Real-Time Shop Floor Integration, Simplified

The Right ERP System Can Make It Happen
As a manufacturer, you know where your money is made – on the shop floor, day-in and day-out. And, like countless other manufacturers, you also realize the shop floor is the next great frontier in the quest for truly lean operations. In a recent report entitled “Bridging the ERP and Shop Floor Divide,” the Aberdeen Group notes that the disconnect between ERP (Enterprise Resource Planning) and the shop floor hinders manufacturing performance. But you already know this. You’ve seen it in data collected from the shop floor with pen and paper on spreadsheets and charts, then uploaded in batches or transferred manually to multiple databases that aren’t readily connected to each other, let alone your ERP system. Very often the data is uploaded after it is needed, creating problematic situations.

In the realm of demand-driven manufacturing, where you must consistently do more with less, real-time information from the shop floor is imperative to prevent problems, drive quality, and enable the flexibility your customers require. Left unchecked, issues like down time, poor machine performance, scrap, and overruns can quickly erode your profit. But without an enterprise system that works in unison with real-time shop floor data, these issues can remain hidden and change any seeming lean progress into nothing more than a mirage.

Unfortunately, the path to shop floor integration doesn’t always appear straightforward. According to Aberdeen, manufacturers face many challenges in eliminating the disconnect between ERP and the shop floor. Existing systems are hard to integrate. Companies have no unifying manufacturing architecture. There are too many applications to support and aging or proprietary systems to consider. It’s also difficult to get the right information to the people who need it in time for them to make critical business decisions. What’s more, Aberdeen says effective integration cannot be accomplished simply by collecting shop floor data and passing it on to the ERP. Rather the ERP system must be active in pushing orders to the shop floor. It must keep constant track and provide access to current and planned inventory requirements.

Your shop floor operates in real-time. It moves fast and so must you. Information today about last week’s overrun will not let you prevent the overrun that’s about to occur now. Beyond the collection and integration of shop floor data, the real challenge is to make that data actionable – in an instant – to everyone, at every level within your organization, and in fact across your entire supply chain. Only by doing so will you achieve the visibility and control you need to be competitive in today’s demand-driven
economy. While this challenge may seem complex, with the right solution, you can attack it head-on, intelligently, and more cost-effectively than you might think. This white paper will show you how.

*Demand-driven manufacturing mandates real-time flexibility.*
*But real-time shop floor integration isn’t enough. You’ve got to make shop floor data actionable – in an instant – to everyone, at every level across your supply chain.*

**Shop Floor Integration – Myth vs. Reality**
Manufacturers approach shop floor integration through various means, some methods are more complicated, and thereby more expensive, than others. A common myth concludes that ERP cannot handle shop floor integration in complex manufacturing environments. As a result, Manufacturing Execution Systems (MES) and more recently Manufacturing Intelligence (MI) dashboard applications have come to the forefront as go betweens, extra layers designed to connect the shop floor to the ERP. Yet in reality because these “bolt-on” solutions are not inherent to the ERP system, they require higher levels of customization and architectural changes before they can perform as intended. Once installed, these solutions may also require greater ongoing support from IT staff. And even with the extra cost and effort, they may not provide immediate, accurate or automated results because they have no execution capabilities, or they rely on batch transfers instead of real-time communication.

Demand-driven manufacturing mandates flexibility to respond automatically in an instant to changes in areas such as inventory, production status, customer requests, even compliance mandates. Batch communication does not happen frequently enough to support this level of flexibility, and worse, batch transfers perpetuate time lags and inaccuracies across your supply chain, resulting in problems such as excess inventory, carrying costs, and lost productivity.

