



Rational software

IBM Rational ClearCase Change Management Products

Highlights

Provides software configuration management (SCM), including defect and change tracking

- **Manages all assets from design to code to tests**
- **Lets you quickly prioritize and track defects and change requests**
- **Simplifies change with out-of-the-box process automation**
- **Enables parallel development**
- **Uses advanced workspace management**
- **Gives developers direct access to assets and changes from within leading IDEs**
- **Supports asset-based development for design and component reuse**
- **Provides advanced build/release management and audit support**
- **Scales from small workgroups to highly distributed global teams**

Enterprise change management in software development addresses the need to cost-effectively manage teams and assets across the development lifecycle. A key foundation to the IBM Rational enterprise change management strategy, the IBM Rational ClearCase® Change Management family is made up of products, a proven change management model, and services that provide comprehensive software configuration management (SCM). SCM gives you the flexibility to manage change across the lifecycle of your software, to secure and

permanently store your development assets, and to provide all your team members – anytime, anywhere – with instant, yet controlled, access to the information they need. The result is you can create and deliver higher quality applications, faster.

Software Configuration Management

For more than five years, Rational ClearCase Change Management products have been recognized as the market-leading solution for managing software change and complexity.*

IBM Rational ClearCase LT IBM Rational ClearQuest	IBM Rational ClearCase Change Management Solution	IBM Rational ClearCase Change Management Solution Enterprise Edition
Version Control Defect and Change Tracking	Software Asset Management • Version Control • Advanced Build Management • Dynamic Views Defect and Change Tracking	Software Asset Management • Version Control • Advanced Build Management • Dynamic Views Defect and Change Tracking Multiple Site Support
Single Server	Distributed Servers	Replicated Servers



IBM Rational Team Unifying Platform

The IBM Rational ClearCase Change Management product family provides software configuration management solutions for any size team and is integrated with the IBM Rational Team Unifying Platform for full lifecycle support.

* Source: International Data Corp. Worldwide Software Configuration Management Tools Competitive Analysis, 2003: 2002 Shares and Current Outlook.

There are six key products in the Rational ClearCase Change Management product family as well as combinations of these products you can select to meet specific project needs:

- *IBM Rational ClearCase Change Management Solution, providing complete software configuration management*
- *IBM Rational ClearCase, providing software asset management*

- *IBM Rational ClearCase LT, providing entry-level version control*
- *IBM Rational ClearQuest®, providing flexible change and defect tracking*
- *IBM Rational ClearCase MultiSite® and IBM Rational ClearQuest MultiSite providing support for globally distributed teams*

Rational ClearCase Change Management products, when used

together or separately, include Unified Change Management (UCM), a flexible SCM model that raises the level of abstraction for managing change.

UCM supports the full development lifecycle, automating and integrating the change management process across all types of assets including requirements, design models, documentation and source code.

IBM Rational ClearCase Change Management Products at a Glance

Products	Functionality	Team Type	Product Components
IBM Rational ClearCase Change Management Solution	Configuration management	Medium to large teams distributed	IBM Rational ClearCase IBM Rational ClearQuest
IBM Rational ClearCase Change Management Solution Enterprise Edition	Enterprise change management	Teams geographically separated by multiple locations and time zones	IBM Rational ClearCase IBM Rational ClearQuest IBM Rational ClearCase MultiSite IBM Rational ClearQuest MultiSite
IBM Rational ClearCase	Asset management	Medium to large teams	IBM Rational ClearCase Options: Rational ClearCase MultiSite for geographically distributed teams
IBM Rational ClearCase LT	Version control	Small to medium teams co-located	IBM Rational ClearCase LT Note: Rational ClearCase LT is also included with the IBM WebSphere Studio IDE
IBM Rational ClearQuest	Defect and change tracking	Scales from small to large, global teams	IBM Rational ClearQuest Options: IBM Rational ClearQuest MultiSite for geographically distributed teams
Rational Team Unifying Platform and Rational Suite*	Full lifecycle	Support for cross-functional development teams	Includes IBM Rational ClearCase LT, development support and IBM Rational ClearQuest with options to upgrade to full IBM Rational ClearCase and/or IBM Rational MultiSite

