

The power of integration

Reaching new levels of productivity in the automation industry

THORALF SCHULZ – To be competitive, various plant entities, departments, and personnel have to work as one collaborative team. For this to be accomplished, each team member requires real-time access to information and context-sensitive decision and action tools from every point in the system. ABB's Extended Automation System 800xA Release 5.1 provides an integrated framework of systems and applications in which all actionable information is available for use in the system and can be provided to users in a variety of roles. This latest release includes enhancements to help ABB's customers improve performance, usability, and operator effectiveness with a substantially reduced system footprint.

Integration is one of the most challenging global business environments of a generation. Due to increasing levels of competition, companies are under more pressure than ever to achieve greater results with fewer resources. Competitive advantages result when a company can tap into its assets' unused productivity to meet changing demands. In addition, centralization of systems and resources are taking center stage to combat the issue of retiring plant operators and reduced engineering resource pools. Separate information systems, each with all their own "knowledgeable" resources in-

capable of reciprocal operation with other related management systems, cannot be sustained on any level, be it operations, maintenance, or engineering. Increasing both the level and scope of automation is the solution to the problems that exist today. The key to competitive advantage in today's market is integration, enabling

Title picture

Refineries: System 800xA has the capability not only to integrate automation and information management systems in a single plant, but to link the systems of plants at different sites, and in different countries, into a single, integrated entity.





1 Aspect Object technology

Aspect Object™ technology associates information with the plant and business entities (the objects) it belongs to, by organizing these objects to mirror reality and by providing powerful functions for navigation and searching. Expanding further, the concept defines the collection of information required to support each plant component as an aspect object – containing all the characteristics, or aspects of the device. Aspect objects can also be things such as finished products, raw materials, and sales and manufacturing orders. An electric motor for example could be represented by an aspect object containing all the real-time information connected with it. This might include design drawings, control diagrams, maintenance information, location, quality information and configuration information. It is important to realize that an aspect is not just the real-time information connected with a particular aspect object; it also defines a set of software functions that create, access and manipulate this information.

2 ABB's Extended Automation System 800xA core functional areas

Operations. System 800xA Operations, the industry's most intuitive system interface, provides a consistent method for accessing enterprise-wide data and for interacting with multiple applications from any connected workstation in the plant or office.

Engineering. System 800xA's integrated engineering environment efficiently supports the complete life-cycle of the automation project, from planning, through configuration and library management, to commissioning and operation to minimize system ownership costs.

Safety. A complete, scalable IEC 61508 – and IEC 61511 – compliant SIS (Safety Instrumented System) that spans the entire safety loop, including Safety Integrity Level (SIL) – rated field devices, I/O modules, controllers and field actuators. Powerful system functions as well as operator and engineering tools reduce plant risk through management of the human factor.

Information management. Powerful information management software collects, stores, retrieves and presents current and historical process and business data to support reporting, key performance indicator (KPI) visualization, and analysis.

Batch management. System 800xA Batch Management's enterprise – level planning coordinated with production – system scheduling provides the agility, speed and quality control needed to respond to increasing production demands.

Asset optimization. Asset optimization software exploits the wealth of plant resident information to monitor, assess and report equipment conditions in real time to reduce costly corrective and preventive maintenance and optimize maintenance and calibration work flows.

Control and I/O. A comprehensive suite of standards-based hardware and software enable total plant control. Controllers are complimented with a full line of industrial I/O interfaces to meet all plant environments.

Device management. Support of digital fieldbus standards and intelligent device management provides significant cost savings throughout the design, implementation and operation of field equipment.

various plant entities, departments, and personnel to work as one flexible, collaborative team. For this to be accomplished, an automation platform with incredible connectivity capabilities is necessary. ABB's Extended Automation System 800xA extends the reach of traditional automation systems beyond process control with an aim toward achieving the productivity gains necessary for manufacturers to succeed in today's economic climate.

ABB's Extended Automation System 800xA

First released in 2004, System 800xA was designed from the outset to function as an integration platform with connectivity to enterprise and plant systems, applications, and devices where real-time decision-making is a reality. System 800xA was developed with the aim to promote collaboration, improve operator effectiveness, achieve seamless control solutions, and provide flexible evolution paths through integrating diverse, usually separate plant systems, applications, information or fieldbus and controller platforms. Not only has System 800xA been widely embraced for new projects, but it is also the evolution path for ABB's traditional control systems. To date, over 6,000 units have been sold to extend automation functionality in a

wide variety of industries including oil, gas and petrochemical; pulp and paper; biotech/pharmaceutical; utility; chemical/fine chemical; metals; and mining.

