



## Migrating a ClearCase Community to Version 2002.05.00

**ABSTRACT:** This document provides a summary of issues to consider when planning for and carrying out a deployment of Rational ClearCase version 2002.05.00 (ClearCase 5.0) at a site where ClearCase is already in use.

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### 1 Introduction

Deploying Rational ClearCase version 2002.05.00 (ClearCase 5.0) at a site where ClearCase is already in use is a straightforward procedure, especially for smaller sites that can upgrade all their server and client hosts at the same time. Additional planning and preparation may be required for sites that fall into any of the following categories:

- Sites that must operate with a mixture of ClearCase 5.0 and 4.x hosts while they carry out the upgrade over a longer period
- Sites that use Rational ClearCase MultiSite
- Sites that use UCM
- Sites that use an integration of ClearCase with Rational ClearQuest
- Sites that use nonreference platforms as ClearCase servers or are still using ClearCase releases earlier than 4.0.

This paper summarizes the issues that may arise as a ClearCase community migrates to ClearCase 5.0. It suggests guidelines for planning and managing the migration to minimize or avoid disruption of ongoing work, regardless of the ClearCase community's size or geographic distribution.

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### 2 Issues to Consider When Planning The Migration

The ClearCase administrator at any site that has more than a few ClearCase servers should consider several issues when planning the site's migration. Issues described in this section have the potential to affect any ClearCase user. Other sections of this document describe issues that affect only users of UCM or ClearQuest, or users of both.

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## Interoperation with Earlier Releases

Interoperation between ClearCase 4.x and ClearCase 5.0 is supported, with the following limitations:

- ▶ ClearCase 5.0 servers can interoperate with ClearCase 4.x clients.
- ▶ ClearCase 5.0 clients cannot interoperate with ClearCase 4.x servers.
- ▶ Servers and clients running ClearCase releases earlier than 4.0 cannot interoperate with servers or clients running ClearCase 5.0.
- ▶ Additional restrictions apply to UCM projects in which a mixture of 4.x and 5.0 clients participate. For more information, see *Issues for UCM Projects*.

**NOTE:** Because of these limitations, we recommend upgrading ClearCase hosts in a specific order. For more information, see *Upgrade Servers First* on page 4.

Any ClearCase 4.x server or client can be upgraded to ClearCase 5.0. Servers and clients running releases earlier than ClearCase 4.0 cannot be upgraded directly to ClearCase 5.0; they must be upgraded to a 4.x release first.

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## New View Database Format

ClearCase 5.0 introduces a new format (schema) for the view database. The database is reformatted automatically by the view server when the view is first accessed. You may also reformat the view database manually using the **reformatview** command. We suggest that you take this step for views with large databases. Otherwise, the first user to access a view with a large database may experience a time-out error while the view server reformats the database.

After a view database is reformatted to the new schema, it cannot be reformatted to an earlier schema. If you need to revert a view server host to ClearCase 4.x after it has been upgraded to ClearCase 5.0, you must remove its views, then restore them from 4.x backup media after you reinstall ClearCase 4.x. You cannot move a view from a 5.0 host to a 4.x host.

**NOTE:** When you reformat a view that was created prior to ClearCase 3.2, the **view\_server** will log messages of the form

```
Ok: *** db_VISTA database error -2 - invalid set"
```

in the **view\_log** file. You may ignore these messages.

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## New Feature Level

ClearCase 5.0 introduces a number of new UCM features. Some of these features are available as soon as a server or client host is upgraded. Others are available after the feature level of a project's VOBs has been raised to Feature Level 3. Many sites that use UCM will not be able to

raise the feature level on a project's VOBs until all servers and clients used for UCM development are running ClearCase 5.0. For more information, refer to the sections *Issues for UCM Projects* and *VOB Feature Levels*.