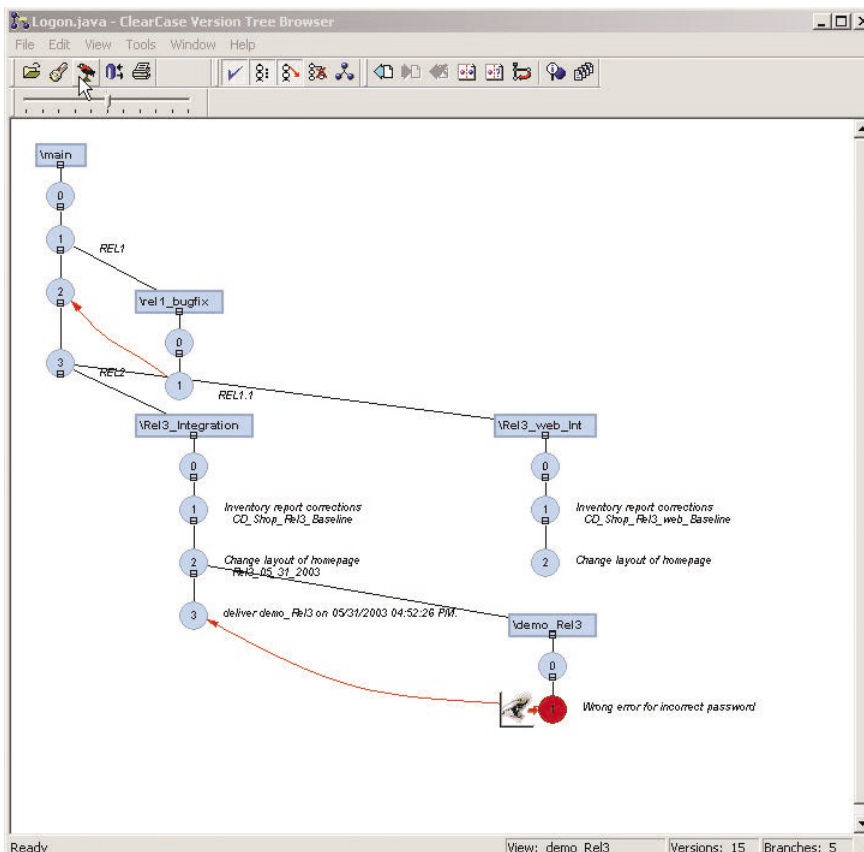
* includes IBM Rational Unified Process, requirements management, design, test, and project management solutions

Software Asset Management

Rational ClearCase provides software asset management. Ideal for medium to large teams, Rational ClearCase manages multiple versions of any digital asset.

Key Rational ClearCase features include:

- *Advanced version control support*
- *Workspace management using dynamic views for access to distributed assets and versions*
- *Build management to automatically produce detailed bill of materials and to recreate any previous build at any time*
- *Process configurability using UCM or base Rational ClearCase capabilities*
- *File conversion from other version control and SCM products to speed migration activities*
- *Wide platform support with Web access options and connectors for mainframe-based applications*
- *Integration with leading IDEs including IBM WebSphere Studio, Eclipse and Microsoft Visual Studio .NET*



Rational ClearCase version trees provide a visual history of parallel development branches.

Flexible Defect and Change Tracking

Rational ClearQuest provides defect and change request tracking across the development lifecycle. Ideal for organizations managing multiple development projects, Rational ClearQuest includes:

- *Out-of-the-box workflow, process, templates and schemas with point and click customization*
- *The ability to easily customize fields, user interface, queries, charts and reports*
- *Web, UNIX, Linux, and Windows client interface options*
- *Extensive reporting and query support*

- *Integrations with IBM Rational tools, Microsoft Project and other third party products to provide full lifecycle change support*
 - *Scalability to support projects of any size, across locations and platforms*
 - *Access via the Web*
 - *Access via native client interfaces (Windows, UNIX, Linux)*
- Refer to the end of this document for specific platform support information.

Rational ClearCase Change Management products can be conveniently accessed in several ways:

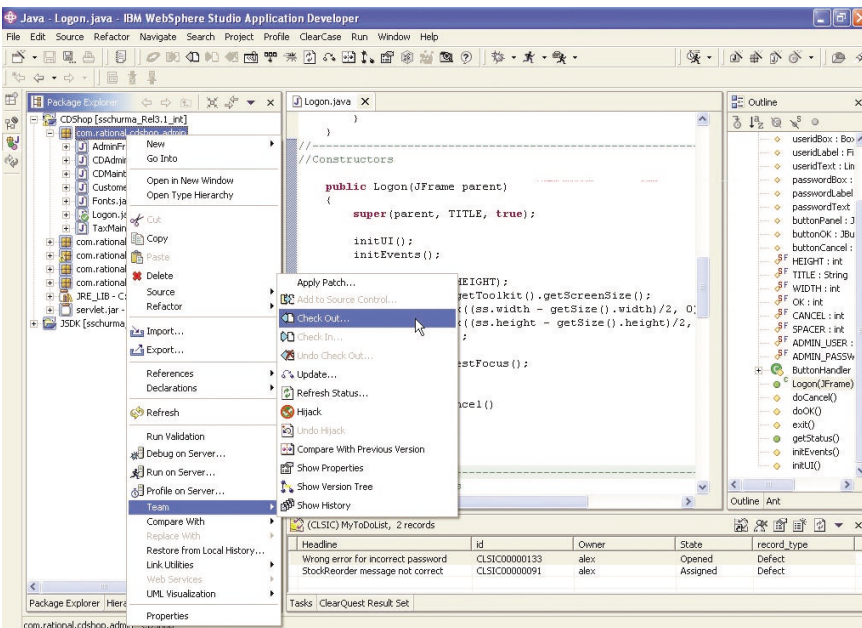
- *Use your preferred IDE (such as IBM WebSphere Studio, Eclipse, or Microsoft Visual Studio .NET)*

