Working in Base ClearCase

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1 ClearCase Concepts

Rational® ClearCase® provides a flexible set of tools that your organization uses to implement its development policies. To use these tools, you need to understand the following concepts:

- ➤ ClearCase views
- ➤ VOBs, elements, and versions
- ➤ Parallel development

Recommend Reading Paths

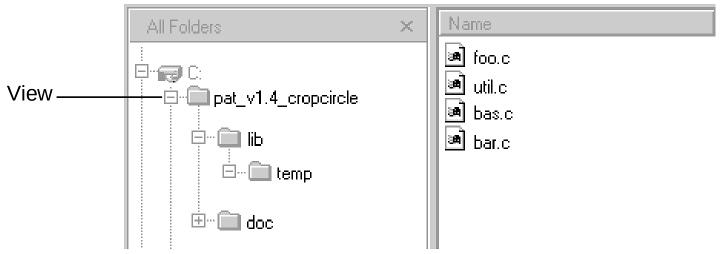
Read this chapter first. Then, if you want to start working immediately, use online help to learn as you go. Or, if you prefer a more structured approach, use the remainder of *Working in Base ClearCase* as a guide through your organization's development cycle.

The sections titled *Under the Hood* provide detailed information and suggest ways to become an advanced ClearCase user.

1.1 ClearCase Views

To access files under ClearCase control, you set up and work in a *view*. Figure 1 shows a view named **pat_v1.4_cropcircle** as seen from Windows Explorer.

Figure 1 A View as Seen from Windows Explorer



A *view* shows a directory tree of specific *versions* of source files. The view **pat_v1.4_ cropcircle** is a directory tree of source files for developing release 1.4 of the Cropcircle software product.

Snapshot Views and Dynamic Views

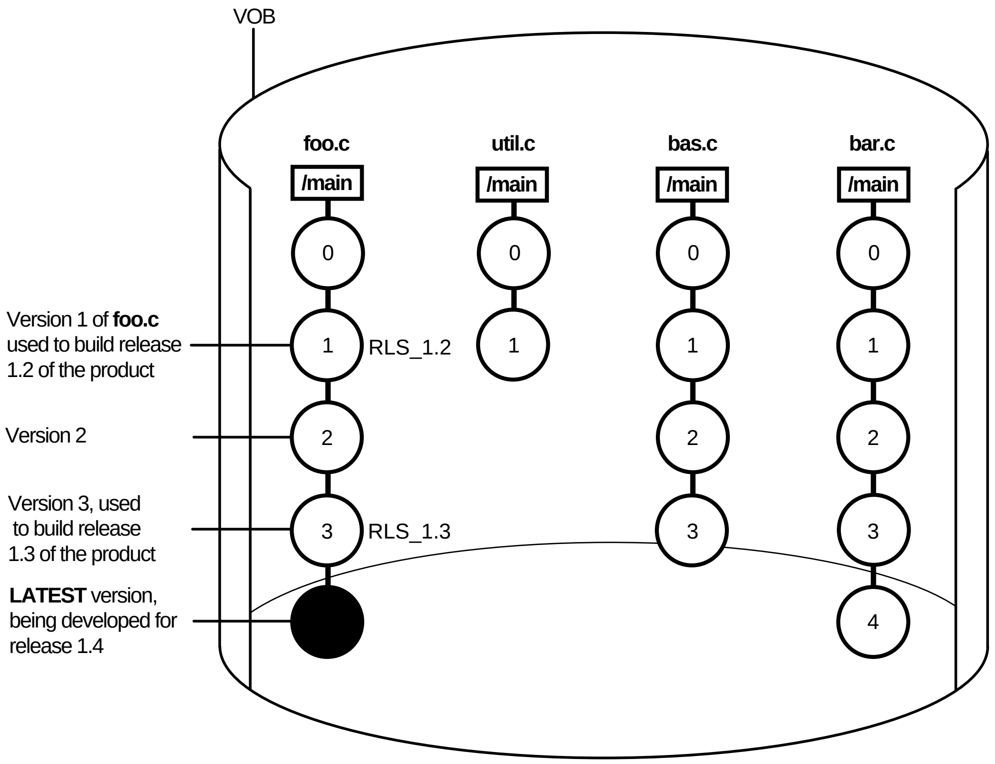
ClearCase includes two kinds of views:

- *Snapshot views*, which copy files from data repositories called *VOBs* (*versioned object bases*) to your computer.
- *Dynamic views*, which use the ClearCase *multiversion file system* (MVFS) to provide immediate, transparent access to the data in VOBs. (Dynamic views may not be available on all platforms. For more information, see the ClearCase online help.)

1.2 Versions, Elements, and VOBs

Each time you revise and check in a file or directory from a view, ClearCase creates a new *version* of it. Files and directories under ClearCase control (and all of their constituent versions) are called *elements* and are stored in *VOBs*. Figure 2 illustrates a VOB named **lib** that contains the file elements **foo.c**, **util.c**, **bas.c**, and **bar.c**.

Figure 2 A VOB Contains All Versions of an Element


VOB
foo.c
util.c
bas.c
bar.c
/main
/main
/main
/main
0
0
0
0
Version 1 of **foo.c** used to build release 1.2 of the product
1
RLS_1.2
1
1
1
Version 2
2
2
2
Version 3, used to build release 1.3 of the product
3
RLS_1.3
3
3
LATEST version, being developed for release 1.4
4

Depending on the size and complexity of your software development environment, ClearCase *elements* may be distributed across more than one VOB. For example, the elements used by the documentation group are stored in one VOB, while the elements contributing to software builds are stored in a different VOB.

