



Rational ClearCase v7.0.1 Release Report

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1 Introduction

This document provides a high-level overview of the content of the Rational ClearCase 7.0.1 release, and highlights the value of this release to IBM Rational customers.

2 Summary

The Rational ClearCase 7.0.1 release focused on two major areas of product improvement: quality (including new features), and stability.

In terms of quality, focus during this release was given to the following key quality indicators:

- **Capability** – This quality indicator describes the new features or functionality being included in this release.
- **Usability and consumability** - These quality indicators express the enhanced functionality targeting the improved user experience.
- **Performance, scalability, and availability** - These quality indicators focus on improvements to response time, supported load and uptime of the product. Each of these measurable targets were compared against the 7.0 release benchmarks.
- **Security** - This quality indicator describes the improvements in the ability to protect the product, such as restricting user access.
- **Serviceability** - This quality indicator describes improvements in the ability to get assistance when using the product. This includes, but is not limited to, documentation and diagnosing problems encountered in the environment.
- **Reliability** - This quality indicator focuses on improvements to quality in terms of internally found defects (non-APARs), and customer found defects (APARs). Commitments are made around defects found during the testing of the release under development, and defects that have been reported against earlier versions of the product.

For detailed information about the improvements that were made in each of these areas, see Section 3.

To ensure the improved stability of the product, the following types of testing were performed:

- **Functional Verification Testing (FVT)** - Testing focusing on testing new features added, and ensuring that no regressions were introduced into existing functionality.
- **System Verification Testing (SVT)** – Testing focusing on the key quality indicators of availability, capability/functional completeness, integrations, load/stress, volume, reliability, and regression in major scenarios.
- **Globalization Verification Testing (GVT)** – Testing focusing on new features added, and ensuring that no regressions were introduced into existing functionality when using the product with non-English data.
- **Translation Verification Testing (TVT)** – Testing to ensure translation of our product and documentation in the supported languages has been completed successfully.
- **In-House Deployment (IHD)** - Testing involving the use of pre-release version of Rational ClearCase 7.0.1 in the development of the product.

More information, including the types of tests run in each area, see Section 4.

3 Rational ClearCase v7.0.1 features, enhancements and quality

This section details quality improvements to Rational ClearCase as a result of new features and enhancements added in the 7.0.1 release.

3.1 Capability

The following capabilities were added to Rational ClearCase in the 7.0.1 release.

ClearCase Remote Client (CCRC)

Support for base ClearCase integration with Rational ClearQuest

CCRC supports the base ClearCase (non-UCM mode) ClearQuest v2 integration, with the same functionality as the native ClearCase client. Version 2 of the Base ClearCase/ClearQuest Integration runs on CCRC supported platforms.

Increase use cases supported for server side triggers

This release completes support for server side triggers. Files in the CCRC client's copy area are kept consistent with the server state after a server-side trigger operation. The copy area is now automatically updated after server side triggers modify files during checkout or check-in, and uncheckout triggers that remove empty branches also works in the CCRC 7.0.1 release.

Eclipse Logical Resource support

The CCRC plug-in now provides support for the Eclipse Logical Resource Model API in a Base CC or Single Stream UCM environment. For example, users of CCRC in the context of Rational Software Architect 7.x will have their models treated as a logical unit, even though stored in multiple files in Rational ClearCase, resulting in improved model consistency and integrity.

Support for UCM alternate target delivery from development stream

There is more complete support for the UCM Deliver operation in CCRC. Users can now select a target stream for delivery other than their default target stream.

CCRC UCM integration with Rational ClearQuest by using ClearQuest Web on the UNIX system

Prior to v7.0.1, the ClearCase UCM integration with Rational ClearQuest in CCRC was only supported on Windows and Linux platforms. The integration is now supported on all CCRC supported UNIX platforms using Rational ClearQuest Web to access ClearQuest operations.