Manufacturers might also believe that the more complex a solution, the better it will be in solving shop floor integration issues. An MES system, for example, may be complex with feature-rich process monitoring tools, but do you need a separate system to monitor process when the machines you’re running have extensive process monitors onboard? While an MES system offers information on product properties, that information is not the most relevant to profit. Rather, it’s your production output that more directly affects your bottom line, and the data derived from that output that is more actionable to your ERP system.
Today’s reality also demands real-time communication that flows automatically across your supply chain. A single-database, extended ERP system that knits ERP and shop floor capabilities into one comprehensive weave may deliver better results with less effort and cost than batch-oriented, third-party solutions. For example, an ERP solution like EnterpriseIQ from IQMS can deliver real-time shop floor integration across a globally distributed network and fulfill many of the same functions normally performed by MES systems. EnterpriseIQ with its embedded RealTime Machine Monitoring technology removes the complexity of real-time shop floor integration by using simple contact closures to connect all machines to a single ERP database. The result is actionable, real-time shop floor data that can be utilized any time, anywhere, by anyone within your organization to drive up quality, boost performance, and improve your bottom line.

Think ERP can’t handle shop-floor integration in complex manufacturing environments? Think again. A single-database, extended ERP system that knits ERP and shop floor capabilities together may deliver better results with less effort and cost than batch-oriented, bolt-on solutions.

Making Complete Contact
Think of a contact closure as the flip of a switch, up then down for every part produced or even scrapped. By counting these flips as they occur on individual machines, RealTime Machine Monitoring can determine how long it takes to make a part and how many parts are produced in each shift. Because RealTime Machine Monitoring works in tandem with EnterpriseIQ, there is always instantaneous two-way communication between the shop floor and various aspects the ERP system. EnterpriseIQ pushes schedules to the machines based on demand and RealTime Machine Monitoring automatically provides feedback as production occurs. EnterpriseIQ then manages the complexity of the data by comparing it instantly to predetermined parameters such as average cycle time, scheduled production, inventory on hand, and more to automatically update the finite schedule. Because this information is shared across the ERP, inventory control is also highly incorporated. By recognizing which part or parts the machine made, the communication of raw material, labor, and overhead consumption are compared to the bill of manufacture. The result is the push current and accurate information across your entire supply chain.

This method of collecting shop floor data is less expensive than added, batch-oriented solutions for several reasons. First, it’s built for the shop floor environment and it’s easy to install. Each machine is
connected to the system using either cabled machine interface unit (MIU) or wireless mesh network (802.15.4) technology. (See diagrams A and B.) Due to its integrated architecture, scalability is never a problem even across multiple plants and globally distributed networks with multiple languages.

Finally, because the data collected from all machines routes instantly to the same database, your entire network is contained and visible to all. This single-database schema is far less complex than that of a typical batch-oriented system. By eliminating cumbersome third party interfaces that require manual data entry, EnterpriseIQ with RealTime Machine Monitoring speeds the transfer of accurate information to provide true, real-time, 24/7 shop floor visibility.

**Instantaneous two-way communication between the shop floor and the ERP can be as easy as flipping a switch.**

**Green Means Lean**

In “Bridging the ERP and Shop Floor Divide,” the Aberdeen Group states that best-performing manufacturers are five to fifteen percent more likely than others to connect individuals at all levels of the enterprise. Even so, Aberdeen states best-performing status also requires total visibility be linked with predictive, real-time,
analytic capabilities, and event management. EnterpriseIQ with RealTime Machine Monitoring automatically delivers production information and alerts to any computer or remote device on your network, including cell phones, laptops, and hand-helds, enabling you to respond in real-time from anywhere to prevent problems before they happen.

The system also uses easy-to-read, color-coded LightSticks or an audible enunciator to convey machine performance to those who work on the shop floor. LightSticks allow shop floor operators to quickly identify late, slow, and fast running machines. Machines that are running to standard indicate green or lean status, while machines that are slow light up red. LightSticks glow yellow when a machine is down, and turn blue when a machine is running fast. (See picture 1.) Stationing computers at every machine on the shop floor can be cost-prohibitive. LightSticks are a cost-effective alternative, and give operators fast, actionable information at a glance.

One manufacturer who is already using EnterpriseIQ with RealTime Machine Monitoring says the immediacy of RealTime on the shop floor allows operators to think like business owners. “Operators can now see when their machine is not performing to standard and take immediate action to correct the issue,” he says. “Changes that happen on the shop floor also show up simultaneously on the ERP screen, so operators are more aware that what they do on the shop floor can be seen by management the second it happens. This motivates operators to understand the impact of their actions, and as a result work better, smarter, and more productively.”

