Eclipse-based Expert System Shortens Sales Cycles for APC

APC may be known to the general public for their Uninterruptible Power Supplies, but in fact they provide many large companies with a wide range of high availability data center equipment, including computer racks, cooling systems, power conditioners and, of course, UPS systems.

"We've been able to reduce the amount of time required to generate a quote from months to hours."

loads, power requirements and others must be taken into account when proposing a solution that will meet today's business demands for 365/24x7 access. Previously, APC's sales force and field engineers spent a great deal of time piecing together the right configuration of equipment for each requirement.
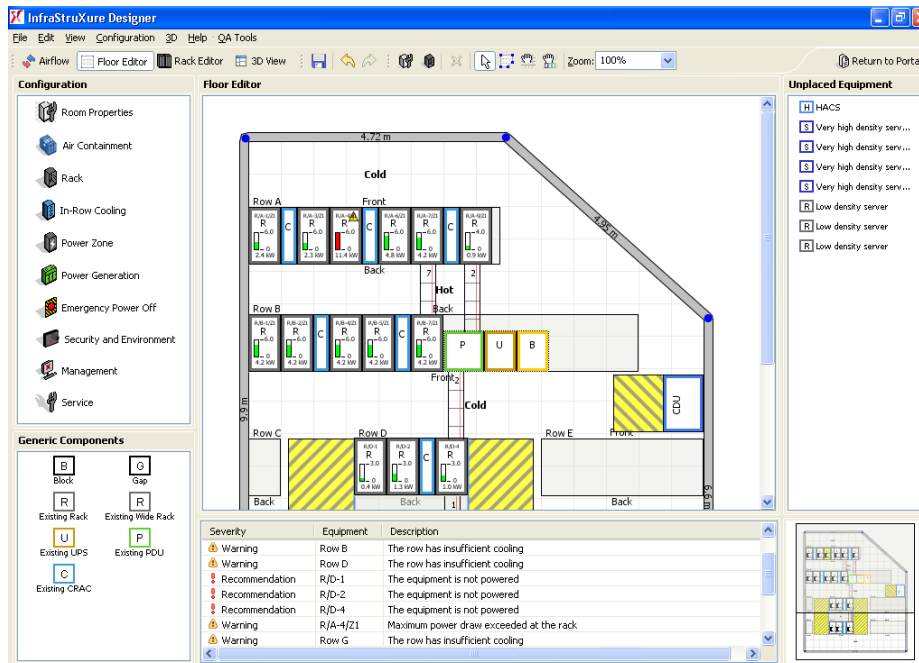
InfraStruXure® Designer is APC's answer to the challenge of responding to sales opportunities quickly and inexpensively with proposals that are technically correct, professional and consistent.

Built on Eclipse's RCP and OSGi frameworks, InfraStruXure® Designer is a client/server-based application consisting of a set of components, such as floor layout and rack editors, a Design Assistant and even a 3D design view.

InfraStruXure® Designer offers a sophisticated, simple-to-use interface that makes it easy for non-technical sales people to create technically accurate customer solutions.

Designing a complete and robust solution for a data center is complicated business, with many variables coming into play that make each solution unique. Factors such as room size, heat

Empowering Salespeople

Over 10,000 non-technical users such as APC's sales force and the employees of partner companies access InfraStruXure® Designer from APC's Design Portal to ease the task of designing data centers. Working from a basic room layout, they can add racks, power

supplies, cooling systems, UPS units and more from APC's parts catalog, which connects to InfraStruXure® Designer via Apache Axis. The software understands the characteristics and operating parameters of each and helps prevent design mistakes by guiding the user to the right options. For example, an error message will be displayed if a cooling unit is placed away from the equipment to be cooled, or an undersized power supply to be used with equipment requiring a higher capacity. Users can also do simulations and run what-if scenarios to help them come up with the best possible solutions.

From Months to Hours

Since introducing InfraStruXure® Designer, APC's sales force and partners have seen a dramatic decrease in the time required to design a complete customer solution.

Once a design has been completed, a user can export the floorplan showing all equipment, a parts list, manufacturing report and even a 3D view of the data center for use in proposals and presentations.

InfraStruXure® Designer has had a major impact on APC, reducing sales cycles and the whole Configure-to-Order (CTO) process. Soeren Brogaard Jensen, Director of the Design and Service Management Applications Group, is responsible for optimizing the sales process within APC through technology initiatives, and relates that, "By making expert knowledge widely accessible, our whole sales process has become less resource intensive. In fact, we've been able to reduce the amount of time required to generate a quote from months to hours."

The Power to Reuse Technology

InfraStruXure® Designer is second generation CTO software for APC, and when the time came to select a development direction, they had to accommodate a large number of components previously written in Swing and ActiveX, including drag-and-drop part models. They knew that writing their own framework would take too long and become an unending job in itself. They also knew that any framework they chose would have to provide maturity, scalability, extensibility, and a clean, native UI.

"We've considered several different frameworks, and found that Eclipse is easy to use and the community around it is mature. Eclipse RCP and SWT make applications look and feel great, and the application infrastructure meets our needs best" says Sandi Schoellhammer of the Design and Service Management Applications Group.

The design of SWT as a thin abstraction layer on top of the native UI was more than a cosmetic benefit for APC. It also provided the control they needed to integrate ActiveX components seamlessly and easily into InfraStruXure® Designer.

Incorporating existing Swing components from the previous application was more challenging, but ultimately successful. As Schoellhammer explains, reusing Swing code creates two threads, one each for SWT and Swing. If a user accesses a SWT control from some context other than its UI thread, SWT throws an InvalidThreadAccessException. But Swing has no similar exception handling, and this causes strange behavior and can even crash the JVM. APC solved this problem by developing custom techniques for handling invalid thread access in Swing.

While the long-term goal is to move their parts models and Swing components to SWT and have a pure Eclipse solution, the ability to leverage existing code was vital to keeping their development time down to several months.

APC also leveraged the Eclipse Equinox OSGi framework for security and scalability. They found the Eclipse concepts of plug-ins and extension points, interfaces that allow plug-ins to be extended by other plug-ins, very powerful for designing extensibility and reusability into InfraStruXure® Designer from the ground up. They were able to write plug-ins without knowing exactly how best to segment their functionality, and then easily break them up in to smaller plug-ins based on experience.

APC is currently in the process of migrating the InfraStruXure® Designer Floor Editor and Rack Editor components away from their old homegrown Swing framework to the Eclipse Graphical Editing Framework (GEF) Draw2D plug-in. While GEF does not provide an SVG export feature, the Graphical Modeling Framework (GMF) does provide Draw2D to Graphics2D conversion. With access to the source code, they were able to take what they needed from that project to add scalable vector graphics (SVG) export capabilities.

A Virtuoso Application

InfraStruXure® Designer has been in use at APC since early 2006, and had been a great success. Not only has it shortened sales cycles by putting an expert system at the disposal of sales people, it has also greatly improved consistency across APC and partner organizations. While InfraStruXure® Designer is currently used as a sales tool, Schoellhammer's team understands that the component architecture opens doors to other uses in the future, such as allowing engineering simulations during product design.

With Eclipse as a solid foundation, InfraStruXure® Designer has an innovative future ahead throughout APC.

Ron Stone is a technology writer and content management consultant based in Ottawa, Canada.