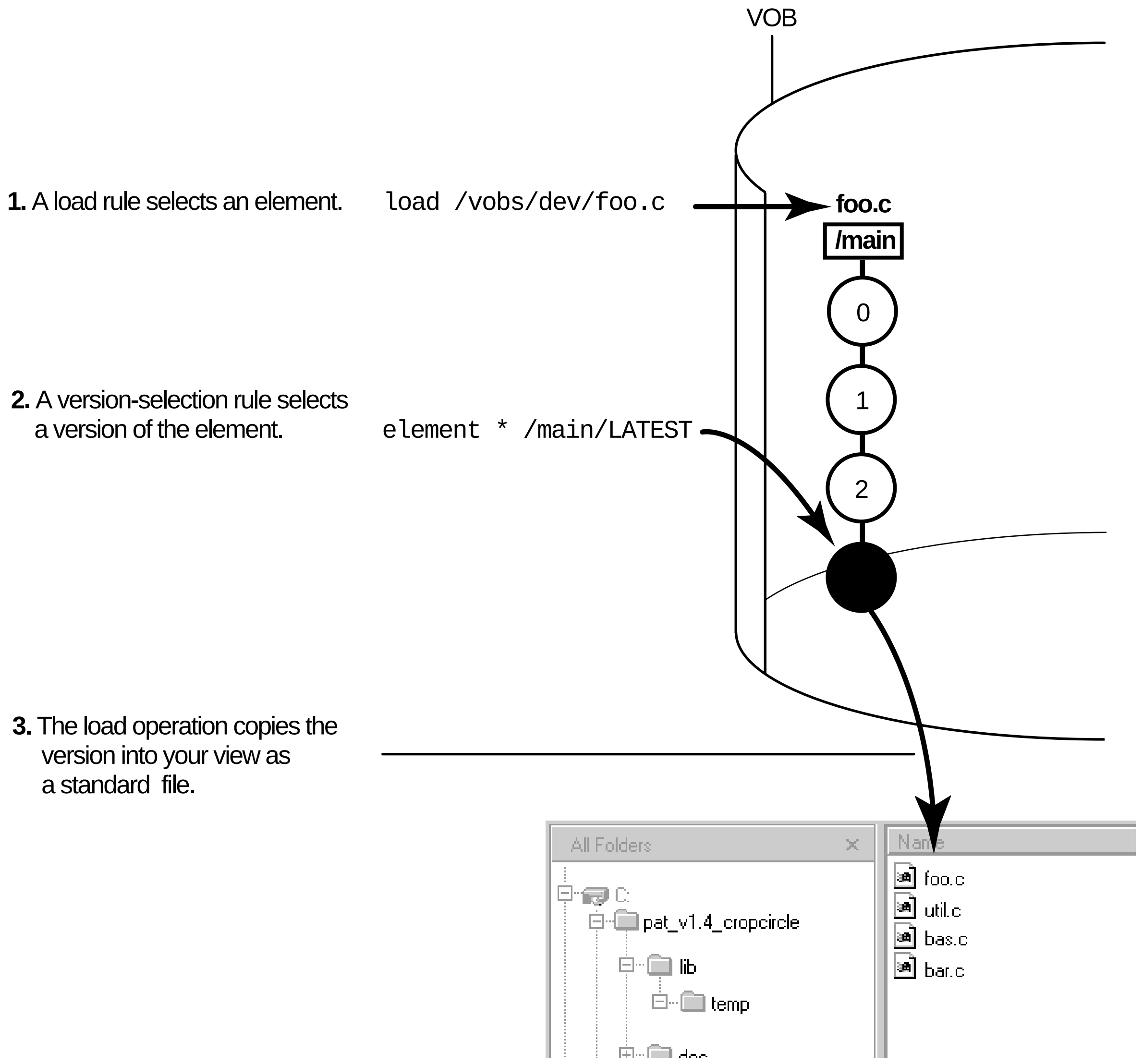
Selecting Elements and Versions

A set of rules called a configuration specification, or *config spec*, determines which files are in a view.

Config Specs for Snapshot Views

Config specs for snapshot views contain two kinds of rules: *load rules* and *version-selection rules*. Figure 3 illustrates how the rules in a config spec determine which files are in a view.

Figure 3 Config Spec Selecting Versions



1. A load rule selects an element.

```
load /vobs/dev/foo.c
```

2. A version-selection rule selects a version of the element.

```
element * /main/LATEST
```

3. The load operation copies the version into your view as a standard file.

Config Specs for Dynamic Views

Dynamic views use version-selection rules only (and ignore any load rules). A dynamic view selects all elements in all VOBs activated on your computer, and then uses the version-selection rules to select a single version of each element. Instead of copying the version to your computer as a standard file, the view uses the *MVFS* (multiversion file system) to arrange the data selected in the VOB into a directory tree.

Criteria for Selecting Versions

The rules in the config spec constitute a powerful and flexible language for determining which versions are in your view. For example, version-selection rules can specify the following criteria:

- The latest version.
- A version identified by a *label*. A label is a text annotation that you can attach to a specific version of an element. Usually, your project manager attaches a label to a set of versions that contributed to a specific build. For more information on labels, see *Managing Software Projects with ClearCase*.
- A version identified by a *time rule*, that is, a version created before or after a specific time.

The version-selection rules are prioritized. For example, the view can try to select a version identified by a label first, and if no such version exists, the view can select a version based on a time rule.

Learning the Config Spec Syntax

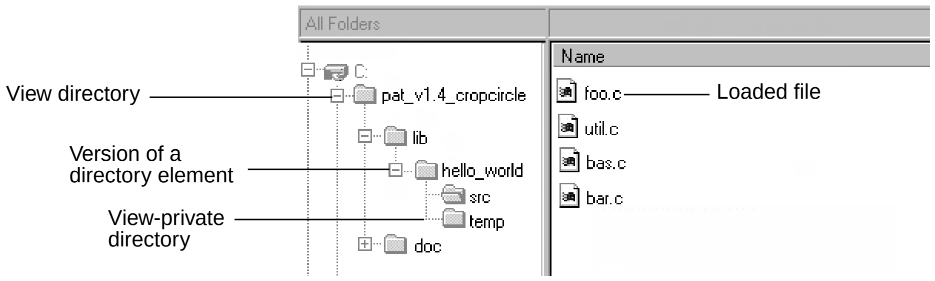
Usually only one or two members of your software team learn the syntax for these rules and creates config specs for everyone on the project to use. For more information on the rules in the config spec, see *Managing Software Projects with ClearCase* and the **config_spec** reference page in *ClearCase Reference Manual*.

View-Private Objects

In addition to versions of source files, a view also contains file-system objects that are not under ClearCase source control, such as temporary files that you create while developing your source files. These non-ClearCase file-system objects are called *view-private files* and *view-private directories*.

Figure 4 shows the **pat_v1.4_cropcircle** view with the objects labeled.

Figure 4 A View Contains Versions of Elements and View-Private Objects



1.3 Parallel Development

The combination of config spec rules, views, VOBs, and *branches* (which are described in Chapter 5, *Working On a Team*) provide the basis for *parallel development*, a strategy in which an organization can develop multiple versions of the same source file concurrently. For example, you're working on release 1.4 of a software product, and you want to experiment with the GUI as a result of feedback from usability testing. You can create a view that isolates your modifications from the rest of the release 1.4 development project. Although you work with the same set of files used in the official builds, the versions of the files you create from this view evolve separately from the versions used in the official builds. When you're satisfied with your usability modifications, you can use ClearCase tools to merge your work with the files used in the official release 1.4 build.

