

M2M and the Supply Chain

The Power and Potential of M2M in the Supply Chain: A Network of Manufacturing and Distribution Facilities and Processes

The modern supply chain consists of a network of manufacturing and distribution facilities and processes that procure raw materials, transform these materials into intermediate or finished goods, and then distribute these goods to customers. Years ago, these chains may have been much simpler and easier to understand (Figure 1). However, increasing efforts to reduce costs through outsourcing and a shift towards distributed manufacturing (along with the recent economic slowdown) have transformed today's supply chain into a series of complex relationships among multiple supplier/customers (Figure 2).

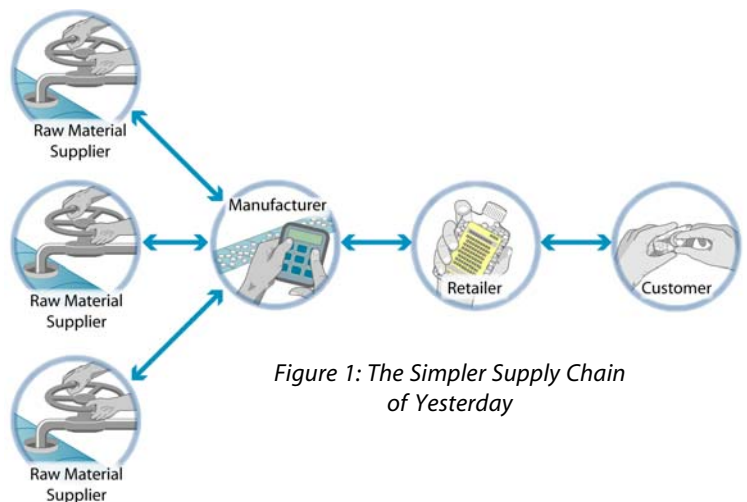


Figure 1: The Simpler Supply Chain of Yesterday

Today, manufacturers are seeking out best pricing for the raw materials they need to produce their products. Many times, this results in the selection of multiple vendors that are very often geographically dispersed. When this occurs, supply chains become more elaborate and extended, while simultaneously becoming less visible and more difficult to manage. Suppliers, manufacturing managers, shipping supervisors, customers, and others have no way to gauge what's taking place outside the four walls of their own facilities.

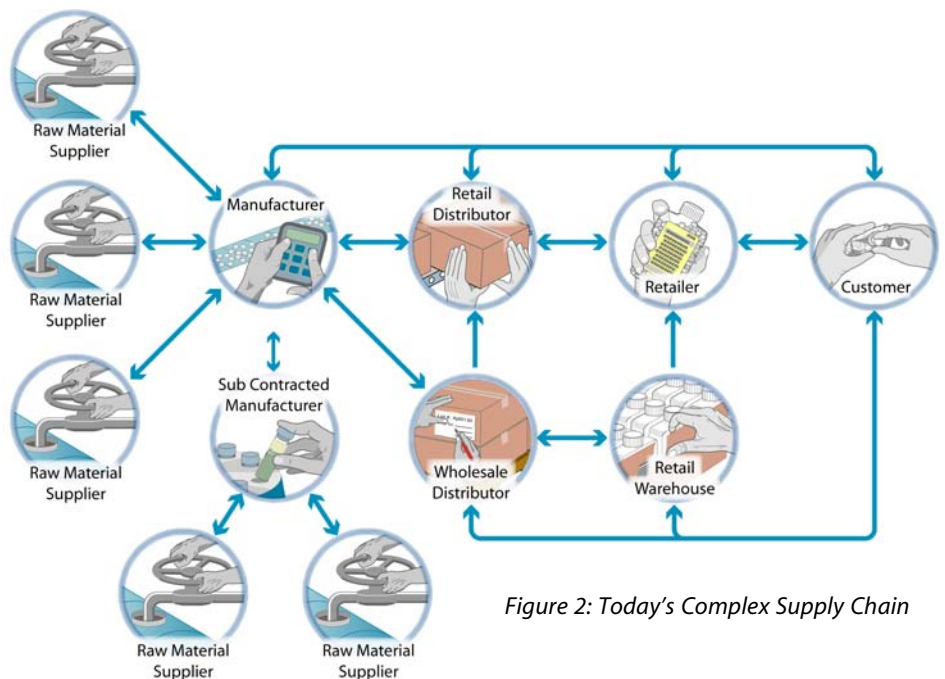


Figure 2: Today's Complex Supply Chain

Information and Collaboration

What's needed to support today's complex supply chains is collaboration amongst partners on manufacturing and assembly processes, shipping and receiving, warehouse management, transport, distribution, and all the other components of the extended supply chain. This collaboration should include the fundamental sharing and exchanging of forecasts, inventory reports, delivery schedules, billing, and other information that may prove valuable for both suppliers and customers.

