Industry:
Document production

Organization:
Xerox Production Systems Software Unit

URL:
www.xerox.com

Business Problem:
Accelerate software build cycles to support new product launches every six months.

Solution:
Use Rational ClearCase to support parallel development across multiple sites with efficient, repeatable process.

Key Benefits:
Improve developer productivity by supporting existing tools and work styles

Accelerate development cycles by enabling multiple builds of multiple products

Support concurrent development across multiple sites

Automate code merges to reduce error and increase efficiency

Increase system reliability to minimize development downtime

Rational. software

Xerox Accelerates Time-to-Market with Rational ClearCase

With new products launching every six months, the Xerox Production Systems Software Unit faced intense pressure to keep up with demand while establishing a repeatable development process. In less than one year, Rational® ClearCase® empowered the 300-member development team to reduce time-to-market, manage multiple overlapping release cycles, and organize an effective development process.

You probably think of Xerox as a hardware company — the company that makes big copiers, high-speed (180 ppm) printers, and all sorts of document production equipment. But at the heart of all the equipment is the software that makes it work: various drivers, real-time communications software, and more. Today, more than 300 software developers spread across four sites work to ensure that the required, critical software is in place when new products in the DocuSP line of high-volume, digital printers are rolled out. These developers, along with quality assurance staff, are the heart of Xerox's Production Systems Software Unit based in Webster, NY.

About Xerox PSSU

Xerox's Production Systems Software Unit (PSSU) is a highly professional software development organization. Charged with the task of building software to support the company's unrelenting stream of product releases, the developers feel intense pressure to hit each launch date.

The software isn't trivial. A final build consists of 10,000-17,000 source files, depending on the product family, reports Alfred Neill, Senior Project Engineer. The final software must work with the server and network operating systems to which the Xerox products connect, primarily UNIX (Solaris) and Windows NT.

The unit takes a disciplined approach to software development. It is slowly working its way up the SEI Software Capability Maturity model, which defines a method for consistently achieving quality software. Currently, the group considers itself at about 75% of Level 2 within the five-level SEI hierarchy. Level 2 defines a repeatable software development process consisting of requirements management, software project planning, software project tracking and oversight, software subcontract management, software quality assurance, and software configuration management.

Achieving both its production goals and SEI quality objectives requires a combination of process and automated tools, believes Neill. Ideally, process and tools merge, with tools transparently enforcing process.

The Problem to Solve

Xerox was launching new products every six months. To keep up, the software unit tried to achieve at least one build each week and was pushing for two. But even that wasn't enough. In the fast moving, highly competitive markets where Xerox operated, “we knew we had to get to multiple builds on multiple products,” Neill recalls.

While the group had a process in place, based on the SEI model, it experienced difficulties with the SCM tool it used to support that process. “Our old CM tool was completely unreliable. We were experiencing weekly crashes,” notes Neill. When crashes occurred, it was difficult to recover. “You can imagine how expensive a crash is when you have 40 developers sitting around twiddling their thumbs because they can't access code,” he continued.

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If the crashing problem wasn't enough, development managers were also encountering general resistance to the tool from the developers. Specifically, developers who installed the tool's client on their workstations had numerous complaints. "The client software, they claimed, caused strange behavior," Neill explains. The situation created a deep level of mistrust in SCM among all the developers. It was a problem, Neill feared, that would haunt the development team long after it solved the crashing problem.

In addition to the problems with crashing and strange work-station behavior, the tool had other shortcomings. "It wasn't able to support the needs of our software team spread across four sites. It couldn't handle different baselines seamlessly. It also didn't help us enforce our process," Neill points out.

Cross-Functional Team Chooses Rational ClearCase

The solution was obvious — get a new SCM tool. But which one? Tool selection itself can create turmoil in a development organization, and unless the selection receives broad buyin, the new tool will likely encounter resistance, which will undermine the benefits it is intended to provide.

To ensure acceptance of whatever tool was chosen, "we set up a cross-functional problem-solving team," Neill explains. The group consisted of developers, development managers, CM administrators, QA engineers, and others involved in the software delivery process. "We spent a lot of time talking to people and gathering requirements. We collected a lot of feedback," he continues.

The requirements for the new tool became clear: rock solid reliability, no noticeable impact on the developer workstations, the ability to support multiple baselines, the ability to transparently enforce the development process, and ease of use/ease of learning. The tool also needed to adapt to process improvements quickly. In addition, the group wanted traceability features and the ability to share code across multiple development sites.