2 Setting Up a View

Usually you set up a separate view for each development project to which you contribute. Setting up a view involves the following tasks:

- ➤ Choosing snapshot view or dynamic view
- ➤ Choosing a name and location
- ➤ Adding or modifying version-selection rules
- ➤ Selecting elements to load into snapshot views

NOTE: If you plan to access source files stored in UNIX VOBs, you may need to create your view in MS-DOS text mode, depending on how your shared source files handle line termination sequences. For more information, see *Accessing UNIX Views and VOBs from Windows* on page 84.

The View Creation Wizard assists you in each step of setting up a view. Start the View Creation Wizard and use this chapter to complete the steps.

To start the View Creation Wizard:

1. From ClearCase Home Base, click the **Views** tab.

2. On the **Views** tab, click **Create View**.

3. The first step of the wizard asks if you want to work on a UCM project. Click **No**, and then click **Next**. If you do want to work on a UCM project, see *Working in UCM*.

2.1 Choosing a Snapshot View or a Dynamic View

Depending on how your computer is configured, the View Creation Wizard may ask you to choose to create a snapshot view or dynamic view. As described in *ClearCase Views* on page 2, snapshot views load elements onto your computer; dynamic views use the *MVFS* to arrange VOB data into a directory tree. (Dynamic views may not be available on all platforms. For more information, see the ClearCase online help.)

Work in a snapshot view when any of these conditions is true:

➤ Your computer does not support dynamic views.

➤ You want to optimize build performance to achieve native build speed.

➤ You want to work with source files under ClearCase control when you are either disconnected from the network that hosts VOBs or connected to the network intermittently from a remote location.

➤ You want to access a view from a computer that is not a ClearCase host.

➤ Your development project doesn't use the ClearCase *build auditing* and *build avoidance* features.

Work in a dynamic view when any of these conditions is true:

➤ Your development project uses build auditing and build avoidance.

➤ You want to access elements in VOBs without copying them to your computer.

➤ You want the view to reflect changes made by other team members at all times (without requiring an *update* operation).

2.2 Choosing a Name and Location

The View Creation Wizard prompts you to choose name and location information.

Choosing a Name

Each view must have a descriptive name (called a *view-tag*) that is unique within a network region. The View Creation Wizard suggests a view-tag based on the following convention: *username*_**view**. This name is designed to help you determine the owner and purpose of the view. Names like **myview** or **work** do not describe the view's owner or contents; if you work with more than one view, such generic names can lead to confusion. Here are some suggested names:

pat_v1.4_cropcircle	Personal view for development of release 1.4 of the Cropcircle product
1.3_fix	Shared view for use in a particular bug-fixing task

A view's name must be a simple name; that is, it must follow the format of a single file or directory name with no special characters or spaces.

Using the View-Tag

The way you use the *view-tag* is different for each type of view:

➤ When creating snapshot views, you must supply a view-tag for ClearCase administrative purposes. You do not refer to the view-tag when performing most ClearCase operations. Instead you refer to it in one of the following ways:

  ➢ **\\Heartland\Library\SnapshotViews\pat_v1.4_cropcircle**, which is the view's *UNC name*

  ➢ **C:\Library\SnapshotViews\pat_v1.4_cropcircle**, which is the view's path using a drive letter

  ➢ A relative path to the **pat_v1.4_cropcircle** directory

  The root directory of the snapshot view contains a hidden file, **view.dat**, which provides information that ClearCase uses to perform operations on the files in the view. When ClearCase finds the view's **view.dat** file, it can determine the view's view-tag. (If you delete the **view.dat** file inadvertently, see *Regenerating a Snapshot View's view.dat File* on page 84.)

➤ For dynamic views, the view-tag is the only name you use when performing most ClearCase operations. After activating a dynamic view, you use the view-tag to refer to the root directory of the view's directory tree. For more information, see *Accessing Files* on page 21 and the **ccase_pathnames** reference page in *ClearCase Reference Manual*.

Snapshot View: Choosing a Location

When creating a snapshot view, you must choose a location into which ClearCase *loads* (copies) files and directories. When choosing a location for the view, investigate these constraints:

➤ The view's root directory must be located on a disk with enough space for the files loaded into the view and any *view-private files* you add.

➤ If you want to access the view from other workstations, it must be located in a shared directory.

➤ Your organization may restrict where you can create a view. For example, you may be required to use a disk that is part of a data-backup scheme.

If your makefiles or other files require absolute pathnames, or if using a persistently mapped drive letter is more convenient than navigating to the view, assign it to a drive letter. For more information, see *Assigning Snapshot Views to Drive Letters* on page 78.

Under the Hood: A Snapshot View Storage Directory

Every view has a *view storage directory*. For snapshot views, ClearCase uses this directory to keep track of such information as which files are loaded into your view and which versions are checked out to it. The view storage directory is for ClearCase administrative purposes only. Do not modify anything in it.

For every 1,000 elements loaded into the view, ClearCase uses about 400 KB of disk space for the view storage directory.

Whenever possible, ClearCase creates the view storage directory for snapshot views in one of the locations on the ClearCase servers list. (ClearCase administrators or other users can create this list when they set up ClearCase servers.) Each time you create a snapshot view, ClearCase creates this directory on the ClearCase server that stores the fewest of these directories. You can, however, choose a different location.

Valid Locations for View Storage Directories

Consider the following restrictions when choosing a view storage directory location:

➤ The directory must be below a shared network resource on a Windows NT® ClearCase host. (View processes run on the machine that physically stores the view storage directory, and only Windows NT ClearCase hosts can run view processes.) The pathname for the directory must not use a Windows special share name, such as the share that is designated by *drive-letter* **$** and allows an administrator to gain access to a drive over the network. For example, **\\bread\c$\view\pat_1.4_cropcircle.vws** is not a valid pathname.

- To maintain data integrity, the location must remain connected to the network. For example, do not locate the view storage directory on a removable storage device or on a laptop.

Consider also making the view storage directory accessible to any data backup schemes your organization institutes.

To Choose a Location for a View Storage Directory

NOTE: Use this procedure only while creating a view. To change the location for an existing view storage directory, see *Administering ClearCase*.

1. While creating a view, on the step of the wizard that asks you to choose a location for a view, click **Advanced Options**.
2. In the Advanced Options dialog box, do one of the following:
   - Select **Auto-select from list of available servers**. ClearCase chooses a computer designated as a ClearCase server containing the fewest number of view storage directories.
   - Clear the **Auto-select from list of available servers** check box and choose one of the locations in the View server storage directory list or click **Browse** and choose a valid location.