When pursuing any business initiative, the gathering and analysis of enterprise information has always been the single most important driver, and supply chain activities are no exception. Regardless of the industry, the more that's known about what's taking place at every link of the chain, the better. The ability to access, aggregate, evaluate, and collate fresh, accurate data can tell you which business decisions need to be made in order to optimize manufacturing processes, manage inventory more cost effectively, and generally streamline operations while also increasing profitability.

Indeed, according to the Gartner presentation *Optimizing Fulfillment Through Supply Chain Execution*, "Through 2004, enterprises that provide customers and trading partners with visibility of orders, shipments and events across the extended supply chain will experience up to a 15 percent increase in profitability, because they will be able to reduce inventory while increasing customer satisfaction."

But while the value and benefits of sharing information throughout the supply chain are clear, the strategies for accomplishing this are not. A recent study conducted by the University of Texas found that only 11 percent of 1,000 manufacturing companies studied have any form of transactional or information-sharing capabilities with their suppliers. A separate



study identified industrial manufacturing organizations specifically as having some of the lowest levels of collaboration within their supply chains. What can be done about this?

M2M—What it Is. What it Does.

M2M (short for machine-to-machine, man-to-machine, and mobile-to-machine) refers to the leveraging of machine connectivity, communications, and information technology to 1) automate and enhance business processes, and 2) enable or enhance value-added services. M2M solutions accomplish this by successfully integrating discrete company assets with existing IT systems, thereby facilitating the gathering and sharing of real-time information from every level of the organization. Most large organizations have established ERP (enterprise resource planning), CRM (customer relationship management), and other applications they rely on for enterprise planning initiatives. To offer any value, however, these applications need to be populated with up-to-the-minute, relevant, accurate data. When collated with other data gathered from every corner of the extended supply chain, this data creates a unique type of business intelligence that improves supply chain operations in a number of ways.

