Rational software

Charles Schwab Turns to Rational ClearCase to Stay One Step Ahead

Charles Schwab & Co., Inc. has a long track record of innovating new business strategies to anticipate the changing needs of its customers. Schwab's move to the Internet was no exception, as the company's "Clicks and Mortar™" strategy has paid big dividends. As of the second quarter 2000, client usage of online services at Schwab has grown to 4.2 million accounts with $420 billion in assets, up 46% and 65%, respectively, from a year ago. Online trades made up 81% of all client trades during the second quarter of 2000.

To meet the increasingly sophisticated demands of its customers and the challenges posed by its competitors in the financial services industry, Schwab continuously and rapidly introduces new customer-focused services and applications. Schwab's Electronic Brokerage Technology (EBT) division, located at the company's headquarters in San Francisco, CA, is at the forefront of this effort.

EBT's charter is to both support the company's external Internet-related products and services and build the new applications that will keep Schwab ahead of the pack. EBT's support and maintenance of the company's Web site, www.schwab.com, is facing new challenges as Schwab further refines its Web offerings and moves to integrate all its customer communications channels — branch, telephone, automated telephony, Web, email, and now wireless — into a streamlined customer experience. Schwab's new wireless trading service, burgeoning email communications, and ongoing Web redesign will continue to challenge EBT.

Time-to-Market

"In our business, time-to-market is essential," said Diana Cheng-Lau, EBT Senior Manager. "We are continuously upgrading existing features and adding new capabilities to our Web site for our customers and our business partners. Schwab has one of the largest secure Web sites on the Internet and managing it is a major challenge." EBT supports, maintains, and enhances schwab.com. The company must add new features and functionality for Schwab's constantly growing customer base without sacrificing customer service levels or interfering with the normal daily operations of one of cyberspace's most active sites, even during periods of enormous market activity. For example, in early April, 2000, there were over 95,000 simultaneous secure logons onto Schwab's customer site, topping the record 85,000 simultaneous secure logons set just a month earlier.

About two and a half years ago Cheng-Lau said that EBT decided to switch from its file-based configuration management software to Rational® ClearCase® from Rational Software.

"In order to keep pace with the company's need to constantly develop new applications, we decided that we had to stack the delivery of the releases by overlapping the development life cycles," she explained. "This meant that as one development team was building and testing an application, another team was working on the next release at the same time. In fact, often we were (and still are) developing a number of releases in parallel. As version one was being implemented, versions two and three were already in the pipeline."

Cheng-Lau said that at the time, EBT was rapidly adding staff to keep up with the overall growth of Schwab as its on-line financial services became increasingly popular. (Today, the

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division has hundreds of developers supporting Schwab's electronic brokerage services.)

"In 1998, we outgrew the configuration management change tool we were using. It just couldn't support the complex environment and the shortened build cycles that came with the kind of growth we were experiencing," Cheng-Lau continued. "We needed software that could scale to handle concurrent projects involving large development teams dealing with huge amounts of code." Patrick Bush, EBT's ClearCase administrator, said that the Schwab developers and testers looked at other configuration management tools but quickly settled on Rational ClearCase. Bush said that one of the major reasons they chose the Rational product was its ability to provide multiple virtual views of the projects in progress.

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Bush added that because the virtual Rational ClearCase "Views" provides multiple, simultaneous Web staging sites, other authorized organizations outside of EBT, such as other Schwab technology groups, can view or even work with the virtual database without danger of file contamination. "For example," he said, "we can provide the front end of an application under development to the mainframe to test how it affects other back-end applications."

Schwab has a highly distributed three-tier client/server architecture. Multiple Hitachi and IBM mainframes, located at the company's data center in Phoenix, Ariz., host the EBT virtual database. The company's production Web server farm is now up to 450 machines and growing.

During the development of a major new Schwab application, up to 200 EBT developers and testers may be involved at the same time. Rational ClearCase allows the testers to test one Web release, content developers to work on another release and Webmasters to roll back to yet another release without worrying about data redundancy or introducing copy errors. This allows each update to be verified with maximum efficiency without having to freeze ongoing development. The net effect is faster time to market with bug-free applications that helps Schwab maintain its competitive edge.

Accelerate the Cycle

Rational ClearCase, Bush explained, is more than a version control system. EBT is using the software to organize its overlapping, distributed Web development process, while allowing developers to roll back to any previous or current version of the application. "One of the beauties of the tool is its ability to be customized — you can tailor it to meet your needs," he added.

Rational ClearCase's solution covers both Web code and content, allowing EBT to manage all its Web assets using common tools and procedures, no matter which team is involved in the development of a specific release. The tool versions all the organization's Web assets, including source code, HTML, GIFs, JPEGs, Perl, Java, multimedia and all file systems objects. The open nature of the software allows it to span multiple servers and platforms and version all directories and folders accessible on the network. At Schwab, ClearCase is working on both NT and Unix-based servers.

Cheng-Lau added, "Rational ClearCase refines the development process and makes it more efficient from a use standpoint. By moving from a file-based system to a concurrent virtual database for change management, we are enjoying the advantages of a far more structured build cycle. ClearCase provides auditability — a record of changes that allows us to support development in a timely manner. And the software is scalable: it supports any kind of process, from file-based to a full development life cycle process with all the triggers in place."

The tool provides private work areas with "controlled sharing," and allows authorized personnel to merge content from multiple contributors. Changes rendered in HTML are easily previewed and the changes can be tested against the latest Web updates. In addition, Rational ClearCase versions directories and folders in order to protect the integrity of Web assets by ensuring they can't be lost, overwritten or sabotaged.

Because most of the members of the EBT development team are located in the San Francisco area, EBT has not needed to use another Rational ClearCase product, Rational ClearCase MultiSite,® to coordinate the development efforts of widely dispersed teams. "But," said Bush, "although we don't need to use ClearCase MultiSite as a development tool, we employ it as a really efficient backup device. Every hour, the software automatically sends packets of our work to Phoenix over one of our back-up or business resumption servers. I know of a lot of other companies that are using this feature of the software as well."

In Step With Its Customers

Some of the recent applications that Schwab has added to its Website in order to help its present clients and attract new ones are features like allowing customers to automate processes such as funds transfers and password changes. Previously these tasks required customers to call a customer service representative or go to a Schwab branch office. By handling these activities on-line, Schwab is saving millions of dollars annually. Many more automated services are in the development and planning stages.

This, of course, means more work for the EBT developers and "the prospect of even more releases being built and tested at the same time," according to Cheng-Lau. "We know that Schwab's growth is going to continue and even accelerate. That means we have to be even more efficient and effective in our work. We believe Rational ClearCase 4.0 will allow us to even better manage the entire Web application life cycle, help our teams work efficiently and productively, and ensure that every release is top quality."

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About Rational

Rational provides a software development platform that improves the speed, quality, and predictability of software projects. This integrated, full life-cycle solution combines software engineering best practices, market-leading tools, and professional services. Ninety-six of the Fortune 100 rely on Rational tools and services to build better software, faster. This open platform is extended by partners who provide more than 500 complementary products and services.

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