Dynamic View: Choosing a Drive Letter

After you choose a dynamic view's name, choose a drive letter from which you access the view.

In addition, depending on how your computer is set up, when you click **Next**, you may be prompted to choose a location for the view's *view storage directory*.

Choosing a Drive Letter

The View Creation Wizard presents a default drive letter from which you access the versions of files and directories your dynamic view selects from the VOB. Change the drive letter if, for example, your makefiles or other files require pathnames with specific drive letters.

If your computer is running out of drive letters and you don't need to assign this view to its own drive letter, choose **{none}** and access the view from the *dynamic-views drive*, which is **M:** by default. If you choose **{none}**, you must restart the dynamic view each time you log on.

Choosing a Location for the View-Storage Directory

Every view has a view storage directory. For dynamic views, ClearCase uses this directory to keep track of which versions are checked out to your view and to store view-private objects. The view storage directory is for ClearCase administrative purposes only. Do not modify anything in it.

The size of the view storage directory depends on the following factors:

- Whether you use the **clearmake** or **omake** *build auditing* and *build avoidance* features
- The size and number of view-private files

For more information, refer to the **clearmake**, **omake** and **view** reference pages in *ClearCase Reference Manual*.

If your computer is set up to store view storage directories, ClearCase reduces communication over the network by locating the view storage directory on your computer. If this is the first time you're setting up a dynamic view, ClearCase prompts you to choose a shared directory on your host as a location for the view storage directory. For dynamic views you create subsequently, ClearCase uses the previous location by default.

To Choose a Location for a View Storage Directory

NOTE: Use this procedure only while creating a view. To change the location for an existing view storage directory, see *Administering ClearCase*.

1. While creating a view, on the step of the wizard that asks you to choose a location for a view, click **Advanced Options**.

2. In the Advanced Options dialog box, do one of the following:

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   - Clear the **Auto-select from list of available servers** check box and choose one of the locations in the View server storage directory list or click **Browse** and choose a valid location.

Valid Locations for View Storage Directories

Consider the following restrictions when choosing a view storage directory location:

- The directory must be below a shared network resource on a Windows NT® ClearCase host. (View processes run on the machine that physically stores the view storage directory, and only Windows NT ClearCase hosts can run view processes.) The pathname for the directory must not use a Windows special share name, such as the share that is designated by *drive-letter* **$** and allows an administrator to gain access to a drive over the network. For example, **\\bread\c$\view\pat_1.4_cropcircle.vws** is not a valid pathname.
- To maintain data integrity, the location must remain connected to the network. For example, do not locate the view storage directory on a removable storage device or on a laptop.

Consider also making the view storage directory accessible to any data backup schemes your organization institutes.

2.3 Adding Version-Selection Rules

Development projects often require team members to add specific version-selection rules to your view's config spec. This manual assumes that someone in your organization creates these rules, and you must either paste them into your config spec or add an inclusion rule so that your config spec includes them from a config spec available over the network. For information on creating version-selection rules, see *Managing Software Projects with ClearCase*.

To Paste or Include Version-Selection Rules

1. In the View Creation Wizard, click **Finish**.
2. In the Confirm dialog box, click **Inspect Config Spec**; in the Config Spec Editor, click **Edit**.
3. In the Config Spec Editor, do any of the following:
   - Paste the rules from the Windows clipboard into the Config Spec Editor. Verify with the author of the shared config spec whether you need to include any rules other than the ones you paste.

- ➢ Type on its own line **include** *path-to-shared-config-spec*. Verify with the author of the shared config spec whether you need to include any rules other than the include rule.

4. Click **OK**.

5. In the Confirm dialog box, do one of the following:

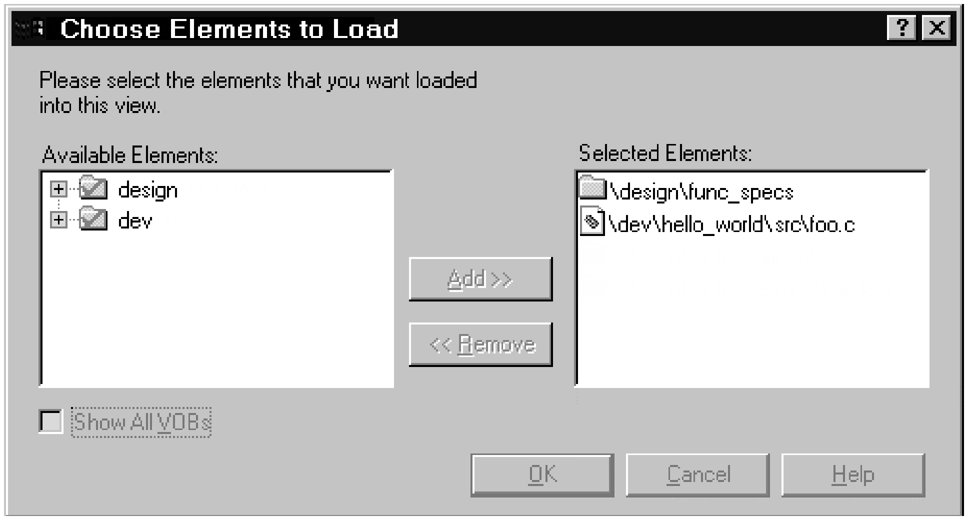
   - ➢ For snapshot views, take note of the path for the view's root directory. This is the directory from which you access source files and directories. Then click **OK** to select elements to load into the view.

   - ➢ For dynamic views, take note of any drive letter you assigned. Then click **OK**. By default, ClearCase starts the view.

2.4 Snapshot View: Selecting Elements to Load

After you set up version-selection rules for a snapshot view, the View Creation Wizard displays the VOB Namespace Browser (see Figure 5) from which you select the files and directories to load into the view.

Figure 5 Choosing Elements to Load


Choose Elements to Load

Please select the elements that you want loaded into this view.

Available Elements:
- design
- dev

Selected Elements:
- \design\func_specs
- \dev\hello_world\src\foo.c

VOB Namespace

In its general sense, a *namespace* is a set of unique names. The namespace of a file system usually consists of a hierarchical arrangement of files and directories. Each file and directory has a unique name.

In a VOB, a simple file name is not sufficient to select a single, unique object. For example, **foo.c** is ambiguous: does it refer to version 1 of **foo.c** or version 42 of **foo.c**?