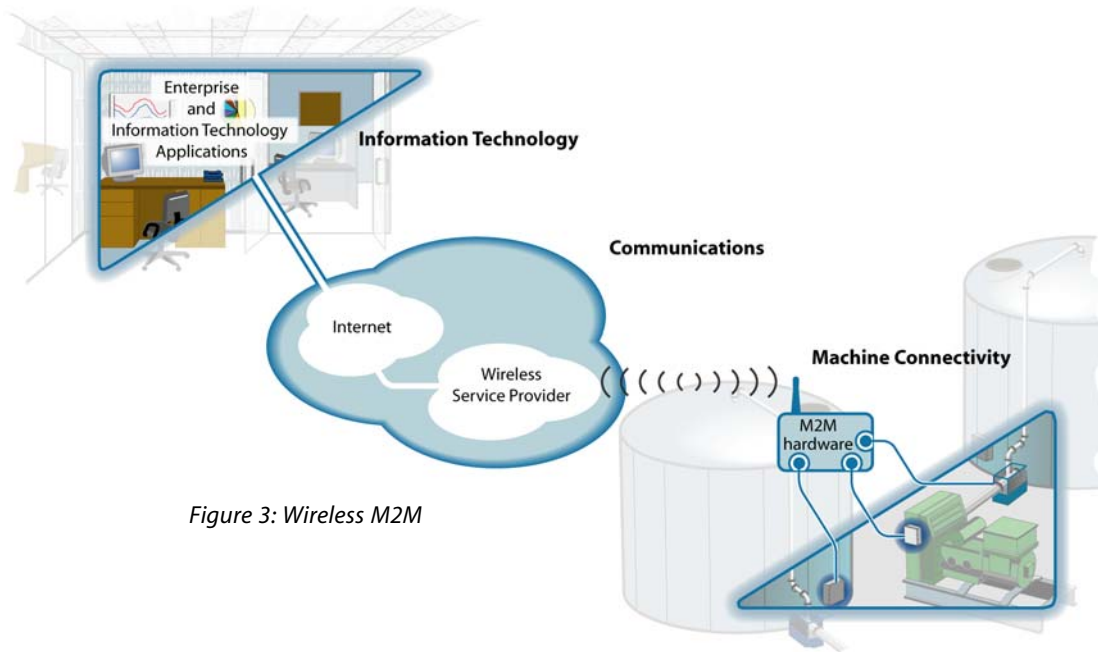


Figure 3: Wireless M2M

When deployed for the purposes of streamlining and improving the enterprise supply chain, M2M provides measurable ROI by helping to establish closer relationships with customers and suppliers and providing real-time visibility into key performance indicators. In a manufacturing environment, for example, M2M enables the sharing of real-time information between the various raw material suppliers, manufacturers, and distributors and greatly aids in ensuring the continuous availability of needed components and finished goods. Costs are reduced and inventories optimized through the better coordination of supply strategies, ordering, manufacturing runs, deliveries, and other business-critical processes.

The Right Choices—Wireless Leads the Way

The goal of M2M in the supply chain—enabling collaboration—is nothing new. According to the

Forrester report *Apps for Dynamic Collaboration*, 72 percent of firms agree that supplier collaboration is “critical to their product development success.” Thus, the challenge of M2M lies in determining the easiest and most affordable way to achieve this collaboration. In this regard, solutions built on technologies utilizing open standards are currently prevailing. Conversely, rigid architectures and proprietary interfaces were identified by Forrester as factors that “limit interoperability and cramp collaboration.”

M2M applications seek to acquire and transfer data from a collection of business equipment, devices and systems. In an extended supply chain, these diverse assets have no common interface and many are remotely located. In this situation, deciding how to establish the connections needed to enable M2M communication can be a daunting task. Solutions can be designed to incorporate wired networks, dial-up modems, licensed radio networks, or even satellite

communication. Each has unique pros and cons, and decisions on which to implement need to be made on an application-specific basis. Careful consideration must be given to installation costs, security issues, and reliability.

That being said, it should be noted that M2M solutions employing wireless technologies (e.g., wireless LAN and cellular) offer some distinct advantages for supply chain applications. For instance, wireless M2M applications enable the gathering of information from equipment that is remotely located, that is, where a wired network does not exist, at an unmanned facility, or where the installation of network cabling would not be possible due to excessive cost or harsh environments. Wireless M2M also represents the most cost-effective choice when seeking to incorporate mobile physical assets (or assets that may be in transit) into the M2M application. Wireless M2M enables real-time fleet management and monitoring of mobile assets like ship containers, railroad boxcars, or even cattle and livestock.

The case for wireless M2M was recently underscored by a report from Cap Gemini Ernst & Young, *Top Supply Chain Trends in the Marketplace*, which states, "the development of wireless-based M2M applications is now beginning to roll out and is picking up speed. As exciting and new technologies enter the market, expect to see increasingly sophisticated, best-practice examples from leading-edge companies."

Beyond Simple Supplier-Customer

Deployed throughout the extended supply chain, the comprehensive monitoring and data sharing that M2M provides allows suppliers and customers to enter into sophisticated Collaborative Planning, Forecasting, and Replenishment (CPFR) and Vendor-Managed Inventory (VMI)-type relationships. Each of these focus on the same objective: optimizing supply chain performance by giving suppliers visibility into customers' inventory and production data and then assuming responsibility for the replenishment of raw

materials. CPFR and VMI relieve the customer of the responsibility of scheduling deliveries and maintaining inventory levels, while the supplier is able to eliminate forecasting, reduce warehouse capacity, and provide higher levels of on-time delivery. Other benefits include the elimination of data entry errors (due to direct machine-to-machine communications) and the ability to automatically generate purchase orders on a predefined basis.

In the supply chain relationship, improving service to the end customer is always paramount. In many industries, raw materials are commodities, so if customers can't get what they expect in terms of both goods and quality of service, they can easily seek out alternative providers and purchase from them. Enabling M2M helps ensure this doesn't happen. For example, the visibility that M2M provides the manufacturer into the distributor's inventory makes forecasting easier. The manufacturer can see the potential need for an item well ahead of time. Monthly reporting becomes a thing of the past as access to real-time data reveals purchasing trends and makes ordering and replenishment planning easier and more accurate. As a result, fill rates are improved and, ultimately, the customer is happy because he has the product he wants when he wants it.