Support for unreserved, non-mastered checkout

CCRC users can perform unreserved, non-mastered checkouts on versions not mastered at their local replica.

UCM 'deliver with checkouts' and 'rebase with checkouts' policies

CCRC supports the new 'Rebase with checkouts' and 'Deliver with checkouts' policies. The Deliver with checkout policy involves allowing a user to deliver activities with checkouts or hijacked files. The Rebase with checkouts policy allows Rebase operations to proceed in UCM views, even if there are checked out or hijacked files. This functionality is also available in the full ClearCase client.

Support for Sun Solaris 10 non-global zones on Sun Sparc and x86

This support covers installation, running, and upgrading in a Non-Global Zones environment on Solaris 10. Non-global zones is supported for Solaris 10 running on both Sparc and x86. With this new functionality, customers running Rational ClearCase can fully leverage their Solaris 10 deployment and hardware investment.

Shared Memory Lock Manager (SMLM) for Solaris x86

SMLM was implemented on Solaris x86. The Shared Memory Lock Manager (SMLM) provides for greater performance and scalability on VOB servers where there are many VOBs (greater than 60) hosted, and the server hardware has multiple CPUs. This component enables Rational ClearCase to take advantage of the hardware better to provide faster response times while serving many more users concurrently.

3.2 Usability and consumability

The following usability and consumability improvements were added to Rational ClearCase in the 7.0.1 release to improve the user experience with the product.

ClearCase Remote Client

Support for multiple versions of CCRC on the same workstation

CCRC v7.0.1 clients can co-exist with previous versions on the same workstation. For the CCRC plug-in, only one version can be active at a time, but the plug-ins for multiple versions can be present in a shell and users can employ the Manage Configuration feature to switch between them.

Support for a user to load a resource by path name

If the user has a pathname to a resource, this new interface provides a way for the user to quickly locate and load that resource.

3.3 Performance, scalability, and availability

Performance, scalability, and availability describe the measurable targets that are used to assess readiness of the offering. Performance baselines were gathered for base ClearCase, UCM, and CCRC. During the 7.0.1 release, performance results were compared against the 7.0 data sheets; no regressions were found.

For more information about the performance testing done for the 7.0.1 release of Rational ClearCase, go to www.ibm.com/developerworks/rational/performance.

The following areas were covered during the performance testing:

Rational ClearCase core

Tests were conducted to measure performance of the Rational ClearCase client as a single-user in both a large VOB scenario and a small VOB scenario.

For more information refer to the following datasheets posted at the performance URL:

IBM Rational ClearCase Core 7.0.1 Single User Performance Report (RedHat Linux)

IBM Rational ClearCase Core 7.0.1 Single User Performance Report (Windows)

Rational ClearCase UCM

Performance test runs were conducted for several component scenarios (1, 4, 16, 64, 128 and 256 modifiable components).

For more information refer to the following datasheets posted at the performance URL:

IBM Rational ClearCase 7.0.1 UCM Component Scalability Performance Report

ClearCase Remote Client

A series of tests were conducted to measure performance and scalability. The first set of tests measured CCRC Web server response times under a single-user load. The second set of tests measured scalability (server response times for user loads ranging from 25 to 200 users).

For more information refer to the following datasheets posted at the performance URL:

IBM Rational ClearCase Remote Client 7.0.1 Performance Report (Windows)

IBM Rational ClearCase Remote Client 7.0.1 Performance Report (Solaris)

IBM Rational ClearCase Remote Client 7.0.1 Performance Report (RedHat Linux)

High Availability (HA) related features in the release:

Veritas Cluster Server (VCS) support was added to the 7.0.1 Rational ClearCase release to facilitate HA

This feature provides automatic failover support of all the Rational ClearCase server processes (Registry, VOB, View, License, Syncmgr), with as little downtime for users as possible on Solaris using Symantec's Veritas Cluster Server. Failover to a secondary Rational ClearCase server is automated and does not require a ClearCase restart on the failover node for Symmetric use cases. Emphasis is on use cases that support crash recovery.

