Rational® software

Maximizing Cross-Platform Application Availability

Robert Kennedy, SCM Product Manager
Karen Wade, SCM Product Marketing Manager

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The challenges of change in complex computing environments

Modern organizations need to achieve various strategic objectives to remain competitive. These include accelerating product and service delivery to multiple markets, improving service levels with customers and business partners, and increasing operational efficiencies—all while containing costs. This requires building responsiveness and agility into the organization and improving individual and team effectiveness.

Organizations often require frequent changes and enhancements to software applications in order to meet business demands. They need to adapt new technology, while leveraging existing technology. Software applications are often built and managed across both distributed and mainframe environments, and application mixes are constantly evolving. And as more organizations create service-oriented architectures (SOAs) to leverage existing application technology, the ability to accelerate the rate of change and effectively manage changes to n-tier applications becomes critical.

Compounding the pressure—particularly in highly regulated industries, such as financial services and healthcare—are the impacts of constantly changing government regulations. To reduce these impacts, organizations require an effective compliance-driven development infrastructure.

IBM bridges the mainframe/distributed chasm

Organizations have traditionally managed mainframe development separately from other development. This separation not only can hinder collaboration and productivity across the software lifecycle, but it can also lead to errors that result in application failure or downtime. This can be devastating to an organization's ability to drive revenue, address new market opportunities, and maintain customer loyalty. And it is often the catalyst that drives organizations to rethink and reengineer their development processes and infrastructure.

This paper explores how IBM Rational® ClearCase® and IBM Rational ClearQuest® change management products have been extended to support mainframe development. By automating the software lifecycle and providing a consistent process paradigm across distributed and z/OS® environments, IBM Rational change management products help integrate mainframe and distributed development to:

· *Enhance project collaboration and release coordination*
· *Improve development responsiveness and agility*
· *Increase operational efficiency*

One of the most significant factors affecting application availability and quality is the agility of an enterprise's software development environment. At the core is the ability to cost-effectively manage and control ongoing change to software assets in heterogeneous development environments.

The role of enterprise change management in cross-platform development
To prevent application failures and to help meet increasingly stringent regulatory requirements, organizations must ensure that the right versions of the right applications are available at all times and be able to provide an audit trail of changes across the software lifecycle.

One of the most significant factors affecting application availability and quality is the agility of an enterprise's software development environment. At the core is the ability to cost-effectively manage and control ongoing change to software assets in heterogeneous development environments.

Frequently, applications use components that run on both distributed and mainframe operating platforms, including z/OS, UNIX®, Windows®, Linux®, and others. Because changes to one part of an application on one platform can impact other parts of the application on another platform, supporting these applications requires an enterprise-scale approach to synchronizing activities relating to software development, management, and release.

An effective change management solution automates and enforces development processes and enhances collaboration and productivity across distributed and mainframe operating platforms at every stage of the application lifecycle. It provides controlled access to the information practitioners in various roles who need to create, update, build, deliver, reuse, and maintain business-critical software assets.

As a result, your organization should be able to detect code defects early as well as quickly correct them to minimize disruptions. You should also be able to better synchronize software releases across multiple platforms to speed application delivery to customers, external partners, and internal business users. An effective enterprise change management solution also provides verifiable audit trails of software changes throughout development processes. This all helps manage risk and leads to the strategic gains that enable modern enterprises to compete effectively.

The importance of coordinating mainframe and distributed development
For 40 years, the mainframe has served as a primary platform for business-critical application development. The history of the distributed platform in enterprise application development is about half as long. When companies first began incorporating distributed servers into their computing environments, they managed them independently from their mainframe environments with different people, processes, and tools.

Today, many n-tier business applications are built with components developed on both mainframe and distributed systems. Typically, application components that power complex transactions and/or require databases are developed on mainframes. Distributed servers generally support the development of application elements, such as a graphic interface, that serve end users.

