in real time. Suppliers can enhance operational efficiency by using data from the item master database to generate product identification and attribute data for RFID tags. Similarly, when retailers receive a tagged item, they can check its GTIN and EPC serial number against the information in the item master database.

Figure 4 illustrates the value of synchronized information from the GDSN in the EPC Network. In this example the standard GDSN model is expanded to highlight the communication of synchronized information from the data pool of a supplier to the EPC Network in support of RFID tags. This illustrates the eventual solution that will emerge from EAN-UCC to leverage the GDSN in the deployment of the EPC Network. The architecture may change from the illustration below, but the business process, using synchronized data in the EPC Network, will not change.

Benefits

GDS supports EPC deployments and helps create one "version of truth" for planning, packaging, distribution, logistics, partners and others. But GDS has a strong value proposition in its own right. Several research firms have undertaken studies to quantify these benefits. A 2003 study by A.T. Kearney (Figure 5) reported that total benefits from synchronization are in the range of $1 million additional earnings for every $1 billion of sales[1]. A June 2002 study by A.T. Kearney for the Grocery Manufacturers of America and the Food Marketing Institute found that $40 billion — 3.5 percent of total sales — is lost each year due to value-chain information inefficiencies in the grocery industry. In addition, 30 percent of item data in retail catalogs is incorrect, and 60 percent of all invoices generated have errors[2].

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[1] "Data Synchronization Proof of Concept: Case Studies from Leading Manufacturers and Retailers," 2003.

[2] GMA-FMI Trading Partner Alliance, "Action Plan to Accelerate Trading Partner Electronic Collaboration," June 2002.

Manufacturers	**Retailers**
→ 3-5% reduction in shelf out-of-stocks	→ 3-5% reduction in shelf out-of-stocks
→ 2-week reduction in speed-to-market for new items	→ 2-week reduction in speed-to-market for new items
→ 7-13% reduction in sales force time communicating basic item information	→ 10,000-30,000 hours saved in store labor costs resulting from shelf-tag and scan errors
→ 5-10% reduction in sales force and accounting time spent dealing with invoice disputes	→ 5,000-10,000 hours saved in merchandising and data entry time dealing with new item introductions and updates
→ Elimination of basic item data errors, currently found in up to 8% of total purchase orders	→ 1,000-2,000 hours saved in finance time dealing with invoice disputes related to basic item information
→ 0.2-0.7% reduction in outbound logistics costs	→ 0.5-1% reduction in inbound freight costs
→ 0.5 % reduction in inventory	→ 1,000-2,000 hours saved in warehouse and DSD time dealing with item discrepancies
	→ 1% reduction in inventory

**Identified by A.T. Kearny, GMA/FMI Trading Partner Alliance: "Action Plan to Accelerate Trading Partner E-Collaboration,"
June 2002

Deployment of EPCs and the EPC Network build on the foundation of synchronized data and offer expanded value-chain performance.

Benefits for manufacturers and suppliers can include:
→ More efficient ways to track products currently stored in their warehouses
→ More efficient ways to "pick and pack" orders for end customers
→ More efficient ways to track and document what products and quantities are actually shipped to an end customer
→ The potential to track the shipment process to end customers
→ More accurate demand/production planning based on real-time information

Retailers can expect to experience:
→ More efficient ways to track products stored in their warehouses or store receiving areas
→ More efficient ways to track and document what products and quantities are received by their distribution centers (DCs) and are transferred between their DCs and stores
→ The ability to track shipments
→ The ability to identify product inventory shrinkage and theft
→ The ability to track and identify out-of-date products

The opportunity to offer better and unique services to their end customers in-store, including automated checkout, product identification, search and inventory levels.

EPC shows indications of soon reaching critical mass, and the biggest players in the retail and CPG industries, including Wal-Mart, Gillette and Procter & Gamble, are aggressively pursuing it. Other vertical markets, most notably pharmaceutical distributors, are also exploring the potential of the EPC/EPC Network. The benefits are so compelling that companies should not delay implementation. Businesses that implement quickly, cleanly and creatively can gain a competitive advantage.