Here are the performance highlights from the 7.0.1 release:

*The UCM **rebase -recommended** command performance was improved by 30% over version v7.0.*

*The UCM **deliver complete** command performance was improved by 25% over the v7.0 baseline*

3.4 Security

The following security improvements were added to Rational ClearCase in the 7.0.1 release.

ClearCase Remote Client

Multiple region support for the server

Administrators can partition their VOBs into multiple regions and map which users can access which region, thereby restricting the set of VOBs each user can access.

Support for the CLEARCASE_GROUPS environment variable

From the CCRC client, the user can now specify a group list which is passed to the CCRC Windows server to be used as the CLEARCASE_GROUPS environment variable. This group list specifies which Windows groups Rational ClearCase should consider when checking the user's access rights.

3.5 Serviceability

The following serviceability improvements were added to Rational ClearCase in the 7.0.1 release to improve access to assistance when using the product.

Availability of the update Rational ClearCase v7.0 plug-in for IBM Support Assistant

The updated Rational ClearCase v7.0 plug-in is now available for download via IBM Support Assistant. IBM Support Assistant (ISA) is a free local software serviceability workbench that

helps you resolve questions and problems with IBM software products. You can find more information about ISA at:

<http://www.ibm.com/software/support/isa/>

With the update to the Rational ClearCase v7.0 plug-in, you can quickly access Rational ClearCase v7.0.1 information and simultaneously search across many IBM knowledge repositories, including the Rational ClearCase Information Center. Additionally, two [Clearbug collectors](#) (full and quick) and a winMSD collection script are included that can help you quickly gather data the support team needs to provide assistance.

Availability of Rational ClearCase v7.0.1 Information Center

All product documentation is now available from the Rational ClearCase v7.0.1 Information Center, which is based on IBM Eclipse Help System (IEHS) technology and located at:

<http://publib.boulder.ibm.com/infocenter/cchelp/v7r0m1/index.jsp>

The Information Center contains a search utility that can search the entire information center or only selected topics. You can also print individual topics or a hierarchy of topics. The Rational ClearCase v7.0.1 Information Center contains updated content that is not in the media version of the product. In earlier releases, updated content was published in the "Documentation updates" chapter of the *IBM Rational ClearCase and ClearCase MultiSite Release Notes*.

For more information about the new features, see the IBM Rational ClearCase and ClearCase Multisite Release Notes; go to

http://publib.boulder.ibm.com/infocenter/cchelp/v7r0m1/topic/com.ibm.rational.clearcase.help.doc/cc_ms_release_notes.htm

For information about supported platforms, see the Tech Note "System Requirements for ClearCase 7.x"; go to

<http://www.ibm.com/support/docview.wss?rs=0&uid=swg21239315>

3.6 Reliability

Reliability commitments focus on the improvement of the quality of the product in terms of two classes of defect: APARs and non-APARs. An APAR is a defect that has been reported by a customer, whereas a non-APAR is an internally found defect. Commitments are made around two areas: defects found during the testing of the current release under development, and defects that have been reported against earlier versions (backlog defects).

The severity distribution for the fixes in this release is shown below, with DS1 being most severe and DS4 being least severe.

3.6.1 Defects found in the 7.0.1 Release

Figure 1 compares the number of incoming defects verses the number of defects closed in a given period of time. When the closed rate meets or exceeds the incoming rate, it is an indicator of the team's ability to keep up with the testing efforts performed and stay ahead of issues and defects found during the same period. When the incoming rate exceeds the closed rate, it indicates that the defect backlog is growing. Figure 1 shows that for many weeks the number of defects closed exceeded the incoming defects, demonstrating that we were reducing our backlog of open defects in the product.

Figure 1 describes the trend in defects processed by the team over the course the 7.0.1 release. There are typically spikes in defects found during the initial time period following

the introduction of a feature to the code stream. As time passes and testing continues, the defects introduced earlier are closed and the incoming rate declines, indicating that the code is stabilizing, and no new regressions are being found.

