

ABB Industrial^{IT}

Providing the business value proposition for automation

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ABB introduced its Industrial^{IT} concept in 2000, the goal of which was to expand the role of industrial automation beyond that of a traditional DCS system. This was to be accomplished by integrating the domain of traditional process control with the domain of IT technologies and applications. The combination of industrial focus and IT infrastructure would deliver a unified information system for control, engineering, maintenance, planning and more.

Automation Systems

Nowadays, end users are finding that technology alone is no longer sufficient to justify automation purchases. Instead automation must provide solid business value benefits based on a combination of metrics, such as enhanced asset availability, return on assets, reduced lifecycle cost, and many other strategic and financial objectives ¹. Industrial^{IT} provides this value proposition with an open technology platform that provides seamless access to data from all areas of the plant and the enterprise. Therefore, ABB's goal today is to show the bottom line economic impact and improved business performance that can be obtained through implementation of Industrial^{IT} solutions.

The following article is an executive summary of an ARC Advisory Group report¹⁾ on ABB's Industrial^{IT} architectural concept.

800xA is core of the Industrial^{IT} offering

At the core of all Industrial^{IT} solutions is the System 800xA Extended Automation control system²⁾. Extending the core of System 800xA hardware and applications are ABB and third party products that have been tested and certified (Industrial^{IT} Enabled³⁾) to verify proper operation with an 800xA

system. A powerful object-oriented technology called Aspect Objects underlies all of the Industrial^{IT} offerings and resides at the core of System 800xA. Simply put, Aspect Objects allow users to view any aspect of the automation scheme, from a pump or a valve to a process unit or pressure transmitter, as a software object. Each object in the system has a number of attached aspects ^{Factbox} that can range from integration to computerized maintenance management systems (CMMS) and Enterprise Asset Management (EAM) systems to schematic drawings and trending information. Aspect Objects provides the key real-time linkage between equipment and applications.

800xA supports ARC's Collaborative Automation vision

A key aspect of ARC's vision for Collaborative Process Automation Systems (CPAS) includes a single, unified environment for the presentation of information to the operator, as well as the ability to present information in context to the right people at the right time from any point within the system. System 800xA provides these functions with a single window environment for information access and context sensitive decision and action tools, and builds on a common environment for engineering, operations,

information management, and asset optimization. System 800xA also provides a common operator environment for ABB's entire portfolio of safety and process control systems, providing access to information across the enterprise as well as context sensitive decision and action tools that allow the right users access to the right information at the right time from any point within the system.

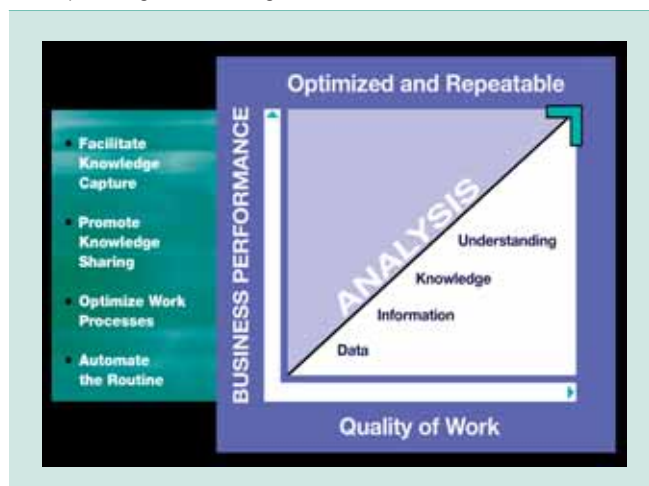
Capital deployment is reduced through planned upgrades for installed systems and the use of Overall Equipment Effectiveness tools.

In the next phase of their evolution process automation systems will be considered the sentinel of plant performance. They will continue to facilitate process control but will also become the primary source of manufacturing data and information for Collaborative Manufacturing Management (CMM) applications all within a robust environment. Similarly, a key strength of System 800xA is its ability to extend its reach beyond the traditional functions of the Distributed Control System (DCS) to include functions

