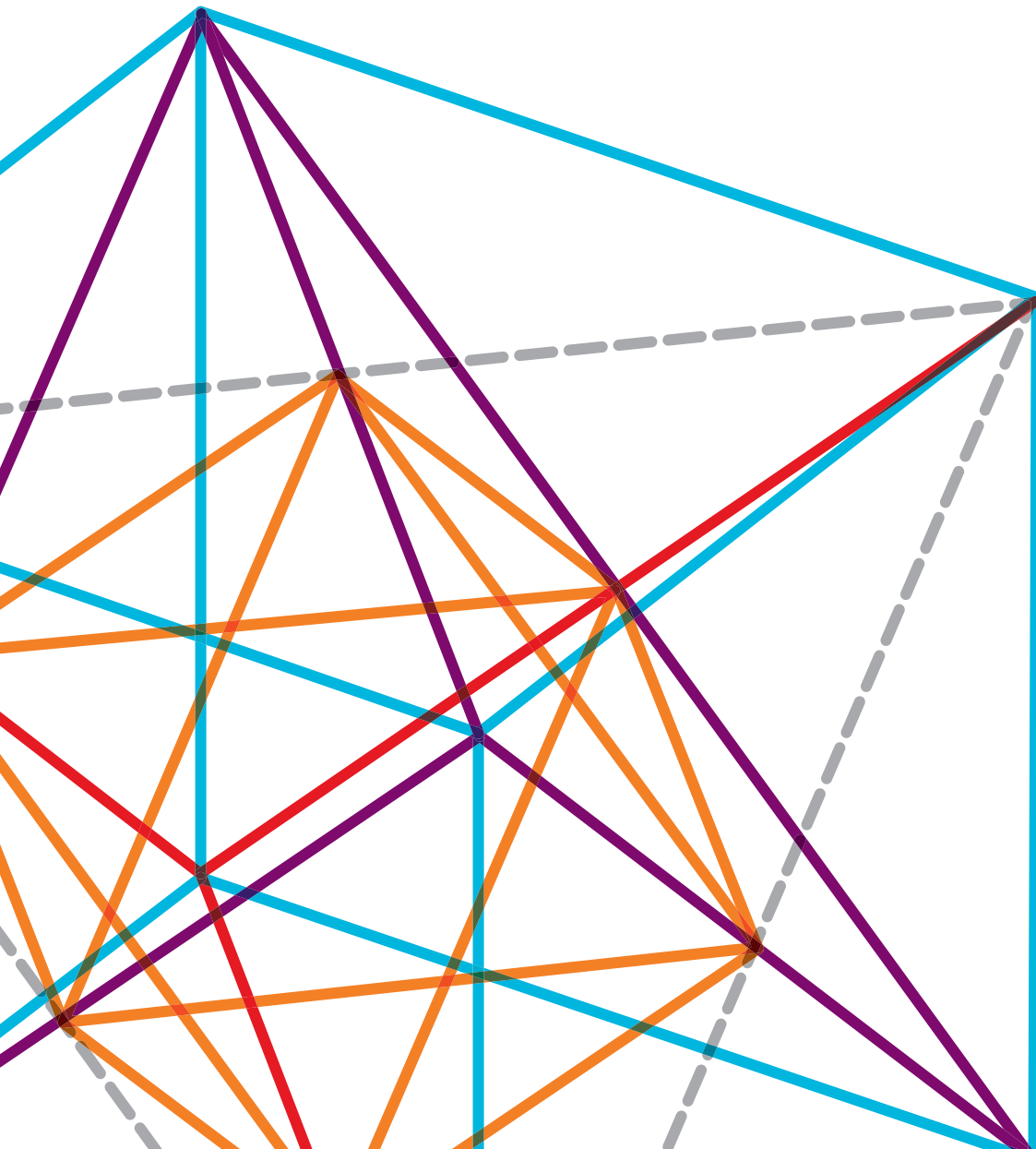


DRIVE VALUE ACROSS YOUR SUPPLY CHAIN
WITH CHIP-BASED RFID SERIALIZATION
A simpler, more cost effective solution for
deploying item-level tagging



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EXECUTIVE SUMMARY

Enterprises are looking for ways to improve visibility and efficiency across the value chain—from the manufacturing floor, through the distribution door, to the retail store. To provide deep visibility, a growing number of enterprises are leveraging item-level radio frequency identification (RFID) due to its affordability, ease of deployment, and ability to deliver Electronic Product Codes (EPCs) outside the line of sight.

