



SUPPLY 360: RETAIL & CONSUMER INDUSTRIES

MARKLOGIC WHITE PAPER • FEBRUARY 2016

The MarkLogic Supply 360 solution helps you better manage complexity, by providing a consolidated, operational view across the wide variety and sources of supply chain data – helping you grow revenue, manage risk and compliance, and address cost and operational concerns.



MANAGING SUPPLY CHAIN COMPLEXITY

A Supply Chain is a complex, dynamic environment. It connects all interactions from "Farm to Fork" in the Consumer Goods industry, and from the source of inputs or raw materials to the final point of sale at Retail.

This process involves multiple players and the exchange of a wide variety of data across all the links in the supply chain – not only structured information but also unstructured documents including contracts, design objects, RFID sensors, carrier manifests, shipment notifications, and payments.

The MarkLogic Supply 360 solution helps you better manage the complexity, by providing one consolidated view across the supply chain — design objects, bids and contracts, forecasts, inventory, procurement documents, and shipments. With MarkLogic, you can:

- Integrate and ingest multiple sources of data seamlessly into one operational database platform without upfront data modeling, saving you time and money
- Perform real-time search and query on all your data, and get alerts on new items of importance
- Build applications to support forecasting, planning, and tracking especially for recalls and return of un-saleables
- Review your data geospatially and bitemporally to get a more complete picture
- Ensure data reliability with ACID transactions and government-grade security
- Cost-effectively and elastically scale to meet your business' fluctuating data needs



Figure 1: A simple version of a supply chain

BENEFITS OF A SUPPLY 360

Maintaining and managing a 360 degree view of your supply chain and sources of supply delivers significant benefits for consumer and retail companies.

GROW REVENUE

Plan and forecast the movement of products across your supply chain and reduce out-of-stocks at retail. Having real-time access to a complete view of your data helps you be more responsive and enables your business to take advantage of changing fashions or consumer trends

MANAGE RISK AND COMPLIANCE

As manufacturers and retailers work with an increasingly complex and remote network of suppliers, the potential opportunities – cost, availability, quality, and more – carry associated risks, and you need to be able to track and manage regulatory compliance issues such as:

- **Social and Labor.** These practices and standards address primarily the impact on the health and welfare of farm and factory workers and the surrounding communities, e.g. Nike* is responsible for the actions of its suppliers and must document regulatory and compliance requirements overseas

- **Quality.** The quality and reliability of the end product sold, as well as to the ability to identify and remedy problems that may arise anywhere from source to shelf. For example, in case of a product recall being able to track the source of supply and identify the cause of the safety issue is critical
- **Ethical Reporting and Standards.** Compliance with applicable laws and regulations as well as overall processes by which to monitor and enforce business partners' contractual and ethical commitments
- **Environmental Compliance.** Practices and standards refer to the importance of environmental preservation through safe handling of hazardous materials, responsible sourcing, carbon footprint management in distribution and logistics, and other environmental impacts
- **Contractual.** Ensure the satisfaction of contractual arrangements between business partners and preservation of the mutual business case for the transacting parties

ADDRESS COSTS & OPERATIONAL CONCERNS

A 360 view lets you gain actionable insight across your core operational processes, from ideation and research and development (innovation) through distribution and logistics and associated service requirements. Key data driven processes that need to be tracked and monitored include:

- Customer service and on-time delivery/ fulfilment
- Logistics and carrier management
- Manufacturing including recipe development, ingredient tracking
- Sourcing, procurement and contract management
- Product development

CHALLENGES IN BUILDING A SUPPLY 360 SOLUTION

The supply chain process includes multiple suppliers, multiple legacy systems, heterogeneous data sources including structured data, machine and sensor data (RFID), documents and contracts, as well as compliance and tracking requirements that need to be fulfilled.

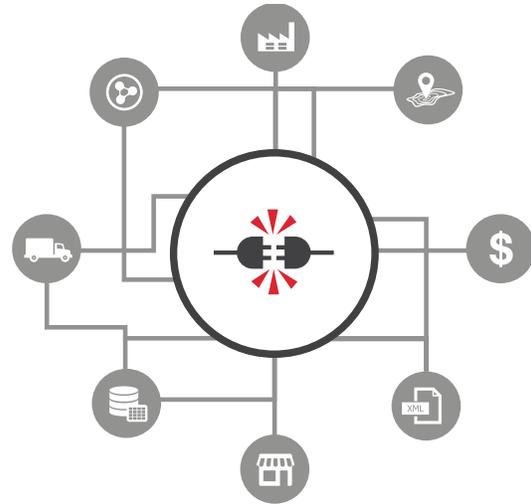


Figure 2: Supply chain data is disparate and siloed

Some key challenges include:

- **Data integration** across multiple legacy systems for forecasting, planning, and tracking – between suppliers, distributors, manufacturers and retailers
- **Manual documents and forms** – think contracts, pricing agreements, shipment notifications, delivery receipts and acceptance, warehouse tracking, and un-saleables (stuff that the retailer can't sell and returns causing a reverse supply chain), as well as recalls for safety (where you need to be able to track where goods and supply sits). With increased use of machine data intelligence and sensors, e.g. RFID chips, the volume of data has increased dramatically
- **Product linkages.** Manufacturing, especially in the food industry, uses multiple recipes (which once again are tracked in complex systems for ingredients, quantities, forms, and chemical ingredients). Having logical linkages built across multiple data elements is critical. Similarly, in the apparel industry linking design objects with sources of supply materials helps you better estimate price and plan sources of supply
- **Global Supply Chain Management and Compliance.** In industries like apparel your supply chain is global – and you must be able to track not just your suppliers, but your suppliers' suppliers.