Portrait of a mixed-workload environment

Consider the example of an online travel enterprise. A company like this may use mainframes to build and house database applications that store and integrate content in different forms from many sources. This could include customer profile data; calendars; pricing information from airlines, railroads, cruise lines, and rental car agencies; and hotel property descriptions. When purchases are made via a Web interface application built on distributed systems, mainframes process the complex transactions that coordinate information, such as customer preferences, dates, transportation and lodging costs, and confirmation and ticketing procedures.

When you make a change to the mainframe application that manages airline pricing, the deployment of the associated change to the distributed application that delivers it must synchronize. Failure to do so could result in information inconsistencies. Even worse, it could cause service disruptions that result in customer defections and revenue loss—not only for the online travel enterprise, but also for the airline and other travel partners impacted by the one pricing change.

To prevent such a scenario, enterprises need to break down the barriers that isolate mainframe from distributed development and lead to costly inefficiencies that increase the probability of error. This requires an enterprise-wide approach to unifying mainframe and distributed environments. The best approach provides a consistent process paradigm and common tools to reduce cost, minimize risk exposure, and improve development agility.

Breaking down the silos

IBM Rational change management products are an integral part of the IBM Rational Software Development Platform. They provide a solid foundation for a complete software lifecycle solution that can simplify and accelerate enterprise software development.

IBM Rational ClearCase enables the lifecycle management of software development assets through integrated version control, automated workspace management, parallel development support, baseline management, and build and release management. IBM Rational ClearQuest provides flexible workflow management and change tracking across the application lifecycle to improve the focus, predictability, and control of software development processes.

By providing a consistent process paradigm across Linux, UNIX, Windows, and z/OS platforms, these products bridge the gap between mainframe and distributed development. As a result, organizations can increase project collaboration, improve release coordination, and unify development across platforms.

By introducing common methods and normalizing development processes, centralized asset management and federated asset management can improve project collaboration and release coordination to better manage complexity across the enterprise.

Two change management approaches meet different asset management models

To support the different ways organizations manage and develop software applications, IBM provides two flexible approaches to enterprise change management. These include:

- *Centralized asset management for enterprises interested in maintaining distributed and z/OS assets in a common repository*
- *Federated asset management for enterprises interested in maintaining native asset repositories on their distributed and z/OS platforms*

With both approaches, mixed workload enterprises can leverage a consistent process paradigm across mainframe and distributed environments. By introducing common methods and normalizing development processes, centralized asset management and federated asset management can improve project collaboration and release coordination to better manage complexity across the enterprise.

Centralized asset management

Many organizations want to consolidate application development processes across platforms, modernize development processes, or reengineer development processes to meet compliance requirements. These organizations are interested in a true cross-platform approach to development that unifies distributed and z/OS development activities, and uses a common repository to maintain both distributed and z/OS assets.

The centralized asset management approach consists of the following:

· *IBM Rational ClearCase for distributed and z/OS asset management*
· *IBM Rational ClearQuest for workflow management and change tracking across distributed and z/OS environments*

Figure 1. Centralized asset management extends IBM Rational ClearCase to manage distributed and z/OS assets.
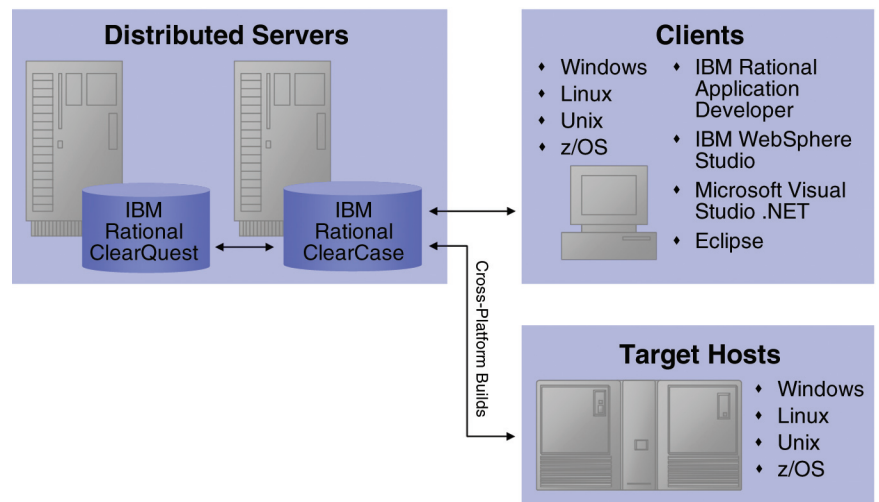
Access anytime, from anywhere