**NOTE:** All new VOBs created on a host running ClearCase 5.0 are created at Feature Level 3 and cannot be changed to a lower feature level. If you need to preserve the ability to create new VOBs at Feature Level 2, you must retain one or more ClearCase 4.x VOB server hosts on which these VOBs can be created. A VOB created on a ClearCase 4.x server can be moved to a ClearCase 5.0 server without having its feature level changed. See the *Administrator's Guide* for Rational ClearCase for information about moving VOBs.

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## New Web Interface and Web Views

Rational ClearCase 5.0 introduces a new Web interface. This interface is not compatible with Web views created by previous ClearCase Web interface clients. If you want to reuse existing Web views, we recommend that you clean them up, using the following procedure, before you upgrade the ClearCase Web server host to ClearCase 5.0.

For each ClearCase 4.x Web view:

1. Check in all checked-out files and directories, or cancel the checkouts.
2. Make a note of the files and directories that are loaded into the view. You need this information to configure the view to load these objects after the Web server host has been upgraded to ClearCase 5.0.
3. Unless the view contains important view-private files or directories (or hijacked files that you cannot convert to checkouts and then check in), delete all files and directories under the Web view root directory, but not the root directory itself.

Views that have not been cleaned up can be converted for reuse after the ClearCase Web server has been upgraded, but the procedure, which is available in online help for the Web interface, may be more difficult.

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## 3 New and Discontinued Platforms

When planning your upgrade to Rational ClearCase 5.0, consider the following list of OS platforms that have been added or discontinued since ClearCase 4.2, so that you can upgrade discontinued platforms to new OS versions as needed.

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### Reference Platforms

ClearCase 5.0 supports one new reference platform, Microsoft Windows XP Professional. No reference platforms have been discontinued in this release.

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## Nonreference Platforms

ClearCase 5.0 supports the following new nonreference platforms:

- Red Hat Linux 7.2 (kernel version 2.4.7)
- IBM AIX 5.1 (32-bit and 64-bit)
- Compaq Tru64 UNIX 5.1A
- SGI Irix 6.5.13, 6.5.14
- Caldera OpenUnix 8.0

Support for the following nonreference platforms has been discontinued in ClearCase 5.0:

- Red Hat Linux 6.2
- Compaq Tru64 UNIX 4.0F
- SGI Irix 6.5.2 - 6.5.6
- Reliant UNIX

### Nonreference Platform Availability

If any of your ClearCase hosts are nonreference platforms, your upgrade plans should take into account the 90-day interval between the reference platform release and the nonreference platform release. If all of your nonreference platforms are clients and do not need to be part of a UCM project, you can upgrade the reference platform servers as needed and continue to support a mixed network of 4.x and 5.0 hosts until the nonreference platform release is available.

If you have nonreference platforms that must be part of a UCM project, see *Issues for UCM Projects* on page 6 for more information.

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## 4 Upgrade Servers First

Because clients running ClearCase 5.0 cannot interoperate with servers running ClearCase 4.x, you must upgrade servers first. For a typical deployment of ClearCase 5.0, we suggest upgrading ClearCase hosts at a site in the following order:

1. Registry servers and license servers
2. VOB servers
3. Clients that host their own dynamic or snapshot views
4. View servers that host shared dynamic or snapshot views

## 5. Clients that use shared views

If ClearCase MultiSite is in use, this sequence applies to each site that hosts VOB replicas.

**NOTE:** ClearCase hosts that run releases earlier than 4.0 cannot be upgraded directly to ClearCase 5.0. They must be upgraded to a 4.x release first.

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## 5 VOB Feature Levels

A feature level is an integer that defines the set of features that a VOB supports. Whenever a ClearCase release introduces features that require support in the VOB database, you must raise the feature level of a VOB before clients can take advantage of the new features when accessing data in that VOB. The primary purpose of feature levels is to manage VOBs that are replicated (using ClearCase MultiSite) across server machines that are running different releases of ClearCase.