Simplify and Control Change

In software development it isn't enough to capture change requests and track defects. A single change typically impacts multiple assets from design models, to code, to test scripts. Several team members may be involved in resolving a single

application issue. To simplify and control change, IBM Rational provides Unified Change Management (UCM), a flexible SCM model, based on best practices, that defines a consistent, activity-based change process. The UCM model and supporting automation provides:

- *Simplification of key SCM functions and workflows with activity-based management*
- *Easy configuration of SCM processes for teams of any size*
- *A complete view of how defects and changes relate to specific files, versions, baselines, and/or releases*



Developers can easily join a project, access files, and view change information from the WebSphere Studio IDE.

Key to UCM is the level of abstraction it offers. With UCM, you have the option to track multiple changes as a single, higher level activity. You can track one logical change that can represent many physical changes across multiple files. Project managers can easily see the status of an activity, even when multiple team members are involved. And individual team members can quickly see the relationship of what they are working on to the higher level activity. This holistic view means you can better understand the impact of

proposed changes across your project. You have greater insight into real progress and early warnings about potential bottlenecks.

UCM makes it simple to implement SCM processes for projects of any size. Rational ClearCase and Rational ClearQuest include UCM wizards so you can quickly define project-wide and/or organization-wide SCM policies. Features include:

- *Out-of-the-box policy settings to quickly implement SCM on project(s)*

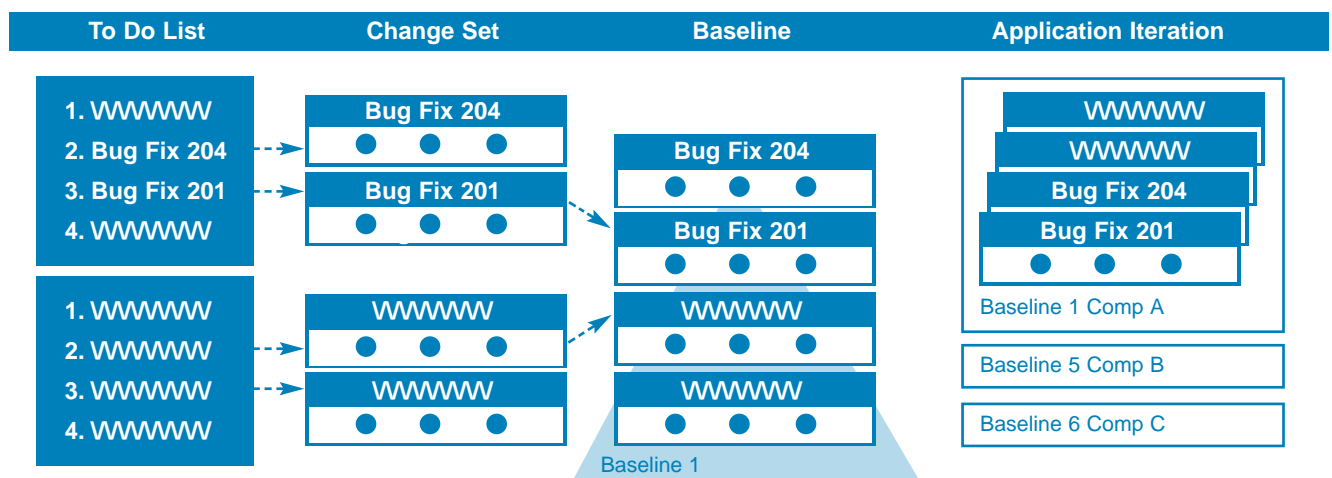
- *Additional extensions and options including support for triggers and metadata*
- *Out-of-the-box change models that can be easily and extensively modified for unique project needs*

UCM automates and streamlines the steps required to:

- *Create and maintain developer work areas and, if needed, integration areas*
- *Identify change sets which are the set of versions of associated with a given activity*

- *Integrate changes across the project*
- *Create and manage component baselines*

UCM enables developers to get up and running quickly on new projects. They simply “join” a project and select an activity – their workspaces are automatically populated with the right set of file versions.