In many organizations, z/OS developers continue to develop on the host using time-sharing option (TSO) and interactive system productivity facilities / program development facilities (ISPF/PDF). The centralized asset management approach extends the power of Rational ClearCase to z/OS development by enabling access to Rational ClearCase functions and a common repository through its TSO client. With this approach, local, remote, Web, and TSO clients alike can access common Rational ClearCase functions.

By leveraging Rational ClearCase commands, and accessing and managing Rational ClearCase assets locally from ISPF, z/OS developers can work more effectively by using Rational ClearCase in their own familiar environment. And with the central repository, users can share assets between distributed and mainframe systems.

You can also use IBM Rational change management products in concert with integrated development environments (IDEs), such as IBM Rational Application Developer, IBM WebSphere Studio, Microsoft Visual Studio .NET, and the open source Eclipse framework. This enables developers to access change management functions directly from their IDEs to streamline and accelerate development of applications spanning multiple platforms.

Heterogeneous build support

Performing z/OS builds is fundamentally different from performing builds in distributed environments. Centralized asset management addresses these differences by extending Rational ClearCase to provide a build facility for z/OS assets. With this approach, z/OS developers can initiate a build from their client of choice. Rational ClearCase then sends the corresponding build commands and software assets to the mainframe system where the build is performed, and the resulting derived objects are returned to the Rational ClearCase repository. This enables users to integrate heterogeneous build processes and provides automatic and complete build audits via the ClearCase clearmake and clearaudit build programs.

Cross-platform process management

The centralized asset management approach offers additional advantages through seamless integrations between Rational ClearCase and Rational ClearQuest. With Rational ClearQuest, enterprises can automate process workflows to further streamline collaboration across platforms and project roles. Rational ClearQuest helps organizations manage workflows, implement a consistent process paradigm, and provide audit trails across platforms to accelerate project work and reduce risk exposure throughout the application lifecycle.

Federated asset management

Federated asset management is designed for organizations that prefer a native repository approach to manage software assets on the platforms from which they are sourced. Typically, organizations such as these prefer to keep distributed and z/OS assets separate and are not interested in reengineering development processes. In many cases, they may be in maintenance mode and/or simply comfortable with their existing z/OS solutions.

The federated asset management approach consists of the following:

·   *IBM Rational ClearCase for distributed asset management*
·   *IBM SCLM Plus for z/OS asset management*
·   *IBM Rational ClearQuest for workflow management and change tracking across distributed and z/OS environments*

Figure 2. Federated asset management provides a single point of management across distributed and mainframe development with IBM Rational ClearQuest.
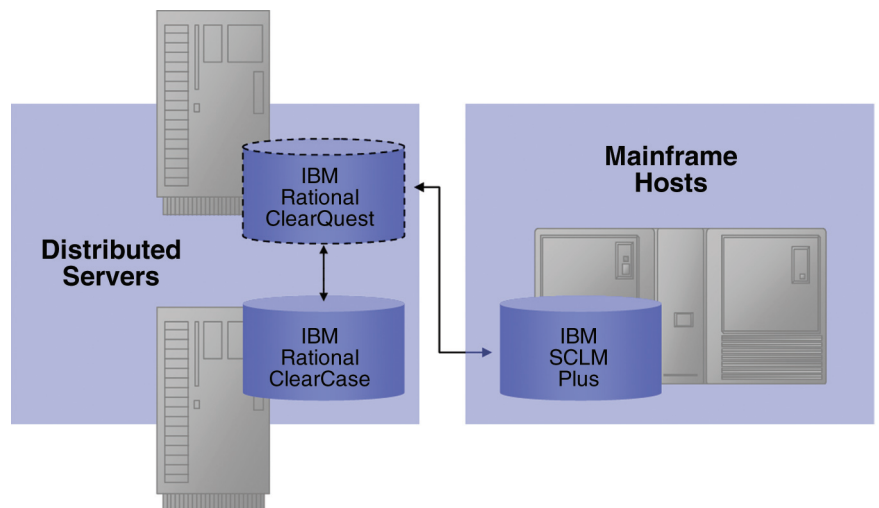
Single point of management