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Real-Time Supply Chain
According to the Aberdeen Group, best-performing manufacturers operate with real-time intelligence that encompasses process, organization, knowledge, and technology. Based on a survey in Aberdeen’s recent report, these leading manufacturers do a number of things, including: utilize real-time sensing and analytics to proactively avoid schedule interruptions; allow management a real-time view of the shop floor; and make real-time data accessible across the supply chain to include decision makers, operators, customer service, logistics, and delivery.
EnterpriseIQ with RealTime Machine Monitoring enables a real-time supply chain by giving you the tools you need to capture, monitor, manage, and track discrete, cyclical, and continuous operations as they occur. Supply chain automation is supported with capabilities such as activity monitoring and alerts, embedded workflow, label printing, bar coding, automated shift reports, and the ability to correlate shop floor activity automatically to every interaction with customers and suppliers alike, from initiation to resolution.

Reports provide accurate and timely information including good and bad parts, downtime, rejects, and more. (See picture 2.) Because the data you receive is immediate and in one central location, it provides true power at every point in the production cycle over factors such as labor and supplies, overruns, scrap, quality, and on-time delivery. It also supports adherence to industry standards and quality compliance regulations such as TS13485, ISO 9001 standards, and CFR and FDA requirements.

Summary information can provide a wealth of information for part performance that carries into the schedule or even Preventative Maintenance. An overall idea of how well or poorly machines are
operating to target standards within an individual work center or across an array of plant operations. (See pictures 3 and 4.) Historical data is used to make the finite schedule and is used to automatically indicate what jobs will run best on what machines based on data such as reject and cycle-time records. Any variances to standard that occur on the shop floor are instantly taken into account, allowing you to leverage advantages such as better-than-average runs, or prevent situations such as having to reset a tool after a job has run. In addition, the actual usage information for both machine hours and tool usage is directly conveyed to the Preventative Maintenance module for preservation of equipment integrity.

Manufacturers that are using EnterpriseIQ with RealTime Machine Monitoring have seen many benefits. For example, before implementing EnterpriseIQ, one manufacturer assumed his utilization rate was at 75 to 80 percent. EnterpriseIQ allowed him to see that his true utilization was closer to 50 percent. Now with real-time updates every 15 seconds, he’s dramatically increased shop floor efficiency and reduced scrap by 37 percent. For this manufacturer, the true benefit is best seen in the bottom line: “We now know our true costs, and as a result, we’ve exponentially increased our profits. Any enterprise not exploiting the power of real-time shop floor data is already falling below the curve.”

**EnterpriseIQ with RealTime Machine Monitoring enables a real-time supply chain that can benefit your bottom line. As one manufacturer put it, “We now know our true costs, and as a result, we’ve exponentially increased our profits.”**

**A Single Conclusion**
Real-time shop-floor integration is possible without the complications and added costs of integrated third-
party solutions. The right ERP system can make it happen, even in complex manufacturing environments and across globally distributed supply chains. EnterpriseIQ with RealTime Machine Monitoring is designed from the ground up to support 24/7, real-time shop floor integration in today’s demand-driven, manufacturing environments.

A single-source solution, EnterpriseIQ is written, developed, and supported by IQMS to deliver a wealth of functionality with simplified vendor contact. IQMS applies this same principle to its RealTime technology, using the simplicity of signal data and the comprehensive accessibility of one database to deliver tangible results and complete shop-floor visibility within an easy-to-manage and user-friendly computing environment.

The key to achieving cost-effective savings in the supply chain is to exchange information accurately and quickly in real-time. EnterpriseIQ with RealTime Machine Monitoring is the only manufacturing ERP solution that actively monitors the shop floor as production occurs, and automatically enables the exacting exchange of real-time shop floor data. In the pursuit to connect your shop floor to your ERP, EnterpriseIQ with RealTime Machine Monitoring may be the best choice. It’s that simple.

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