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CASE STUDY

Operation Brilliance: How Walmart and Gildan Reimagined Supply Chain Visibility

Challenge

Organizations frequently face claims disputes, inventory exceptions, and other supply chain discrepancies, yet the data needed to understand what happened often stops at a trading partner's door. Without visibility beyond point-to-point data-sharing arrangements, supply chain blind spots make it difficult for trading partners to reconcile shipments, resolve discrepancies, and maintain an accurate view of goods moving across the supply chain. These gaps can drive operational inefficiencies, increase costs, expose organizations to risk, and hinder informed decision-making across the supply chain.

Solution

To address these visibility gaps, Walmart and Gildan, with the help of GS1 US®, the Auburn University RFID Lab, and r-pac International, piloted a standards-based approach that leveraged three GS1 Standards: Radio Frequency Identification (RFID) Tag Data Standard (TDS 2.3), [GS1 Digital Link](#), and Electronic Product Code Information Services (EPCIS). The pilot transformed the GS1® logistic data carrier into a direct access point to web-based information, enabling stakeholders to understand what an object is, what merchandise it contains, and where it has been throughout its journey in the supply chain.

Walmart 

GILDAN®



AUBURN

UNIVERSITY

RFID LAB



r-pac International Corporation

Pilot Results

As product moved through distribution centers, third-party logistics, and retail locations, RFID tags were read at each node, updating shipment visibility and providing a trusted chain of events. Rather than relying on fragmented data-sharing approaches, the pilot demonstrated a more open and scalable model for shipment and content visibility.

The eight-week pilot shipped a large number of Direct Store Delivery Consolidation (DSDC) cartons and units, achieving a 99% detection rate through Walmart's RFID-enabled distribution center and a 100% detection rate in stores equipped with RFID infrastructure at the point of receipt. The results demonstrate how organizations can move beyond fragmented, point-to-point data exchanges to a multi-party visibility network that improves visibility into shipments, streamlines reconciliation when there are discrepancies, and enables more-informed decision-making. The pilot focused exclusively on products and logistic units and was not designed to collect information about customers or associates.

Potential Benefits

The pilot demonstrated how trusted, shared event data can significantly improve visibility into the movement of products across the supply chain. As standards-based visibility scales, it could support the following use cases:



Improved Supply Chain Visibility

By turning GS1 data carriers into a direct link to live supply chain information, stakeholders gained visibility into an item's identity, contents, and journey across multiple trading partners.



Order Reconciliation and Claims Compliance

Shared access to trusted EPCIS event data can help retailers and suppliers align shipment information, improve claims validation, accelerate order reconciliation, and resolve discrepancies more efficiently. This is mutually beneficial for both brand owners and retailers.



Certification of Authenticity

When combined with broader participation across the supply chain, trusted event data may help organizations validate that goods are authentic, originate from approved sources, and have moved through expected supply chain pathways.

Building a More Connected Supply Chain

For many organizations, visibility ends at the boundaries of individual trading partner relationships. Beyond that point, transportation and logistics can become a "black hole" where data is fragmented, shared manually, or unavailable altogether. "There are many missed choke points in the middle of the supply chain," says Jonathan Gregory, Senior Director of Global Standards at GS1 US. "The pilot created

What is GS1 Digital Link?

GS1 Digital Link is a GS1 standard that converts GS1 identifiers, such as a Global Trade Item Number® (GTIN®) or Serial Shipping Container Code (SSCC), into web-based Uniform Resource Identifiers (URIs). This allows a barcode or RFID tag to serve as both an identifier and a direct gateway to digital information associated with a product or logistics unit.

an integrated way of illuminating the supply chain by sharing serialized information as needed. It allowed for high visibility with low effort."

Determined to close these visibility gaps, Walmart and Gildan partnered to push RFID, EPCIS, and GS1 Digital Link beyond traditional inventory management and into a multi-party visibility network. The eight-week pilot, code-named *Operation Brilliance*, demonstrated how trusted supply chain data can be shared across trading partners, delivering a 99% detection rate and unlocking new levels of end-to-end visibility.

The Spark Behind Operation Brilliance

To help bring *Operation Brilliance* to life, GS1 US partnered with r-pac International and the Auburn University RFID Lab. r-pac helped enable the pilot through its expertise in RFID and packaging solutions, while Auburn provided the research and testing expertise needed to analyze pilot data and demonstrate solution capabilities.

The innovation behind this stemmed from the concept of adding a web domain to a logistic unit RFID tag. The idea was simple but powerful. By embedding a hostname within the RFID tag, *Operation Brilliance* would connect participants to a single EPCIS repository designated by the shipper. This would allow authorized stakeholders to access the same product and logistics data, overcoming the data silos that have long limited supply chain visibility. Importantly, the solution was designed to provide visibility into the movement and status of products and shipments across the supply chain, though this may also be leveraged for distributed equipment or reusable containers. By enabling access to trusted, shared data, the pilot demonstrated how standards-based information sharing can improve transparency, collaboration, and operational efficiency among supply chain partners.