A *VOB namespace* is the set of file and directory versions your config spec selects. For example, the view **pat_v1.4_cropcircle** sees a VOB namespace of the files and directories that contribute to release 1.4 of a software product; the view **pat_v1.3_cropcircle** sees a VOB namespace of the files and directories that contribute to release 1.3 of the same product. Because ClearCase tracks versions of directories, the VOB namespace varies depending on the versions of directories you select.

The VOB Namespace Browser presents the VOB namespace selected by your view's config spec.

Case-Sensitivity

If you're selecting elements from VOBs located on a UNIX host, you may encounter problems due to case-sensitivity. Because native file systems for UNIX are case-sensitive, it is possible to create two elements from a UNIX host whose names differ only in capitalization. For example, in a UNIX VOB, these two elements are distinct:

```
/design/func_specs/bas
/design/func_specs/Bas
```

However, Windows does not support case-sensitive file lookups and does not distinguish the two elements in the previous example. If you were to load these two elements, only one of them would have the correct data when copied into the view; duplicated files are reported as *hijacked*. (Hijacked files are discussed throughout Appendix A, *Working in a Snapshot View from a Remote Location*.)

Administering ClearCase discusses case-sensitivity issues in depth. We suggest that you not use mixed-case names for elements that you store in VOBs.

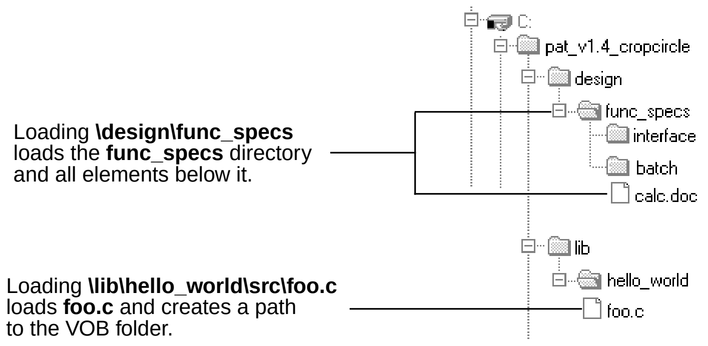
To Choose Elements

To choose the elements you want to load into your view, browse through the **Available Elements** list. To load an *element*, move it to the **Selected Entries** list. Keep the following in mind:

- ➤ If you load a directory element, all of its files and subdirectories are loaded into the view.
- ➤ If you load a specific file element, only that file is loaded into the view. To maintain the file's path, ClearCase also copies into the view the empty directories leading up to the VOB directory.

Figure 6 illustrates the results of the load operation.

Figure 6 A View with Loaded Elements


C:
pat_v1.4_cropcircle
design
func_specs
interface
batch
calc.doc
lib
hello_world
foo.c
Loading **\design\func_specs** loads the **func_specs** directory and all elements below it.
Loading **\lib\hello_world\src\foo.c** loads **foo.c** and creates a path to the VOB folder.

For each element specified in the **Entries to Load** box, the View Creation Wizard adds a *load rule* to your config spec. For example, the VOB Namespace Browser shown in Figure 5 creates these two load rules:

```
load \design\func_specs
load \lib\hello_world\src\foo.c
```

Using these rules, ClearCase loads the directory element **\design\func_specs** and every element below it, along with the file element **\lib\hello_world\src\foo.c**. To maintain the path to **foo.c**, the View Creation Wizard creates the directory **\lib\hello_world\src** in the view.

Setting Up for a New Development Project

If none of your development project's files and directories are under ClearCase source control, you can dismiss the VOB Namespace Browser by clicking **OK**. The section *Adding Elements for a New Development Task* on page 70 describes how to add elements to the VOB for a new development project.

2.5 Loading Versions of Elements into a View

When you dismiss the VOB Namespace Browser, ClearCase loads elements as follows:

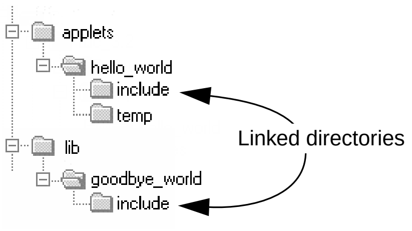
1. It uses the *version-selection rules* to select one *version* of each *element* specified by a *load rule*.
2. It copies the version into the snapshot view.
3. It records which version it copies into the view.

As ClearCase loads files and directories into your view, it shows a progress indicator in the **Snapshot View Update** dialog box. The complete list of files copied into your view appears in the Snapshot View Update window.

Under the Hood: VOB Links

A VOB link makes a file element or directory element accessible from more than one location in the VOB namespace. There are two kinds of VOB links: *symbolic links*, which are available for file and directory elements, and *hard links*, which are available for file elements only. We recommend that you use VOB symbolic links instead of VOB hard links whenever possible In Figure 7, the directory element **include** is linked.

Figure 7 VOB Link



You use the **cleartool ln** command to create VOB links. See the **ln** reference page in *ClearCase Reference Manual* for more information.

Symbolic Links and Hard Links in Dynamic Views

In *dynamic views* (which use the MVFS, or multiversion file system), VOB links behave similarly to symbolic links or hard links in a UNIX file system: symbolic links point to a file or directory element in a different location, and hard links are alternate names for a single file element.

You cannot check out a VOB symbolic link; you must check out the symbolic link target.

When you check out a hard-linked element from a given pathname, ClearCase considers other pathnames for the element as `checked out but removed`. That is, to prevent you from modifying the element from multiple pathnames, ClearCase executes standard checkout behavior at only one pathname (the one from which you entered the **checkout** command), but does not create view-private files at other pathnames. For information about standard checkout behavior, see the **checkout** reference page in *ClearCase Reference Manual*.

Symbolic Links in Snapshot Views

Because *snapshot views* use Windows file systems (which do not support links), ClearCase approximates VOB symbolic link behavior in the following ways:

➤ If a *load rule* selects a symbolic link, ClearCase copies the link target into the view at the link's pathname.

  We recommend that you do not load a linked directory more than once in your view unless it is necessary for build purposes. While ClearCase accurately keeps track of multiply loaded elements, you may become confused, modify the wrong copy of a file, and lose information upon checkin. For more information, see *Caution: Losing Data Because of VOB Hard Links*.

➤ You cannot check out a file element from a symbolic link pathname; you must check out the link target. In the Windows Explorer integration, the shortcut menu for a symbolic link includes the **Explore Link Target** command, which displays the link target's parent directory in Windows Explorer. Use this command to find and check out the link target. When you check in the modified link target, ClearCase updates all associated symbolic links loaded in your view. Unlike directory link targets, you can check out a file link target only if it is loaded in your view.