Unified Change Management makes it easy to trace an activity from initial change request through final software release. 1) A developer selects an activity from a personal To Do List. 2) As the developer works on the activity, UCM tracks its change set automatically and behind the scenes. 3) The activity's change set is delivered to a project integration area, where it becomes part of a new component baseline. 4) Multiple component baselines are assembled to form a new application iteration.

Each member of your team can easily identify activities included in a build or baseline. With UCM, an activity is automatically associated with its change set, which in turn encapsulates all versions used to implement the activity. You're assured that all code changes are delivered and promoted accurately.

UCM Abstraction

UCM abstraction includes objects and corresponding SCM operations so your teams can stay focused on

developing applications rather than managing infrastructure. Specific UCM objects include:

- *Activities that encapsulate sets of changes*
- *Components that help define software architecture and organize assets for reuse*
- *Streams that manage development and integration workflow across previous, current, and future releases*

- *Baselines that represent versions of components so you can understand exactly what makes up a given release*

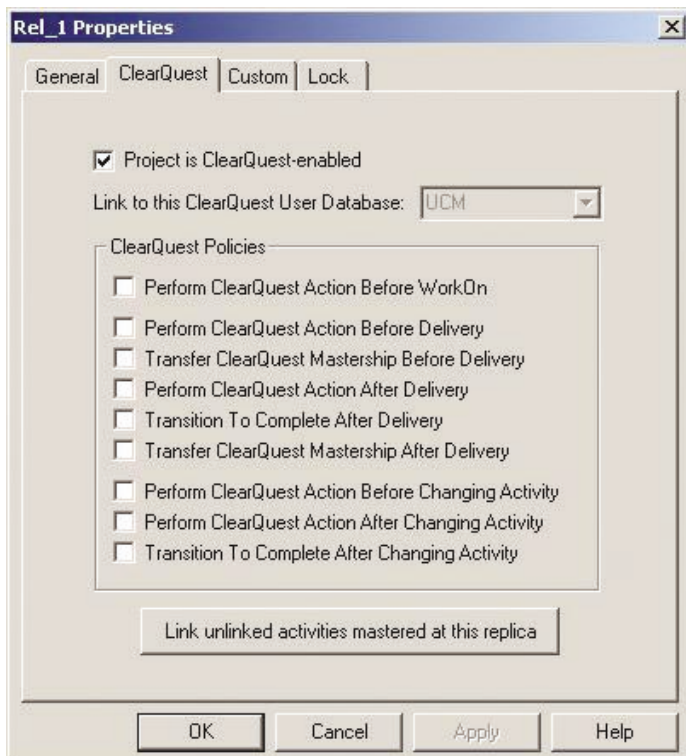
UCM operations include:

- *Deliver and rebase operations to simplify the integration of parallel changes*
- *Comparing baselines so you can understand exactly why and how certain changes were made to a given release*

These objects and operations are directly supported in Rational ClearCase and Rational ClearQuest.

Enable Parallel Development

Rational provides extensive support for parallel development so developers can work on the same code or release and more easily resolve conflicts and reduce confusion. Supporting parallel development requires balancing the need developers have to work independently and the integration needs of the project. The development and integration stream model in Rational ClearCase Change Management products provide private developer workspaces and public integration areas.



Unified Change Management support enables easy selection of change management policies for projects

Key capabilities in Rational ClearCase Change Management Solutions that enable parallel development include:

- *Easy identification of exactly what changes have to be merged in a given release*
- *Effective development and integration stream models that define how and when developers deliver code changes*
- *Branching and merging capabilities that support isolating specific changes or versions, and integrating changes into releases*
- *Advanced diff/merge technology to quickly and visually highlight conflicts for easy resolution*
- *Automatic and selective options for merging updates*
- *Options for Rational ClearCase MultiSite and Rational ClearQuest MultiSite that provide virtual teams with the experience of a single site*

Workspace Management

Rational ClearCase gives developers fine grained control over their personal workspaces yet provides seamless access to the exact file and

directory versions needed, regardless of where those assets may reside.

Rational provides two types of views supporting networked and local usage models respectively:

- *Dynamic views provide transparent access to any version of any element, anywhere on the network*
- *Snapshot views provide the flexibility to work using local copies of file versions while disconnected from the network and easily synchronize changes when connected*

Developers can mix and match dynamic and snapshot views based on their preferences and project needs. Dynamic views are useful on highly distributed projects and are required for build management tasks including build auditing. Snapshot views, while used across large and small projects, are particularly useful for remote development work and for prototyping or early stage projects.