IBM research indicates that RFID can improve distribution center productivity by 10 percent to 20 percent, and retail store productivity by 5 percent to 7 percent.[3] Cap Gemini Ernst & Young reports that even in the medium term, global data synchronization can have a 10 percent to 15 percent impact on the bottom line for retailers and manufacturers alike.[4] Finally, GDS and EPC create a foundation for higher-level collaboration. In the hierarchy of collaborative engagements, data synchronization provides the foundational elements of common data standards, a single item registry (the GLOBALregistry), and worldwide item attribute synchronization (via GDS). By leveraging these standards, companies can pave the way to collaborative business processes such as new product development initiatives; collaborative planning, forecasting and replenishment; and localized or "micro-retailing" product assortments.

If these benefits are not sufficiently compelling to move forward toward GDS and EPC, consider the risks of inaction. By delaying, you run the risk of having competitors gain an advantage in efficiency, value chain execution and retail performance. Competitors who move faster will save money and use it for investments that will put them further out in front of the pack. And, of course, you may face penalties from retailers if you don't meet their deadlines for standards compliance.
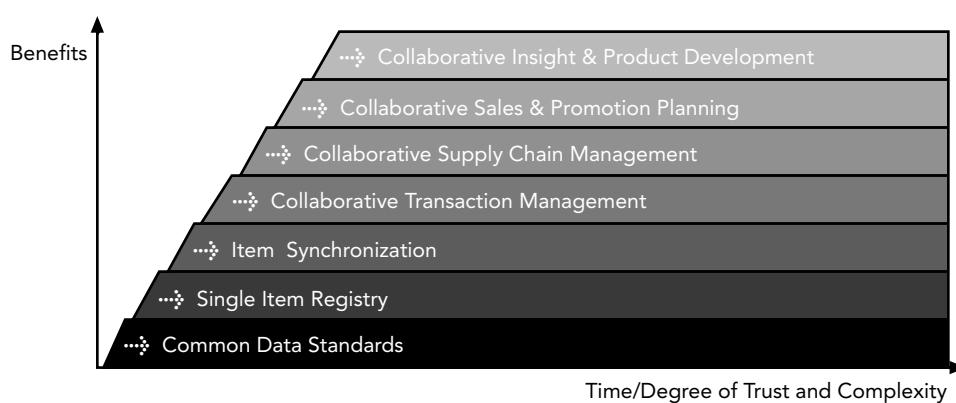
Figure 6: Building on the foundations of common data standards, a single item registry and item attribute synchronization, retailers and CPG manufacturers can achieve collaborative benefits in synchronized pricing data, value chain management, promotions planning and product development.

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[3] "RFID Solution for Supply Chain Management and In-Store Operations from IBM," 2003. http://www-1.ibm.com/industries/cpg/doc/content/solution/956491123.html#2

[4] Cap Gemini Ernst & Young and Global Commerce Initiative, "The Case for Global Standards: Creating the Business Case for Global Data Synchronization in Your Company," 2003.

Moving Forward: Steps to Success

Whether you're one of Wal-Mart's top 100 suppliers or a smaller company trying to determine what GDS and EPC mean for you, one thing is clear: EPC: GDS and 2005 Sunrise are complex undertakings whose impacts will be felt throughout your company and across your value chain. They are also interrelated efforts, and most businesses will want to undertake them as parallel efforts.

Because of the high degree of interrelationship, a best practice is to treat the initiatives as an integrated whole. Start 2005 Sunrise immediately if you haven't already done so; begin designing the business processes and infrastructure for data synchronization, and start running EPC pilots. Supplement your in-house resources as needed. To maximize value, avoid silo thinking, take a holistic approach and keep the big picture in mind — both in building the business case and in planning implementation efforts. Below are some specific steps and suggestions.