- The **Add to Source Control** command (available from ClearCase GUIs) checks out, modifies, and checks in the link target directory whether you issue the command from a directory symbolic link or from the link target (and whether or not the target directory is loaded into the view).

  From a symbolic link directory, the command **cleartool checkout.** (that is, a **checkout** command issued for the current directory) checks out the link target whether or not the target directory is loaded into the view. However, if you use the **cleartool checkout** *dirname* form of the command to check out a different directory, *dirname* must be a link target.

  When either you or ClearCase checks in a link target directory, ClearCase updates the associated symbolic links that are loaded in your view. See also, *Checking Out Directories*.

- If you *hijack* a file symbolic link, the **update** tool detects it. However, you cannot check out the hijacked symbolic link. To add your hijacked changes to the VOB, you must check out and modify the link target.

Hard Links in Snapshot Views

Each time a load rule selects a hard link, ClearCase loads the element into the view as a standard file.

Caution: Losing Data Because of VOB Hard Links

If you load multiple instances of a hard-linked element into a snapshot view, you must be careful to check out, modify, and check in only one instance of the file. When you check in a hard-linked file (or a file below a symbolic-linked directory), ClearCase updates all other instances in your view, which could result in loss of data if you modified multiple copies of the same file. (Note that, when updating instances of files because of a checkin, ClearCase renames any *hijacked* file to *filename*.**keep** before updating it.)

For example, when you check out the hard-linked file **foo\util.c**, ClearCase removes the read-only attribute from **util.c** in the **foo** directory only (which is the location from which you issued the **checkout** command). However, if you lose track of which file you checked out and remove the read-only attribute and modify **util.c** in the **bar** directory, ClearCase does not prevent you from checking in **bar\util.c**. Any changes you made to **foo\util.c** are lost upon checkin because ClearCase updates all copies of duplicated files when you check in an element. Note that

ClearCase does not consider any copy of **util.c** to be hijacked (even if you change attributes), because you checked out the element in the VOB.

3 Working in a View

This chapter guides you through the everyday tasks of managing source files from ClearCase:

- Accessing files
- Checking out files
- Working with checkouts
- Canceling checkouts
- Checking in files

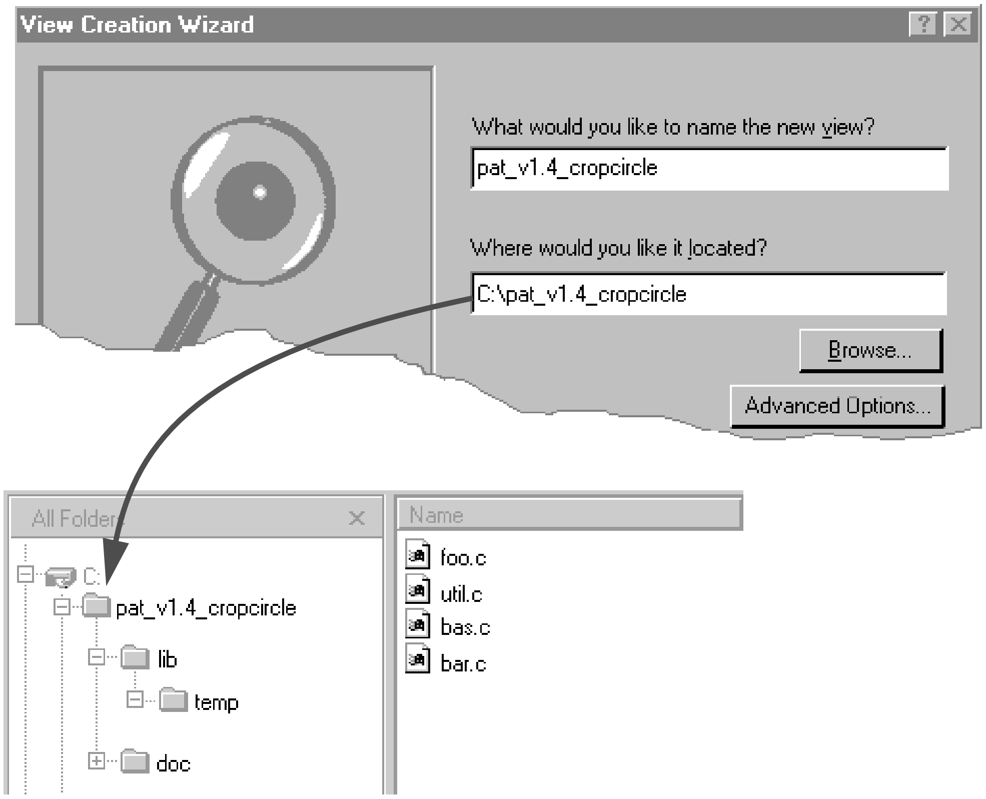
3.1 Accessing Files

Because snapshot views and dynamic views use different methods for creating directory trees, the procedure for accessing source files differs for the two view types.

In a Snapshot View

Recall that when you create the view, ClearCase copies one version of each element specified by a *load rule* into your view. To access the files loaded into a view, open Windows Explorer and navigate to the directory you specified in the View Creation Wizard (see Figure 8).

Figure 8 Accessing the View from Windows Explorer



Accessing a Snapshot View from Other Computers

If you want the view to be accessible from other computers in your network, you can set up the root directory of the snapshot view as a shared network resource. Refer to Windows documentation for information on sharing directories.

If you access the view from a computer on which ClearCase is not installed, you cannot perform ClearCase operations on any of the files or directories. If you need to modify loaded files from a computer that is not a ClearCase host, refer to *Hijacking a File* on page 116.

Similarly, if you access a snapshot view that was created from a UNIX host, you cannot perform ClearCase operations on any of the files or directories.

In a Dynamic View

Accessing source files from a dynamic view entails two procedures:

- Starting the view
- Activating VOBs

Starting the view initiates the process of arranging data in the VOBs activated on your computer into a directory tree.

To Start a Dynamic View

As described in *Choosing a Drive Letter* on page 11, the Confirm dialog box of the View Creation Wizard prompts you to start the dynamic view. However, if you do not start the view when you create it, or if you want to start the view at some other time, follow these steps:

1. In ClearCase Home Base, click the **Views** tab and click **Start View**.
2. In the Start View dialog box, select a view and a drive letter. Then click **OK**.

To Activate VOBs

1. In ClearCase Home Base, click the **VOBs** tab and click **Mount VOB**.
2. In the Mount VOB dialog box, select the VOBs containing your source files.
3. Select **Reconnect at Logon** to activate the VOBs when you log on.
4. Click **OK**.