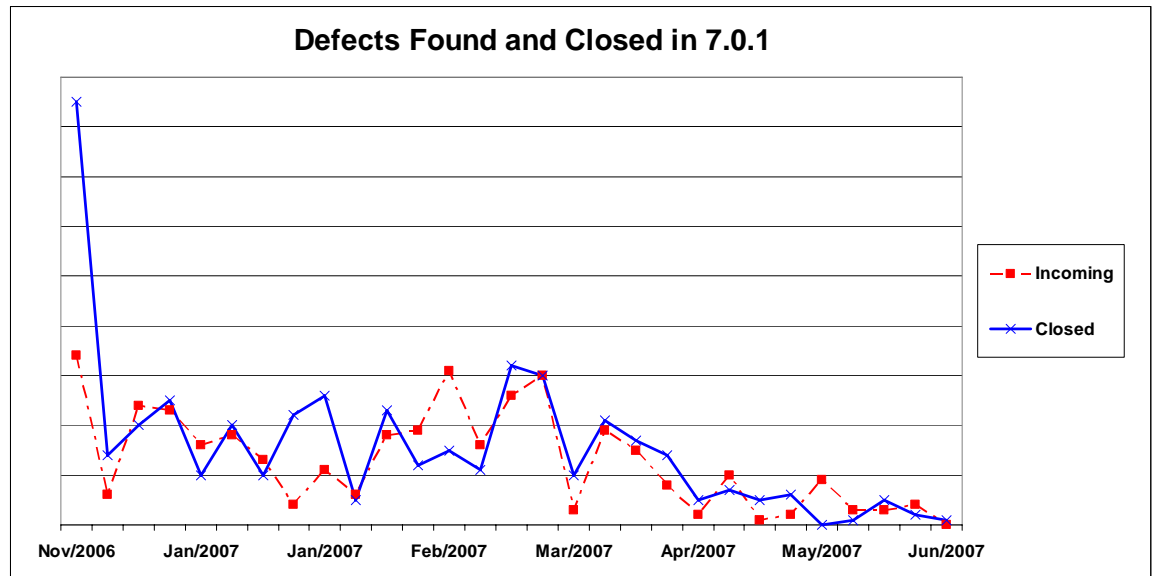


Figure 1: As the general availability date approached, the number of defects dropped, reflecting the code's stability, while the testing continued.

For the 7.0.1 release, the commitment was to close 100% of DS1 defects and 80% of DS2 defects found in the 7.0.1 release. Figure 2 shows that the DS1 and DS2 defect commitment were met, with 100% of DS1 and 83% of DS2 defects found in the release closed.