---> Establish 2005 Sunrise GTIN Compliance

Begin by assessing your current hardware and software systems to identify any that use legacy UPC or EAN codes for item identification, including point-of-sale systems and those that pertain to inventory, distribution and receiving, ordering and order fulfillment, accounts payable and receivable and product catalogs. Current systems need to be updated to accommodate GTINs, including recognition of legacy EAN codes. Contact vendors and, if their products are not already 2005 Sunrise GTIN compliant, ask them to ensure compliance before the January 1, 2005, deadline. Establish priorities for upgrading, replacing and validating systems as needed. Adopt GTIN and GLN data structures internally to begin experiencing their benefits even before you deploy them externally.

---> Aggregate and Cleanse Your Item Data

Product item data may be stored in a variety of locations across the organization. Before synchronizing data, it's important either to bring it together in a single data warehouse or integrate the various applications in which it resides. You may need to add additional data attributes to meet GTIN standards. It goes without saying that the data must be cleansed to ensure that it not only complies with standards, but it is also accurate. Even if you never undertake external synchronization, these steps can improve internal business operations and product tracking.

---> Synchronize With the GDSN

The GDSN provides a standards-based framework that has been adopted by a broad array of industry organizations, exchanges, data pools, and leading retailers and manufacturers. Once your company has cleansed its data and piloted or deployed GTIN and other synchronization internally, you're ready to communicate and synchronize with the outside world. Evaluate certified Solution Partners and prepare to connect to the GDSN. Then, load and maintain your information, publish it to retailers through the registry, and manage the reports and status updates generated.

---> Analyze Business Processes

GDS and EPC provide an opportunity to reengineer and streamline internal business processes. In parallel with the above steps, business processes must be examined to identify or determine what functions are impacted by GTIN data. You should also identify which processes need to respond when data events are triggered, and which processes must change to take advantage of the volumes of data that EPC will generate. Since GTINs are used almost everywhere — from finance systems to packing, distribution and logistics — all of these groups and systems will be affected. At a minimum, warehouse-management systems and others designed to handle bar codes will need to be reworked to accommodate longer GTINs.

--→ Begin RFID Pilots

Start with pallet or case-level tagging and pilot your hardware and data structures before finalizing your designs. If you are included in Wal-Mart's 2005 program, you should be moving aggressively toward compliance with its implementation requirements. Otherwise, consider preparing to use RFID technology internally in a pilot to gain experience before integrating with partners. Piloting will help you see how specific products perform in your environment, better understand and resolve technical issues, gain insight into effects on your business processes, and demonstrate the benefits to be realized within your own environment. Initial pilot tests should focus on EPC technology and its functional requirements, as well as on how EPC will affect current manual processes, the value chain and collaborative systems between retailers, manufacturers and suppliers.

Software Requirements and Solutions

EPC has the potential to regularly generate huge volumes of data. In the extreme case, Retail Forward, the management consulting and market research firm, calculated that if Wal-Mart put an RFID tag on every item in every store and tracked each change in information, it would generate 7.5 terabytes of data each day.[5] To reap the potential rewards of EPC, companies must invest in systems that filter, process, manage and purge that data. Information technology investments are also required to integrate EPC data with business systems that can use the data. EPC data must enter the enterprise through a scalable and secure B2B communications infrastructure. It must be then be transformed, if necessary, and routed to appropriate back-end business systems. The data will need to be associated with business documents such as sales orders and invoices. It will be aggregated and integrated with ERP systems, customer service and other enterprise solutions to streamline operations and gain a clear view of inventory movement. Certainly, IT departments will be responsible for data storage and management, but they must also work with other functions across the business to analyze business processes and determine how to extract maximum value from the available data, i.e., how to turn the data into actionable information.

The software architecture to support the GDS and EPC initiatives and to enable next-generation business processes should be modular, secure and flexible. Some application vendors will build direct support for EPC into new versions of their offerings. In many cases, however, integration software will need to be deployed at the edge of an organization's trusted network. Some firms may use this single point of entry to relay EPC event data to systems that have direct EPC support.

