



PRESS RELEASE

((Kicker))

Powerful eMES interface module supports service-oriented architectures

((Title))

Transparent Processes are the benefit

((Intro))

In today's markets growing cost pressures and associated demands for ever greater productivity and better manufacturing and service quality are forcing companies to optimise their entire value addition chain. As a result, economic success now increasingly depends on close integration of all production and business processes, with maximum transparency. Achieving this requires a comprehensive flow of information between production systems and management systems, ensuring that reliable data is available to all the decision-makers in real time. Mitsubishi Electric's e-F@ctory concept is a particularly efficient solution for this problem.

((Body Text))

Many companies now face the challenge of having to produce better products faster at a lower cost, ideally with "zero" defects. At the same time, increasingly differentiated customer demands and more product variants make it necessary to make both technologies and business processes more flexible, often across company boundaries. In this struggle for competitive advantage, plant and machine automation has proved to be one of the most effective levers for improving productivity. There is not much more room for further efficiency improvement in this area, however – many plants are now almost fully automated, and not just in the automotive industry, which has always been one of the leading pioneers in factory automation.

More productivity through transparency

One area where there is still significant untapped potential for productivity enhancement is optimisation of operations by means of real-time communication and company-wide information management. This can be achieved in all sectors, from mechanical engineering to the process industry. The key here is the establishment of both seamlessly-integrated automation systems and a smooth flow of information throughout the

entire process chain. Comprehensive, real-time data from production is the objective: It provides a solid foundation for informed decision and the optimisation of all operations, from receiving the order to production planning and finally to the finished product. Data on the availability of materials and machines must also be made fully transparent and directly accessible at all times, just like the current production status.

Getting up-to-date information on current production status is the main reason companies invest in Manufacturing Execution Systems (MES). Working at the process level, production control systems record operation, materials, machine, personnel and quality assurance data for fine-tuned planning and control, and also provide links to the company management level (Enterprise Resource Planning, ERP). These systems are increasingly becoming a new corporate information hub. Today, information technology (IT) must provide the best possible support not only for production but also for the associated business processes, which are an equally key component of corporate activities. Unfortunately, the situation in many companies is still far from ideal in this respect.

Obstacles to improved efficiency

One of the weak points of many systems is the inadequate IT integration between the production and company management levels. In many companies data is still entered manually and information is passed on directly from one employee to another. The error potential involved here is naturally quite high: In addition to the possibility of data loss, this approach can easily cause delays in the information flow and often the entire production process as well. Other manually-executed tasks, for example in quality control, can also affect smooth operations, hindering faster throughput and delivery times and accurate production planning.

Even in companies where most data is already transmitted electronically, poorly-integrated or overly-complex IT systems can often create barriers to efficient communication. Conventional information management systems generally first transfer production level data to a computer in the production facility, where it must be pre-processed and converted before it can be transferred on to the central database via the corporate network. This shop floor computer acts as a gateway between the different communications networks, which all use different protocols. In addition to the cost of the hardware, this indirect data route via a gateway computer also involves significant software

engineering overheads. Over the years, company planning departments develop heterogeneous IT centers with a large number of highly-specialised business applications and interfaces, becoming increasingly rigid and inflexible as a result. The negative consequences of this are considerable: It is difficult to adapt these established IT structures to the ever-faster changes in the market, hindering the implementation of flexible, market-oriented business strategies.

MES Interface Module with support for the Enterprise Service Bus

Making meaningful production data available throughout the entire corporate structure requires integrated technologies for both horizontal and vertical real-time communication. This is also the basic idea behind Mitsubishi Electric's e-F@ctory concept: Intelligent modules perfectly matched to the company's automation products close the gap between the control systems on the automation level and the tools used in the corporate and production planning departments. Mitsubishi offers several MES interface solutions for connecting the production level to higher-level management systems, completely eliminating the need for expensive and failure-prone gateway computers and their programming overheads. These solutions communicate directly with all major current database systems, bi-directionally and in real time via a standardised interface. Selected process and manufacturing data can be transmitted directly to the higher-level systems for processing and the results can then be transmitted straight back to the shop floor. For example, the MES Interface Module for the modular MELSEC System Q controller and the MES Interface Function for the GOT1000 line of HMI control terminals have both already proved their value in many applications.