Much of the benefit from EPC comes from each item's uniqueness from others just like it. Accurate counts are only possible if each tag carries a unique serial number. In addition to rapid counting, serialization enables the tracking and tracing of individual items throughout the product lifecycle—an additional benefit for a wide range of product categories.

As major retailers deploy item-level RFID and require their suppliers to do the same, brand owners must find a low-cost, reliable way to implement serialization. Because serialization is new for most suppliers, it has

the potential to be disruptive to existing packaging and labeling business processes, especially when the supply chain extends across geographical boundaries. In most cases, serialization is typically regarded as an IT-owned issue, requiring an enterprise-class software solution and the associated overhead to allocate and distribute serial numbers, often to many locations in many different parts of the world.

Instead, brand owners, supply chains, and retailers all can avoid the pitfalls, costs, and complexities of IT-based serialization using chip-based serialization. By using data already on the RFID silicon, chip-based serialization delivers a non-IT, low-cost solution that preserves sourcing flexibility and leverages existing business processes. For the enterprise, the results are lower costs, improved business efficiencies, and a more effective value chain.

INTRODUCTION

Big Data is the vast, ever-changing mine of information that enterprises must capture and refine to ensure better decision making. A major portion of achieving this goal requires visibility into the flow of materials and products. One of the major benefits of item-level RFID tagging is that it allows every item to be treated as unique, so they can be counted and differentiated rather than having thousands of items with the same SKU. The ability to track, trace, and collect information in near real time is prompting enterprises to accelerate RFID adoption across a wide range of industries, markets, and geographical locations.

In fact, RFID-based inventory management and tracking systems can scan items 25 times faster than systems that use barcodes. What's more, RFID scanners use radio frequency (RF) waves to access the tag, eliminating the need for line of sight access, allowing the scanner to simultaneously count large numbers of tags. This level of automation also eliminates the need for the person operating the scanner to manually ensure that they only scanned each tag once.

In serialized RFID tags, all products of the same make and model carry an EPC that contains the Universal

Product Code (UPC) and a GS1-standard serialized General Trade Item Number (SGTIN). The SGTIN contains a 96-bit data field that describes the item along with a 38-bit unique serial number. Brand owners are responsible for writing the correct EPC data into this memory location using an RFID-enabled printer/encoder, other specialized RFID equipment, or through a service provider. Any duplication of serial numbers or EPCs will introduce errors into the supply chain and reduce the value that RFID provides. The challenge is how to ensure the serialized numbers are globally unique to improve supply chain accuracy—essential for today's globally sourced supply chain.

As major retailers roll out item-level RFID, brand owners and manufacturers must find a low-cost, reliable way to implement serialization that does not add significant product costs. Just as critical, it must be automated and scalable, regardless of where in the world the supplier resides. Until recently, the development, deployment, and maintenance of the software, systems and business processes for allocation and distribution of serial numbers has generally been complex and costly.

COMMON SERIALIZATION CHALLENGES

Today's globally sourced supply chain has resulted in lower costs for manufacturing and the consumer. Improving efficiencies and driving costs lower require visibility into processes and products. The key issue brand owners face is having millions of items and serial numbers spread across multiple sites in countries around the world. Of course, the volume of products, codes, and serial numbers will only increase in the years ahead.

For serialization to be accurate and effective, every serial number must be unique. Multiple companies in diverse facilities throughout the world may use multi-

channel sourcing to manufacture a given product. Furthermore, downstream trading partners and distributors may also have specific processes that require serialized tagging. Each manufacturing location and distribution center must ensure no serial numbers are duplicated internally across the enterprise. Finally, a process to manage serial number usage must be in place, while providing assurance that no duplication exists outside the corporate firewall.

THE PITFALLS OF IT-BASED SERIALIZATION

In IT-based approaches to serialization, software or administrative processes are used to manage serial number allocation. Such solutions can range from a server that distributes serial numbers in small batches on demand, to a spreadsheet containing large number ranges assigned to locations, service providers, or devices.

As a process, IT-based serialization is a two-step effort. First, systems allocate and distribute serial numbers to the point of use. Second, software applications combine the numbers with the UPC or GTIN to produce a complete EPC. The final EPC is then sent to the printer or other encoding device for writing into the RFID tag chip's memory. In this approach, the development, deployment, and maintenance of the software, systems and business processes for allocation and distribution of serial numbers is complex and costly.

