System 800xA is ABB’s flagship Collaborative Process Automation System (CPAS) offering for all major industrial process manufacturing facilities globally. Since its introduction in 2004, nearly 9,000 systems have been installed across 100 countries. This large and growing installed base has helped make ABB the #1 DCS supplier in the world.

System 800xA serves as the foundation for a number of unique industry-specific automation applications. Removing the barriers in traditional distributed control systems, it provides unparalleled capacity to embed enterprise and plant systems, applications and devices, enabling plant-wide collaboration between people, systems and equipment.

System 800xA has been shown to improve engineering, operations, control and maintenance while reducing total cost of ownership. System 800xA also help operators to collaborate effectively with each other and the systems and equipment they monitor and control. With Feature Pack 4 functionality included it will be even better.

800xA 5.1 and feature releases – key highlights:
- We offer productized control room design by the introduction of Extended Operator Workplaces
- Integrated Alarm analysis for continuous analysis and optimization to avoid nuisance alarm
- Tabbed Navigation with Alarm Status
- Extended communication support for Foundation Fieldbus, Profinet and IEC 61850
- Increased Ethernet IP, DeviceNet, WirelessHART, PROFINET, UDP/IP (User defined) support
- Device Management HART provides full support for HART 7
- Simplified batch scheduling with one tool to organize parameters and schedule batch recipes
- The Batch Spreadsheet Scheduler can now be used on an office PC without the need of an 800xA system
- New Control Diagram Editor
- Increased virtualization support & doubled system capacity reduces the number of servers and installation costs
- Smart Client workplace for presenting 800xA information in the office environment
- SIL Inter-application Communication
- Protection Library for SIL3 Machine safety
- Industrial Defender Certification

Executive Summary

System 800xA 5.1 and feature releases
Improved user, system and plant performance
Operator Effectiveness

Over a total life cycle, many important decisions are made by operators, decisions that have a great impact on safety, productivity and quality. Operator effectiveness can be optimized by focusing greater attention on the operator and on human factors.

Alarm Management

800xA 5.1 includes advanced alarm management capabilities that help users implement successful alarm management strategies. New Alarm Shelving and Alarm Analysis features have been added to help keep alarms in check. In addition to traditional reporting of alarm statistics, built-in Alarm Analysis displays are accessible to operators via graphics based on Microsoft Windows Presentation Foundation (WPF). This involves them in the process and helps ensure your alarm management strategy’s continued success.

The feature release September 2011, Feature Pack 1 (FP1) includes enhancements to 800xA Alarm management that improve operator response to alarms (for information about the concept of feature packs, see page 7).

The new functionality Group Alarms enables display of a single ‘grouped alarm’ that represents multiple alarms reported from different sources related to a common cause in the system. This reduces the number of events listed, thereby helping operators handle key tasks with their full, undisturbed attention. By minimizing the number of alarm list entries that have to be read and assessed, alarm grouping helps operators work more effectively.

Another feature available in FP1 is the Alarm response navigation that speeds up decisions and action by providing fast navigation from an alarm to detailed information needed to handle it correctly. Trend display, faceplate and related documentation can all be brought up with just two mouse clicks.

In Feature Pack 4 we further improve the offering by the introduction of Alarm help and long term alarm analyses and reports. In addition we introduce video surveillance and recording capabilities, this dramatically increases the transparency from the control room to the plant floor.

Control responsibilities

Another function introduced in 5.1 is Point of Control. This allows an operator in one area of a facility to request permission to take over the control a plant area or unit from the currently responsible operator. Once approved, permission to operate that part of the facility is transferred to the requesting operator and captured in the audit trail log. The area or unit alarm and event messages are now routed to the new operator, thereby reducing the number of alarms sent to the original operator.

New EOW workplaces

In FP4 we have four standardized, pre-package extended Operator Workplaces (EOW) that includes all of the necessary hardware and software to make it easier to create high performance local and remote control centers.

