Distributed Manufacturing with SAP and Cisco: Extending Visibility Across the Global Manufacturing Environment

To compete in today's dynamic business environment, global manufacturing organizations must be able to respond to rapidly changing market and operational conditions. Distributed Manufacturing with Cisco and SAP integrates two proven technologies to offer real-time visibility and collaboration across widely distributed processes to rapidly address critical business events.

The combination of SAP's Manufacturing Integration and Intelligence (SAP MII) application and the Cisco® Service Oriented Network Architecture (SONA) provides secure connectivity between multiple locations and enterprises, and improves the quality and effectiveness of communications between decision makers. The secure Cisco network platform connects SAP MII to systems and applications across enterprise boundaries to deliver critical information to the right person in the right location, based on business rules customized for specific industry needs. Manufacturers gain the ability to:

- Extend manufacturing intelligence across the distributed manufacturing environment and across enterprise boundaries
- Identify business-critical events and alert managers
- Deliver real-time communication and collaboration in response to manufacturing events
- Improve executive decision making
- Utilize existing systems and data sources through efficient deployment models

The Challenges of Distributed Manufacturing

Today's manufacturers are being challenged by a rapidly changing business environment. Even small manufacturers are doing business internationally, both as a production base and to find new markets. This globalization requires the ability to work, communicate, and innovate across corporate and cultural boundaries.

However, increasing globalization has also fragmented the traditional value chain. With suppliers, partners, prospects, and customers dispersed worldwide and new parties coming into the picture—such as contract manufacturers, parts suppliers, foundries, third-party logistics providers (3PLs), and channel partners—insight into plant systems is often dim, with disconnected islands of information storing overwhelming amounts of data. Manufacturing systems are evolving into extremely complex, multi-tier environments.

Even human communication systems are beginning to inhibit the business process. In the real-time, demand-driven enterprise, delays in connecting with decision makers and getting the right information to them slows the company's ability to respond to market and operational issues. This is becoming more challenging as organizations become globally dispersed and rely more on mobile or remote workers.

As a result, production lead times are becoming longer and more variable—geographically dispersed partners are stretching the supply chain to its limits, yet the time available to build products is simultaneously shrinking. Customer demand for flexible configurations and faster delivery is creating intense time pressures. Today's savvy buyer is armed with information about real product value, eroding loyalty and requiring service levels that are too expensive for companies unable to manage supply chain efficiencies.

These forces highlight the need for greater visibility and collaboration, enabling the entire supply chain to adjust to rapid change and respond to operational incidents while still meeting customer requirements.

Distributed Manufacturing with Cisco and SAP

Cisco and SAP address these challenges by helping to transform manufacturing organizations and their supply chains into lean, agile, efficient systems able to respond quickly to shifting market dynamics. Today's manufacturers need visibility into business-relevant events anywhere in the manufacturing process—whether from plants, contract manufacturers, suppliers, partners, or distributors. These may include urgent matters of shipment delays, order or demand changes, product quality issues and metrics, inventory status, and logistics events, as well as such network-related events as security issues and system performance.

The SAP MII platform and the Cisco Service Oriented Network Architecture (SONA) together provide highly secure visibility, collaboration, and real-time information, correlating manufacturing Key Performance Indicators (KPIs) to business processes and making them visible to key stakeholders. By enabling connectivity across the multi-tier manufacturing environment, these combined technologies gather data from sources throughout the supply chain, analyzing and displaying it via powerful analytics and visualization services. When business-relevant events are detected, a notification is instantly triggered based on granular rules, contact availability, device, location, and other relevant information. A rich set of communication and collaboration tools further enables management decisions based on up-to-the-minute information.

The SAP MII Application

Even today's best-integrated shop floor systems may still have disconnects between enterprise resource planning (ERP) systems, manufacturing execution systems (MESes), and shop floor automation and control (SFAC) systems, resulting in mismatched data, recipe/BOM errors, limited visibility, and inadequate information exchange into real-time business metrics. It can still be difficult to quickly identify business-relevant events and find the appropriate information.