**NOTE:** You can raise the feature level of an unreplicated VOB whenever it is convenient. Replicated VOBs require additional consideration. When a VOB is replicated, each replica has a replica feature level, and the VOB family itself has a feature level. Replicas in the same family can have different feature levels. The family feature level must be equal to or less than the lowest replica feature level found among members of the VOB family. Before you raise the feature level of a VOB family, you must raise the feature levels of all replicas in that family. For more information about feature levels and VOB replicas, see the *Administrator's Guide* for Rational ClearCase MultiSite.

### Displaying the Feature Level

To display the feature level of a replica, use Windows Explorer or the ClearCase Administration Console to display the properties of the VOB. The feature level is listed on the **Custom** tab. You can also use the **cleartool** command line.

To display the feature level of a replica family, use the command **cleartool describe replica:replica-name@vob-tag**. For example:

```
cleartool describe replica:tokyo@\dev
  replica "tokyo"
    created 20-Aug-00.13:35:37 by John Cole (jcole@goldengate)
    replica type: unfiltered
    master replica: sanfran_hub@\dev
    ...
    feature level: 2
    ...
```

To display the feature level of a VOB family, use the command **cleartool describe vob:vob-tag**. For example:

**cleartool describe vob:/vobs/dev**

```
versioned object base "/vobs/dev"
  created 15-Aug-00.14:19:03 by Susan Goechs (susan.user@minuteman)
  master replica: boston_hub@/vobs/dev
  replica name: boston_hub
  VOB family feature level: 2
  ...
```

**Changing the Feature Level**

The **chflevel** command changes the feature level of a VOB. To raise the feature level of an unreplicated VOB:

1. Log on to the host that contains VOB storage directories for the VOBs you want to upgrade.
2. Issue the **chflevel** command with the **-auto** option. The command lists each VOB served by the host. It then offers to raise the feature level of each unreplicated VOB that is not already at the feature level corresponding to the release of ClearCase that is installed on the host.

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## 6 Issues for UCM Projects

If UCM is in use at your site, you should consider several additional issues before upgrading to ClearCase 5.0. These include:

- New features that are available as soon as a client has upgraded to ClearCase 5.0
- New features that are only available after the feature level of the project VOB (PVOB) has been raised to Feature Level 3
- A requirement to specify new recommended baselines for all integration streams after the feature level of the PVOB has been raised to Feature Level 3
- Changes in rebase behavior when composite baselines are used

**NOTE:** We recommend that you complete or cancel any in-progress deliver or rebase operations that were started on a ClearCase 4.x client before the client is upgraded to ClearCase 5.0. A ClearCase 5.0 client cannot complete a deliver or rebase operation started on a 4.x client. It can only cancel the operation.

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### New UCM Features

Rational ClearCase 5.0 introduces a number of new UCM features. Some of these features are available as soon as a server or client host is upgraded. Others remain unavailable, even from a ClearCase 5.0 client using a ClearCase 5.0 server, until the feature level of the PVOB has been raised to Feature Level 3 as described in *Changing the Feature Level* on page 6. (See *Managing Software Projects* for important information on new UCM features and how best to manage their introduction into existing projects.)

UCM projects that must accommodate both ClearCase 5.0 and ClearCase 4.x clients will not be able to use the new UCM features listed in *Features That Depend on Feature Level 3* until the feature level of the PVOB has been raised to Feature Level 3. In such an environment, ClearCase 5.0 clients can use only those UCM features available to ClearCase 4.x clients.

After the PVOB has been raised to Feature Level 3, the ClearCase 4.x clients cannot perform any UCM operations in the project's component VOBs and cannot perform any ClearCase operations in the PVOB.

**NOTE:** It is only necessary to raise the feature level on the PVOB to use new UCM features that depend on Feature Level 3; component VOBs can remain at Feature Level 2 if necessary. Raising the feature level on these VOBs improves performance of some UCM operations. We recommend raising the feature level on all VOBs as soon as practical.

