

**IBM Rational ClearCase and  
IBM Tivoli Configuration Manager**  
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**Rational** software



## **Bridging the chasm between development and operations**

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**Introduction**

The development and deployment of software applications is becoming progressively more complex, fast-paced and critical to business success. Companies now need to build, test and deploy new versions of applications with increasing frequency while maintaining 24x7 operations. By integrating software configuration management (SCM) with an automated solution for managing distributed deployments, companies can roll out new releases much more efficiently and effectively, reducing both cost and risk and accelerating time to value.

This paper explores the deployment challenges that many organizations face today and discusses how to bridge the gap between software builds and deployments. It also explains how using IBM Rational® ClearCase® change management software with IBM Tivoli® Configuration Manager distribution software can help automate, streamline and accelerate the software build/ deploy process.

**Deployment challenges today**

Today's IT departments have more systems to manage, more locations to support and more mission-critical applications to build, deploy and maintain than ever before. Some organizations now find that they must rebuild and redeploy dozens or even hundreds of new software versions a week across multiplatform global networks. Yet the need to eliminate business downtime associated with software rollouts is paramount. These growing concerns place the application build/ deploy process squarely in the critical path to competitive success.

In many organizations, the processes employed to move applications from the build phase to the deploy phase are partly or entirely manual, and therefore time-consuming and error-prone. These inefficient processes inevitably lead to loss of revenue because of business downtime and reduced software quality. Manual build/deploy processes also make compliance with regulations and other mandates challenging—primarily because it can be difficult to identify which application versions are in operation on which servers and to identify which software configurations were used to build a given deployed application.

When the build/deploy process is not automated, executable code destined for various targets must be manually copied from a build environment to a deployment area, and then manually distributed. Server provisioning and configurations must be checked manually, generally by logging on to each server. A spreadsheet is typically used to track which releases went to which servers. Data transfer through firewalls may require further manual intervention and can compromise security, because server ports are open for long periods of time to enable moving executables to the server.

Several problems can arise during a manual build/deploy process, including:

- *Difficulty in reproducing and fixing defects, which can delay application delivery and decrease quality*
- *Difficulty in rolling an application back to a previous version, which can waste time and development resources*
- *Redeployment failures, which can waste time and resources and negatively affect customer satisfaction*
- *Undocumented deployment procedures, which can decrease individual productivity and increase redundant tasks*

***Consistently delivering  
software updates is a multistep,  
iterative process.***

Even when an automated solution for managing software deployments is in place, many of these problems remain, particularly those pertaining to defect repair and rollback. These problems persist because no automated linkage exists between the management of deployed applications and the management of the software configurations used to build them. The result is an area of weakness that can prevent, delay or compromise application deployments and require several intensive hours to diagnose and resolve.

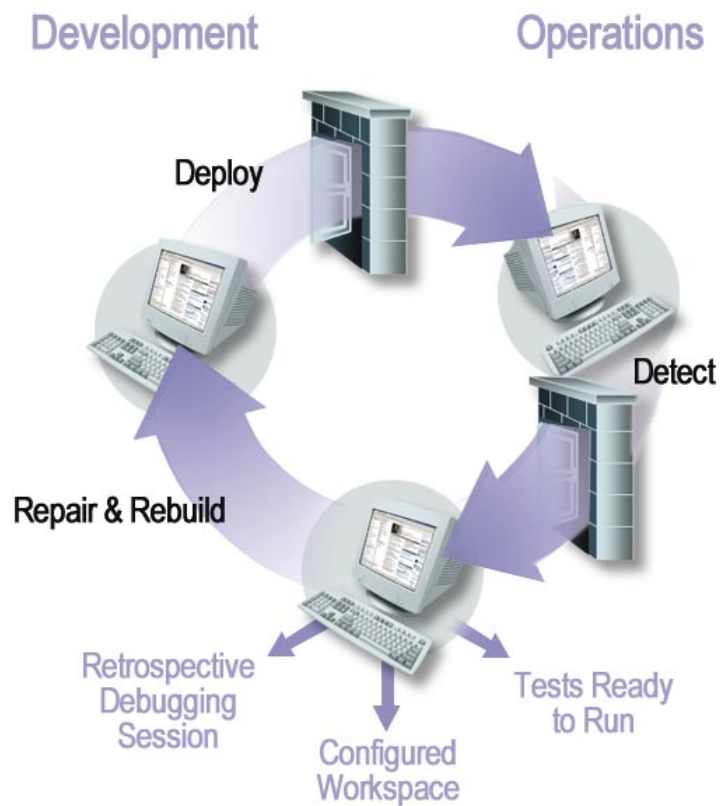
#### **Bridging the gap between build and deployment**