SAP's MII application bridges these gaps by providing the functionality to link manufacturing throughout the business. Prebuilt, standards-compliant connectors between the shop floor and enterprise systems significantly reduce cost, complexity, and time to value. A rich set of manufacturing visualization and analytics tools support Six Sigma programs, providing both manufacturing integration and intelligence to improve product and process quality. By integrating plant and business systems, including multiple disparate plant automation and execution systems, the SAP MII application synchronizes manufacturing and business systems and performs intelligent event correlation and notification.

The Cisco Service Oriented Network Architecture

The SAP MII application performs these tasks within Cisco SONA. This resilient network architecture allows applications to leverage network-based services such as security, virtualization, and application delivery to create innovative business solutions. SONA establishes a suite of application-centered design principles that underlie a flexible and resilient networking environment, providing an integrated platform for business services. Based on SONA elements and best practices, network administrators can architect and deliver services-capable communications infrastructures that are reliable, scalable, highly secure, predictable, and built to optimize the end-user application experience.

How It Works

Cisco SONA network services are integrated with SAP MII by connecting instances of SAP MII across the multitier manufacturing environment and delivering business-relevant information to it, enabling comprehensive visibility of manufacturing events and performance metrics. Network intelligence and communications services are utilized to send notifications and data to decision makers as events occur, regardless of location or device, and collaboration tools and applications enable effective, timely business decisions. These services include:

- **Security:** Network-based services provide highly secure visibility through application-level security, policy enforcement, and encryption.
- **Unified communication:** Notification and collaboration aligned to business rules reduce the delays associated with traditional, siloed communications. Farflung business units can work together as never before, not only communicating but innovating from any location, at any time.
- **Network information:** Real-time event notification and intelligent, message-based routing enable rapid information sharing and exchange.
- **Manufacturing intelligence:** A real-time analytics engine aggregates and delivers unified visualization of events, alerts, KPIs, and decision support to production personnel through role-based dashboards, without data replication.
- **Manufacturing integration:** A single network layer enables ERP connectivity within real-time plant floor applications (MES, legacy systems, and so on) for comprehensive business interoperability.

For example, a company building a new product may discover that a key component is failing during production at a manufacturing partner. In the Cisco and SAP Distributed Manufacturing environment, a high failure rate/low yield is detected early in the assembly process, triggering an automatic call to the project manager. The manager is able to connect to the partner, place a hold on the damaged components, and pull up supplier inventory information to find an alternate vendor who can meet production deadlines. Or, perhaps a critical material has been delayed; the event is detected, managers receive instant notification of it, and they are connected with the systems and people at key suppliers to recover the situation and keep production on schedule.

Based on this powerful joint technology, manufacturers establish closer relationships with suppliers and trading partners to improve business performance. Suppliers, outsourcing partners, service providers, and even customers become extensions of the manufacturing organization, improving product adoption and raising market share.

The Benefits of Distributed Manufacturing

Cisco and SAP provide comprehensive business benefits to global industrial organizations, allowing them to manufacture more profitably as they adapt to changing marketing demands. The benefits of these Distributed Manufacturing capabilities include:

- This highly secure, scalable platform utilizes existing infrastructure and data sources to protect current investments, while positioning the company for future growth.
- It allows manufacturers to better meet customer demands by providing the visibility needed to ensure more consistent product quality and accurate availability dates.
- Production conditions improve with real-time visibility into operational and market conditions, with tracking of relevant metrics throughout the value chain.
- Alert notifications allow context-rich collaboration with mobile and remote business decision makers and subject matter experts.
- Manufacturers can operate closer to rated capacity, better matching dynamic production capability with market opportunity.

Based on this powerful functionality, manufacturers are able to streamline business processes to optimize inventory, identify quality events, meet customer demands, and achieve more consistent lead time performance across the most complex global environments.

Conclusion

The Cisco and SAP collaboration allows manufacturers to take advantage of a business model based on proven technologies that can dramatically increase productivity in the supply chain. Companies improve their ability to communicate and collaborate, accelerate the rate of innovation, and bridge the gap between manufacturers, suppliers, distributors, and customers. Manufacturers are able to rapidly adapt their processes and achieve a new level of agility that prepares them to respond to both current needs and the future of business.

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