### Features That Depend on Feature Level 3

The following UCM features become available when the feature level of the PVOB is raised to Feature Level 3:

- Creation of composite baselines
- Creation of components without VOB root directories
- Using composite baselines to configure a stream
- Storing multiple components in a VOB
- Creation of nested streams
- New stream configuration policies (use of baselines created in other streams of a project) and recommended baseline model.
- The ability to bind different projects in a single PVOB to different ClearQuest user databases

### Other New Features

The following UCM features are available on a client as soon as it has been upgraded to ClearCase 5.0, regardless of the PVOB's feature level. If your UCM project must accommodate both 4.x and 5.0 clients, you should be aware of the potential incompatibilities these new features could introduce.

- **Permissions:** Additional permission checks performed by UCM operations in ClearCase 5.0 are not performed by ClearCase 4.x clients. You cannot rely on these permission checks to implement a development process when a project supports both 4.x and 5.0 clients.
- **Triggers:** ClearCase 4.x clients are not aware of the new UCM triggers included in ClearCase 5.0. You cannot rely on these triggers to implement a development process when a project supports 4.x and 5.0 clients.
- **Policies:** New project and stream policies that can be set and used by ClearCase 5.0 clients are ignored by ClearCase 4.x clients.

- ▶ **Names and titles:** ClearCase 5.0 clients do not assign titles to folders, projects, or streams. Instead, they assign names. Existing titles remain visible to 5.0 clients. ClearCase 4.x clients cannot see the names of folders, projects, or streams created by ClearCase 5.0 clients unless they have been patched, as described in *Patches for ClearCase 4.x Clients*.
- ▶ **Modifiable components:** ClearCase 5.0 clients can change a modifiable component to a nonmodifiable component. This change also affects ClearCase 4.x clients that use the component.
- ▶ **Additional activity information:** ClearCase 5.0 clients provide additional information about a rebase or deliver activity's contributing activities. ClearCase 4.x clients cannot see this information, but can see the results of these activities when they rebase.

### Patches for ClearCase 4.x Clients

Because of changes in the way UCM handles names and titles of UCM objects, the names of new projects, streams, folders, and activities created by ClearCase 5.0 clients are not visible (will appear to be blank) to ClearCase 4.x clients unless they have been patched with one of the following ClearCase patches:

- ▶ Windows patches
  - > clearcase\_p4.2.NT-7
  - > clearcase\_p4.1.NT-23
  - > clearcase\_p4.0.NT-29
- ▶ UNIX patches
  - > clearcase\_p4.2-9
  - > clearcase\_p4.1-22
  - > clearcase\_p4.0-29

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### Baselines Must Be Explicitly Recommended at Feature Level 3

In a UCM project whose PVOB is at Feature Level 3, recommended baselines are no longer computed dynamically but must be explicitly recommended by means of GUI or command-line tools. After you raise the feature level of a PVOB, there are no recommended baselines, and you must recommend a baseline for each active project's integration stream before any of the project's development streams can be rebased. All existing baselines remain available for recommendation.

Before you raise the feature level of the PVOB:

1. Notify all project managers that the PVOB is ready to be raised to Feature Level 3



2. Ask each project manager to make a note of existing baselines that will have to be explicitly recommended after the feature level is raised.

After the feature level has been raised, use the **chstream** command to reset recommended baselines for each project's streams. The following command, where *istream* specifies the project's integration stream, recommends the baseline of a project's integration stream as the default baseline for the project:

```
cleartool chstream -recommend -default istream
```

You can automate the procedure using a **perl** command line like the one shown here:

```
perl -e "system ('cleartool chstream -recommend -default `cleartool lsproject -fmt \"%[istream]p \";"
```

