
ENTER

A commanding view

For companies that are struggling to get an end-to-end view of their global supply chains, taking command of multi-enterprise visibility issues in ways that combine real-time information, event processing, and advanced analytics may provide the answer.

At a time when the free flow of information is readily available to most of the world through the Internet, supply chain managers still struggle with getting accurate and timely information to run their global operations. This is a major concern for companies today as they seek agility and responsiveness in their global operations. They are so concerned about acquiring the information they need, in fact, that supply chain visibility—the ability to see detailed information about operational events affecting supply and demand across multiple enterprises—was the biggest challenge identified in the most recent IBM "Chief Supply Chain Officer Study."

Companies can overcome that challenge by focusing on an approach that connects all of the players and partners in a supply chain by fusing real-time information, event processing, and advanced analytic technologies to provide multi-enterprise visibility. Business benefits from multi-enterprise visibility include lower inventory costs, rapid availability of reliable data, fast response to shifts in market demand, and flexible analyses for tactical and strategic decision making.

The road to visibility

Supply chain executives are at different points along the road to building smarter, collaborative visibility capabilities. Some are still struggling with transaction-level exchanges of information and with breaking down the silos among supply chain functions within the enterprise. In sharing information with their supply chain partners, they rely primarily on electronic data interchange (EDI) and, as a result, spend their time working through standardization and data management approaches to make sense of the information.

Others have moved a step beyond that stage through integration. They are integrating their strategies, plans, and operational capabilities with visibility in various functions and business units within the enterprise and across their extended network. They are building more integrated visibility capabilities with key partners (suppliers, service providers, contract manufacturers, and customers) that are focused primarily on supply chain planning and logistics functions. And they are implementing ways to measure and monitor ongoing performance against targets and to manage exceptions and disruptions.

The companies that are considered to be "visionaries," however, are pushing ahead by using business intelligence and collaboration among their network partners to make fast, collective decisions. They are using business intelligence and advanced analytics soft-

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ware to analyze, monitor, and detect changes—from the highest-priority events to the most minute transactions—that influence customer service. Whether these changes are adjustments in forecasts due to real-time point-of-sale data or actual orders, a supplier's production-schedule adjustments, or in-transit shipment status provided by a carrier, the visionaries are aware of such events and can react quickly to them.

These visionary leaders are integrating and synchronizing end-to-end information among all parties, bringing together pertinent event data in order to monitor activities as well as performance compared to plan. They are implementing dashboards that, like instrument panels on an automobile or airplane, present information from multiple sources in a single, easy-to-read view and help them proactively manage their supply chains. And they are placing these dashboards on multiple devices, from smartphones to computers.

In addition, they are taking the supply chain concept of "sense and respond" to greater levels of "predict and act." For example, suppose that an automated replenishment signal from a store shelf predicts a potential out-of-stock situation. Inventory balances are automatically checked, as are the business rules associated with this product for the particular customer involved. An order to immediately ship product is then automatically generated and transmitted to the distribution center, and a signal is sent to the supplier to update production schedules accordingly. No human intervention is required.

To move to this level of "predict and act," many visionaries are creating multi-enterprise visibility by bringing together real-time information, event processing, and advanced analytic technologies. Their extensive connectivity with all supply chain partners enables the entirety of their supply chain network to collaboratively plan and execute decisions. They are aggregating or segmenting information for trend analysis, automating business rules and transactional responses to alerts, and recommending actions based on performance criteria.

And finally, they are capturing real-time information to proactively monitor product and service flows using smart devices such as radio frequency identification (RFID) readers and tags; global positioning systems (GPS); sensors that detect conditions or activities (for example, bar coding, temperature controls, and manufacturing sensors for detecting material flow); and actuators—devices that automatically make changes in response to signals from sensors.

With product lifecycle traceability becoming a major concern in many industries, the use of smart devices is likely to become more prevalent. For instance, companies will increasingly tag not only

[REAL-WORLD ADVANTAGES]

Companies that fuse real-time information, event processing, and advanced analytic technologies to achieve multi-enterprise visibility gain many benefits. These include lower inventory costs, rapid availability of reliable data, fast response to shifts in market demand, and flexible analyses for tactical and strategic decision making. What does that mean in "the real world"? Here are two examples of companies that attained practical advantages from this approach.