Turning an Idea Into Reality

The GS1 Standard for a logistic unit, the [SSCC](#), includes the supplier's GS1 Company Prefix and a serialized value, making each logistic unit unique.

The Auburn RFID Lab built a demo that leverages the GS1 encoding scheme that incorporates the domain name of the EPCIS repository into the logistic unit label. Auburn leveraged the GS1 SSCC++ RFID encoding scheme, which extends the traditional SSCC by adding a hostname, providing authorized stakeholders with direct access to EPCIS event data and shipment visibility.

To support *Operation Brilliance*, r-pac International produced and delivered the requisite RFID-enabled carton labels capable of supporting the new SSCC++ encoding scheme. The company also helped integrate SSCC++ encoding into Gildan's existing validation process, enabling cartons to be verified and encoded in a single pass via its r-pac CNCT solution suite at Gildan, r-pac high-speed RFID tunnels, RFID-enabled pallet wrappers, and overhead readers. These solution elements captured events before shipments were sent downstream. Combined with a shared EPCIS repository and existing RFID infrastructure at downstream locations, this allowed the pilot to be executed with minimal new hardware and operational disruption.

Connecting the Missing Links

Many supply chain partners already leverage GS1 Standards to share and exchange supply chain data. Both suppliers and retailers have access to the data, but third-party logistics partners (3PLs) and other transportation and logistics

stakeholders were a missing link in the chain. For a market leader like Walmart, with many thousands of trading partners and participants, the removal of this obstacle alone flattens links in the supply chain into a smooth glidepath.

One of the key factors that allows one to describe the process as “lightweight” is the elimination of point-to-point data-sharing agreements. Justin Patton, Executive Director of the Auburn RFID Lab and Professor of Practice at Auburn University, explains: “Past pilots were more chaotic: ‘Could we capture some data here? Could we capture some data there?’ It was like trying to find a needle in two haystacks at the same time, because when a shipment would leave one network and show up at the next network, it was challenging to make those things line up and match. We discovered quality issues and claims compliance issues that became a major driver for the *Operation Brilliance* use case.”

Visibility in Motion

The innovation was not RFID alone but the combination of RFID, EPCIS, and GS1 Digital Link. Together, these standards enabled stakeholders across the supply chain to capture, share, and access trusted event data, providing authorized stakeholders with greater visibility into merchandise movements from source to store, including through 3PL operations. No longer limited by traditional supply chain blind spots, both Walmart and Gildan could “see” where and what merchandise was in the pipeline destined for store delivery, making the alignment of products ordered to products received far simpler.

“We instantly realized the value of visibility at the case level,” says Bethany Strasser, Director of RFID Infrastructure at Walmart. “Historically, we spend a great deal of time and generate a lot of metrics around ‘Did we receive a case or not?’ Drilling all the way down to each level was super appealing and removes an obstacle we’ve been trying to resolve. The pilot offered us an opportunity to accelerate reaching our goals. And data just goes to one place—EPCIS—which is wonderful.”

Structuring Event Data With EPCIS

To create EPCIS event data for packing operations, organizations capture key information such as product and shipment identifiers, packing dates and times, Global Location Numbers (GLNs), and other business data. EPCIS standardizes this information into a common format, making it easier for trading partners to share and understand event data. EPCIS also supports JavaScript Object Notation (JSON), a human-readable format that simplifies integration and data access.





Well-Read With Standards

The Auburn University RFID Lab applies GS1 Standards to ensure tag quality and readability, helping generate reliable data that supply chain participants can trust. Walmart's Strasser says, "I'm not sure that we would have gotten the same readability and read rates had we deviated from GS1 Standards and Auburn's support."

Easing Universal Supply Chain Challenges

In retail, it's rarely as simple as a one-to-one match of cases shipped today to cases received tomorrow. Claims, inventory discrepancies, and shipment exceptions can create challenges when trading partners lack complete visibility into product movement.

Clearly, without an interoperable visibility framework, reconciling thousands of cases of merchandise against hundreds of purchase orders can require significant manual effort. Data inconsistencies may go unnoticed as products move through the supply chain, making it more difficult for retailers, brands, and manufacturing partners to align order and shipment information. Greater traceability provides a shared foundation of trusted data, helping partners streamline reconciliation, resolve issues more efficiently, and build confidence in product and shipment information from source to destination.

"We deal with multiple order flows: Our customers will order from us in different ways depending on the product line, the sales velocity of the items, or the SKU complexity of the items," says Dan Hardy, Director of Customer Operations at Gildan. "They hold back some inventory in their warehouses and ship to stores from there. One of the challenges we've been trying to solve is validation of internal contents of cartons as they move through the supply chain. We deal with compliance issues around carton shortages that can result in chargebacks. We also have an issue with internal shorts and overages—a carton that is supposed to have 12 packs but has just 10."