1 Core business values



2 Empowering the knowledge worker



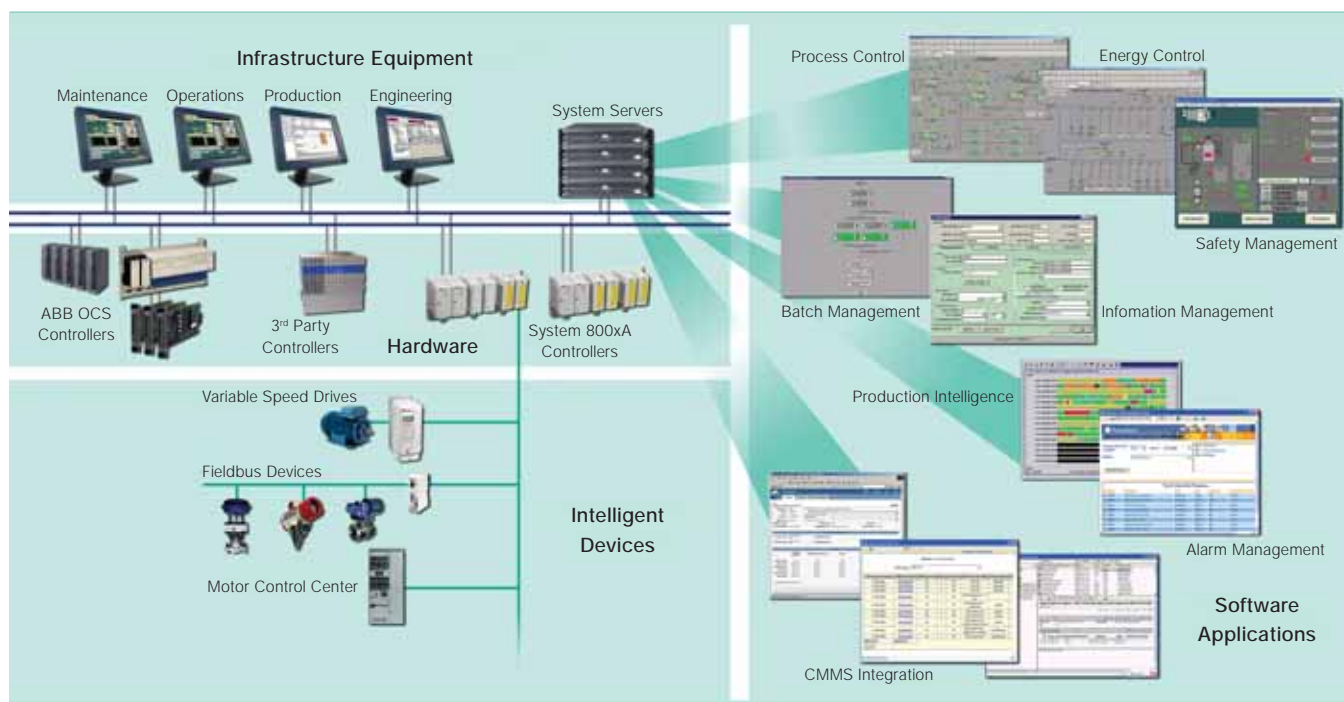
Footnotes

¹⁾ The full, 32 page article can be found on www.abb.com/industrialit

²⁾ www.abb.com/product/us/9AAC115756.aspx?country=US (October 2006)

³⁾ This symbol on products from ABB and its strategic partners means a product has been tested and certified for compliance with Industrial^{IT} standards for information, integration, and architecture.

3 Extended automation



such as production management, safety and critical control, advanced control, information management, smart instrumentation, smart drives and motor control centers, asset management, and documentation management capabilities.

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Reduced total cost of ownership and enhanced asset utilization

The three core areas where Industrial^{IT} provides business value are:

- Increased productivity
- Reduced total cost of ownership
- Enhanced safety through reducing risk and providing a high level of security.

The value proposition of an automation system rests in its ability to provide enhanced asset utilization and reduced total cost of ownership (TCO). Companies are in business to make money through adding value. The amount of profit resulting from this endeavor is directly related to the

asset utilization rate. A recent ARC survey conducted with 107 operations and management personnel – 86 percent of which came from the process and hybrid industries, showed a definite shift toward making return on assets (ROA) the primary criterion in justifying process automation.

ABB offers a path to reduced TCO through reduced engineering and design costs from integrated front end engineering tools, standardized workflow processes around the ISA 95 standard and standard ERP/CMMS connectors. Capital deployment is reduced through planned upgrades for installed systems and the use of Overall Equipment Effectiveness (OEE) tools. Maintenance costs can be reduced by integrating operations and maintenance data, through the integration of control systems with ERP systems, and by embedding operator knowledge about maintenance into the process automation system. Daily operating expenses can be reduced by offering contextual data access, reducing cycle times, and consolidating multiple data sources.

