

# Information-Enabled Building Blocks For Industrial Automation

## ABB's Industrial IT program puts intelligence into plant assets

By George Taninecz

Industrial settings today typically contain hundreds of pieces of production equipment, power and automation devices, and software applications – each with a diverse constituency of interested employees and managers. While many companies strive to identify and integrate all these assets into one collective IT network, the sheer magnitude of the task is daunting. But the promise of a “thinking” industrial IT framework is perhaps the final frontier from which manufacturers can squeeze substantial results in terms of easier engineering, faster information, and improved asset management.

The principle challenge in this quest for enterprise-wide connectivity has been how to overcome the lack of consistent information “building blocks” from which to build an IT framework. At the most basic level, every plant object – be it a robot, motor, transmitter, or transformer – requires multiple pieces and types of information such as manuals, drawings, configuration details, and maintenance instructions.

Look for this information in most plants today, and it’s located in various systems and formats – from online islands of reference material to paper copies stuffed in a desk. The consistent linking of electronic information with the assets it supports simply has not been available . . . but that’s about to change.

Through its Industrial IT initiative, \$24 billion ABB Group is linking plant assets with the information technology needed to unlock their greater value for business enterprises. The company’s Industrial IT commitment consists of a broad portfolio of compatible, “information enabled” products from ABB and selected partners; a single open architecture that integrates product characteristics in real time; and the resources to customize components into reusable solutions.

“ABB’s technologies are rapidly evolving under a single information framework that is transforming our entire power and automation product line into an integrated portfolio of compatible building blocks,” says Jörgen Centerman, president and CEO of Zurich, Switzerland-based ABB. “With Industrial IT, our customers will more easily build tailor-made solutions for their businesses, helping them improve their performance.”

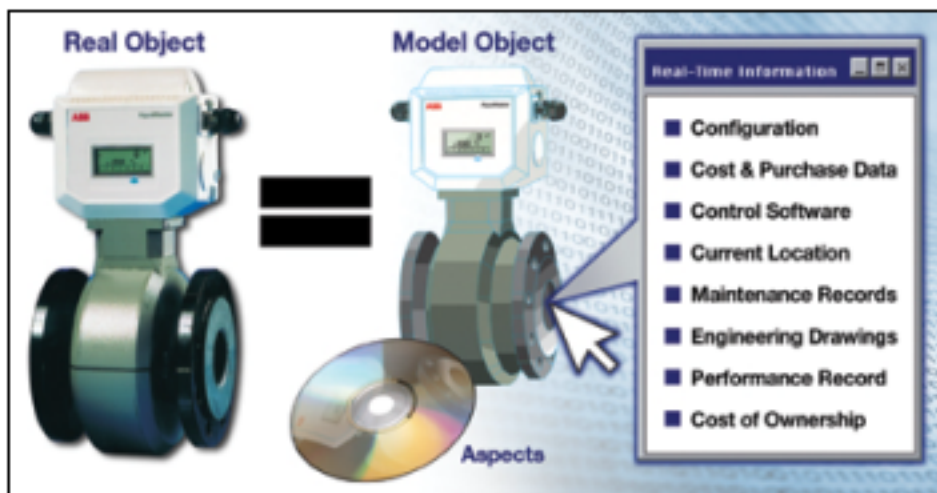


Figure 1 – Interactive product information for each Industrial IT device is bundled in a dynamic software shell called an Aspect Object.

Each Industrial IT product from ABB is accompanied by an Aspect Object, a dynamic software shell that holds multiple electronic characteristics (Aspects) of the product – much the way many personal computer products come bundled with the drivers, fonts, utilities, and instructions necessary to make them work efficiently. Industrial IT objects may be presented via CD-ROM, the Internet, embedded memory, or a

combination of each.

As each physical component is installed, its electronic Aspect Object is simply copied and pasted into the Aspect Integrator Platform (AIP), an open-architecture environment based on the Windows operating system. The AIP automatically opens the dynamic links that allow individual users to drill down through the plant hierarchy to locate the right information on any device. With a mouse click, the user – whether CFO, plant manager, or machine operator – can access the tools necessary to install, configure, operate, and optimize a component. Users interact with thousands of objects through a logical electronic hierarchy that mimics the system of physical devices.

“The electronic objects that accompany each real object can be manipulated very much like the folders on your personal computer, but there’s a key difference,” says Brad Hoffman, head of communications for ABB’s Industrial IT

team. “The actual pieces of information accessed via these objects may reside almost anywhere on the network, and the navigation path into these tools can vary greatly – depending on who’s interested.”

For example, a maintenance engineer might arrange the Aspect Objects for quicker access to service schedules, a line supervisor to analyze operating efficiency, or a control technician to review equipment sequencing. Users can also create and apply their own Aspects to installed objects, such as maintenance logs, performance history, or cost-of-ownership data.