When it comes to global RFID tagging, the allocation and management of EPCs requires continuous connectivity and seamless software integration between the server and the remote usage points. In the global apparel-manufacturing industry, high-availability

IT infrastructure remains a significant challenge, especially at manufacturing sites located within remote third-world countries.

Another issue is that the diversity of equipment and suppliers often make seamless integration of systems and data a near impossibility—only made worse when the supply chain spans geopolitical boundaries. Small errors and system failures can disrupt operations, produce duplicate tags, or cause entire production stoppage, further reducing the value of RFID tagging.

Segmenting serial numbers and providing chunks to each location is one common method used, but it reduces the total number of tags available per site. Each tag producer (e.g., factory location or even printer device) is assigned a specific number range. In some industries, like apparel, change is constant, forcing manufacturing operations to require tracking number ranges that allow re-assignment and re-allocation as needed. This added complexity leads to business processes that have significant chance of error and duplication, thus increasing IT workloads and escalating costs. Fortunately, there is another alternative.

CHIP-BASED SERIALIZATION HELPS SIMPLIFY PROCESSES AND REDUCE EXPENSES

RFID chip-based serialization offers a unique approach that avoids the trade-offs of IT-based serialization. In addition to the EPC memory, many RFID chips have another memory location called the Tag Identifier (TID) that is written only once by the chip manufacturer. The TID includes make and model information for the chip as well as a unique serial number. In chip-based

serialization, the EPC serial number comes from the TID on the chip instead of an IT system. Now the entire process is simplified—the distribution of RFID tags also distributes serial numbers.

FREE UP IT, ENHANCE FLEXIBILITY

During RFID label printing and encoding, the printer or other RFID encoding system produces the complete EPC internally. This method combines the UPC or GTIN from the printer driver (as normally required for barcode printing) with the TID serial number from the tag chip. From a business-process, software, and variable data management perspective, producing an RFID label using chip-based serialization is no different than producing a traditional barcode label. The serialization happens under the printer's hood, uses fewer IT resources, and allows the brand owner to "Set it and forget it".

The major RFID chip suppliers have aligned to allow interoperability for chip based serialization, creating a "win-win" situation for brand owners. Now, enterprises can leverage virtually any RFID chip vendor to accurately serialize its tag chips instead relying on an internal system or a third party. Chip manufacturers are already in the business of precise serialization because many downstream applications depend on this TID feature.

Using the TID for serialization is a win for the brand owner because the chip vendor has already made the serialization investment. Brand owners who implement chip-based serialization can take advantage of the features already built into the tags they are buying, while maintaining stand-alone serialization operations. It also frees them up to choose virtually any RFID chip manufacturer, and mix and match RFID vendors as business conditions change.

Brand owners can encode unique serial numbers, simply and cost effectively, while eliminating the need for a global network of 100 percent connectivity and uptime to deploy. There is no need for an automated or manual management process for serial numbers or the cost associated with them. Enterprises can encode unique serial numbers anywhere in the world, enabling unmatched flexibility, from the source, through the supply chain, to the retailer. Users are not tied to any software or RFID label supplier, and the RFID printer/encoder automatically adjusts to the current chip loaded into the printer for unmatched flexibility.

TEAM UP WITH THE RIGHT PARTNER

Its 40-year history and resulting network of trust positions Zebra squarely in place to help pave your path to RFID success. Zebra's extensive portfolio of asset-tracking, location, and printing technologies, including barcode, passive and active RFID, and RTLS—along with unmatched domain expertise—turns the physical into the digital to give item-level products and operational events a virtual voice. This enables you to know the real-time location, condition, timing and accuracy of the events occurring throughout your value chain. Once you can see the events, you have the opportunity to create new value from what is already there. We call it the Visible Value Chain.

Zebra provides several RFID printer families to support your chip-based serialization needs including:

- At the source – Manufacturing
- T&L – Distribution centers, warehouses
- Retailers – In-store tagging, inventory management, and exception control

Zebra printers provide unique flexibility that allows dividing the 38-bit serial number into segments. Zebra leverages the new Multi-Vendor Chip-Based Serialization (MCS) configuration, which uses the first 3 bits for the chip vendor identification. The Zebra printer/encoder then applies a "recipe" to derive unique serial number from the TID data field. The second segment enables customer-specific information such as location, manufacturing line, etc., providing users a wide range of options for supporting uniquely-designed applications.