Federated asset management extends Rational ClearQuest capabilities to SCLM Plus, as well as Rational ClearCase, enabling enterprises to leverage a single point of management across distributed and mainframe environments. With this approach, z/OS developers can work with SCLM Plus and distributed developers can work with Rational ClearCase, while Rational ClearQuest coordinates development activities across platforms. This provides a consistent, cross-platform process paradigm while supporting the lifecycle management of n-tier applications. It also accelerates development and reduces risk exposure by automating approval workflows and providing audit trails across the development environment.

Cross-platform build, promotion, and development support

The federated asset management approach creates a parent-child relationship between Rational ClearQuest and SCLM Plus as well as between Rational ClearQuest and Rational ClearCase. Rational ClearQuest initiates cross-platform actions that drive build and promotion events for both tools. In this way, federated asset management coordinates application builds and promotions across platforms and coordinates development activities performed in Rational ClearCase and SCLM Plus. The integration of Rational ClearQuest and SCLM Plus is enabled via HTTP connections between these two solutions.

Flexible change management access

Like centralized asset management, federated asset management provides the flexibility developers need to access change management functions from virtually anywhere, at any time. Distributed developers can access IBM Rational change management functions through various local, remote, and Web clients as well as through leading IDEs, including IBM Rational Application Developer, IBM WebSphere Studio, Microsoft Visual Studio .NET, and the open source Eclipse framework. Mainframe developers can access SCLM functions via a native ISPF client or through an Eclipse-based client.

*IBM Rational ClearCase and IBM
Rational ClearQuest change
management products bridge the
chasm between distributed and
mainframe development.*

Conclusion

Escalating time-to-market, service, cost, and revenue pressures are just some
of the challenges that drive modern organizations to make frequent changes
to business-critical software applications. This unrelenting demand for change
requires organizations to align IT and business goals, improve development
responsiveness and agility, and maximize the effectiveness of individual
and team-based professional resources. Requirements such as these keep
the pressure on IT to accelerate development processes without sacrificing
application quality or savings. At the same time, today's enforcement-focused
regulatory environment puts IT organizations in the hot seat to maintain
a compliance-driven development infrastructure that can reduce
an organization's exposure to risk.

All of these factors make the prevention of downtime, and the assurance that
the right versions of the right applications are available at all times, paramount.
This presents special challenges to organizations that build and manage
software applications in complex environments with both distributed and
mainframe platforms. Overcoming these challenges requires the adoption of
an enterprise-wide view of managing ongoing change to software assets across
multiple hardware systems, tools, and operating platforms.

IBM Rational ClearCase and IBM Rational ClearQuest change management
products bridge the chasm between distributed and mainframe development.
Together, they automate and enforce development processes to enhance
collaboration and productivity across distributed and mainframe operating
platforms at every stage of the application lifecycle. With IBM Rational change
management products, enterprises are better able to prevent application
failures by resolving code defects early. They can also speed the delivery of
business-critical information, products, and services by tightly synchronizing
software releases across multiple platforms. As a result, organizations can
achieve the strategic advantages that can help give them an edge. These include
improved application quality and availability, faster time-to-market, improved
ability to meet compliance requirements, lower operational costs, and better
risk management.

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For more information

To learn how IBM Rational ClearCase and IBM Rational ClearQuest can help streamline development and improve productivity, visit:
ibm.com/software/rational/offerings/scm.html

To learn about IBM SCLM Plus for z/OS, visit:
ibm.com/software/awdtools/sclmsuite/sclm/