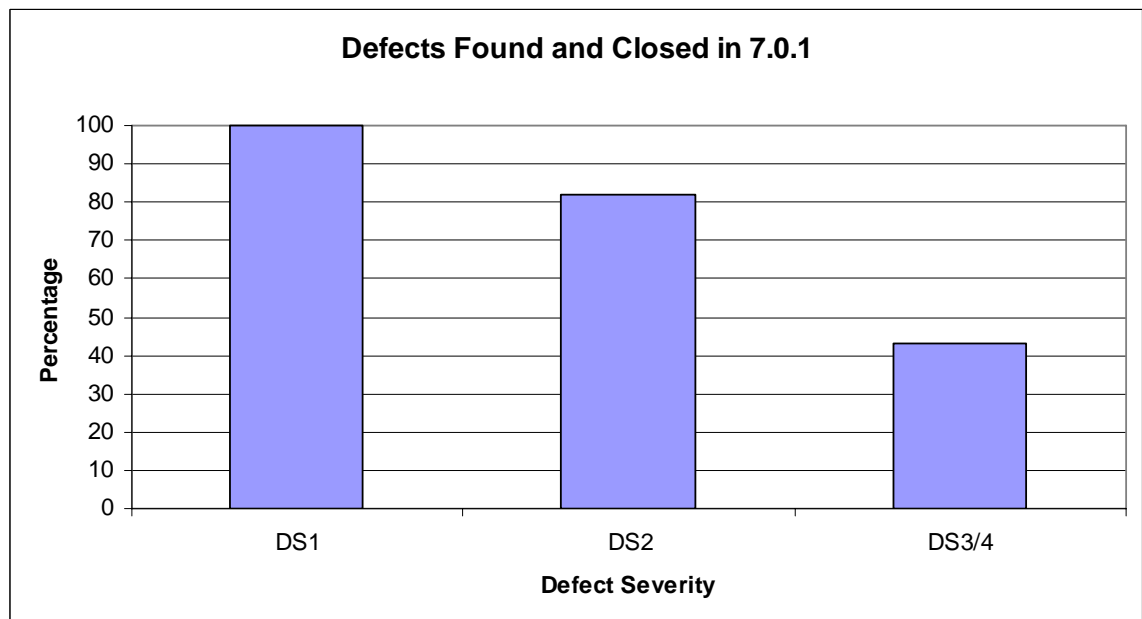


Figure 2: 100% of DS1s closed and over 80% of DS2s closed

3.6.2 APAR and non-APAR backlog defects closed in v7.0.1

Backlog defects are identified as those defects that were found prior to the development and testing of the 7.0.1 release. Defects can be grouped into two broad categories: APARs and non-APARs. An APAR is a customer reported defect, while a non-APAR is an internally found defect against an earlier release. Commitments are made in terms of each of these categories.

A commitment was made to close 14% of the open APARs. Rational ClearCase exceeded that commitment by closing out 42% of all outstanding APARs. The 42% reflects APARs resolved in the 7.0.1 release, as well as APARs fixed in 7.0 iFixes and FixPacks and merged into the 7.0.1 release.

In Rational ClearCase v7.0.1 the overall defect backlog was reduced by 53%. As part of this reduction, the backlog of DS1 defects was reduced by over 70% and DS2 defects by approximately 50%. Figure 3 reflects this reduction, and provides a comparison between APAR and non-APAR defects that were closed.