In FP4 we have also added high performance graphics elements, alarm history and reports, mobile client workplace and guide, smart client with PG2 graphic support, Video server and CAD Viewer, larger harmonized icons and much more...

1. Alarm analysis according to ISA 18.2 and EEMUA 191 that includes calculations of the 20 longest standing alarms, 20 most frequent alarms etc.
2. Tabbed navigation, including alarm severity and status shown in buttons & tabs, promote operator responsiveness and effective navigation and action.
High performance HMI
The release of Feature Pack 1 enhances the high performance HMI with support for tabbed navigation, facilitating fast, intuitive and secure navigation between displays using buttons and tabs.

Tab-based navigation enables quick and direct access to primary displays and minimal keystroke access to secondary and associated displays, thus improving situation awareness and responsiveness to alarms and events. With the release of Feature Pack 3, alarm severity and status can be displayed in the buttons and tabs, further improving responsiveness and plant safety.

Another feature introduced in Feature Pack 3 is an enhancement to the application bar icons that enables larger size icons, making it easier for the operators to navigate to 800xA features. Also, Feature Pack 3 introduces the combined one line tool bar that is a collection of tools from the Display bar, the Application bar, and the Status bar. This saves vertical screen space and is well suited for wide screen displays, providing the operator with more display area and the simplicity of having one tool bar only.

Furthermore, with Feature Pack 3 aspect links will now indicate if the link points to the previous display. This is useful when there are two or more aspect links and is an excellent complement to the existing display history.

Finally; Feature Pack 4 introduces the possibility for the operator to use high performance graphics elements, alarm help and web reports and use of 800xA mobility guide.

Operation of several systems
Multi-system integration promotes control consolidation since it makes it possible to supervise and operate several 800xA systems from one central control room in a safe and effective way. With FP1, integration capabilities are enhanced with MS support for Foundation Fieldbus and IEC 61850. Support for two subscribers to a provider is also available. Point of Control also applies for multi-system integration set-ups from FP1.

Sequential Function Chart (SFC) Viewer
FP1 introduces guided operator action by SFC Viewer for AC 800M. The operator can navigate directly from the transition in the SFC Viewer to the context menu for the related object and bring up the faceplate, trend, etc. This speedy and accurate response to process upsets improves stability and availability.

Automation and power integration
By embedding power and process systems on the common 800xA platform, plants optimize the design and performance of their electrical and automation systems and gain additional benefits in reduced maintenance, engineering and overall lifecycle costs. According to ARC, typical savings can result in a 20% reduction in CAPEX (capital expenditures) and OPEX (operating expenditures) by integrating these two, usually separate, automation infrastructures.

To provide even deeper and wider integration with electrical systems, 800xA’s IEC 61850 Communications Interface capability has been enhanced by increasing the number of supported Intelligent Electrical Devices (IEDs) per communication interface card and by improving alarm and event support.
The capacity of the IEC 61850 connectivity package has also been increased in FP2. It is possible to use 4 OPC servers per connectivity server. This doubles the capacity, or cuts the footprint for IEC 61850 servers in half, thus reducing installation costs.

In FP3 Function Designer IO Allocation now also supports IO fieldbus devices connected via IEC 61850, Profinet and Foundation Fieldbus Communication Protocols.

**Enterprise Asset Management**

An effective asset management strategy combines the needs of the production and maintenance organizations. It increases both equipment availability and production rate by providing insight into asset health, corrective action instructions and organizational visibility.

**Integration of the maintenance system**

Integrated CMMS is a key enabler for shifting to predictive maintenance by increasing the number of fault reports from operators, for example. This helps the maintenance department to attend to anomalies before they cause disturbances and unplanned shutdowns.

800xA provides extensive support for integration of EAM/CMMS maintenance systems (e.g. Mincom, Maximo, SAP, IFS, etc). The FP1 release supports integration of the latest versions of IBM Maximo (version 7.1) and SAP/PM ERP Central Component 6.0 (ECC6), as well as the previous ones.