Example Number 1. As its suppliers became more geographically dispersed, one of the world's largest commercial aircraft manufacturers found it increasingly difficult to track parts, components, and other assets as they moved from suppliers' warehouses to one of the company's 16 manufacturing sites. To address this problem, the manufacturer needed to control parts and components from multi-tiered suppliers to final assembly.

By tagging each part with smart sensing devices, the aircraft manufacturer was able to detect when inbound shipments deviated from their intended paths. As parts move from suppliers' loading docks to warehoused inventory to the assembly line, they travel in smart containers fitted with RFID tags holding vital information. At each important juncture, readers interrogate these tags. If shipments arrive at the wrong place or do not contain the right parts, the system alerts employees to fix the problem before it disrupts production.

As a result of this strategy, the airplane manufacturer has significantly reduced the incidence and severity of parts delivery errors as well as the costs associated with correcting them. It has increased the overall efficiency of its parts flow, cutting the time spent physically handling parts in its warehouses by 75 percent. In addition, the company has reduced safety stock while avoiding significant carrying costs. Finally, it has been able to prepare a response to both known and unanticipated costs and challenges associated with potential global disruptions to its supply chain operations.

Example Number 2. A global consumer electronics manufacturer used multi-enterprise visibility to control both the horizontal (cross-enterprise functions) and the vertical (within the multi-enterprise network) integration of processes and data among factories and partners. This enabled the creation of a single "virtual plant" for the enterprise.

Because the lifecycle for electronics has become extremely short, electronics manufacturers need the various functions in their supply chains (such as procurement and logistics) to communicate quickly and to work from the same information. For that reason, a horizontal, cross-enterprise division of labor has

products but also the containers and conveyances that transport them. Although this capability may fall a little lower on their list of priorities, those that are endeavoring to use automated tracking rather than labor-based tracking and monitoring are realizing numerous benefits.

Three information hubs

This multi-enterprise visibility approach comprises three major hubs that manage and synchronize demand, supply, and logistics information. These hubs consist of interconnected data, business rules, integration, and other functions and information related to those three areas of the supply chain.

The first, the "demand hub," focuses on demand-driven replenishment and forecasting. This hub receives data from multiple customer sources—from point-of-sale (consumer retail) to point-of-order—and uses that information to provide continuous updates of actual demand. Actual demand is then used to recalculate forecasts that originally were derived and achieved through sales and operations planning (S&OP). Depending upon the industry and company situation, the demand hub can then make proactive buy/sales decisions—sending out replenishment signals to distribution channels, for example. In addition, in accordance with business rules (which determine criteria and responses to specified situations) the demand hub manager may send out instructions to reevaluate inventory in the pipeline. This could include an event management signal to redistribute, reallocate, or resupply inventory at appropriate junctures.

The second facet is the "supply hub." As the name implies, the supply hub is responsible for all activities involved in managing the information flow and making decisions concerning multi-tiered supply. Typical transactions managed by the supply hub include supplier commitments and production planning/scheduling outcomes measured against original purchase agreements.

With this constant, current information, the supply hub manager can dynamically balance supply with demand. Based upon business rules and tolerances, alerts are sent to the appropriate parties when there is a significant imbalance that could cause a delay in meeting customer requirements. The supply hub also facilitates supplier collaboration so that companies can deal with these imbalances in a timely manner and revise the business rules to incorporate corrective decisions and actions. For example, suppose a change in a supplier's production schedule will affect a purchase order's delivery amount. The system automatically checks business rules based upon demand from customers, synchronizes the two considerations, and determines if this change will affect the customer delivery cycle. If it determines that the change could negatively affect delivery, then an alert is sent to an individual, and sometimes an automatic correction is issued—for instance, to source the product from another supplier in order to get it to the end customer on time.

The third facet, the "logistics hub," assimilates a multitude of transactions involved in the physical storage and transportation of products, ranging from enterprise logistics planning to service provider tracking to shipment status reports. Smart devices, such as RFID tags, send real-time product disposition data to the hub. The hub then optimizes the continuous flow of products while managing the discrete logistical activities. Logistics constraints (for example, lead times, port delays, and carrier capacities) are evaluated against customer service levels. Based upon business rules and tolerances, either a corrective action may be automatically generated (for example, rerouting or expediting a shipment) or an alert indicating that human decision making is required may be generated.