A typical apparel company will have multiple global suppliers for their fabric manufacturing, e.g. for denim (largely India), fabric stitching (Bangladesh and China), warehousing (ports in China or US West Coast). They will need to send design objects online which are transmitted to suppliers for stitching and then the finished piece which may include a shirt, suit, dress, or multiple forms of apparel will need to be shipped to the USA. This entire process needs to be tracked for planning, forecasting, and to meet regulatory requirements – and it must be audited for compliance with safety and export/import regulations

THE SOLUTION

The MarkLogic® Enterprise NoSQL database platform is the right technology to power a Supply 360 solution. Global organizations use MarkLogic to create an operational, searchable system that presents a unified view of multi-structured *and* unstructured supply chain data across organizational silos. A Supply 360 solution based on MarkLogic provides one consistent view of supply chain data.



Figure 3: MarkLogic integrates disparate, siloed data

Capabilities provided by MarkLogic include:

- **Flexible schema-agnostic data model** enables integration of data from multiple sources (structured, semi-structured, and unstructured) into a single database without the need to build a schema upfront prior to data ingestion. Store and manage JSON, XML, RDF, text, binary, and geospatial data with a document-centric, schema-agnostic database
- **Search and Query capabilities** as well as alerts that can be set up for out-of-stocks, recalls, or delays
 - Ingest your data as-is and rely on the universal index and over 30 sophisticated specialized indexes to get better answers from today's data
 - Perform lightning fast, sub-second search across hundreds of terabytes of data and billions of documents
 - Support agile delivery of powerful, complex queries across heterogeneous data
 - Deliver a full-featured UX with full-text search, type-ahead suggestions, facets, snippeting, highlighted search terms, proximity boosting, relevance ranking, and language support
- **Semantics** facilitates product linkages to enable sourcing for recipes, food ingredients, materials for apparel manufacture, supplier linkages by product type, country, or geographical location. MarkLogic is a multi-model document-centric database that serves as an enterprise triple store for relationships, and lets you perform complex queries across a combination of documents, data, and triples
 - Store and query billions of facts and relationships; infer new facts
 - Facts and relationships provide context for better search
 - Flexible data modelling – integrate and link data from different sources
- **Real time transactional management** capabilities to give you up-to-date, accurate data to support:
 - Inventory analysis and out-of-stocks
 - Supply and demand management (support the “S & OP” Sales and Operational Planning Process)

- Regulatory compliance and reporting
 - Design objects for fashion and digital images
 - Recipe management
 - Un-saleables and return management
- **Bi-temporal** for better insight and reporting on returns management and un-saleables, managing expiry dates, and recalls. With MarkLogic, you can know “where was the product and what actions did we take prior to and after the recall notification?”
 - Rewind the information “as it actually was” in combination with “as it was recorded” at some point in time
 - Critical for anyone in regulated industries like food and beverage where managing government recalls and reducing risk to consumers is essential
- **Government-grade data security**
 - Certified security – Higher security certifications than any other NoSQL database, carrying a Common Criteria Security Certification and authorized to run in classified government systems
 - Granular security – Role Based Access Control (RBAC) at the document level
- **Scalability and Elasticity.** MarkLogic scales horizontally in clusters on commodity hardware to hundreds of nodes, petabytes of data, and billions of documents — and still processes thousands of transactions per second. Elasticity ensures you are

meeting SLAs without overprovisioning hardware, by allowing you to easily scale back down as needed. You can also save money by leveraging Tiered Storage capabilities that put data in the economically right place based on business needs

- **ACID transactions for data integrity and reliability.** If you are running a transactional application, then you need all of the ACID properties so that reads and writes are durably logged to disk, and strongly isolated from other transactions. Without this feature, you run the risk of encountering data corruption, stale reads, and inconsistent data – all of which are unacceptable for supply chain data, which is highly transactional

CONCLUSION

MarkLogic’s Supply 360 solution for retail and consumer has significant business benefits:

- Enables a single, consistent, and reliable view of all your disparate data across the supply chain
- Allows for lightning fast search and query across the data, to get you the information you need when you need it
- Provides you with an operational database with real time capabilities to enable applications like forecasting, planning, managing out-of-stocks, as well as alerts

© 2016 MARKLOGIC CORPORATION. ALL RIGHTS RESERVED. This technology is protected by U.S. Patent No. 7,127,469B2, U.S. Patent No. 7,171,404B2, U.S. Patent No. 7,756,858 B2, and U.S. Patent No 7,962,474 B2. MarkLogic is a trademark or registered trademark of MarkLogic Corporation in the United States and/or other countries. All other trademarks mentioned are the property of their respective owners.

MARKLOGIC CORPORATION

999 Skyway Road, Suite 200 San Carlos, CA 94070
 +1 650 655 2300 | +1 877 992 8885 | www.marklogic.com | sales@marklogic.com