System 800xA represents a single operation, engineering, and information management environment for an extended automation scope. It extends the reach of

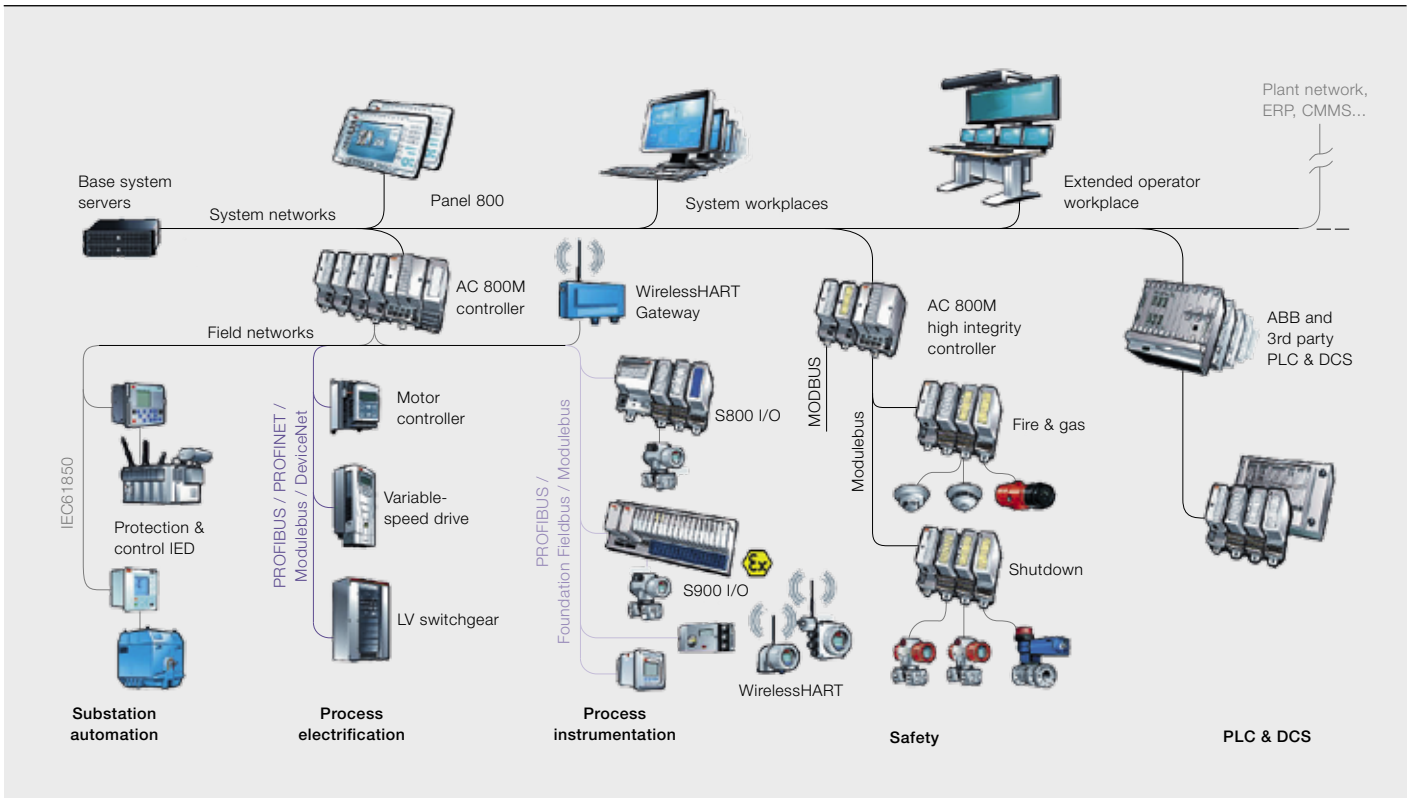
operating environment that enables presentation of information, in context, to the right person in the right format from any point within the system.

ABB's patented Aspect Object™ technology resides at the core of System 800xA → 1. This eliminates the time-consuming task of locating information

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a traditional distributed control system (DCS) to incorporate process control, production management, safety, discrete logic and sequence control, advanced control, information management, smart instrumentation, smart drives and motor control centers (MCCs), asset management, and documentation management capabilities into a single virtual database environment. It does this through the use of a unique Microsoft Windows-based

spread among different people, locations, computers and applications. Aspect object navigation presents the entire facility in a harmonized way through a virtual database environment, which includes smart field devices, asset optimization functions, information management, batch management, safety systems, and manufacturing execution systems (MES) applications. By removing the barriers of traditional DCSs, System 800xA provides the integrated environment that is necessary to increase productivity while reducing risk and total cost of ownership. System 800xA can dramatically improve plant-wide productivity through the following powerful, integrated



core functional areas: operations, engineering, safety, information management, batch management, asset optimization, control and I/O, and device management as described in → 2.

What's new in System 800xA Release 5.1

With this latest release the power of integration is strengthened with the aim of delivering improved functionality that promotes collaboration, improves operator effectiveness, generates cost-effective solutions, helps achieve seamless control and provides flexible evolution paths. Each core functional area has seen significant upgrades.