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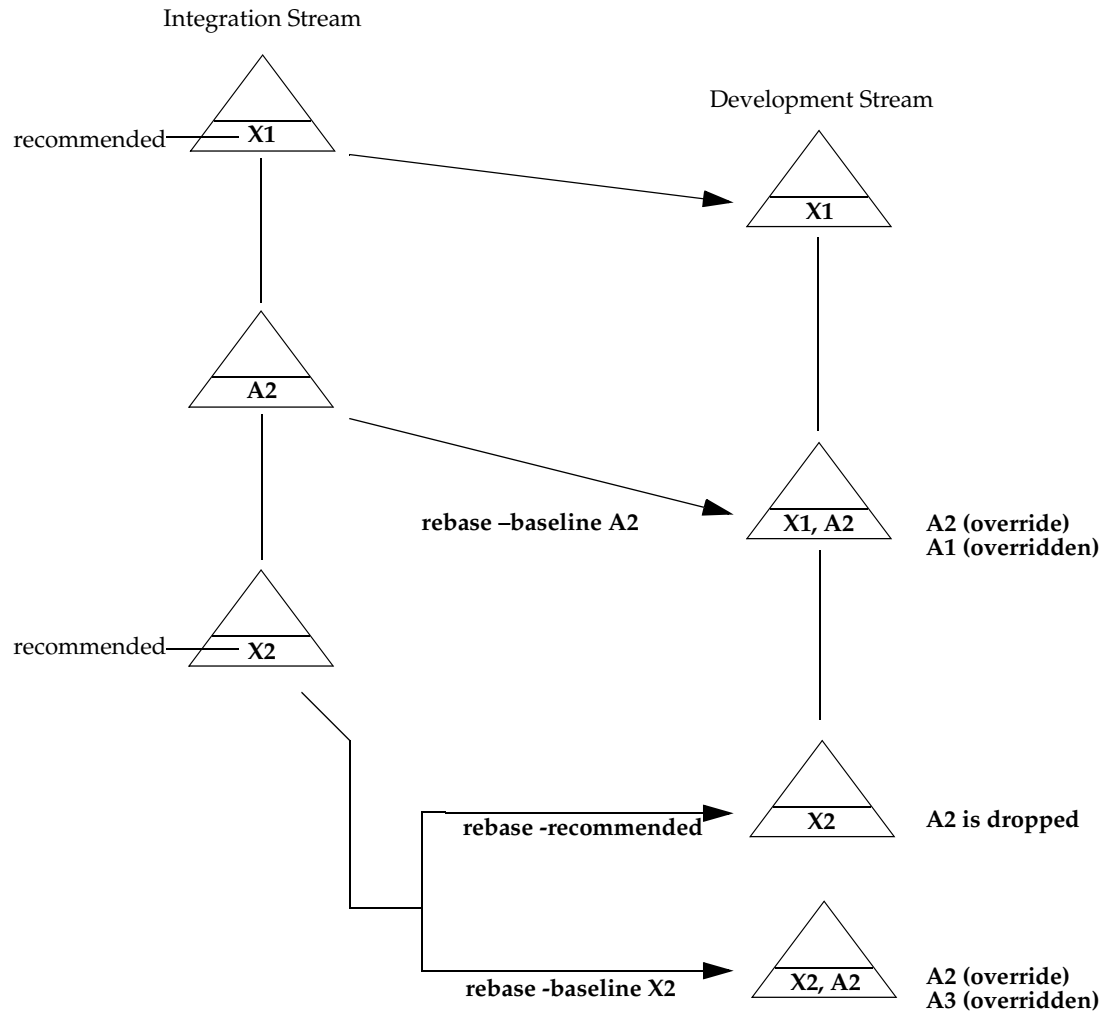
## Rebasing to a Composite Baseline

This release introduces composite baselines. A composite baseline selects baselines from other components. You can use a composite baseline to select baselines from all components in the project. Then, rather than recommending a set of baselines, one for each component, you recommend the composite baseline. Developers rebase their streams to the recommended composite baseline.

