LAENDmarKS enables targeted recalls with traceability technology

Overview

The Need
Key players in the German automobile industry sought to minimize the inefficiency of wholesale vehicle recalls through more precise parts tracking.

The Solution
IBM and business partner IBS AG designed and implemented an open, secure parts tracking solution that enables parts traceability at all levels of the supply chain.

What Makes it Smarter
The ability to precisely identify vehicles or subassemblies containing defective parts enables more "surgical" recalls, thus minimizing the costs, inefficiency and brand damages resulting from untargeted wholesale recalls.

The Result
"The success of the LAENDmarKS project is a major step toward making automobile supply chains smarter."

— Bernd Schäfer, leader of the LAENDmarKS project and responsible for International Standards, KEIPER

Every year, in a pattern remarkable for its consistency, automobile manufacturers recall millions of their vehicles to address problems or defects. For automobile manufacturers forced to issue a recall, the costs can be staggering—not only in direct costs such as consumer notification, replacement parts and labor, but also in the potential damage to the manufacturer's brand, which can impact brand loyalty and future market share. What's equally remarkable is that the high cost of recalls can, in many cases, be traced to parts whose underlying costs are a tiny fraction of the cost of repairing them. Think of a defective batch of seven-cent screws that makes its way into another supplier's modules or subassemblies, before being assembled into finished vehicles in plants located around the world.

While a hypothetical example, it illustrates some important realities of automobile manufacturing in the age of globalization. The most fundamental is the increasing complexity and global quality of the automotive supply chain, with production networks spanning multiple countries and suppliers all over the world. When auto manufacturers identify quality defects, their first duty is to size up the scope of the problem by determining which vehicles are affected and notifying owners accordingly. Achieving this requires the ability to track and trace at the parts level with a high degree of precision, from the point of assembly all the way back to second- and third-tier suppliers.

Gaining precision through transparency
That's where the global auto industry hits a roadblock. Parts tracking capabilities exist today, but are limited in scope and heavily customized to support existing trading partner relationships. What's lacking is the transparency needed to track parts flow—with granularity—across the entire supply chain. With no means to trace defective parts to the subset of vehicles affected by them, auto manufacturers have—as a matter of safety—followed a sweeping approach in which vehicles of entire model years are recalled. In many ways, the need to follow a policy in which "some bad apples" are assumed to "spoil the bunch" may be the single most important reason that recalls are so costly and inefficient.

Business Benefits

- Expected major reduction in costs associated with vehicle recalls through more precise tracking of parts across the automobile value chain

- Improved quality control for automobile manufacturers and suppliers

- Avoidance of damage to brand and customer loyalty resulting from large-scale vehicle recalls

- Improved decision-making in the area of production, inventory and logistics due to increased supply chain transparency

Prompted by a German government program aimed at strengthening the country's automobile industry, KEIPER, a large supplier, proposed extending its internal traceability system into a standardized, global platform that could be used across the full extent of the value chain. To meet this goal, KEIPER pulled together a consortium of German automakers, suppliers, software companies and academia and spearheaded their collective efforts in a project known as LAENDmarKS. A critical factor in the project's ultimate success was IBM's development of a first-of-a-kind traceability infrastructure that met strict requirements around the secure and open exchange of supply chain event data—issues that had limited the scope of parts tracking in the automotive industry to date.

A new model for parts traceability

Brought into the project by consortium member IBS AG, IBM saw LAENDmarKS as a different kind of supply chain traceability solution requiring a fundamentally different architectural approach. Up until then, data related to supply chain "events" (such as a parts shipment arriving at a receiving gate) was consumed directly by the local traceability solution of IBS AG. IBM's breakthrough was to apply a service-oriented architecture (SOA)-based approach under which supply chain data was abstracted into a separate event repository—independent of applications—that could be tapped for multiple purposes. To address the thorny issue of data security, IBM Global Business Services designed a global traceability solution that enables each company in the connected supply chain to maintain its own events repository, updated by the IBS AG event capturing solution within each company, from which it can provide partners with appropriate levels of access.