Although purpose-built RFID/EPC event processors will no doubt emerge in the marketplace, most organizations should avoid proliferating point solutions to support their EPC efforts. Instead, firms should look to their integration software providers to support EPC as well as GDS. Adding EPC support to existing integration platforms and B2B communications systems will be a straightforward vendor enhancement, although quality and depth of functionality will vary. Firms should begin to ask their vendor of choice for plans that provide:

--→ Scalable and secure perimeter network traversal. EPC event data must be kept secure, and the system must be able to process varying amounts of EPC data while retaining the ability to scale linearly through increased hardware investments. Security schemes are still in development, but there are opportunities for security exposure that will need to be addressed.

--→ Data transformation, including XML translation capabilities, for standards-based messages and other data (including, among others, EPC Network and UCCnet messages).

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[5] Ephraim Schwartz, "Brace for the RFID Data Deluge," InfoWorld, Sept. 12, 2003.
http://www.infoworld.com/article/03/09/12/36Opreality_1.html

→ Interfaces to back-end systems that will need to consume EPC data. Those systems may also raise their own business events in response to the receipt of EPC data. The software must therefore be able to trigger reactive processing from those back-end systems, and will ultimately require the capability for formal workflow orchestration. An example here would be the need for integration of EPC data streams from inbound goods with warehouse-management and inventory systems to record receipt of goods and update inventory.

→ Support for both EPC and GDS. It is desirable that EPC support be provided by the same solution that supports the firm's GDS initiatives. In this way, the coordination of the two efforts can be optimized.

The Time is Right

GDS and EPC promise to improve data accuracy, accelerate business processes, reduce inefficiencies and produce savings across the enterprise. They also provide a foundation for full machine-to-machine automation, new business processes and collaborative engagements that will lead to faster product development times, faster and more successful new product introductions, reduced operational and overhead costs, and earlier ROI from e-Business initiatives. With global standards in place and industry leaders adopting aggressive deployment schedules, the time is right for any large or midsize supplier or retailer — and even many smaller ones — to move forward. The benefits are great and will accrue to those that start early.

Glossary

CIC   Catalog Item Confirmation. A message the retailer sends in response to a notification, indicating that the item has been accepted, rejected, is under review, or has been synchronized (added to internal systems).

CPFR   Collaborative Planning, Forecasting and Replenishment

CIN   Catalog Item Notification. A message sent to notify retailers of a new or changed item.

EAN   European Article Number. EAN International administers product codes for Europe and Asia, much as UCC does in the US.

EDD   Extended Data Definition

EPC   Electronic Product Code

GCI   Global Commerce Initiative. An organization of consumer goods companies, established in 1999, that defines requirements and best practices for global trading.

GDS   Global Data Synchronization

GLN   Global Location Number. A numbering system for identifying companies and their associated locations, such as plants, offices, stores, distribution centers and warehouses.

GLOBALregistry   A central registry maintained by UCCnet for storing item (GTIN) and location (GLN) data.

GSMP   Global Standards Management Process. Process specified by UCCnet to specify terminology and business process changes and coordinate EAN and the UCC.

GTIN   Global Trade Item Number. A unique 14-digit number that identifies and describes a product or service. A GTIN is built from a company's current UPC numbers and is a subset of the electronic product codes used with RFID.

PIM   Product Information Master

RCIR   Registry Catalog Item Register. A message sent to a the GLOBALregistry to add or change items and their attributes. More than 35 attributes can be specified, including brand name, a trade item unit indicator, size and weight data.

RFID   Radio Frequency Identification.

UCC   Uniform Code Council, Inc. A nonprofit organization that manages the UPC system in the US and, with EAN International, manages the EAN.UCC system.

UCCnet A nonprofit subsidiary of the Uniform Code Council that provides a single location to store product and trading partner specifications (GTIN and GLN data) and enable partners to communicate and synchronize data.

XML   Extensible Markup Language. An open standard, developed by the World Wide Web Consortium (W3C) that provides a universal format for structured documents and data on the Web. XML serves as the basis for messaging communications within UCCnet.

About Sterling Commerce

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