After activating VOBs, access the directory tree of source files from the drive letter you assigned to the view, or if you did not assign a drive letter to the view, from the *dynamic-views drive* (**M:** by default).

Accessing a Dynamic View from Other ClearCase Hosts

Team members can access any dynamic view by starting it on their computers. To start a dynamic view that was created from a UNIX host, you must first use the Region Synchronizer to import the view’s *view-tag* into your Windows network region. For more information, see *Administering ClearCase*.

3.2 Checking Out Files

To modify files and directories under ClearCase control, you must check them out. (Placing files and directories under source control is a separate procedure, and is described in *Adding Files and Directories to Source Control* on page 67.)

To Check Out a File

1. In Windows Explorer, navigate to the directory containing the files you want to check out. Then select the files.
2. Right-click one of the selected files. On the shortcut menu, click **ClearCase→Checkout** to display the Check Out dialog box.
3. In the Check Out dialog box, provide comments describing the changes you plan to make.
4. Determine whether you want a *reserved* or *unreserved checkout* (refer to *Reserved and Unreserved Checkouts* on page 26).
5. Click **OK**.

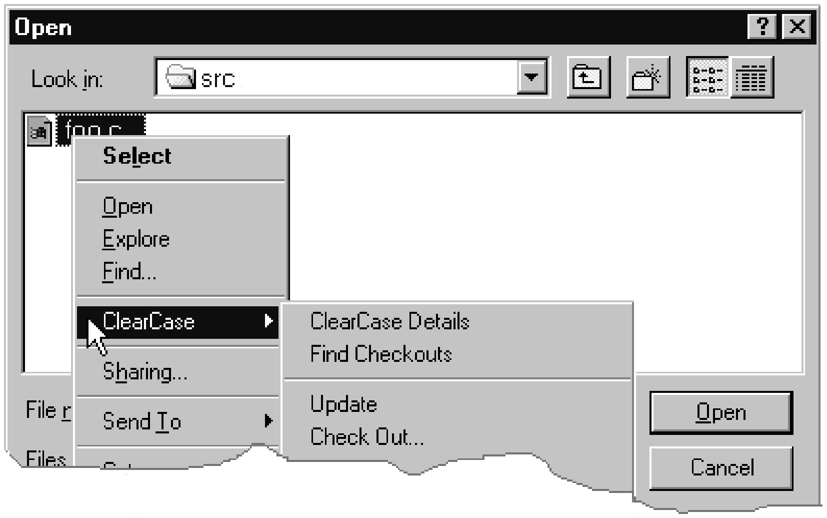
Using the Open Dialog Box

The Open dialog box that many applications use is actually part of Windows Explorer. As illustrated in Figure 9, right-clicking a loaded version of a ClearCase element in the Open dialog box displays the ClearCase shortcut menu.

To check out a file from an Open dialog box:

1. In an application such as Microsoft Notepad, click **File→Open**.
2. In the Open dialog box, access the file or directory that is under source control.
3. Right-click the file; then click **ClearCase→Check Out**.

Figure 9 The ClearCase Shortcut Menu from the Open Dialog Box



Checking Out Directories

Directories, as well as files, are under ClearCase source control, yet you rarely need to check out a directory explicitly. ClearCase checks out and checks in a file's parent directory when you add the file to source control.

What does it mean for a directory to be under source control? In a version-controlled directory, ClearCase creates a new version of the directory when you add or rename a file element under source control. Having versions of directories can be helpful if, for example, you rename a source file used in a particular release and then modify your makefile to reflect this change. If you need to rebuild a previous release, you can set up your view to select the version of the directory that contains the file under its previous name.

NOTE: When you issue commands from a command-line interface (CLI), such as an MS-DOS command prompt, ClearCase does not check out directories automatically. When using a CLI to change a directory element, you need to check out the directory explicitly. For more information on checking out files and directories from a CLI, see the **checkout** reference page in *ClearCase Reference Manual*.

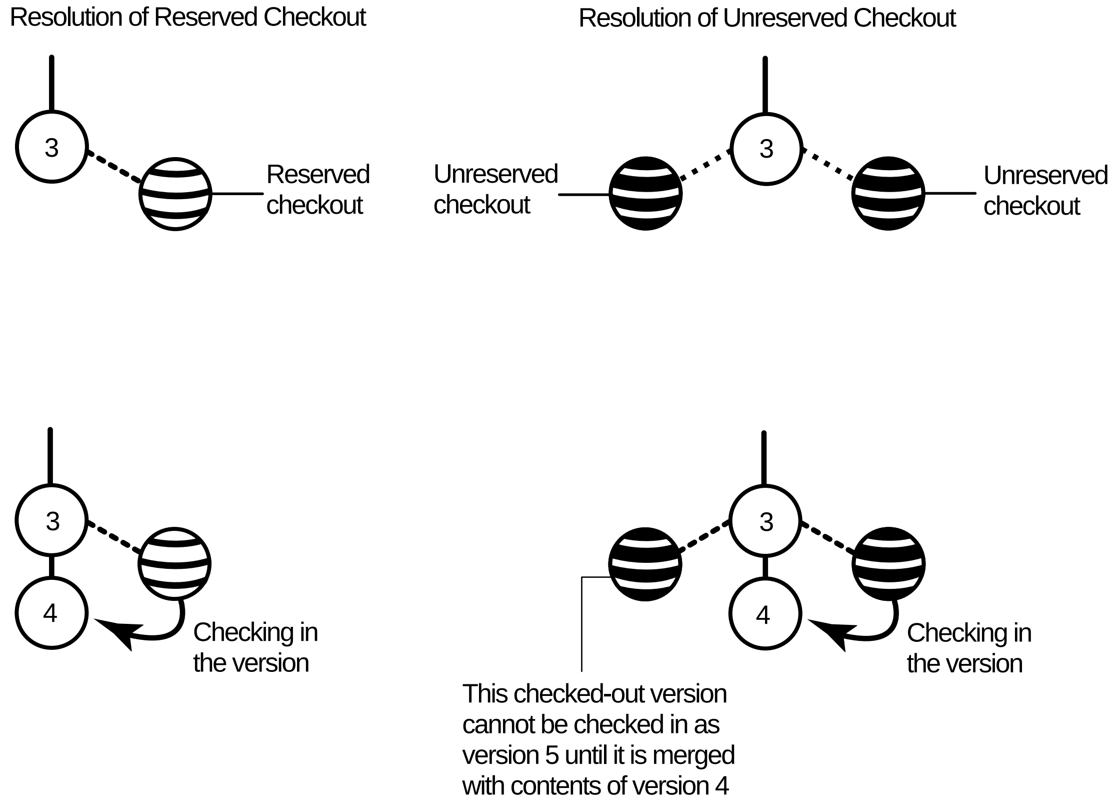
Reserved and Unreserved Checkouts

In some version-control systems, only one user at a time can reserve the right to create a new version. In other systems, many users can compete to create the same new version. ClearCase supports both models by allowing two kinds of checkouts: reserved and unreserved.

