Company Profile

World’s leading aerospace company and the largest manufacturer of commercial jetliners and military aircraft combined.

Goal

Leverage global partners to reduce cost, speed time-to-market and increase customer value while maintaining the highest level of safety

Challenge

How to maintain visibility and control while transitioning from a vertically integrated manufacturing model to a global partner model that leverages providers of best value components and technology

Solution

Exostar’s Supply Chain Management Solution powered by E2open software to provide end-to-end management of the order, inventory, and planning processes executed across multiple tiers of supply partners

Expected Results

- Eliminate latency in communicating demand/supply changes and change impacts across partner tiers
- Ensure continuity of supply while minimizing supply disruptions
- Improve on-time delivery and ship-to-commit date with end customer
- Provide global visibility to all partners involved in the delivery of the completed assemblies
- Reduce total manufacturing cost by leveraging best price and value partners globally

BOEING 787: GLOBAL SUPPLY CHAIN MANAGEMENT TAKES FLIGHT

Leveraging Global Partners to Maximize Customer Value

The new Boeing super-efficient jetliner is the 787 Dreamliner. Scheduled for delivery beginning in 2008, the Dreamliner provides passengers with a better flying experience and operators with a more efficient commercial jetliner. Because it uses 20 percent less fuel per passenger than similarly sized airplanes, the 787 is designed for the environment with lower emissions and quieter takeoffs and landings while traveling as fast as today’s fastest wide bodies, Mach .085.

In order to achieve this exceptional performance, Boeing established a core team of the world’s most capable aerospace companies to design key components of the airplane. As an example, Boeing partnered with General Electric and Rolls-Royce to develop engines for the new airplane and expects that advances in engine technology alone will contribute as much as 8 percent to the increased fuel efficiency of the new airplane.

Boeing has worked collaboratively with its partners to engineer the new Dreamliner, and has also adopted a completely new manufacturing model to produce the airplane. Boeing will leverage its extended supply chain and partner manufacturing resources as a competitive advantage to improve time-to-market and reduce total cost. For the first time in Boeing history, the majority of the airplane will be fabricated by global partners and will be delivered as major subassemblies which Boeing will assemble and test at its facility in Everett, Washington.

With Boeing now operating as the final assembler of the airplane, coordinating the many structural and systems partner locations spread around the globe is paramount to the manufacturing success. Boeing has to synchronize demand/supply and logistics information across multiple partner tiers so key components arrive at the Boeing Everett, Washington facility at just the right time for final assembly over a three day period.

Strategy for Achieving Results

- Leverage best in class component and technology providers from around the world
- Establish shared risk model between Boeing and its supply partners
- Synchronize demand/supply, order, and inventory information across all supply partners
- Establish a highly coordinated set of logistics processes and transportation mechanisms to ensure on-time delivery of all assemblies
The Aircraft

- Thousands and thousands of unique parts will be used to build the airplane.
- 50 percent of the primary structure, including the fuselage and wing, will be made of composite.
- More than 100 partners across 12 countries on 5 continents are involved in the manufacturing and delivery process.
- 11 major subassemblies will be delivered to Everett, WA for final assembly.
- First flight is expected in 2007 with certification, delivery and entry into service occurring in 2008.

How the Strategy was Executed

- Move to partner-led manufacturing and fabrication model for the 787 Dreamliner
- Establish partner managed inventory programs with Boeing managed contracts to share risk and improve supply availability
- Implement common tools to provide global visibility to all demand/supply, order, and inventory information across multiple tiers of partners
- Invest in logistics visibility tools and specialized transport mechanisms to reliably move large subassemblies globally

Challenges Posed by Partner Manufacturing Model

The Boeing 787 Dreamliner represents a fundamental shift in manufacturing philosophy and approach for The Boeing Company. With 135 structural and systems partner locations around the world involved in the manufacturing and fabrication of the airplane, coordinating the end to end supply chain across these partners is paramount to the program’s success.

One of the biggest challenges in this production model is ensuring that all partners have access and visibility to the latest demand information from Boeing and that Boeing has visibility to the supplier’s ability to meet the delivery schedule. It is crucial that all of the major subassemblies arrive in Washington at the same time for final assembly. If a sub assembly is late or missing, there is very little time or space for Boeing to store the other large components. If a partner can not meet an expected delivery date then Boeing must adjust the schedule and potentially delay the arrival of the other assemblies.

Another critical success factor is to ensure continuity of supply of component parts being consumed by the Tier 1, volume partners. Due to the critical nature and dollar value of some of these component parts, Boeing retained contractual relationships directly with the Tier 2, providing partners. One of the benefits to the Tier 2 supplier is shorter payment cycles. The challenge was implementing a pull based replenishment model between the Tier 1 and Tier 2 partners that could be supported by the commercial relationship and payment process between Boeing and the Tier 2 partners.

Above all else, Boeing and their partners needed a way to quickly identify potential problems across the supply chain and immediately assess their impacts on other partners or aspects of the manufacturing process. As an example, if a component part replenishment shipment was late, will it cause a potential stock-out at a Tier 1 provider? If it will, then which delivery schedule will be impacted and against which finished airplane? What are the other subassembly production schedules that must be adjusted as a result? Having global visibility to process exceptions across the supply chain is critical to delivery performance.
The following highlights several business process flows executed between partners across several tiers of the 787 supply chain:

### Challenges in Managing External Processes

- As outsourcing increases, companies must find new ways to manage complex processes across multiple supply chain tiers.
- Companies require visibility and control into demand/supply and execution processes in order to reduce complexity, risk and cost.
- To facilitate effective collaboration, partners must have a trusted, single source of truth to evaluate real-time performance across the supply network.
- Companies require process automation with performance filters that allow management by exception and early identification of potential problems anywhere in the supply chain.
- Participating companies in the Extended Enterprise must be able to trust the identity of individuals and have non-repudiation of actions taken.