Case Study #1—Bayer AG—Ensuring Availability of Raw Materials

The German division of the pharmaceutical giant, Bayer AG, is also a supplier of chemicals and gases to a number of smaller drug manufacturers. The company was seeking a simple, affordable, and effective way to remotely administer and manage its customers' chemical and gas storage tanks through automated ordering and other proactive strategies. To accomplish this, the company recently deployed a combination of M2M systems for remote monitoring. The systems utilize sensor technology to connect Bayer's customers' storage tanks to the Bayer corporate network via standard and wireless modems and the

Internet. The M2M system is configured to remotely monitor the tanks and send communication reports when low tank levels, power failures, out-of-range temperatures, or other critical conditions occur. Also, as tanks are being replenished, the delivery person scans a barcode indicating their employee identification number along with the type and quantity of each chemical or gas they are delivering. All of this information is sent to Bayer corporate's Oracle database and SAP supply chain management system.

Access to real-time data on tank conditions and replenishment activities helps Bayer reduce costs and optimize their supply inventories by giving the company the ability to identify and deliver needed chemicals to its customers and to better coordinate

their supply strategies, schedules, and processes. Also, the delivery data that the M2M system gathers using the barcode readers saves a great deal of time, as previously, all of this information was being recorded by hand and entered into the supply chain management system at a later time. Getting this information into SAP immediately allows personnel in accounts receivable to access up-to-the-minute information on tank deliveries so they can begin billing right away. Finally, significant monetary savings are realized due to the lower warehouse capacity required now that the delivery reporting process has been streamlined. Bayer customers are no longer burdened with having to physically monitor their tank levels or generate purchase orders whenever chemicals are needed. Instead, they operate confidently knowing that they will have the agreed upon amounts of raw materials replenished automatically.

"Here was a company [Bayer] basically just looking for a Web-based way to monitor their tanks and track inventory," says Joachim Klasen, Project Manager for ATplan, the company responsible for sourcing and integrating the M2M system for Bayer. "This new technology lets the customer not only view all of their connected assets, but also capture data in real time and adjust their supply chain activities—production and delivery processes—appropriately. All in all, they got a lot more than they bargained for."

Case Study #2—BioLab—Wireless Pool Monitoring and Reporting

In some cases, distributors are using M2M to pass along savings (realized by the streamlining of their supply chain) to their end customers in the form of discount pricing or special promotions. In some cases, M2M allows them to offer value-added services. BioLab, Inc., a Georgia-based distributor of water treatment products, is a good example.

As a provider of pool chemicals and equipment, BioLab brings its products to market through a



network of distributors and authorized service providers. Seeking to differentiate themselves from a slew of like chemical providers, BioLab looked to establish a closer link to their dealer channel and, ultimately, the end consumers of their chemical products. To do so, BioLab deployed a wireless M2M system at its customers' commercial pools, water parks, fountains, and other recreational water facilities. At each site, the M2M system gathers real-time data such as pH balance, oxidation reduction potential (ORP) values, chemical levels, and water temperatures. The system interfaces back to a network operations center (NOC) using embedded wireless technology. At the NOC, the data is aggregated, stored, and presented to customers, dealers, and authorized BioLab personnel through a secure Web portal.

BioLab's new collaborative relationship with its supply chain has delivered measurable benefits for all. Customers can now view critical equipment performance data at any time of the day or night. Facility operators can also review information relative to water quality and chemical usage, which helps reduce or eliminate litigation stemming from liability claims. For its part, BioLab now has the data it needs to proactively schedule chemical deliveries and ensure timely replenishment. Equally important is the fact that BioLab has used the real-time benefits of M2M in the supply chain to develop a new source of revenue for both itself and its dealers by providing notification and repair dispatch to facility operators should equipment fail or water conditions drift out of specifications. According to Steve Clark, director of BioLab Commercial Water, BioLab's new collaboration with its supply chain partners is a good one. "In order for us to grow as a manufacturer, we needed to offer more than just chemicals. We needed a solution that would allow our dealers to better interact with their customers. M2M technology has enabled that."