**Object diagnostics**

Another important parameter for predictive maintenance is asset monitors that detect anomalies and provide maintenance with early warnings. To meet the increasing use of Control Loop Asset Monitors (CLAM), this capability has been increased to 500 CLAMs in one system with Rev A.

**Control and I/O**

Several performance enhancements make 800xA’s already robust Control and I/O offering even more versatile, flexible, and scalable. The 5.1 version includes a new member of the AC 800M controller family, the PM891. This has approximately three times the clock speed (450 MHz) and four times the memory of its predecessor, making it the most powerful controller of its class. PM 891 helps plants do more with less, requiring fewer controllers for applications and providing 1:1 controller evolution for previous generation ABB and third-party controller platforms. In FP4 we release more powerful AC 800M controllers and some new I/O models and connectivity options to assist operators with the installation of field equipment such as Ethernet IP and UDP/IP communication.

**Communication**

800xA has added to and enhanced its 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. 800xA’s WirelessHART solution seamlessly integrates Pepperl+Fuchs WirelessHART Gateway, providing wireless connectivity to HART-enabled devices such as sensors and actuators, and making process variables and diagnostic data available in 800xA’s controller, HMI, and integrated Asset Optimization application. 800xA’s FOUNDATION Fieldbus interfaces also now support EDDL. These interfaces make it easier to access and use diagnostic data from smart instruments, regardless of manufacturer or physical device location.

Enhancements for more efficient and faster commissioning in Device Management for FOUNDATION Fieldbus are also included in the FP2 release. The traditional overview pane and life list in commissioning mode of Fieldbus Builder FF have been replaced by the Device List View and Diagnostic List View. Both lists give comprehensive overviews about all device data relevant for the FF commissioning steps.
Engineering

800xA 5.1 includes multiple engineering improvements such as simplified bulk data handling when engineering FOUNDATION Fieldbus projects. In addition, three new features improve and streamline change management procedures.

Task Analysis Tool lets users evaluate how their 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. It also performs ‘what if’ scenarios to pinpoint where problems may occur when modifying task execution cycle times.

Detailed Difference Report provides a way to easily see changes made in control applications and graphics, and reports exactly what has been modified, added, or removed in an easy-to-read user interface. It provides the engineer and quality personnel with precisely the information needed to pinpoint 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. This can save hours of change request verification and testing.

With the release of FP3, Function Designer IO Allocation now also supports IO fieldbus devices connected via IEC 61850, Profinet and FOUNDATION Fieldbus Communication Protocols.

In FP3 a new Bulk Data Manager Excel template has been added that allows configuration of sequences in Excel. The SFC structure can be configured for Control Builder as well as for Function Designer sequences.

Batch

Simple Batch and Parameter Management introduced in FP1 has in FP3 been enhanced to include new security features. These provide stricter user access on the Excel spreadsheet scheduler and user formulations. It also simplifies scheduling and improves stability and availability. Now users only need one tool to organize parameters and schedule batch recipes.

This provides all the information the operator needs to schedule batches in one simple application, easily integrated into the user graphics. As it requires little or no knowledge and training to use, operators can focus on the process instead of the tool. It’s ideal for procedures where multiple formulations apply to one recipe.

The multi-write capability to OPC is also improved in FP1. Application performance is improved with new ‘putm’ and ‘subscribe’ function calls now added to the batch expression language.

In FP3 a new Batch Scheduling aspect is available. This configurable graphic element allows a scheduling dialog to be embedded directly into a PG2 graphic display or through a separate overlap display to better match operational workflows. Batch Status, Priority and Mode OPC properties have been exposed providing improved visibility to operators during batch execution.

Virtualization

Virtualization reduces the physical number of PCs required for installations by as much as 75%. This significantly reduces footprint, energy consumption and maintenance requirements.
Thanks to FP1, virtualization with 800xA now supports SAN storage, which has the potential to increase availability. Virtual machines can either reside on hard disks local in the ESX server, or in a network storage device such as a Storage Area Network (SAN) server. In both cases, the storage is added to the ESX server and seen as data stores.