Direct Access from Leading IDEs

Developers prefer to work within their chosen development environments.

Rational ClearCase Change Management products provide deep integrations with leading IDEs, including WebSphere Studio, the open

source Eclipse platform, and Microsoft Visual Studio .NET, enabling developers to use common SCM functions without leaving their preferred development environment. Developers can, via tool bars or right-click, access functions including check-in/checkout, deliver and rebase. And unlike other IDE SCM integrations, the defect and change tracking capabilities of Rational ClearQuest are also available, giving you, for example, the ability to run queries and submit defects from within these IDEs.

Enabling Asset-based Development

Software industry experts estimate that the cost to reuse a software component is 20% of the cost of new development, yet there are many obstacles to successful reuse. Rational ClearCase is key to effective software reuse in many organizations today and as development activities become more distributed, the challenge for architects and developers is knowing what assets exist where and being able to categorize and reference these assets in design and development activities.

IBM supports the Reusable Asset Specification (RAS) which defines a standard way to package reusable software assets. The integration

between Rational Rose XDE Developer and Rational ClearCase provides development teams with the ability to search, locate, download, and apply assets from reusable asset repositories located locally or on the web. These assets can then be stored in Rational ClearCase.

Advanced Build Management

Effective build management focuses on

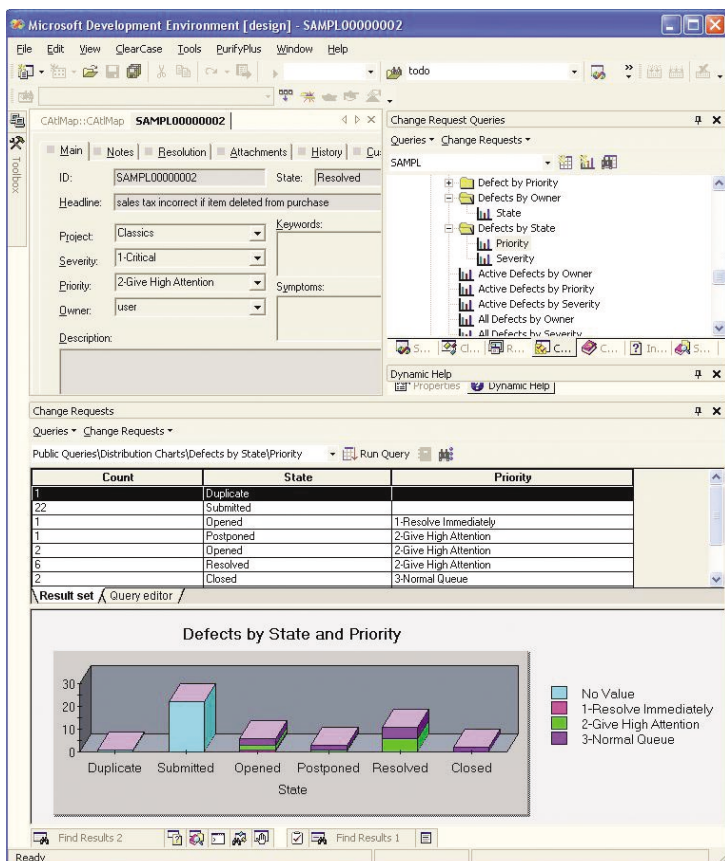
two issues: Streamlining the edit-build-debug cycle and ensuring the accurate reproduction of software versions. While Rational ClearCase is compatible with traditional build scripts and native Windows and UNIX make programs, it also offers upward compatible build utilities with clear advantages. By automatically detecting dependencies, reusing derived objects wherever possible and producing detailed build

audit trails, Rational ClearCase optimizes build times while guaranteeing the reproducibility of software versions.

Rational ClearCase includes the clearmake and omake build programs. These build utilities facilitate functions such as configuration lookup, binary sharing, parallel and distributed builds and build auditing. You can also generate a detailed bill of materials (configuration records). These configuration records can be used to determine when derived objects can be safely shared among views by developers. This facility, termed wink-in, saves both disk storage and build time.

Integrate to Accelerate Team Development

The Rational ClearCase Change Management products provide deep integrations with development and team products. Integration with leading IDEs include WebSphere Studio, Visual Studio .NET, and the open source Eclipse platform. For architects and developers using the IBM Rational Rose® XDE family and/or IBM Rational Rapid Developer for rapid application development, SCM integration keeps designs, models, generated code, and related assets in sync.



Rational ClearQuest provides graphical defect and change tracking information so you can easily monitor trends.