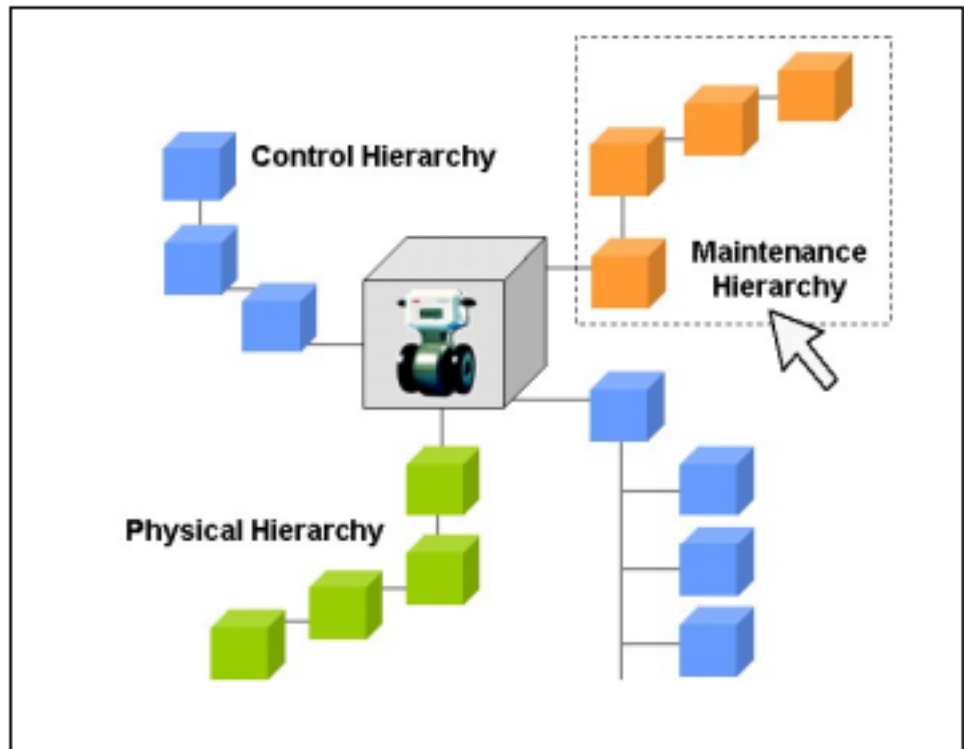


Figure 2 — Aspect Object groups may be copied, pasted, and arranged into hierarchical structures that meet the needs of diverse plant personnel.

### Putting compatibility to the test

While the concept of electronic documentation is far from new, ABB’s Industrial IT initiative is unique for the sheer scope of the effort and covers the company’s full power and automation product portfolio of controls and instrumentation, robots, motors, drives, transformers, switchgear, and more. Through an aggressive enhancement and certification program, ABB is equipping every product with one of four cumulative levels of electronic capability – ranging from basic product information to advanced Aspects that can remotely control plant devices or even interact with their counterparts from other devices to optimize the system in which they’re working.

The first product certification level, Information, covers bundling of basic documentation, such as

instructions, specifications, and drawings in consistent electronic form. The second level, Connectivity, adds electronic tools that support installation of the product into a larger system. The third level, Integration, incorporates communication protocols that allow the product to “see” other Industrial IT products in the system, share data, and work together. The top level, Optimization, will enable multiple devices to optimize the system in which they are working, learning from each other and increasing process efficiency. In each case, the Aspect Integrator Platform automatically manages object relationships, permitting multiple uses for information entered only once.

ABB has focused first on attaching consistent electronic information to every product. Since January 2002, all new ABB products have been bundled with at least base-level Aspect Objects. Nearly 20,000 existing products were Industrial IT Enabled through August 2002, and the company has committed to some 40,000 certified products by end of the year. ABB has invested significant effort to ensure that each enhanced product adapts smoothly to legacy systems, providing customers a transitional migration to Industrial IT.

Beyond its application to ABB’s own products, Aspect Object technology can be applied to raw materials, finished goods, and almost any component in the enterprise value chain – breaking each down into its logical, individual characteristics. As a customer installs and links the distributed objects – power and automation devices, machines, software, and materials – a full-fledged Industrial IT value chain emerges and a virtual representation of the business takes shape. As each Industrial IT component is added, the Aspect Integrator reports and manages their characteristics throughout the system in real time.

### **Turning Industrial IT into tangible results**

The organizational commitment to bundle even basic electronic information with *every* ABB product is impressive, but it’s the potential rewards from enterprise-wide deployment that put a gleam in executives’ eyes. Industrial IT forms a software layer that will support both plant operations and integration with business systems such as ERP. By sharing modular, real-time information about plant assets between manufacturing and business systems, Industrial IT will improve asset optimization and collaborative business processes while speeding deployment of new systems.

