

Industry:
Utilities & Telecommunications

Organization:
Vsys

Description:
Vsys is the developer of Vsys Softswitch, which facilitates the convergence of packet switched and circuit switched telephony networks.

Business Problem:
Vsys needed to develop a technically superior product using the best processes available that would allow them to work effectively and efficiently despite time, personnel and funding constraints.

Rational Solution:
Rational ClearCase, Rational ClearQuest, Rational PureCoverage, Rational Purify, Rational Quantify, Rational RequisitePro, and Rational Rose

- Key Benefits:**
- Tripled overall developer productivity and effectiveness
 - Developed a technically superior product on time and on budget
 - Increased development speed by using an iterative, repeatable process
 - Overcame time, funding and personnel constraints by establishing a sound development process
 - Improved team communication by providing common access to project requirements, models and other development artifacts
 - Created a highly controlled release environment leading to effective management of changes, releases and defects



Rational[®]
the e-development company™

Rational Helps Vsys Transform Next Generation Intelligent Networking

Vsys, a privately held company founded in 1993, began life as a telecommunications consulting and customized software development firm specializing in call processing, SS7 signaling, enhanced services, and voice over Internet protocol (VoIP). But, as interest in Internet telephony and intelligent networks began to heat up, the Colorado Springs, Colorado-based company saw a unique opportunity to capitalize on its wealth of technical talent and its vision of how telecommunications should evolve. By 1997, the company had narrowed its focus to become the foremost developer of a sophisticated solution which makes the convergence of packet switched and circuit switched networks a reality.

The Opportunity

"We had been looking for a product development opportunity," recalled Bob Wise, Vsysis' Chief Technology Officer and Vice President of Engineering. "It was becoming obvious to us that VoIP was developing into a reasonable way to provide telco grade services that could eventually replace the existing public-switched network. At the time, the larger vendors of switching equipment were in a state of denial around IP technology. So we decided to quickly move into this nascent market and establish ourselves as a leader."

Under Wise's direction, the company's software developers began an intensive product development effort that culminated in the creation of a softswitch, one of the most sophisticated components in next generation intelligent networks.

Based on its years of consulting experience, Vsys took a different design approach. Other companies believed that the goal of the software was to deliver switching services within the network. But Vsys took the position that a softswitch must provide switching services to a new generation of applications that ride on top of the network. Wise and his team were committed to developing a product that provided the intelligence necessary to monitor both voice and data applications in the new global networks.

They also knew that they needed to get this product to the market place quickly. In the rapidly evolving VoIP marketplace, time-to-market means the difference between success and failure.

The Rational Advantage

"Because we did a great deal of fixed price development work for our clients, we had an experienced team already in place to work on the Vsys Softswitch" Wise said. "The other major advantage we had was our familiarity with software development tools — we had been using Rational[®] Software's products for our client development work from the time the company was founded.

"When we started work on Vsys Softswitch in December, 1997, the company was somewhat underfunded," Wise continued. "Unlike the large telco suppliers, we couldn't throw lavish amounts of money at the development project. So one of our primary goals was to develop a technically superior product, but to do it as efficiently and cost-effectively as possible."

A core team of six developers tackled the project. They decided to use object technology as the Vsys Softswitch foundation in order to employ an architecture-centric, highly iterative approach to the design, development and testing process.

"We wanted to use the best processes available to build the product, even though we were working with time, personnel and funding constraints," Wise said. "Object technology supported this approach. A good process is repeatable and iterative. It allows you to extend what you've done previously without having to modify it. The object property of inheritance is a classic way to do this."

Wise added that the entire product is based on C++. "C++ is a very powerful and flexible language, but it is also very easy to make mistakes while using it," Wise noted. "The Rational environment lets us take advantage of the language's power and speed while providing the tools that we need to maintain rigor and quality."

Wise said that from day one of development the team used Rational RequisitePro[®] for capturing and managing requirements and Rational Rose[®] for code generation and visual modeling. Rational RequisitePro allowed the team members to collaborate on the project by providing common access to project requirements, efficient ways to share information, and the promotion of artifact reusability. Today, the requirements management software is integrated with Rational Rose, one of the cornerstones of

Rational's fully integrated software development solution. Rational Rose is a visual modeling tool based on the Unified Modeling Language (UML), the standard notation for software architecture.

Importance of Rational Rose

"Rational Rose has been very critical to our success with Vsys Softswitch," Wise commented. "We're also a CORBA (Common Object Request Broker Architecture) shop," he added. "And we use Rational Rose to generate all the CORBA standard interfaces used in the development process. It provides us with the ability to update our design during all phases of development by keeping our models and code in synchronization. We have used Rational Rose to generate every bit of code for the Vsys Softswitch product since we began the project in 1997. And this will be the case for the foreseeable future."

Role of Rational RequisitePro

Wise said that Rational RequisitePro has been particularly helpful in tracking releases. "This is critical," he said. "We're now into our sixth release and each release has included a major upgrade because the IP space we're competing in is advancing so rapidly. For example, in our latest release, we provide the capabilities needed to control ISDN signaling. This is a very complex, highly technical product, with demanding performance requirements and extremely high reliability."