For team support, integrations with IBM Rational Team Unifying Platform and IBM Rational Suite® provide full lifecycle support across development disciplines. The result is, for example, that test engineers can directly enter defects and monitor status from within their testing environment (note Rational ClearCase and Rational ClearQuest are included in the Rational Team Unifying Platform). Project management integrations include support for Microsoft Project so you can associate and synchronize project plan tasks with defects and other change records. Project-wide measurement support is also available via the ProjectConsole feature in the Rational Team Unifying Platform, which provides out-of-the-box integrations with Rational ClearCase and Rational ClearQuest. These integrations enable you to view and analyze overall project trends using real data from multiple development tools.

The Rational ClearCase and Rational ClearQuest APIs also provide an open, extensible way to meet specific integration needs.

IBM Rational ClearCase Change Management Solution

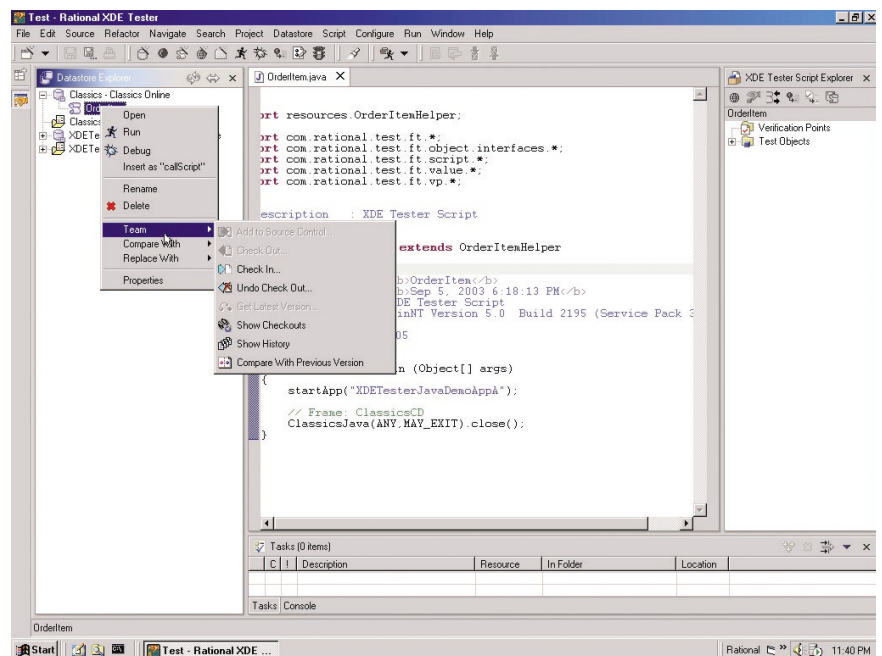
The Rational ClearCase Change Management Solution provides comprehensive SCM. Ideal for

medium to large teams working in a distributed, heterogeneous development environment, it includes Rational ClearCase for software asset management and Rational ClearQuest for flexible defect and change tracking. This combined solution enables teams to directly relate change requests to code and to see how activities impact software quality.

The Rational ClearCase Change Management Solution includes comprehensive workflow support so you can enforce a consistent process across your team for submitting,

assigning, resolving and verifying modifications. You can further customize your processes to:

- *Meet specific project needs (e.g., based on size, development activity, and release goals)*
- *Define change request views, categories and specific workflows*
- *Implement site specific development policies*



Lifecycle integration: Access to Rational ClearCase from XDE Tester (XDE Tester is component of Rational Rose XDE product family).

Overview of the IBM Rational ClearCase Change Management Product Family

Features	IBM Rational ClearCase LT	IBM Rational ClearQuest	IBM Rational ClearCase	IBM Rational ClearCase Change Management Solution	IBM Rational ClearCase Change Management Solution Enterprise Edition
Asset Management					
Version control including directory versioning	X		X	X	X
"Snapshot" or sandbox views	X		X	X	X
Promotion model support	X		X	X	X
Dynamic views			X	X	X
Parallel development support	X		X	X	X
Activity-based change management	X	X	X	X	X
Web access clients	X	X	X	X	X
IDE integration (WebSphere Studio, Microsoft .NET, Eclipse)	X	X*	X	X	X
Windows/UNIX interoperability	X	X	X	X	X
COM API development support	X	X	X	X	X
Detailed build auditing			X	X	X
Binary sharing			X	X	X
Build dependency automation			X	X	X
Distributed builds (UNIX only)			X	X	X
Parallel builds (Windows/UNIX)			X	X	X
Mainframe connectors			X	X	X
Distributed servers			X	X	X
Network attached storage devices			X	X	X
Replication and synchronization					X
Defect and Change Request Tracking					
Change workflow automation & process enforcement		X		X	X
Email notification/email reader		X		X	X
Metrics support (Query, Charting, Reporting)		X		X	X
VB & Perl scripting support		X	X	X	X

* When used with Rational ClearCase

IBM Rational ClearCase Change Management Solution Enterprise Edition

Rational ClearCase Change Management Solution Enterprise Edition provides robust SCM for distributed teams. Ideal for development organizations working across geographically dispersed sites on different platforms, it includes Rational ClearCase with Rational ClearCase MultiSite for synchronization and replication of asset repositories, and Rational ClearQuest with Rational ClearQuest MultiSite for local access to replicated defect and change tracking information.