Another very powerful solution is the brand new eMES Interface Module, which has been developed specifically for complex IT systems. It provides trouble-free data communications via the Enterprise Service Bus (ESB), supporting a service-oriented architecture (SOA) geared to the characteristic needs of business processes. This microprocessor module for the recently-launched iQ Automation Platform, which integrates up to four different controller types in multi-processor mode, runs the VxWorks industrial real-time operating system. It is plugged directly into the controller backplane, just like the other CPU modules. It uses the common high-speed backplane bus to communicate with the controllers and regular Ethernet TCP/IP (Transmission Control

Protocol/Internet Protocol) for communication with third-party controllers and the higher-level management systems.

Flexible IT solutions geared to business processes

The SOA facilitates communication between different software applications and has a modular design: Instead of a rigid and monolithic program the company receives a solution comprising a package of individual software modules or services. These modules can then be combined to configure individual application environments. Open standards like XML (eXtensible Markup Language), Web Services and the Java Messaging Service ensure that the modules all interoperate smoothly. The Enterprise Service Bus, which has now become the de-facto standard for the integration of complex architectures, ensures reliable access to data and services in all the connected systems. Communication between the systems is performed by means of “messages” – a core ESB concept that enables asynchronous communication between the company’s applications. This makes it possible for the eMES Interface Module to dispense with the roundabout route through a database and transmit the data directly to higher-level systems for further processing, for example for energy management.

Simple configuration instead of complex programming

This principle applies to setting up the controls and safety functions in the Mitsubishi Electric system, for example. A user-friendly configuration tool helps the user to choose the data items needed to control all production and business processes. With a simple menu-based interface, the configuration program requires no special database programming skills so you don’t need a PC programmer for the task. Access to all configuration and data options is controlled by a flexible, password-protected security system that can be configured to respond dynamically in the event of malfunctions. A data buffer in the module reliably protects against data loss in the event of failure of the network or the higher-level information system.

Close collaboration with IBM and ILS Technology

The new eMES Interface Module for the iQ Automation Platform is the result of a close collaboration with IBM and ILS Technology. IBM’s Integration Services and SOA Foundation are key elements of this project; ILS Technology contributed their device-

WISE platform. The software is implemented in the module and fully integrated in Mitsubishi Electric's e-F@ctory product portfolio.

This system solution for full integration of production and business data is aimed in particular at companies in high-tech industries like car manufacturers and their suppliers. However, it is also attractive for other industries and for all companies with heterogeneous system environments who need to be able to respond efficiently to rapidly-changing market situations.

Transparent manufacturing boosts productivity

A pilot project in North America has already provided an impressive demonstration of the capabilities of the new eMES Interface Module in combination with the latest generation of Mitsubishi Electric controllers. The manufacturer is now saving €250,000 of maintenance costs per year for the gateway computers that are no longer needed in production. In addition to this, the seamless, comprehensive flow of information across all levels from management to machines is enabling the company to introduce more and more flexibility into their business processes through their application systems.

Mitsubishi Electric has also implemented the e-F@ctory concept for integrated automation solutions at its own servo motor production facility at the Nagoya Works in Japan. The results of the new transparent factory system are impressive: Productivity has increased by 80 percent compared to conventional manufacturing facilities and delivery times have become shorter. Today producing a servo motor only takes half as long as it used to – and now in a zero defects factory without expensive wastage. In addition to this the company has also reduced normal development costs by 65 percent.

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((Captions))

((Fig. 1: Mitsubishi_e-F@ctory.tif)) Faster response capability: The e-F@ctory concept delivers solutions for an integrated flow of data from the production to management levels.

((Fig. 2: Mitsubishi_IT-Graphic.pdf)) Key component of service-oriented architecture: Using the Enterprise Service Bus, the controller's eMES Interface Module enables communication with virtually any database system and business software applications.

((Fig. 3: Mitsubishi_iQ-Automation-Platform.jpg)) Fully integrated: The iQ Automation Platform unites PLC, motion control, CNC and robot controllers in a single, flexible modular system and integrates MES functionality in the same platform.

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