SOLUTIONS THAT DELIVER PROVEN RESULTS

Consider Zebra's collaboration with Mid-South Marking Systems. For more than 30 years, Mid-South Marking Systems (MSMS) has provided solutions focused on integration of Auto-ID technologies for a wide range of industries including manufacturing, retail, healthcare, pharmaceutical, government, and distribution, tailored for customers around the world.

For retail EPC compliance, Mid-South Marking Systems used its PortalTrack software to deliver encoding solutions to a variety of apparel brand owners. PortalTrack has the ability to interface with enterprise resource planning (ERP) and warehouse management systems (WMS) to provide customers a seamless EPC/UPC printing and encoding solution. MSMS has been an early pioneer of Zebra's MCS printing/encoding products to deliver compliance solutions throughout the global supply chain.

Recently, MSMS deployed a complete MCS solution at an industry-leading apparel manufacturer with 26 different printing locations spread across seven different countries. The solution was up and running in less than two months. The streamlined chip-based serialization deployment removed software complexity, helped reduce overall IT costs, and improved the value of item-level RFID tagging. As a strategic move, this leading apparel manufacturer is reaping the enormous benefits of RFID while their competitors struggle to comply with ever expanding retail mandates.

SUMMARY AND CONCLUSION

Enterprises are looking for a seamless, rapid, simple way to improve track and trace visibility throughout their value chain without massive multi-year IT deployments. Item-level RFID is rapidly becoming a key technology for meeting this goal. Chip-based serialization helps eliminate the costs and complexities of IT-based serialization. Brand owners can now achieve true interoperability and flexibility when selecting an RFID chip vendor, and eliminate the reliance on an

A global leader respected for innovation and reliability, Zebra offers technologies that illuminate organizations' operational events involving their assets, people and transactions, allowing them to see opportunities to create new value. We call it the Visible Value Chain.

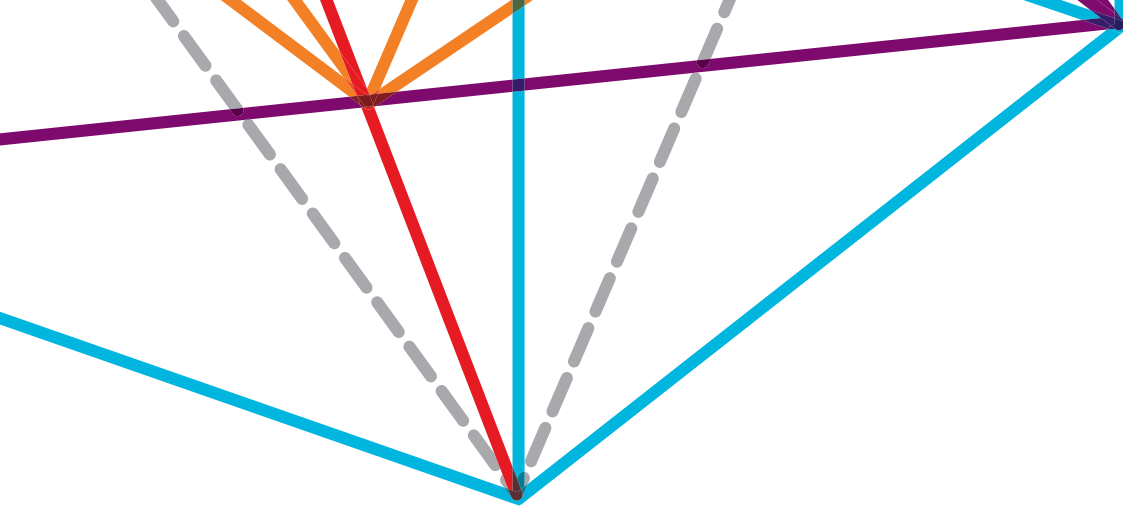
Zebra's extensive portfolio of marking and printing technologies, including barcode, RFID, GPS and sensing, turns the physical into the digital to give operational events a virtual voice. This enables

internal system or a third party.

With 40 years of expertise, Zebra brings new solutions to RFID deployments and systems integrators that deliver real results across a wide range of target markets. Zebra simplifies serialization so companies who want to implement it today finally can—cost-effectively and efficiently—allowing businesses to compete in the global market with confidence.

organizations to know in real-time the location, condition, timing and accuracy of the events occurring throughout their value chain. Once the events are seen, organizations can create new value from what is already there.

For more information about Zebra's solutions, visit www.zebra.com.



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