

THE IT-ARCHITECTURE PROFESSIONALS

ABB Uses ArcStyler to Web-Enable High-End Resources for Cost-Effective Access via the Intranet

Industry

Electrical engineering

Application

- **Web-based Simulation Toolbox** that makes the high-performance simulation software and hardware of the ABB research centers available to all ABB business units and customers worldwide via the Web

Benefits

- Expensive high-end software and hardware do not need to be purchased and maintained by each business unit locally, but can be hosted by a few central units and offered to all ABB engineers worldwide as remote resources, saving the business units tens of thousands of dollars yearly
- Availability of sophisticated simulation resources to all development departments considerably improves the quality of ABB products and speeds up the design and engineering process
- Fast and high return on investment due to high degree of automation and automated quality assurance in the software development process with ArcStyler
- Model of the Web-based Simulation Toolbox is completely platform-independent and can be used for code generation to new or updated implementation platforms to make the system future-safe

ABB

ABB is a leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impact. The ABB Group of companies operates in more than 100 countries and employs approx. 146,000 people.

ABB runs eight corporate research centers around the globe. These centers conduct advanced research projects, but also provide expertise to the individual ABB business units.

The Challenge

The ability of 3D Computer Aided Design (CAD) systems to rapidly generate virtual prototypes has made them an essential tool in the development of complex products. This applies in particular to sophisticated simulation systems providing numerical analysis on the basis of 3D product models generated with CAD systems. At ABB, such systems are used for simulations of electromagnetic effects using complex, geometrical 3D models of, for example, power transformers, switchgear at all voltage levels and electromechanical systems to reduce the requirements for physical prototypes.

"In the pilot project alone, cost savings of approx. US\$16,000 per developer workplace could be realized with the ArcStyler."

Dr. Andreas Blaszczyk,
Senior Scientist at ABB

However, these advanced analysis modules are usually not integrated in the standard CAD systems and often require pre- and/or post-processing procedures. In addition, these tools are expensive and need to be run on special, high-performance hardware. Finally, the operation of such tools frequently requires application-specific expert knowledge that is not readily available in the typical business units. The total costs of such systems are prohibitive for a single business unit.

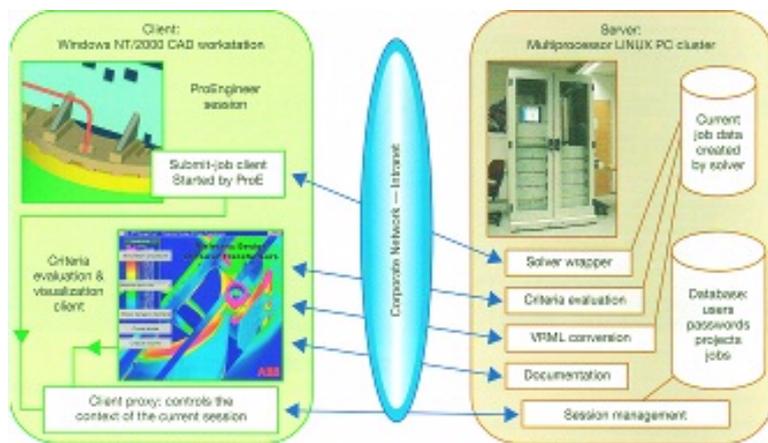
To solve this problem, the ABB corporate research center in Heidelberg Web-enabled its advanced simulation environment to make it available to all ABB units as a shared resource. Says Dr. Andreas Blaszczyk: "We needed to build an integrated simulation platform that would allow us to integrate our systems and make them available via a common platform within the context of our Low Cost Computing (LCC) initiative."

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The Solution - Sharing High-Performance Resources via the Internet

ABB's new Web-based Simulation Toolbox provide intranet access to complex engineering and simulation systems running on PC clusters controlled by job management systems. General-purpose portals offer remote access to three types of software systems: first, analysis engineering packages that support the designers' work but that are not used in the ABB business units to such an extent as to justify local installation and maintenance, second, advanced 3D systems that are used for projects usually carried out by research centers, and third, business-unit-specific engineering tools based on inhouse code whose maintenance can be centralized this way.



Client-server architecture for accessing the remote resources integrated with CAD environment and design criteria evaluation

These general-purpose portals are complemented by highly customized portals integrated in the CAD environment. These portals comprise ABB-specific components such as design criteria evaluation or visualization by means of VRML (Virtual Reality Modeling Language).

ArcStyler was used to develop all infrastructure and integration components enabling the distributed usage of the central simulation resources (Java/RMI). This includes special 'submit-job' clients that transfer data from and to the CAD session, start the simulator on the server and monitor the progress of the computations. Access to the user data on the server is controlled by client proxies that communicate with the 'submit-job' client as well as with the 'evaluation & visualization' client. The latter provides services such as design criteria evaluation based on remote data, VRML conversion and access to the latest documentation.

With ArcStyler, the UML model of this integration platform can be easily mapped to different target technologies and rapidly adapted to generate integration platforms for Web-enabling other systems.

ArcStyler for Simple, Predictable and Efficient Software Development

New Internet technologies have a tremendous potential in terms of optimizing business processes. However, the lifecycles of technologies become increasingly shorter, and new technologies emerge at an ever-increasing speed. Says Andreas Blaszczyk: "It's easy to bet on the wrong horse in today's technology space, in particular so if the business logic and the implementation

logic of your system are not properly separated. All the effort you put into the technology-specific implementation details may become worthless with the next migration. Today, one of the main issues is to shield the design of your system logic from ephemeral implementation technologies."

ArcStyler responds to this demand by moving the development process from a code-centric level to a model-centric level that supports any language, any modeling style and any platform. Andreas Blaszczyk explains: "Model Driven Architecture was the only approach that made sense in our situation. We carefully scanned the rapidly growing MDA market for appropriate tools. A number of vendors are currently trying to lift their tools to a design-driven level, but they are still stuck with their original preoccupations. Interactive Objects' ArcStyler unleashes the real power of UML modeling. This is a lot more than the pure visualization of code to make management happy. For example, we generated a Java/RMI

system. Should it turn out that .NET or any other platform offers decisive advantages over our current implementation, we'd simply plug in the appropriate ArcStyler MDA-Cartridge and regenerate our system. This is a quantum jump in terms of affording process flexibility, increasing overall quality and reducing development time."

The Bottom Line

ABB's new Web-based Simulation Toolbox save the ABB business units tens of thousands of dollars yearly and greatly improve the design quality by providing access to simulation resources that would otherwise be unaffordable.

Using ArcStyler in the development of these portals not only turned out to be the most productive and cost-effective approach, it also assured superior quality and makes the portals future-safe. Summarizes Andreas Blaszczyk: "Interactive Objects' ArcStyler makes software development simple, predictable and economic, more so than any other tool on the market. And their advanced consulting and training services show that they are experienced practitioners with a comprehensive background in modern IT architecture and implementation."

"The code quality produced by the ArcStyler's model-based generation is consistent and clean, reducing the number of programmers and test engineers required to develop and maintain the test environments by approx. 45% compared to a conventional development approach."

Dr. Andreas Blaszczyk,
Senior Scientist at ABB



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