Rebasing a stream to a composite baseline may result in different stream configurations depending upon whether you use the **-recommended** or **-baseline** option with the **cleartool rebase** command. Figure 1 illustrates these differences. In Figure 1:

1. **X1** is a composite baseline that selects baselines **A1**, **B1**, and **C1**. A, B, and C are components.
2. A developer joined the project and created a development stream with a foundation baseline of **X1**.
3. Other developers delivered work to the integration stream, and the integrator created a new baseline of component A called **A2**.
4. A developer wanting to pick up the changes included in **A2** rebased to it. The development stream's foundation baselines were then **X1** and **A2** with **A2** overriding the **A1** baseline selected by **X1**.

Figure 1 Rebasing to a Composite Baseline in the Same Project



5. The integrator then created and recommended a new composite baseline, X2, which selects baselines A3, B2, and C2.
6. If the developer rebases to X2 by using the `-recommended` option, the development stream's foundation baseline is X2. Because the `-recommended` option clears existing foundation baselines, it drops the A2 baseline from the development stream's configuration.

If the developer rebases to X2 by using the `-baseline` option, the development stream's foundation baselines are X2 and A2 with A2 overriding the A3 baseline selected by X2. Use the `-baseline` option when you want to preserve a foundation baseline that conflicts with a member baseline selected by the composite baseline.

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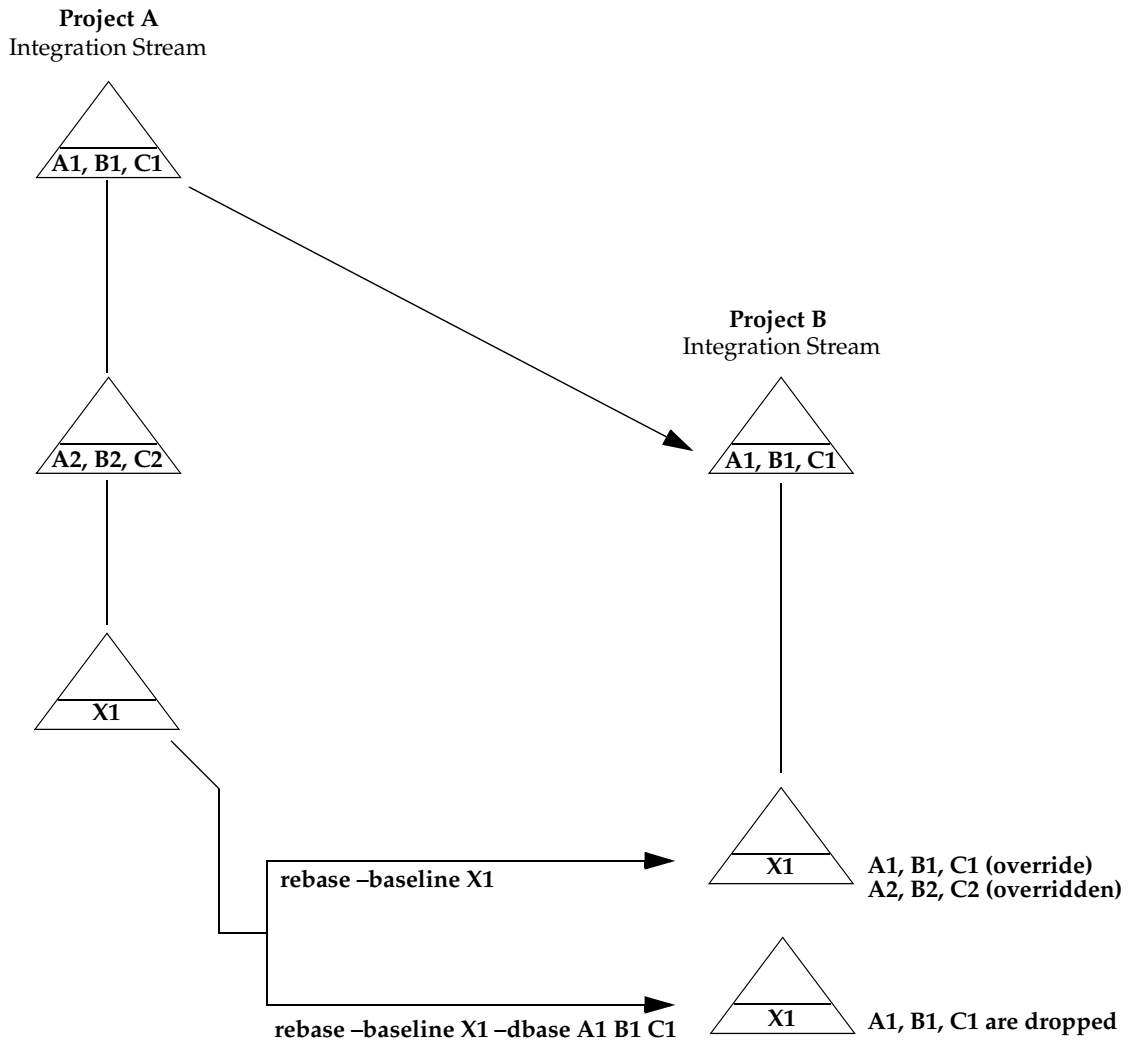
## Rebasing to a Composite Baseline in Another Project