Consistently delivering software updates is a multistep, iterative process. The first step in the process is to build and test the application. Next, the application must be packaged so that it can be easily distributed to the operational servers, which often occurs through a corporate firewall. The servers then need to be updated and the application put into production.

If an error is detected, the application running on the operational server must be rolled back to a previous working version. The defect information needs to go back to the development team, who must be able to view the correct application

and file versions. After they repair and rebuild it, the application is repackaged and transported to the operational servers; and the servers are updated to run the new version of the application. All of this needs to be done while keeping the servers up and running 24x7. Figure 1 shows the steps of this process.

Figure 1: Software update cycle



The key to optimizing the software build/deploy life cycle is a reliable, automated process that enables problems to be reproduced, diagnosed and repaired against the precise version of the application that failed on whatever platform was involved. This makes possible other automated capabilities that are critical to success, such as:

**Software configuration management is the foundation of the software update cycle because it helps correctly identify all the differences between a failing software version and more current versions.**

- *The ability to roll back smoothly to a previous application version when issues occur, without the need for manual intervention*
- *An audit trail to specify what executables were deployed and where*
- *The ability to maximize time and resources by building and deploying only what is necessary to “patch” a defect or implement an enhancement, as opposed to rebuilding and redeploying an entire application*

However, providing traceability between software configurations and production applications is of little value unless those assets are well managed. First and foremost, a software configuration management (SCM) solution must be in place during the development phase. SCM is the foundation of the software update cycle because it helps correctly identify all the differences between a failing software version and more current versions.

Similarly important is an efficient, secure and well-controlled deployment management solution to update multiplatform, distributed server environments with new versions of applications. This level of automation is essential for reducing the mistakes and loss of productivity inherent in manual or ad hoc processes like those just described.

And while effective change management and distribution tools are necessary, a single solution that can bridge the gap between the build phase and the deployment phase also is required to accelerate the build/deploy process—and therefore help simplify and streamline operations and reduce time, cost and risk.

#### **A best-in-class solution**

By bringing together Rational ClearCase and Tivoli Configuration Manager, IBM offers a unified, enterprise-scale solution that can help automate and manage software builds and deployments.

Using the existing capabilities of these two complementary, market-leading products, organizations can now readily define a repeatable, well-supported process that traces executables in production back to the software assets from which they were built—thus streamlining the application build/deploy cycle to significantly reduce cost and risk.

The rich feature set of these combined products also provides key capabilities for software update management such as secure, enterprise-scale distribution

***IBM Rational ClearCase provides an extensive range of SCM capabilities including version control, flexible workspace management, access control and advanced build management.***

control; rollback; audit trail functions; role-based access controls; and enhanced software componentization and reuse.

#### *Effective build management with Rational ClearCase*

IBM Rational ClearCase provides an extensive range of SCM capabilities including version control, flexible workspace management, access control and advanced build management. It also includes comprehensive build auditing for improved release maintenance. In addition, Rational ClearCase offers sophisticated build features such as:

- *Creation of configuration records—a software bill-of-materials that documents a software build and enables the build to be reproduced on demand*
- *Configuration lookup—a build avoidance scheme that enables only the changed files to be rebuilt, as opposed to rebuilding the entire application*
- *Dependency detection—a feature that guarantees correct build behavior even for files not explicitly listed as dependencies in the build instructions*
- *Ability for team members to share existing built objects—this feature enables team members to save time that they would otherwise spend performing unnecessary rebuilds*

These build management capabilities can result in faster promotion of products through the test and verification phases and can facilitate correct, reproducible builds from the right sources. The end result can be higher-quality releases delivered in accelerated time frames.

