



## Enabling Technologies: Visualizing the Agile Manufacturing Enterprise

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*Abstract : Software vendors are enabling agility with tools that deliver real-time data, automated exception alerts, and more flexible applications.*

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As manufacturers push to respond with more agility to accelerating rates of change, technology vendors increasingly are supporting that drive with a wide range of new software tools. Among them are tools that provide manufacturers with highly usable, real-time information about what's going right and wrong on the plant floor and across supply networks. Vendors also are focusing on tools that allow manufacturers to quickly make decisions and take action based on that real-time visibility. And, finally, software vendors are making strides to make their own products more flexible and better able to change as business imperatives shift.

"Today manufacturers need a mix of real-time data that can give them a bird's eye view of what's going on at any minute as well as an ability to deal with problems as soon as they happen," says Romain LeVault, vice president of sales and business development at manufacturing operations management software vendor [Intercim](#) LLC.

Intercim, like some other providers, is developing software that will not only provide manufacturers with real-time plant floor information, but also let them easily visualize and react to shop floor events and exceptions.

In June, Intercim sealed a joint development deal with product lifecycle management software provider Dassault Systèmes that will create a tight integration between the two companies' products. That integration will let manufacturers easily model and visualize plant equipment and processes in real time, with Dassault's V6 PLM platform providing the 3D modeling and visualization capability, and Intercim's MOM software providing real-time plant floor data. Using 3D plant models, managers would be able to easily see whether a machine on the shop floor is working and the status of a given production process in a local or remote plant. Managers would be able to instantly provide work instructions to a specific plant cell to resolve nonconforming situations.

LeVault, who calls the concept a "manufacturing control tower," says the project started with a request from Boeing, a Dassault and Intercim customer that wanted to eliminate paper-based plant floor processes as a way to become more responsive.

"What we're really talking about is agility through visibility," LeVault says.

Other vendors are also embracing new technologies that will permit real-time plant floor visualization. [Rockwell](#) Automation, for example, recently enhanced its FactoryTalk View plant visualization software by enabling it to work with [Microsoft](#)'s Silverlight technology, a Web browser plug-in and set of programming tools that allows for the delivery of rich video and visualizations over Web browsers. The technology, Rockwell says, will allow managers to visually track plant events remotely.

In a similar way, other software vendors are working on improving real-time visibility into and visualization of other parts of the manufacturing enterprise. ERP software provider [QAD Inc.](#), for example, is one of several vendors beginning to offer secure, shared online portals that manufacturers and their suppliers can use to track and visualize events in real time. QAD's Supply Visualization module allows manufacturers and suppliers to share demand, shipping, and other information.

"When a supplier has just released an advance ship notice, their manufacturing customer can instantly see that and track it in real time," says Gordon Fleming, QAD's chief marketing officer. "A few years ago, agility meant responding to customer needs from within the four walls of the enterprise. Now it means responding quickly throughout the supply chain."

Enterprise software provider [Lawson Software](#) also has launched technology that provides real-time supply chain visibility, but with a slightly different spin. The company's M3 Trace Engine 3.0 is designed specifically for food, beverage, and other process manufacturers that increasingly are expected to guarantee product safety by providing up-to-the-minute information on product content, origins, and transportation.

Built around a rules engine, M3 Trace Engine pulls product and production transaction information out of Lawson and other ERP systems and makes it available online to customers and regulators. The tool also lets manufacturers visualize internal production processes in real time, quickly tracing the origin of product quality problems.

While Lawson is focusing on providing real-time visibility to support specific processes in particular manufacturing verticals, several vendors of ERP, MES, and business intelligence (BI) software are delivering tools that provide real-time visibility into a wide range of processes by layering data extraction, analysis, and visualization tools on top of existing transaction systems.

Infor and [Epicor](#), for example, recently unveiled plans to tightly integrate BI tools with ERP systems, making it easier for manufacturers to display reports — via dashboards and key performance indicators — that reflect up-to-the-minute data generated by purchase orders, material receipts, and other events. The embedded business intelligence in Epicor's new Epicor 9 ERP suite, for example, includes pre-packaged analytical cubes and content and tools that manufacturers can use to create their own real-time KPIs.

### **Mining Plant Intelligence**

On the plant floor, vendors of manufacturing operations management (MOM) software are taking similar steps. [Wonderware](#), for example, has begun integrating manufacturing intelligence (MI) tools on top of its MES applications to give managers real-time access to key operational information.