IBM Rational ClearCase *Advanced Version Control*

Rational ClearCase offers extensive version control features to ensure the security and integrity of your software assets. Much more than basic version control, Rational ClearCase versions source code, libraries, compilers, visual models, design notes, documentation, binaries, Web artifacts, test suites, databases, and any other project artifact that can be represented as digital content, including text and non-text files, directories and links. Rational ClearCase also provides versioning of directories, subdirectories and all file system objects.

Developers can see at any time, the version, the branch and the file they are working on simply by viewing the Rational ClearCase version tree – accessible via the ClearCase Explorer or within popular IDEs.

Rational ClearCase uses a checkout-edit-checkin paradigm, similar to traditional version control tools as well as access to more advanced capabilities – such as delete version, create/delete branch, list version history, compare versions and merge. Additionally, these features can be accessed directly from a developers' preferred IDE.

Robust Build Management

Rational ClearCase automatically provides a detailed bill of materials that documents software system builds, enabling developers to completely and reliably recreate the environment of any build. In addition, Rational ClearCase reduces build time through intelligent binary sharing and parallel execution of build scripts.

Distributed Build Management for Mainframe Development

For organizations developing and supporting applications using multiple platforms, the Remote Build feature included in Rational ClearCase

mainframe connectors enables teams to support build management for the mainframe.

With the Remote Build feature, you can submit build requests from your Windows and UNIX development environments to compile source code on OS/390 or z/OS. You can also configure Remote Build to return the derived objects such as load modules and listings to be versioned in Rational ClearCase on client platforms. Rational ClearCase provides comprehensive reports about the set of versioned files that comprise each remote build. This enables you to recreate builds on demand.

Process Configurability

Rational ClearCase provides the flexibility to implement program, project, and site-specific policies without imposing procedures or methodologies. You can use UCM out-of-box to implement and automate your SCM activities, or you can customize your process to meet specialized project needs.

Organizations can set up automated routines to monitor changes, prevent changes by unauthorized personnel, notify team members when events occur, and create permanent records of development procedures.

Rational ClearQuest

Rational ClearQuest provides flexible change and defect tracking.

Easily Adapt to the Way You Work

Out-of-the-box, Rational ClearQuest provides a proven change control process that meets the needs of most organizations, but it can also be easily customized using simple point and click features. Robust, flexible workflow support includes email notification and submission options so as change requests are updated, your team members can be informed. You can also define unique workflows for each type of change request. Any changes or updates made to your change process are automatically propagated to all of the Rational ClearQuest client interfaces.

Access Anytime, Anywhere

Wherever your team members and stakeholders are located, access to Rational ClearQuest is available. Two options are provided for Web access: a basic submit, single query Web access mode which can be made available to an unlimited number of users, and a full featured Web client.

Measuring Progress and Reporting

Rational ClearQuest provides comprehensive support for queries with extensive charting and reporting. Distribution, trend, and aging charts help you visualize complex change data. Individual team members can also generate to-do lists and run reports using the query wizard. More advanced reports can be authored using Crystal Decisions Crystal Reports*. (*Rational ClearQuest integrates with Crystal Reports Professional Edition for advanced reporting capabilities).

Distributed Change Management

A separate option to Rational ClearQuest, Rational ClearQuest MultiSite provides reliable way to share change request information with geographically dispersed team members. Using automatic synchronization, Rational ClearQuest MultiSite provides distributed teams with up-to-date access to replicated defect and change tracking information.

Rational ClearCase LT

Rational ClearCase LT is a single server version of Rational ClearCase, providing entry level version control, UCM support, and snapshot views. Ideal for small, co-located teams and projects, Rational ClearCase LT is

also included with IBM WebSphere Studio and is an integral part of the Rational Team Unifying Platform.