One advantage of having virtual machines residing on a SAN server is that they can be moved from one ESX server to another. Since both ESX servers have access to the same shared storage, only the execution context needs to be moved, rather than the much larger virtual machine hard disk.

Increased support for virtualization is also introduced with FP1. The majority of 800xA servers are now supported for virtualized systems. The additional ones released in FP1 are DCI, Harmony, and IEC 61850. This further reduces the number of servers needed. Increased support for virtualization is also introduced with FP1. The majority of 800xA servers are now supported for virtualized systems. The additional ones released in FP1 are DCI, Harmony, and IEC 61850. This further reduces the number of servers needed.

System improvements

Security

800xA has been built with security in focus and has a rich set of security functions that support secure plant operation. Revision A includes important improvements in secure communications, password protection and overall system security recommendations.

Communication on the client/server network can be protected from unauthorized access using the Internet Protocol Security (IPsec), which will authenticate and encrypt all traffic on the network. Its purpose is to ensure that only legitimate nodes in the 800xA System can talk to each other, and hence prevent intrusion through nodes added to the network without proper configuration.

Support is introduced for configuring IPsec to only allow communication between clients and servers that are members of the system’s Active Directory Domain and additional nodes that are explicitly defined. IPsec can be configured for a newly installed system as well as existing systems using 800xA 5.1 or later. The tool automates deployment of settings to all nodes, thus off-loading system administrators and minimizing risks for manual mistakes.

Support for 64bit

800xA 5.1 is available in a 64bit compatible version intended for Windows 7 64bit and Windows Server 2008R2. The existing 32bit version will continue to be supported.

System capacity

Increased system size is supported with the release of FP1. The number of nodes on a Control Network is increased to sixty. This includes controllers as well as servers. The increase supports consolidation and plant-wide control and monitoring systems. It also reduces the number of servers needed, thus lowering installation costs.

In addition, the number of rich clients (i.e. normal operations clients) is increased to eighty.

Finally, controller connectivity server throughput is increased. In practical terms, this means most installations can manage with one single pair of connectivity servers, thereby reducing installation costs.

Cyber security

Based on User Centered Design practices, the 800xA 5.1 includes a System Administration Console and a Security Update Tool to help keep the system running securely and at an optimum level. The Security Update Tool allows users to download Security Patches from Microsoft and cross match that to ABB’s qualified list. Users can then create a loadable set of supported, tested security updates that can be rolled out to 800xA. This helps users save valuable time and effort while providing a more robust, secure system.
Smart Client

Smart Client is a desktop client for presenting information from 800xA in the office environment. This improves plant visibility and production follow-up. Users have easy access to process data for KPIs and easy-to-use tools for analysis and reports for process optimization.

With the Smart Client 2.2 release, users can bring up 800xA PG 2 graphics directly in smart client, view live process data and trends, and navigate to related displays.

The concept of feature packs

This is the conceptual model of how revisions and feature pack add-ons to 800xA relate to each other:

- A user can choose to update to the current revision and keep his installation at that level. This means he will get recently-found problems corrected. The functionality of his system will remain as it was at the time when the original installation was made. This improves the stability of the actual installation, plus that the user does not have to adopt any new functions, updated user interfaces, or anything else that differs from before the revision was installed.

- A feature pack adds functions and features to an installation. Users can optionally choose to install a feature pack.

- A feature pack may require a certain revision level of the system in order to work as intended. The install media for a feature pack also contain the required revision level. This means that by installing the feature pack, the system will be updated to the required revision level. Feature pack installation kits also normally contain the revision. This means that checking the installation usually requires only one entry in addition to the base installation. For some functional areas in 800xA, where the whole installation is replaced when an update is made, there is only one entry visible for the whole functional area.

800xA 5.1 and related feature releases

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<tr>
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