The breakthrough of *Operation Brilliance* provides verification, not just to the retailer, but as an internal check on the packing of cartons before they ship. Data visible to the authorized stakeholders through EPCIS fosters stronger partner relationships, minimizes claims, and enables more-productive, fact-based conversations to the benefit of brand owners and retailers alike.

"Scaling container visibility and item verification requires a common language because no one can accomplish this alone," says Mangalakumar Vanmanthai, Vice President, and Sreejith Gopinath, Group Director of Global Data Foundations within Walmart's AI & Data organization. "GS1 Digital Link, EPCIS, and RFID provide that language and eliminate the need to build new integrations for every supply chain partner. When we verify the package has exactly the size 10 socks that were ordered, customers get what they came for."

From Pilot to Possibility

Operation Brilliance demonstrated how a standards-based visibility network that combined RFID, EPCIS, and GS1 Digital Link can deliver value beyond traditional inventory management by improving visibility, traceability, and data sharing across the supply chain.

"For Walmart, there is no greater benefit than being able to fulfill an order that our customers place," says Strasser. "By driving inventory accuracy to the highest level and knowing exactly what's in stock or when it's expected to arrive, that's the biggest value. And our associates aren't looking for things we don't have."

"We finally cracked the code with this project," says Auburn's Patton. "We were able to use the RFID data standard to accomplish data sharing without having to go through a lot of complex advanced sharing protocols."

Operation Brilliance demonstrated how GS1 Standards and RFID can enable item-level and shipment visibility, providing greater traceability from the assembly line to store shelves. By replacing manual processes and isolated data exchanges with trusted, event-based information, organizations can reduce costs, improve operational efficiency, and strengthen confidence across trading partner networks.

About Walmart

Walmart Inc. (Nasdaq: WMT) is a people-led, tech-powered omni-channel retailer helping people save money and live better—anytime and anywhere—in stores, online, and through their mobile devices. Each week, approximately 280 million customers and members visit more than 10,900 stores and numerous e-commerce websites in 19 countries. With fiscal year 2026 revenue of \$713 billion, Walmart employs approximately 2.1 million associates worldwide. Walmart continues to be a leader in sustainability, corporate philanthropy, and employment opportunity. Additional information about Walmart can be found by visiting corporate.walmart.com, on Facebook at facebook.com/walmart, on X at x.com/walmart, and on LinkedIn at linkedin.com/company/walmart.

About Gildan

Gildan is a leading manufacturer of everyday basic apparel. The company's product offering includes activewear, underwear, socks, and intimates sold to a broad range of customers, including wholesale distributors, screenprinters, embellishers, retailers, or e-commerce platforms, as well as global lifestyle brand companies and directly to consumers. Gildan markets its products in North America, Europe, Asia Pacific, and Latin America, under a diversified portfolio of company-owned brands including Gildan®, Hanes®, Comfort Colors®, American Apparel®, ALLPRO®, GOLDTOE®, Peds®, Bali®, Playtex®, Maidenform®, and Bonds®, as well as Champion®, which is under an exclusive licensing agreement for the printwear channel in the U.S. and Canada, and Polo Ralph Lauren®, also under a licensing agreement.

Gildan owns and operates vertically integrated, large-scale manufacturing facilities that are primarily located in Central America, the Caribbean, North America, and Asia. Gildan integrates industry-leading labor, environmental, and governance practices into its operations and supply chain under a sustainability program that is aligned with its long-term business strategy. More information about Gildan and its sustainability commitments and initiatives can be found at www.gildancorp.com.

About Auburn University RFID LAB

The RFID Lab at Auburn University is a research institute focusing on the business case and technical implementation of RFID and other emerging technologies in retail, aviation, supply chain, manufacturing, and more. Founded in 2005 at the University of Arkansas, the lab moved to Auburn University in 2014 and has since grown to a staff of 100+ students and faculty. rfid.auburn.edu

About r-pac International

r-pac is a global leader in brand identity, packaging, trim, and digital product solutions. Founded in 1987 and headquartered in New York City, r-pac serves many of the world's leading brands across fashion, retail, and consumer goods. The company's advanced proprietary software, hardware, and sensor technologies—including the r-pac CNCT platform—offer connected merchandise and supply chain visibility solutions. With over 30 worldwide locations, r-pac is a critical partner for brands seeking scalability, innovation, and excellence in the global supply chain. Learn more at www.r-pac.com.

About GS1 US

GS1 US®, a member of GS1® global, is a not-for-profit information standards organization that facilitates industry collaboration to help improve supply chain visibility and efficiency through the use of GS1 Standards, the most widely used supply chain standards system in the world. Nearly 300,000 businesses in 25 industries rely on GS1 US for trading-partner collaboration that optimizes their supply chains, drives cost performance and revenue growth while also enabling regulatory compliance. They achieve these benefits through solutions based on GS1 global unique numbering and identification systems, barcodes, Electronic Product Code-based RFID, data synchronization, and electronic information exchange. www.gs1us.org

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