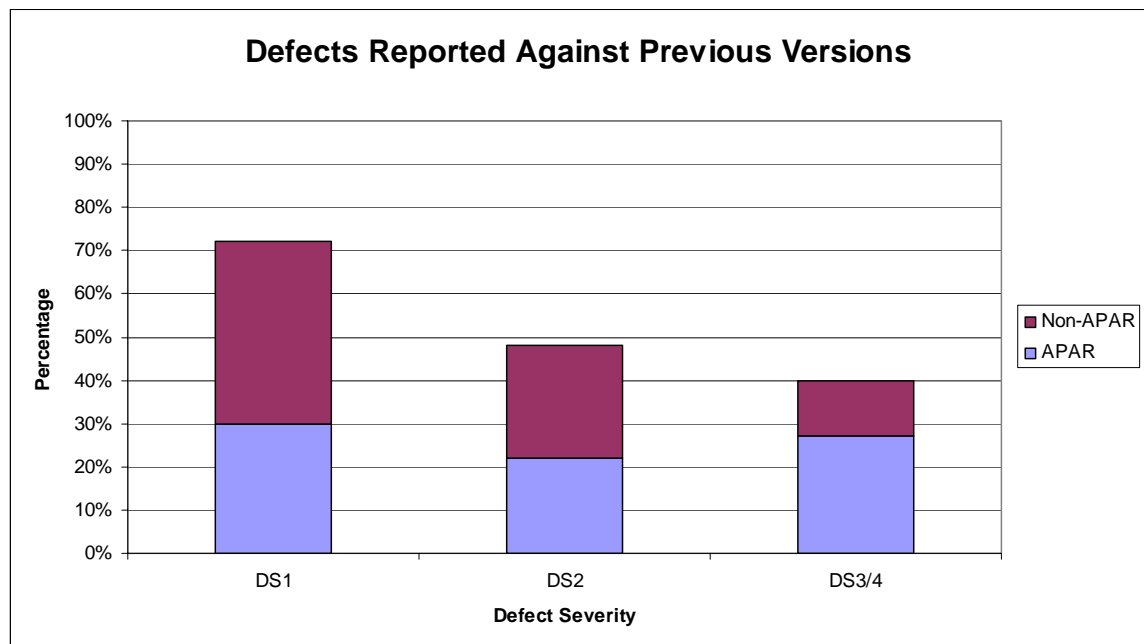


Figure 3: The DS1 defects backlog was reduced by over 70% and DS2 defect backlog was reduced by approximately 50%.

4 Testing effort

This section provides insight into the type of testing that was performed to ensure the quality of the release. This section covers Functional Verification Test (FVT), Globalization Verification Test (GVT), Translation Verification Test (TVT), System Verification Test (SVT), and the In-House Deployment efforts.

4.1 Functional Verification Testing

For the 7.0.1 release, the methodology used for FVT was iterative and test driven development. The testing effort included functional testing of new capabilities, regression testing, upgrade, migration, and cross-version testing. Figure 4 shows spikes in incoming defects as a result of the introduction and testing of new capabilities.

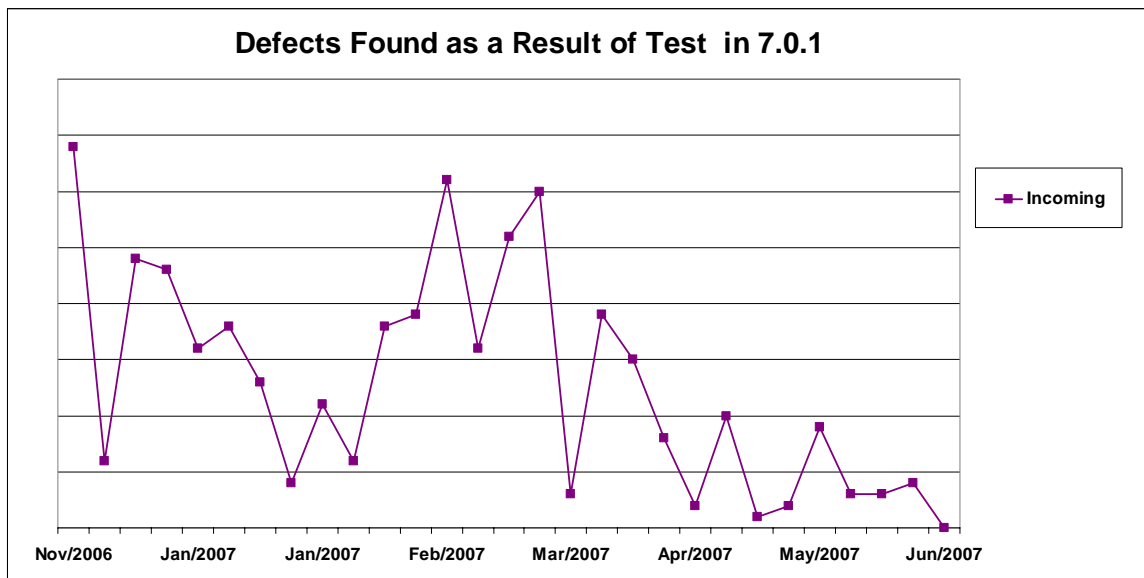


Figure 4: The progression of code stabilization in Rational ClearCase v7.0.1

As the introduction of new capabilities concluded, testing began for upgrade, migration, cross-version compatibility, and functional regressions. While testing continued, the number of defects decreased, as seen in Figure 4, which indicated that the code had stabilized. The regression test suites included manual tests, automated API tests, and automated GUI tests.