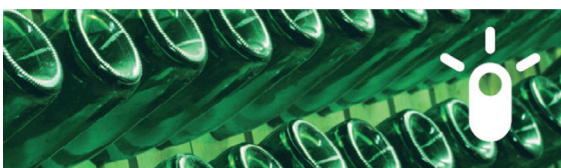## Smarter Supply Chain: Gaining precision through end-to-end parts traceability
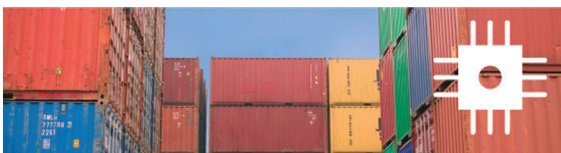
Instrumented   The movement of parts through the automobile supply chain is captured as events and stored along with valuable metadata.

Interconnected   With each party storing event data in SOA-based repositories, parts can be tracked continuously at any point in the supply chain.

Intelligent   Improved parts traceability enables automobile manufacturers and suppliers to target their recalls to specific vehicles affected by defects.

Solution Components

Software
- IBM InfoSphere™ Traceability Server

Hardware
- IBM Power Systems™

Services
- IBM Global Business Services
- IBM Software Group's Technical Exploration Center

IBM Business Partner
- IBS AG

"Whilst traceability within defined parts of the supply chain can be accomplished with reasonable effort, the requirements within interconnected supplier networks are higher and require standard interfaces and processes to enable intelligent collaboration. LAENDmarKS was a major step forward in accomplishing that."

—Bernd Schäfer

The LAENDmarKS project was successful because it demonstrated that with the right technological foundation, the automotive supply chain could be made more transparent along its entire span—not just within or between the largest players. For the purposes of tracking defective parts, the most obvious benefit is the continuity of information the solution enables, which gives supply chain planners the means to trace quality problems to their source. Equally important is the solution's ability to track parts in the context of the modules, assemblies—and ultimately finished vehicles—that they go into. With this combination of traceability attributes, auto manufacturers and their partners can isolate the extent of problems with a high degree of precision, without taking any chances on the safety of their customers.

Each time a part moves through a segment of the supply chain, sensors record it as an event. These events range from logistical (e.g., when a pallet of parts arrives, or fails to arrive) to operational (e.g., which modules or products the part is assembled into). Running within each company's supply chain is an instance of IBM InfoSphere™ Traceability Server, the technical core of the solution based on the EPCIS Standard. Its function is to gather, store and manage the sensing data captured at various process intervals—along with valuable metadata—within that company's event repository. If a specific batch of parts is found to be defective, the auto manufacturer or supplier can identify with certainty only those specific vehicles or subassemblies containing the defective part, as well as the location of other pockets of defective parts that might still be moving through the supply chain. Whether it's a single pallet exposed to the weather during transit or an entire factory's production run, the ability to pinpoint and address quality problems with precision enables more targeted decision-making around recalls, thus minimizing the cost and collateral damages of quality problems in the automotive supply chain.

A key factor in the project's success was the experience in deploying traceability solutions that IBM Global Business Services was able to bring to the project, most notably for German retail giant METRO Group. Its experience in setting up such traceability solutions gave IBM valuable insights into addressing key technical challenges like data structure, security and authentication. Implemented in collaboration with the strong IBM Business Partner and consortium member IBS AG (http://www.ibs-ag.de), the pilot solution was hosted on IBM Power Systems™ servers located within the IBM Software Group's Technical Exploration Center in Stuttgart.

Enlightening supply chain decisions

In addition to improving the efficiency of recalls, the fundamental quality that enables this—increased supply chain transparency—also has the potential to more generally improve supply chain decision-making by giving all players in the chain the means to respond proactively to unplanned or adverse developments such as late parts

shipments. With real-time event data easily accessible, auto manufacturers and suppliers can, for example, create alarms in their ERP systems so that they can promptly change their logistics, inventory or production plans in response to events, thereby avoiding production bottlenecks or parts shortages.

Bernd Schäfer, responsible for International Standards at KEIPER and leader of the LAENDmarKS project, sees its success as an important milestone for the German automobile industry. "With the competitive pressures in the global automobile market growing, suppliers and manufacturers need the intelligence and flexibility to make informed, proactive decisions across the entire supply chain," says Schäfer. "The success of the LAENDmarKS project is a major step toward making automobile supply chains smarter."

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