Version 5.1 is a Microsoft Windows 7-based release resulting in improved life-cycle for ABB customers and for future developments. The latest version is able to accommodate 120,000 objects and supports larger applications, making it easier to integrate multiple systems. Version 5.1 is online upgradable from the latest version of 5.0; a running system can be upgraded on the fly without interrupting production (for System 800xA 5.0SP2 installations). A new intuitive system configuration interface reduces overall system configuration effort.

Improved performance and reduced footprint

Several performance enhancements make System 800xA's already robust control and I/O offering even more versatile, flexible and scalable. The latest version includes a new member of the AC800M controller family, the PM891, which has approximately three times the clock speed and four times the memory of its predecessor, making it the most powerful controller in its class. PM891 provides better support for large applications and multisystem integration projects. The latest version of System 800xA uses new virtualization support for VMware vSphere 4 ESX/ESXi to reduce the physical number of PCs required for installations by as much as 75 percent. This significantly reduces the physical footprint energy consumption and maintenance requirements and lowers the total cost of ownership.

Improved connectivity

ABB's engineers have added to and enhanced System 800xA's portfolio of communication interfaces to help users further leverage its powerful integration capabilities. These include new communication interfaces for PROFINET, DeviceNet via Ethernet IP, and WirelessHART. System 800xA's WirelessHART solution seam-

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lessly integrates Pepperl+Fuchs WirelessHART Gateway, providing wireless connectivity to HART-enabled devices, such as sensors and actuators, making the process variables and diagnostic data available in System 800xA's controller, HMI and integrated Asset Optimization application. In addition, improvements made to System 800xA's Foundation Fieldbus architecture has greatly reduced the infrastructure requirements for its high-speed Ethernet (HSE) network, allowing a fourfold increase in the number of devices that can be connected to one node. System 800xA's Foundation Fieldbus interfaces also now support electronic device description language (EDDL). System 800xA's IEC 61850 communications interface capability has been enhanced by increasing the number of supported intelligent electrical devices (IEDs) per communication interface card from 50 to 80, and by improving alarm and event support to provide even deeper and wider integration with electrical systems. These interfaces make it easier for customers to access and use data from smart instruments regardless of physical location or manufacturer.

Enhanced maintenance

Based on user centered design practices, the latest version of System 800xA

includes a system administration console and a security update tool to help keep the system running securely and at an optimal level. The security update tool allows users to download security patches from Microsoft and crossmatch that to ABB's qualified list. The user can then create a loadable set of supported, tested security updates that can be rolled out to System 800xA. The user saves valuable time and effort and a more robust, secure system is provided.

Operations improvements include integrated alarm management options comprised of alarm analysis functionality, an alarm shelving feature and page alarm acknowledgement. In addition to traditional reporting of alarm statistics, the built-in alarm analysis displays are natively accessible to operators via graphics based on Microsoft Windows presentation foundation (WPF), thereby involving them in the process and ensuring continued success of the alarm management strategy. In addition, the alarm analysis list is compliant with ISA-18.02 standards. A new point-of-control feature allows an operator in a different area of a facility to request permission to control a plant area or unit from the currently responsible operator. Once approved, permission to operate that part of the facility



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is transferred to the requesting operator and is captured in the audit trail log. The area or unit alarm and event messages are now routed to the new operator. Point of control improves the coordination of operators during critical periods, such as shift change, providing a safer, more secure operating environment.

Improved change management

System 800xA 5.1 includes two new features to improve and streamline change management procedures. The task analysis tool lets the user evaluate how his/her application will be executed based on the current task rates assigned prior to downloading. It clearly shows any latency or conflicts and then prevents the new application from being downloaded to avoid a controller error. Performance of “what if” scenarios to pinpoint where problems may occur when modifying task execution cycle times are possible. The detailed difference report provides a way to easily see changes made in control applications and graphics and provides a report of exactly what has been modified, added or removed in an easy-to-read user interface. The detailed difference report provides the engineer and quality personnel with precisely the information needed to identify changes and evaluate their impact. This is especially useful in change

management processes, as it can verify that no other changes have been made except the ones present in the change request, saving hours of change request verification and testing.

System 800xA Release 5.1 improves lifecycle management through the use of the latest technology, providing more performance and usability through increased system sizing and a new, more powerful controller, increased energy savings, and reduced maintenance costs through footprint reduction, and improved operator effectiveness through integrated information and alarm management. With this latest release, System 800xA presents a unified workflow environment that enables collaboration and provides workers with an understanding of their specific requirements in the context of the bigger picture. Sharing the data, knowledge and functional views ensures that each functional group in the plant understands the operational situation and their role in improving it. This is the level of integration delivered by ABB’s System 800xA Release 5.1, an automation platform that has the ability to engineer, commission, control and operate automation strategies for process, power, electrical, and safety in the same redundant, reliable system.

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