Similarly, [SAP AG](#) is adding real-time analytics, dashboards, and alerts on top of its Manufacturing Integration and Intelligence (MII) platform. Specifically, [SAP](#) is building tight integration between its [Business Objects](#) BI tools and MII, an integration and manufacturing intelligence platform. The combination will provide real-time analysis of both business data and plant floor data.

"The idea is to provide a holistic and real-time view of the enterprise," says Siddarth Tapria, a manufacturing industry principal at SAP Business Objects.

Also, many providers are focusing on making their software more relevant, particularly to operational users on the plant floor or elsewhere in the manufacturing enterprise. ERP and MES vendors are doing this by replacing generic software user interfaces with new, highly graphical UIs designed for individuals performing specific roles and including dashboards with KPIs relevant to those roles.

ERP vendor [Infor](#), for example, recently rolled out Infor MyDay, which can be configured for individuals in specific roles and includes real-time KPIs that will be built on top of the company's Infor Decisions embedded business analytics platform. ERP vendors [IQMS](#) and Microsoft are moving in a similar direction, as is [Aspen Technology Inc.](#), a provider of engineering, supply chain, and manufacturing software for process manufacturers.

### **Alarms and Alerts**

But agility isn't only about getting access to real-time information coming from the plant floor or across the supply network. It's also about being able to respond quickly when those KPIs indicate that something has gone wrong. To enable that, several ERP, supply chain, and MOM software vendors

have begun enabling their systems with rules engines and alerting capabilities that can automatically spot a worrying exception and notify individuals in a position to take action.

Supply chain management software and managed service provider [Sterling Commerce](#), for example, recently added a Supply Chain Visibility option to its on-demand supply chain management network. Sterling Supply Chain Visibility automatically tracks specific types of transactions as they move across the network and, using a rules engine, monitors expected responses. An EDI 850 purchase order, for example, should be followed by order acknowledgment within one hour. If that does not happen, Sterling SC Visibility automatically sends an alert to the process owner.

Other supply chain technology providers such as [Kinaxis](#) enable similar automated alerts, as do ERP vendors such as IQMS and MOM software vendors, including [Apriso](#), Wonderware, and Intercim. Several of those vendors, including Wonderware and [OSIssoft](#), are working with Microsoft to integrate that vendor's Unified Communication infrastructure into their products so that alerts can be dynamically directed to different communications technologies, including e-mail, mobile phones, and instant messaging, says Chris Colyer, worldwide solutions director for manufacturing at Microsoft.

Even as vendors roll out new technologies intended to improve manufacturers' agility, many of them — and their customers — are haunted by an inconvenient truth: Many of the systems that manufacturers have deployed in the past to streamline and integrate business processes have reduced agility. That's because many legacy applications, particularly those developed in the client/server technology era, can't easily be modified, integrated, or customized for changing business requirements.

But software vendors are beginning to fix that barrier to agility, using services-oriented architecture and business process management (BPM) technology as well as new software deployment options such as software-as-a-service (SaaS). Having used SOA standards and techniques to make their new systems more modular and easier to integrate, vendors such as SAP, Epicor, IFS, and Wonderware are beginning to layer on BPM tools that allow manufacturers to easily create or modify their own business processes without going through the difficult, time-consuming step of modifying application source code.

Epicor's Service Connect, for example, is a BPM environment that users of the company's newer applications can use to easily modify or extend their enterprise applications. Similarly, Wonderware's ArchestrA SOA architecture allows its MES applications to be easily modified through pre-written templates.

By allowing once monolithic applications such as ERP to be broken up into modules, SOA is also enabling vendors to give manufacturers new deployment options that support agility. A growing number of vendors, including QAD, let manufacturers configure their enterprise applications with different virtual instances. When manufacturers launch or make changes to remote plants and legal entities, they can deploy these virtual instances of the software to support those new entities rather than deploying a new physical instance.

Along the same lines, growing numbers of enterprise application providers, including SAP, QAD, and Infor, are offering their software as a service, giving manufacturers the option of growing, shrinking, and changing their deployments without the constraint of managing the servers and networks themselves.

"Global manufacturers need to operate some processes with a global view and some with more of a local view, and they need to accommodate constant change," QAD's Fleming says. "Things like virtual instances and software-as-a-service give them more options, more flexibility, and ultimately more agility."