Increased productivity not just about cutting costs

In most cases, manufacturing assets are capable of performing design

Factbox Aspect Object technology

The following extract has been taken from "The ABCs of Industrial^{IT} ABB Review 1/2002, pages 6–13.

Aspect ObjectTM 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 Industrial^{IT} 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, 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.

Automation Systems

specifications. Reliability and utilization, however, are suffering from constrained human performance. According to ARC, over US\$ 20 billion or almost 5 percent of production in the process industries is lost to unscheduled downtime. Up to 78 percent of that is readily preventable. Human error, primarily operator error, is responsible for 40 percent. This can be addressed by using both the operators and the automation more effectively.

The biggest change in plant performance improvement for the 21st century and a key vehicle for reducing this unplanned downtime will come from the empowerment of the knowledge worker. Manufacturing will undergo fundamental organizational changes because of operators becoming knowledge workers empowered with information ². This proliferation of information is causing organizational structures to flatten, pushing down the authority and responsibility associated with the distribution of information. A higher level of coordination at lower levels is also required.

ABB's Industrial^{IT} solutions enable knowledge workers in several key ways, but probably one of the most important factors include providing information in context. Another important factor includes providing a unified platform for plant and asset maintenance management that also automates the transactions between the automation system and computerized maintenance management systems (CMMS), also known as Enterprise Asset Management (EAM) platforms ³.

Maintenance is one of the most significant and untapped areas of cost savings in plants today, and also one of the most overlooked. According to DuPont, for example, maintenance is the largest single controllable expenditure in the plant, with maintenance budgets accounting for around two-thirds of annual net profit. According to Dow, the cost of unnecessary maintenance is about the same size as the total plant profit. Shell Global Solutions estimates that about 63 percent of maintenance labor results in no action at all.

ABB's approach to plant maintenance is to provide an environment where information is transparently accessible to users in both the process control system and the maintenance system environments, regardless of where the information has originated. This is consistent with ARC's view that information should be provided in context so the maintenance personnel have access to all the information they need when they need it, regardless of its source or location.

Increased safety and security has direct impact on profitability

ARC believes that end users must take an integrated approach to plant safety, plant security, and risk reduction. Through its approach to the integration of control and safety systems, ABB provides enhanced plant security, and reduced risk through an integrated approach to project management where it can serve as the main automation contractor (MAC). Unscheduled downtime – unexpected stoppages resulting from equipment failure, operator error, or nuisance trips – is the nemesis of all manufacturers. Providing a path toward better safety and security also means providing a path toward increased reliability.

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Implementation of an integrated control and safety system, such as the integrated critical control capabilities of ABB's System 800xA High Integrity (see next paragraph), allows users to significantly reduce risk and realize the benefits of an advanced strategy for critical condition management (CCM). Aside from the safety aspect, ABB reduces risk by providing a single point of responsibility through its MAC capabilities. On the software side, the company has embedded functionality such as secure design practices, patch programs, audit trails, and advanced access control.

System 800xA High Integrity is a IEC 61508 and IEC 61511 compliant Safety Instrumented System (SIS) that spans the safety loop, including Safety Integrity Level (SIL) rated controllers, field devices, I/O modules, and field actuators. Embedded safety and control are within the same architecture providing a common high integrity system environment for production control, safety supervision, and production monitoring. This architecture provides the option of combining control and safety functions within the same controller or keeping control and safety functions separate within the same system. With safety and process applications executing within the same system environment, and even within the same controller, System 800xA offers safe, instant interaction between applications.

ABB's positioning of Industrial^{IT} around the three primary domains of reduced cost of ownership, increased productivity, and reduced risk is a good fit with this increased focus on business value. ABB also has advanced capabilities in products, services, and vertical industries to help end users realize the business value and increased performance potential of automation. In terms of offering a high degree of functionality and a wide array of advanced applications, ABB is very strong and has a lot to offer. The future success of the company depends largely on its ability to successfully provide its customers with sustained and measurable benefits from automation that provide a path to continuous improvement for business performance and profitability.

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Footnote

⁴ *Founded in 1986, ARC Advisory Group is a research and advisory firm in the manufacturing and supply chain sector. www.arcweb.com