"Today, product development is also being driven by customer requirements. We are selling to the telecommunications service providers who need 99.999 percent reliability and availability along with top performance," he continued. "In many of the telco legacy networks, our switch is riding next to switches using older Time Division Multiplexing (TDM) technology. To the network, we appear to be just another switch – one that just happens to handle IP traffic. For newer entries into the service provider marketplace that are building their networks based entirely on IP, we become their core switch. But these providers still need to communicate with older switches used by the legacy carriers. This requires that we build a high degree of flexibility and openness into Vsys Softswitch. It also means that we have to match or better the extremely high reliability of the older, TDM switches. Rational's products provide us with the capabilities to make this happen."

"In this context, Rational Rose and Rational RequisitePro are definitely strategic in terms of our total product development. This is also true of Rational ClearCase®, which we've been using for over a year now," Wise added. "Our reliance on these

tools is even greater today because our development process and the communications needs between team members has become far more complex."

"We began with a team of six developers – today we have 35 software specialists working on Vsys Softswitch," Wise said. "In addition, we're dealing with a larger, more mature product that is now into its sixth release. We've done a good job of decoupling the architecture and, with the help of Rational ClearCase, combined with Rational Rose and Rational RequisitePro, we are able to run development iterations in parallel on separate parts of the system and still keep everything synchronized. This has made a major impact on our ability to quickly and efficiently upgrade the product and get it to market."

Tool for Release Management

Wise said that although Rational ClearCase has proven to be an excellent tool for managing code and model revisions, additional capabilities were required to create a highly controlled release environment. The team needed to know exactly what changes had been made from one release to the next – for example, what features had been added or modified. They also required a rundown of all corrected defects and the impact of these corrections on the current release.

Wise's group had been using a shareware product for release management, but the tool was not tightly integrated with Rational ClearCase or other Rational products they were using. To achieve greater productivity and the integration they needed to handle the increasingly larger and more complex Vsys Softswitch releases, the team turned to Rational ClearQuest®, the highly flexible defect and change tracking system.

Rational ClearQuest is fully integrated with Rational ClearCase to provide a comprehensive change management solution. ClearQuest's "Design Once, Deploy Anywhere" capability allows the Vsys team to distribute customized changes across various platforms, including clients running Microsoft NT and UNIX. Another major benefit is that Rational ClearQuest scales to support projects of any size and can accommodate upcoming releases of Vsys Softswitch no matter what new features are added.

"Along with Rational ClearCase, Rational ClearQuest is a core component of Rational's Unified Change Management (UCM) solution," Wise explained. "We're using UCM to essentially integrate all of our process management activities – including change, release and defect management – as well as the source code management being handled by Rational ClearCase."

"Overall, with the help of the Rational tools, we have been able to triple our productivity. We've managed a huge amount of high-quality development in a relatively short period of time. The amount of time you save using an iterative approach is enormous because of the things you end up not doing wrong."

About Rational Software Corporation:

Rational Software Corporation® (Nasdaq: RATL), the e-development company, helps organizations develop and deploy software for e-business, infrastructure, and devices and embedded systems through a combination of tools, services and software engineering best practices. Rational's e-development solution helps organizations overcome the software development paradox by accelerating time to market while improving quality. Rational's integrated solution simplifies the process of acquiring, deploying and supporting a comprehensive software development platform, reducing total cost of ownership. IDC has recognized Rational as the revenue leader in multiple application development and deployment markets for four years in a row. Founded in 1981, Rational, one of the world's largest software companies, had revenues of \$754 million in its twelve months ended December, 2000 and employs more than 4,000 people around the world. Rational is a component of the Nasdaq-100 Index®. Additional information is available on the Internet at www.rational.com

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Wise said that the development team also uses Rational Purify®, Rational Quantify® and Rational PureCoverage® to pinpoint bugs, highlight bottlenecks, and ensure that every piece of code has been tested and that reliability goals were being met.

"Overall, with the help of the Rational tools, we have been able to triple our productivity," Wise said. "We've managed a huge amount of high-quality development in a relatively short period of time. The amount of time you save using an iterative approach is enormous because of the things you end up not doing wrong."

Long Way to Go

Wise noted that although the IP world has been busily replacing TDM capabilities as quickly as possible, the industry still has a long way to go.

"TDM is a mature technology, while the development of softswitches, including our product, is relatively new," said Wise. "But the service providers are beginning to embrace the softswitch concept because of the many advantages it provides. One of the problems with TDM is that third party developers — people outside the telephone world — have found it almost impossible to add new features or applications to the technology. But in the world of IP, it's far easier to bring new applications to market and move the technology forward. It's also far easier to add features and applications if the switch is properly architected from the very beginning — and a major reason that the Vsys Softswitch is architected correctly is our use of the process and visual modeling that the Rational tools provide."

"The Vsys Softswitch, which is really in a class by itself, provides an open systems solution with the intelligence, flexibility, scalability, and reliability that the service providers need for global networking," Wise added. "It can oversee thousands of sessions from standard telephones, wireless devices, PCs, and any of the other new smart devices that are hitting the marketplace. The Vsys Softswitch allows our customers to add third party applications and new software elements without impacting the network's reliability. With help from Rational's development tools, we're continually improving the product and realizing our strategy of making Vsys Softswitch the leading softswitch solution for the next-generation of networking."

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