The actual "heart" of this approach is performance optimization. Key performance indicators and performance criteria are provided on multiple media (such as smartphones, tablet and laptop computers, and desktop computers) for continuous management review and correction. Performance optimization includes customer demand variations, supplier per-

become more common, even in established companies. However, since a horizontal division of labor generally results in a vertically siloed supply chain model, the production information of companies that have such a division of labor tends to become disconnected and time-consuming to share with other functions. This creates difficulties in the management of a multifaceted supply chain with multiple product lines.

This consumer electronics manufacturer is using multi-enterprise visibility to view the latest information on the status of both inventory and production, which is automatically integrated into the production plans of its 19 different business units. Because it has an integrated information and system infrastructure among those units, the company can see all manufacturing data in a single view. It also can now optimize inventories, reduce work-in-progress inventories, and dramatically shorten the planning period for production and procurement.

Despite the complexity, the electronics manufacturer now can respond more accurately to variability in demand and delivery-requirement signals. It also uses simulations that find optimum production scenarios, which enables quick decision making to fix any gaps between planned production and actual constraints.

formance to plan, and, of course, the continuous stream of logistics activities.

In short, this concept is best described as a multi-enterprise, supply-demand balancing solution. Some of its core features include the ability to:

- Bundle visibility and control of the supply chain into a synchronized portal view. This dashboard presentation gathers, analyzes, displays, and disseminates planning and operational data.
- Consolidate events across the end-to-end value chain, whether related to customers, distribution, manufacturing, or multi-tiered supply.
- Manage by exception, issuing alerts, recommending action, and notifying appropriate parties when key performance indicators are trending toward tolerance boundaries.
- Establish Web-based collaboration with business partners as well as internally enable the sharing of transactional information.
- Initiate corrective "recovery" responses, either automatically or through decision-feedback loops.
- Create agile supply chain operations with the capability to respond to shocks, shifts, and variability in demand, supply production, and logistics activities.
- Use service-oriented architecture (SOA) and composite business services for rapid integration of data from multiple sources. SOA is an information technology architectural style that supports the transformation of a business into a set of linked services, or repeatable business tasks, that can be accessed when needed over a network. A composite business service is a collection of business services that work together, along with a client's existing applications, to provide a specific business solution.
- Use advanced analytics (mathematical equations in the software) to make immediate decisions based upon business rules and analyze complex streams of data. This makes it possible to synchronize end-to-end transactions with intelligence, to optimize inventory at all phases, and to predict demand variations.
- Capitalize on advanced computing technologies that provide the necessary intelligence to advance into a whole new realm of real-time technology where computers make decisions and initiate a response. This technology will be required in the near future to meet the growing complexities of globally integrated value chains.

The way of the future

Companies also discover gain tremendous cost efficiencies. They can achieve lower levels of pipeline inventory and inventory carrying costs, lower labor costs through decreased handling and processing, and less channel inefficiency with its associated costs. Finally, multi-enterprise visibility provides reliable, accurate information that supports proactive risk management at all junctures and in all functions. It reduces the risk of missed opportunities (for example, a missed sale due to product not being on the store shelf) that arise when companies do not have timely information and are unable to "digest" information quickly enough to make alternative decisions.

This approach to decision making gives companies increased flexibility because decisions are automated and are based upon mathematical analysis of constraints, trends, and patterns. This provides them with a window into the future, enhancing decision making for proactive strategic and tactical planning. These capabilities also enable faster response to changing customer demand and supplier lead times through real-time decision making.

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Multi-enterprise visibility is the way of the future. Even though geopolitical uncertainties, currency fluctuations, natural disasters, and business complexity won't be disappearing any time soon, more companies are recognizing the benefits of this multi-enterprise, synchronized approach to supply chain management. While today's visionary companies have only begun to put this approach to the test, the development of new analytical capabilities and technologies will spur further adoption of this concept, thus helping more companies improve the way they run their global supply chains. △

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