Rational ClearCase MultiSite and Rational ClearQuest Multisite

Geographically distributed teams are the norm in most global enterprises today. Rational ClearCase Multisite and Rational ClearQuest Multisite are products providing Rational SCM users with distributed development support including replication and synchronization of development assets and changes. Ideal for software teams that span multiple locations and time zones, yet work on common projects, Rational ClearCase MultiSite and Rational ClearQuest MultiSite are most commonly used in the following situations:

- *Project teams that build and maintain large-scale systems at multiple sites*
- *Porting, localization and customization teams working in separate facilities*
- *Licensees and OEMs who prepare and distribute custom versions of standard products*
- *Acquired development organizations or partners who coordinate work with a central integration team*

- *Software release and standardization teams that share assets across groups*

Features Include:

- *Automatic, error-free replication of project repositories between geographically distributed sites*
- *Resending information in the event of network failure and automatic recovery of repositories in the event of system failure*
- *Efficient transmission of only incremental changes that appear in Rational ClearCase repositories, reducing network resources*
- *Flexible mastership capabilities, preventing changes made from one site from overriding changes made at other sites*

SPECIFICATIONS

IBM Rational ClearCase

Client Requirements

- *Minimum: 64 MB RAM, 35 MB Hard Disk Space*

Server Requirements

- *Minimum: 128MB RAM, 70MB Hard Disk Space*

Supported Web Browsers

- *Microsoft Internet Explorer*
- *Netscape*

Supported Web Servers

- *Rational Web Platform (Based on Apache)*

Supported Environments

- *Hewlett-Packard HP-UX*
- *IBM AIX*
- *Linux, including Red Hat Intel and SuSE Linux on OS/390*
- *Silicon Graphics IRIX*
- *Sun Solaris*
- *SuSE Linux on IBM mainframe*
- *Windows XP, Windows Server 2003, Windows 2000, Windows NT*

IDE Integrations

- *IBM WebSphere Studio*
- *Eclipse*
- *Microsoft Visual Studio .NET*
- *IBM VisualAge for Java*
- *Sun Forte for Java and C++*
- *Sybase PowerBuilder*
- *All SCC compliant tools*

Web authoring tools

- *Macromedia HomeSite*
- *Microsoft FrontPage/Office*

Mainframe Connectors

Remote Build Servers

- *OS/390-MVS and USS*
- *z/OS-MVS and USS*

IBM Rational ClearQuest

System Requirements

- *PC-compatible Pentium microprocessor with 133 MHz or better*

ClearQuest Client and ClearQuest Designer

- *Windows XP Professional, Windows 2000, Windows NT (minimum 64 MB RAM)*

Rational ClearQuest Linux and UNIX

- *Hewlett-Packard HP-UX*
- *IBM AIX*
- *RedHat Linux*
- *Sun Solaris*

Terminal Server Client

- *Citrix MetaFrame*
- *Windows 2000*

Supported Web Browsers

- *Microsoft Internet Explorer*
- *Netscape Navigator*

Supported Web Servers

- *Microsoft Windows 2000, IIS; Windows NT, IIS*

Database Support

- *IBM DB2*
- *Oracle*



- *Microsoft SQL Server*
 - *Microsoft Access (runtime included)**
 - *Sybase SQL Anywhere (included)**
- * Not available with Rational ClearQuest Multisite

IBM Rational ClearQuest Multisite

Supported Databases, Windows clients

- *Hewlett-Packard HP-UX*
- *IBM AIX*
- *Red Hat Linux*
- *Sun Solaris*
- *Windows 2000, Windows NT*

Supported Databases, UNIX clients

- *Hewlett-Packard HP-UX*
- *IBM AIX*
- *Sun Solaris*
- *Red Hat Linux*

IBM Rational ClearCase LT

Client Requirements

- *Minimum: 128 MB RAM, 35 MB HardDisk Space*

Server Requirements

- *Minimum: 256MB RAM, 70MB Hard Disk Space*

Supported Web Browsers

- *Microsoft Internet Explorer*
- *Netscape*

Supported Web Servers

- *Rational Web Platform (based on Apache)*

Supported Environments

- *Hewlett-Packard HP-UX*
- *IBM AIX*
- *Linux*
- *Sun Solaris*
- *Windows XP Pro, Windows Server 2003, Windows XP, Windows 2000, Windows NT*

Product Integrations

- *IBM WebSphere Studio*
- *Eclipse*
- *Microsoft Visual Studio .NET*
- *IBM VisualAge for Java*
- *Sun Forte for Java and C++*
- *Sybase PowerBuilder*
- *Borland JBuilder*
- *All SCC compliant tools*

IBM Rational ClearCase MultiSite

Supported Environments

- *Hewlett-Packard HP-UX*
- *IBM AIX*
- *Linux*
- *Silicon Graphics IRIX*
- *Sun Solaris*
- *Windows XP Pro, Windows NT, Windows 2000*

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