If you have a project from a previous release, you may want to create a composite baseline that selects the final recommended baselines of that project so that follow-on projects can rebase to that composite baseline. Because you cannot use the **-recommended** option when rebasing an integration stream, you must specify the composite baseline with the **-baseline** option. Figure 2 illustrates this use case:

1. The project team had started a follow-on project, **Project B**, while still working on **Project A**.
2. When the team finished **Project A**, the integrator created a composite baseline, **X1**, that selects the final baselines, **A2**, **B2**, and **C2**, of the project's components.
3. The integrator for **Project B** wants to rebase the project's integration stream to the **X1** baseline in **Project A**. The **rebase -baseline X1** command would leave **Project B**'s integration stream with foundation baselines **X1**, **A1**, **B1**, and **C1**. Because the **-baseline** option preserves foundation baselines that conflict with member baselines of the composite baseline to which you are rebasing, **A1**, **B1**, and **C1** override **A2**, **B2**, and **C2**.

To prevent the overriding of member baselines, use the **-dbaseline** option to remove the conflicting foundation baselines from the stream's configuration. When the integrator rebases to **X1** by entering the command, **rebase - baseline X1 -dbaseline A1 B1 C1**, **Project B**'s integration stream has a foundation baseline of **X1**.

Figure 2 Rebasing to a Composite Baseline in Another Project



## 7 ClearQuest Compatibility

Sites that use an integration of ClearCase with ClearQuest, in either a UCM or base ClearCase configuration, can upgrade ClearCase and ClearQuest in any order. While Rational recommends upgrading to the latest release of ClearQuest, other releases and integration packages can be used for an indefinite period if necessary, as described in this section.

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## UCM Integration

ClearCase 5.0 UCM is compatible with both the ClearQuest 2001A and 2002.05.00 releases. ClearCase 5.0 introduces a new version of the UCM integration package, version 4.0, but it is also compatible with earlier versions, as noted in Table 1:

Table 1 ClearQuest Versions and UCM Package Revisions that are Compatible with ClearCase 5.0

ClearQuest version	UCM package revision	ClearQuest database feature level
2001a	2.0, 3.0, 4.0	3, 5
2002	2.0, 3.0, 4.0	3, 5

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## Base ClearCase Integration

Base ClearCase 5.0 is compatible with both the ClearQuest 2001A and 2002.05.00 releases.

### New Triggers

ClearCase 5.0 includes new versions of the ClearQuest integration triggers. Until these triggers are installed (using the ClearQuest Integration Configuration tool in **Start > Programs > Rational ClearCase Administration > ClearQuest Integration Configuration**), the existing ones remain in place and are used by the integration. Both the old and new triggers store the same data in ClearQuest, so you can install the new ones at any time without affecting project data. Because some of the triggers operate differently than they did in previous releases and some may require local configuration changes, we suggest that you test them in one or two VOBs first before deploying them more widely.