FVT regression test suites for the 7.0.1 release focused on the following areas:

- Automated
 - Rational ClearCase Command Line Interface (CLI)
 - Rational ClearCase MVFS
 - Rational ClearCase MultiSite
 - Integration with Rational ClearQuest
 - Rational ClearCase GUI
- Manual

- Installation and Site Prep
- CCRC
- Rational ClearCase GUI
- Integrations with Rational ClearQuest

4.2 System Verification Testing

The SVT effort focused on the key quality indicators of availability, capability/functional completeness, integrations, load/stress, volume, reliability, and regression.

The SVT effort for the 7.0.1 release involved the following major scenarios:

- The virtualized Rational ClearCase data center scenario focused on Rational ClearCase support for Solaris non-global zones. Customers can use this feature to consolidate their Rational ClearCase infrastructure onto large (multi-CPU) systems by partitioning the large system into logically separate servers. This scenario tested the scalability of the Rational ClearCase multi-version file system under extreme concurrency. The tests attempted user load including 200-user view server plus 30 virtualized workstations.
- The ClearCase High Availability Scenario used Veritas Cluster Server to implement failover in a Rational ClearCase deployment. Tests included cluster user-load ranges from 100 to 200 users, and included replication. Tests had a transactional load of approximately 10 Cleartool commands an hour per user running against a server when the failure event would occur.
- The Application Lifecycle Management scenario addressed the focused on cross Rational product use cases. The Traceability use case examined reporting and compliance features of Rational ClearCase, Rational ClearQuest, Rational ClearQuest Test Manager, and Rational Requisite-Pro, with a focus on reporting that spans products in a realistically-sized test environment.
- The secure CCRC deployment scenario examined the ability of the CCRC v7.0.1 server to map users to a particular Rational ClearCase registry region at login time. Rational ClearCase views and VOBs can be hidden by creating multiple registry regions. Tests were run under realistic customer load levels of 50 concurrent developers.
- The system test effort also included 10-day reliability tests for a 6-site Rational ClearCase deployment under a workload of 1 million changes per week. These tests prove the reliability of Rational ClearCase under high load (500,000 changes per week) for 10 days, in a complex deployment topology, with a primary focus on MultiSite. The test bed covers all major platforms, cross-revision, and interoperability configurations.

4.3 Globalization Verification Testing

This team was also responsible for responsible for was Globalization Verification Testing (GVT). GVT regression testing was performed to ensure that pre-existing functionality continued to work properly. The languages used for GVT regression testing included: Spanish, Simplified Chinese, Traditional Chinese, Japanese (shift_jis, ja_JA, and EUC-JP) , and Korean.

This testing was performed in the following areas:

- Rational ClearCase integration with Rational ClearQuest

- Rational ClearCase Web
- CC.NET
- Base ClearCase
- Rational ClearCase MultiSite
- CCRC (Base ClearCase functionality, UCM functionality, and Eclipse plug-in/integration functionality).

4.4 Translation Verification Testing

The v7.0.1 TVT effort included verification that all of the translated text, both in the documentation and the product itself, was properly formed in the target language. The effort focused on new features and fixes added during the release, as well as those features and fixes rolled up from earlier patches. The effort was very successful; 100% of translations were completed and verified as properly formed statements. TVT was performed for Rational ClearCase in English and Japanese. For CCRC TVT was completed for English, German, French, Italian, Portuguese, Spanish, Simplified Chinese, Traditional Chinese, Japanese, and Korean.

4.5 In-House Deployment

As part of the overall testing strategy, IBM-Rational began deploying Rational ClearCase v7.0.1 starting in January of 2007; production servers and clients were using the 7.0.1 version throughout the release. Because the Rational ClearCase development team is located all over the world, the IHD testing effort was a global, with participants in India, China, and Brazil, as well as the United States. Globally distributed teams that were using the CCRC client also participated in the IHD testing effort.