Since the group was rapidly adding Windows NT into its development mix, commonality between UNIX and NT was also a requirement.

After evaluating all tools, including Continuus CM, Teamware, and PVCS, and checking with other companies about their experiences with various tools, the group opted for Rational ClearCase. "Given our needs for reliability, multi-site support, process enforcement, and commonality between UNIX and NT, Rational ClearCase was the only choice that made sense," Neill concludes.

Transparent Access Ensures Smooth Transition

But as much sense as Rational ClearCase made, Xerox wasn't about to implement it in a big bang rollout into production. Fearing such an implementation would disrupt its very tight release schedule, the group piloted ClearCase with "a fearless group of graphical user interface developers," notes Neill. Besides being willing to act as pioneers for the new tool, the choice of the interface team for this task made sense: "The user interface work is done early and then the team moves on to the next thing. As a result, there is less deadline pressure on them if things go wrong," he explains.

The pilot worked well, and Neill's concern shifted to making the full switch to Rational ClearCase. "We couldn't cause the schedule to slip even a week," he recalls. To ensure a smooth transition, the group ran ClearCase and its old CM tool in parallel for a short period before "throwing the switch."

First, the group synchronized on the subsystem level, where close knit development teams focused on a small piece of the overall project. Then, it prohibited code check-ins on the old system. Finally, just after the last Xerox product developed on the old CM system was launched, Neill hit the switch and the group was completely running on Rational ClearCase.

Neill's group developed a training package for the developers. Despite all the preliminary input gathering, some developers still resisted the change; others felt disenfranchised at first. “Overcoming developer resistance was much harder than the technical change,” he observes. “But because Rational ClearCase was transparent, it didn’t force our developers to change their tools or the way they work. It also provided so much more functionality that we soon overcame any resistance,” Neill adds.

Given the product’s strengths, it didn't take long before Rational ClearCase won everyone over. “Rational ClearCase had so many more capabilities. Although it was scary at first, now most everyone is happy or very happy,” Neill reports. Today, Xerox PSSU runs Rational ClearCase at all four of the group’s sites. A repository is set up at each site. ClearCase MultiSite® automatically synchronizes the repositories across sites, allowing all team members to develop from a common code base.

The Payoff: More Products, Faster Turnaround

Today, Rational ClearCase has become a way of life within the Production Systems Software Unit. Developer resistance is long forgotten. “ClearCase has really made their lives a lot easier,” Neill notes. The chaotic scramble for builds, the difficulties merging code, the inadvertent loss of hours of work have been relegated to the distant past. The crashes that routinely idled dozens of Xerox developers are now a distant memory.

The success of Rational Clearcase within PSSU has led to heightened interest in ClearCase by other groups within Xerox, Neill reports. He expects the tool to be increasingly adopted across the organization, as the success of the PSSU SCM infrastructure (tools and processes) becomes increasingly known throughout the corporation.

Xerox is justifiably proud of its progress moving up the SEI Capabilities Maturity Model. “Rational ClearCase is an important tool in our SEI efforts,” notes Neill.

In terms of productivity, PSSU has met its stated goal of efficiently delivering multiple builds of multiple products, all from a common code base. According to Neill, the team is now able to handle more work concurrently, even compressing already tight development schedules. “We have one version in prototype, another in development, still another close to launch, and multiple products in maintenance release. We couldn't do it without Rational ClearCase,” Neill asserts.

Seamless Site Replication

Although PSSU thinks of itself as a Rational ClearCase user, in fact the group relies on Rational ClearCase MultiSite to support its geographically distributed project team. ClearCase MultiSite automatically synchronizes project information across the group's various sites. According to Neill, “MultiSite handles the CM administration automatically, without our having to intervene at all. It makes the process seamless across all locations.

The biggest payoff, however, comes from the ability to combine development process with automated tools. “We particularly like Rational ClearCase's triggers, which we use for policy and process enforcement. The triggers were a key reason we chose Rational ClearCase,” Neill notes. Now Xerox's development process is consistently applied on every project, enforced through the use of Rational ClearCase triggers.

With the help of Rational ClearCase, PSSU is continuing its steady climb up the SEI Software Capability Maturity model. More importantly, according to Neill, the unit is able to deliver more software, of better quality, on time to support Xerox's rapid pace of product development.

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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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