“In addition, the ability to have a common view with our partners of real-time, supply chain performance will reduce risk, improve cycle times and ensure compliance with agreed processes.”

Tim Opitz
Director of 787 Production and Support Tools
Boeing Commercial Airplanes

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### Exostar’s Supply Chain Management Solution Powered By E2open

Boeing turned to Exostar for a solution to help manage processes executed across multiple tiers of their supply network. The Exostar Supply Chain Management Solution, powered by E2open software, is used to manage the complete order lifecycle and returns process across the multiple partner tiers, while also tracking planning schedules, consumption, and managing replenishment for the Boeing Partner Managed Inventory program with Tier 2 partners.

The Exostar solution is designed to allow Boeing and its partners to collaborate on planning schedules, issue purchase orders, track purchase order changes, exchange shipping information, manage returns, track shipments, and manage inventory consumption across the multiple tiers involved in the manufacturing process. The system also monitors events and process exceptions that occur between partners and evaluates the impacts of these events against the master schedule using synchronized time-sequenced information. The solution includes reporting capabilities that allow Boeing and its partners to track overall performance of the supply chain.

Exostar’s Software-as-a-Service delivery model and existing network of connectivity into the A&D supply chain enabled Boeing to go-live with the solution in less than 90 days from project kick-off. Boeing was able to leverage its investment in Enterprise Systems to quickly connect to Exostar in order to enable its supply chain processes across the extended supply chain. Exostar’s solution was configured to meet Boeing’s current process requirements, and can evolve as process requirements or partners change over time.

Leveraging the Exostar Supply Chain Management Solution to manage Boeing’s 787 program, was a logical decision for Boeing who has standardized on Exostar for managing their external information flow with supply partners. Exostar is a well established technology and service provider to the Aerospace and Defense community, currently managing demand and supply processes between 20,000+ companies in the industry. The Exostar Supply Chain Management Solution is powered by E2open software. E2open software currently powers some of the world’s largest supply chain hubs in various industries including electronics, telecommunications, automotive, and heavy equipment.
The following highlights the solutions deployed by Boeing, Exostar, and E2open:

**Multi-Tier Order Management**
- Manage the complete order lifecycle from order issuance through invoice and payment across partner tiers
- Align order information and partner commitments against planning schedules
- Synchronize payment with consumption of Partner Managed Inventory
- Manage and track inventory through the returns process

**Reporting and Analytics**
- Provide ability to report on key performance indicators and to track process against defined metrics
- Provide reporting on parts inventory, delivery performance, schedule changes, returns and replacements

**Community Management and Support**
- Includes existing connectivity to over 23,000 companies and robust partner enablement program
- Supported 24/7 by call center, technical operations, and on-line training as outlined in industry leading service level agreements

**Multi-Tier Demand/Supply Synchronization**
- Communicate planning schedules and changes across partner community
- Evaluate impacts of partner commitments on delivery schedule to end customer
- Highlight demand/supply imbalances and schedule mismatches

**Partner Managed Inventory**
- Provide visibility to partner managed inventory balances, consumption, and replenishment plans
- Track projected inventory balances and supply availability against production schedules
- Measure supplier performance in fulfilling replenishment targets

**Security and Identity Management**
- Protected by role based single-sign on and best-in-class identify management framework
- Secured with end-to-end data encryption and non-repudiation

**Benefits**
Boeing again is leading the way in commercial aviation with the introduction of the 787 Dreamliner. By leveraging a world class, global team of partners, they are able to provide unparalleled value and advanced technology to their customers. By leveraging a world class supply chain management solution from Exostar and E2open, they are able to minimize waste in the supply chain while managing on-time delivery to the end customer.

Some of the anticipated benefits of the integrated supply chain solution include:
- Eliminate latency in communicating demand/supply changes across multiple partner tiers
- Ensure continuity of supply and minimize supply disruptions through the real-time synchronization of demand with available supply
- Improve cash flow for supply partners participating in partner managed inventory programs

“By helping us proactively flag any business process exceptions as they occur among our network of partners, and providing a consolidated view of all material movements across the supply chain, the Exostar solution is expected to tighten our efficiency in the way airplanes are manufactured.”
Tim Opitz
Director of 787 Production and Support Tools
Boeing Commercial Airplanes
Early identification of potential demand/supply imbalances and their impacts on other partners or aspects of the supply chain

Improved on-time delivery to the end customer while minimizing logistics costs

Eliminate many of the manual activities associated with communicating new delivery schedules and order changes across multiple tiers

Reporting and analysis for continued process improvement over the lifecycle of the program

Move to exception based management of the end to end process across partners and partner tiers

About Exostar
Exostar powers secure collaborative supply networks helping manufacturers and suppliers work together to gain visibility, control and integration of critical business processes, speeding time-to-market, increasing profitability and reducing risk. Exostar was founded to support the complex trading needs of the world’s largest aerospace and defense companies, including BAE Systems, The Boeing Company, Lockheed Martin Corp., Raytheon Co. and Rolls-Royce. Today, its on-demand solutions provide business collaboration, secure infrastructure and supply chain execution capabilities for 34,000 trading partners worldwide. For more information, please visit www.exostar.com.

About E2open
E2open is the leading provider of software and services to manage inter-company processes such as inventory management, order management, demand/supply forecast synchronization, outsourced manufacturing visibility, and multi-tier visibility—integrating trading partners across multiple tiers of distributed global supply and demand networks. For more information visit www.e2open.com.

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