“A big potential here is that users will be able to create integrated solutions much more quickly and redeploy them from one project to another,” says Hoffman. “Customers will be able to ‘copy and paste’ major portions of the solution from one task to another, for dramatic reduction in engineering and configuration costs.” While the benefits are many, the costs are surprising low, as much of the Industrial IT initiative is directly linked to changes in ABB’s own business processes for standardizing how it shares information both internally and with customers.

### **Changing the way business systems are built**

Industrial IT product building blocks are mapped into some 30 functional families, using a descriptive nomenclature that provides ease and efficiency for ABB and its clients searching for products. Top-level product suites carry functional monikers such as Drive IT, Control IT, Power IT or Protect IT. Products that previously would have enjoyed a creative (but largely meaningless) name like Millennium 2000 are now descriptively branded based on their function, e.g., the Analyze IT Gas Chromatograph - Model XXX. “While differentiating our offer from a marketing standpoint, we want users to be able to quickly find the right building blocks, without having to navigate a maze of inconsistent naming strategies,” explains Hoffman.



*Figure 3 – ABB’s Industrial IT building blocks span some 30 functional families of products for power, automation, and information – each certified for compatibility.*

putting real-time maintenance management Aspects such as fault reports, service logs, and work-order tracking just a mouse click away from every device.

Even the most basic level of Aspect Object-based documentation has drawn the attention of ABB partners. Bosch Rexroth AG of Lohr, Germany, has committed to Industrial IT and is certifying its full line of more than 1,200 pneumatic product types as a means to deliver consistent electronic product documentation to its customers, establish a standard for real-time product information, and position its products as compatible building blocks of larger systems.

### **Industrial IT At Work**

Although the full Industrial IT concept remains a work in progress, ABB reports that more than 200 customer projects have been sold based on the technology and that some well-known names have joined

Within a given product suite “folder,” hundreds of individual products may ultimately be classified – using a system of common coding that bridges ABB’s diverse businesses. This classification approach will further sharpen the operation of collaborative tools, such as ABB’s online product information library that boasted over one million downloads last year, of which 60% were by external users.

While ABB holds various patents on the Industrial IT concept, third parties will also play an important role. “Our strategic partners will help round out the portfolio of power, automation, and information capabilities required to fully implement Industrial IT,” says Hoffman. “Although we have committed to an unusually broad portfolio of compatible and certified products, that doesn’t mean we’re going to personally build them all.”

The certification process for partner products resembles other licensed collaborative programs such as “Intel Inside.” As long as the Industrial IT label is attached, customers are assured of getting Industrial IT benefits with minimum integration challenges. As an example, Hoffman points to a set of third-party maintenance-management software applications that have been certified to the Industrial IT Connectivity Level.

IFS AB of Linköping, Sweden, recently achieved Industrial IT certification for a suite of asset optimization and maintenance applications, enabling them to seamlessly connect with ABB’s core automation solutions. This brings an exciting extension to the object-based plant hierarchy,

the list of believers. For example, Dow Chemical Co. of Midland, Mich., recently opted to move away from its long-standing, proprietary automation platform – forming a 10-year strategic alliance with ABB to develop automation solutions based on Industrial IT.

ABB and a leading cement producer are developing an Industrial IT solution to monitor product makeup, fuel chemistry, and environmental impact during the manufacturing process – allowing operators to define and manage process components such as raw materials, cement kilns, and fuel components as information-enabled objects. The system will use the Aspect Integrator Platform as a “launching pad” to integrate data from various knowledge-management applications, much the way a file launched from your PC desktop automatically seeks out the right software application and its associated information.

Shortly, ABB will provide a European electric utility with the first complete Industrial IT Enabled substation, featuring Information level Aspect Objects for every device. The Aspect Integrator Platform will arrange the data from hundreds of Industrial IT components into a fully interactive documentation system that lets the customer drill down from the highest level of the plant to any individual circuit breaker – or even a component within that breaker – for asset-management and performance information.

Not surprisingly, ABB will also apply Industrial IT to its own operations. For example, the company’s transformer business unit is implementing a collaborative manufacturing system that will blend customer order inputs, factory-floor operations, and ERP systems. Each transformer ordered will be configured and quoted as a collection of Industrial IT Aspects, such as voltage, design, and configuration specifications. Through the Aspect Integrator Platform, each of these characteristics will “seek out” the corresponding production Aspects, such as raw material and machine capacity necessary to complete the order. ABB expects the solution to cut more than one-third from order cycle times for the highly variable product line.

Based on these examples, it’s not difficult to imagine the “enterprise of the future” where the electronic acceptance of a customer order kicks off an amazing sequence of Aspect Object-based events – from automatically reserving the necessary raw materials, to configuring and controlling the production train, to monitoring and maintaining the health of plant assets across their lifecycle. Once manufacturers get their hands on the right Industrial IT building blocks, there’s no telling how high they’ll stack them.

For more information, visit [www.abb.com/industrialit](http://www.abb.com/industrialit)

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