M2M Application:

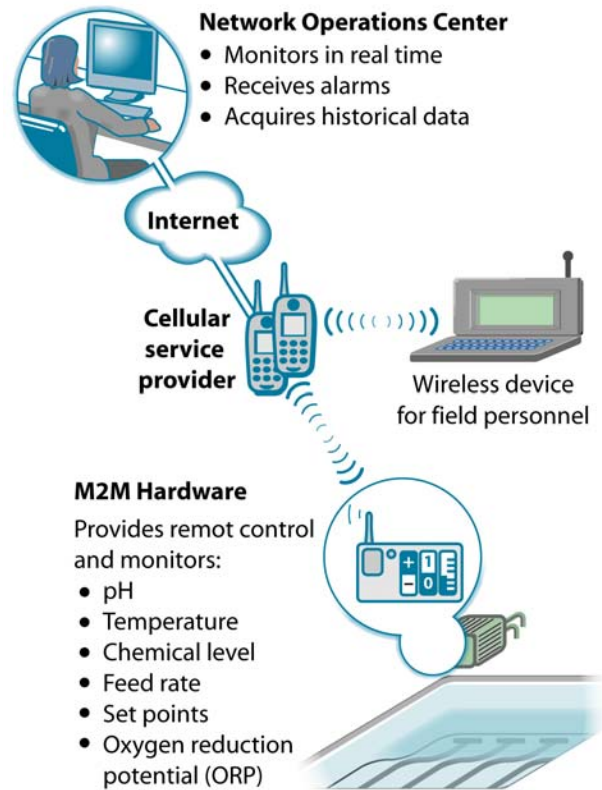


Figure 4: M2M Case Study (BioLab)

How To begin

According to Steven J. Kafka, research director at Forrester Research, "Firms and their partners can lay the groundwork for dynamic collaboration by starting small with trusted partners to engage in basic information sharing." Kafka adds that over time, firms should invest in incremental levels of dynamic

collaboration—monitoring, managing, and optimizing—to transform processes for product design, supply chain and procurement, and sales and service.

Admittedly, M2M technology is not the singular answer for filling the gaps that exist in the supply chain. Monitoring the status of orders, manufacturing processes, shipping and delivery activities, etc., for a conglomeration of suppliers and customers is a complex process. But this process can be significantly improved by enabling machine-to-machine communication that allows inventory reports, production data from manufacturing equipment, ordering and shipping information from databases, tracking information from barcode scanners, and other critical information to be shared among all the supplier/customers. Doing so eliminates the primitive, haphazard, and error-prone methods still used all too often to accomplish this. These include physical inspection and data entry, phone calls, and faxes. Use of such imprecise techniques often results in costly mistakes that are easily propagated all the way down the supply chain before they are (hopefully) discovered. As Simon Ellis and Stephen Lambright write in their article *Real-Time Tech* for *Optimize Magazine*, “The lack of timely, reliable data is the primary challenge driving real-time collaboration initiatives. Even when goods are transported on time and in perfect condition, and invoiced correctly, it takes days to get accurate information.”

Clearly, the adoption of M2M and the flexibility it offers represents one of the simplest and most straightforward ways to enable collaboration and overcome the barriers that hinder the sharing of valuable data between supply chain partners. M2M-based solutions also address the latency and reliability

issues that often arise when attempting to accomplish this sharing through human intervention. M2M technologies are affordable, secure, and can be implemented non-intrusively, without disrupting existing operational processes. Not just technology for its own sake, businesses are finally recognizing the power and potential of M2M and what it provides in terms of its ability to connect us not only to each other, but to every level of our enterprise.

For more information on how M2M can improve your enterprise supply chain activities or to speak to an M2M consultant call 1-877-M2M-OPTO.



About Opto 22

Opto 22 manufactures and develops hardware and software products for applications in industrial automation, remote monitoring, and enterprise data acquisition. Using standard, commercially available Internet, networking, and computer technologies, Opto 22's SNAP systems allow customers to monitor, control, and acquire data from all of the mechanical, electrical, or electronic assets that are key to their business operations. Opto 22's products and services support automation end users, OEMs, and information technology and operations personnel. Founded in 1974 and with over 80 million Opto 22-connected devices deployed worldwide, the company has an established reputation for quality and reliability. Opto 22 products are sold through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at 800-321-OPTO or visit our Web site at www.opto22.com.