#### *Controlled deployment with Tivoli Configuration Manager*

IBM Tivoli Configuration Manager provides comprehensive, multiplatform control over enterprise-wide software distribution and inventory management processes, including rollback, traceability, dependency checking, reporting and access control. It allows users to schedule, submit, monitor and control distribution activities to simplify and streamline software distribution. Tivoli Configuration Manager also can securely perform software distribution and inventory operations against systems operating outside corporate firewalls.

#### *A single solution for enterprise deployment challenges*

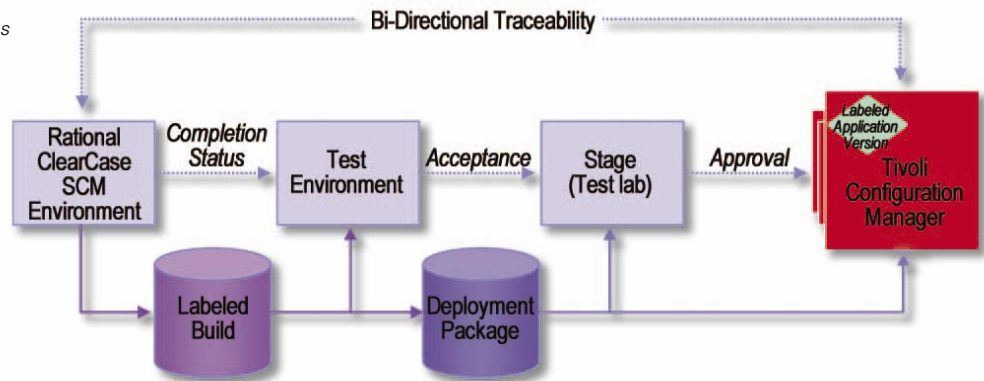
IBM Rational ClearCase and IBM Tivoli Configuration Manager work together to provide a single, proven solution that enables organizations to rapidly and effectively build and deploy diverse applications across even the most complex global environments.

Rational ClearCase is used to manage the software change and build processes. First, an application is developed or updated with required enhancements and defect repairs. Next, the build is completed. A configuration that represents all the required features and defect repairs is tested and staged; promotion levels and approvals are obtained; and a baseline or a label is assigned.

Next, the Rational ClearCase baseline configuration is packaged into a Tivoli distribution package. The distribution package includes profiles, which contain instructions for software distribution. The Tivoli distribution packages are named after baselines in Rational ClearCase. This allows users to trace the packages to identified baselines and code in Rational ClearCase, thus providing an audit trail between the deployed application and code. The distribution packages are created and copied into the Tivoli Configuration Manager environment. Tivoli Configuration Manager then initiates the distribution process and delivers the software packages to the target destinations.

Figure 2 illustrates how Rational ClearCase and Tivoli Configuration Manager together can provide a single solution that automates and controls the software update cycle. This combined solution enables users to create a distribution package from the assets comprising a baseline managed within Rational ClearCase, and to deploy this distribution package to multiple target servers using Tivoli Configuration Manager. By connecting and automating software development and deployment, this solution enables faster application delivery

Figure 2: Bridging development and operations  
with IBM Rational ClearCase and IBM Tivoli  
Configuration Manager



and an improved ability to meet time-critical business demands.

**Summary**

Enterprises today need to deploy and roll back applications efficiently while keeping their businesses running 24x7. To accomplish this goal, on demand businesses need to integrate their software configuration management and deployment processes—to link production applications with the software assets used to build them. This capability is the key to optimizing cycle times for software updates.

IBM Rational ClearCase and IBM Tivoli Configuration Manager bridge the chasm between software development and operations to help better manage complexity throughout the software development life cycle. The result can be reduced downtime, streamlined operations, decreased business risk, greater organizational responsiveness and improved customer satisfaction.

**For more information**

To learn more about how IBM Rational ClearCase can help manage software changes and complexity, visit [ibm.com/software/rational/offerings/scm.html](http://ibm.com/software/rational/offerings/scm.html).

To learn more about IBM Tivoli Configuration Manager, visit [ibm.com/software/tivoli/products/config-mgr](http://ibm.com/software/tivoli/products/config-mgr).





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