The view with a reserved checkout has the exclusive right to check in a new version for a given development project. Many views can have unreserved checkouts. An unreserved checkout does not guarantee the right to create the successor version. If several views have unreserved checkouts, the first view to check in the element creates the successor; developers working in other views must merge the checked-in changes into their own work before they can check in. Your organization's development policy may determine whether to check out reserved or unreserved.

Figure 10 illustrates checked-out versions created by reserved and unreserved checkouts, and the effects of subsequent checkins.

Figure 10 Resolution of Reserved and Unreserved Checkouts


Resolution of Reserved Checkout
Resolution of Unreserved Checkout
3
Reserved checkout
Unreserved checkout
3
Unreserved checkout
3
4
Checking in the version
3
4
Checking in the version
This checked-out version cannot be checked in as version 5 until it is merged with contents of version 4

To Change the Status of a Checked-Out Version

1. In Windows Explorer, right-click the checkout for which you want to change the status.
2. On the shortcut menu, click **ClearCase→ClearCase Details**.
3. In ClearCase Details, select the checkout. Then click **Tools** and either **Reserve** or **Unreserve**.

Setting the Default for Reserved or Unreserved Checkouts

In ClearCase Home Base, you can set the default behavior of the Check Out dialog box. Note, however, that your ClearCase administrator can customize ClearCase Home Base to make this option unavailable to you.

1. In ClearCase Home Base, click the **Options** tab.
2. Click **User Preferences**.
3. In the **ClearCase User Options** dialog box, do one of the following in the **Check Out** box:
   - ➢ To make reserved checkouts the default setting, select **Reserved**. With this selection, you can also select **Unreserved if already reserved** to check out unreserved by default if someone else has a reserved checkout for the same element. If you do not select this checkbox, attempts to reserve a reserved checkout fail.
   - ➢ To make unreserved checkouts the default setting, clear the **Reserved** check box.

Under the Hood: What Happens when You Check Out a File or Directory

Because a snapshot view contains copies of files and directories, and a dynamic view provides access to data in VOBs, ClearCase follows different procedures for checking out from the different view types.

From a Snapshot View

When you use the GUI to check out a file or directory from a snapshot view, ClearCase handles the request as follows:

1. It gathers the following information:
   - ➢ The version currently loaded in the view
   - ➢ The version selected by the config spec
   - ➢ The latest version in the VOB
2. If the version of a file in your view is not the latest in the VOB, ClearCase asks you to specify which version to check out. For directory elements, ClearCase requires you to check out the version of the directory currently loaded in your view.

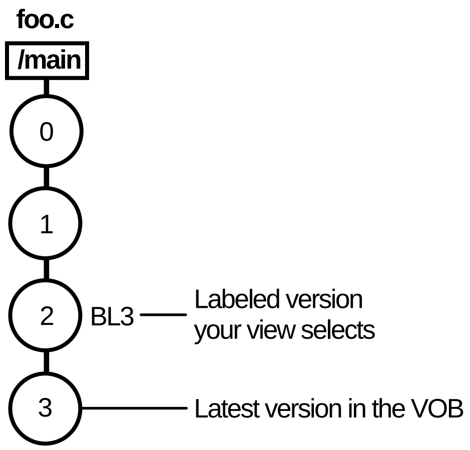
The version in your view will not be the latest in the VOB if either of these conditions exist:

- ➢ Someone else has checked in a new version since you last updated your view.
- ➢ Your view's config spec selects versions based on a label or a time rule, and the latest version in the VOB falls outside those parameters. See Figure 11.

3. If you check out a version other than the one currently loaded in your view, ClearCase loads the checked-out version into your view.
4. ClearCase notifies the VOB which version of the element you checked out.
5. For files, it removes the **Read-Only** attribute. For directories, it allows you to add new elements to source control.

For information on checking out VOB links in a snapshot view, see *Under the Hood: VOB Links* on page 17.

Figure 11 Selecting the Non-Latest Version of an Element



From a Dynamic View

When you use the GUI to check out a file from a dynamic view, ClearCase handles the request as follows:

1. If your view's version-selection rules do not select the latest version in the VOB, ClearCase prompts you to choose a version to check out.

   Your view may not select the latest version in the VOB if, for example, your config spec selects versions based on labels or time rules. See Figure 11.

   See *Merging with the Latest Version* on page 34 for information about checking in a nonlatest version.

2. Clear Case notifies the VOB which version of the element you checked out.

3. For files, ClearCase creates in the view an editable view-private file, which is a copy of the checked-out version. For directories, it allows you to use add new elements to source control.

3.3 Working with Checkouts

After you check out a file, you do not need to interact with ClearCase until you're ready to check in. However, some ClearCase tools can help you with the following tasks:

➤ Viewing an element's history
➤ Comparing versions of elements
➤ Tracking checked-out versions

Viewing an Element's History

The History Browser displays the history of an element's modifications, including version-creation comments (entered when someone checks out or checks in an element).

To View an Element's History

In Windows Explorer, right-click an element; on the ClearCase shortcut menu, click **History**.

Comparing Versions of Elements

As you modify source files, you may want to compare versions to answer such questions as these:

- What changes have I made in my checked-out version?
- How does my checked-out version differ from a particular historical version or from the version being used by one of my colleagues?

To start a comparison, right-click a file in Windows Explorer. On the ClearCase shortcut menu, click **Compare** or **Compare with Previous Version**.

Tracking Checked-Out Versions

Depending on how you work, you may forget exactly how many and which files are checked out. To list all the files and directories you currently have checked out to your view, follow these steps:

1. In ClearCase Home Base, click the **Elements and Versions** tab and click **Find Checkouts**.
2. In the Find Criteria dialog box, enter the path to the root directory of the snapshot view in the **Search folder** box.
3. Click the **Include subfolders** option.
4. Click **OK**.

Prototype Builds

Typically, when you're developing source files for a project, you want to perform prototype builds to test your modifications. If your organization uses **clearmake** or **omake**, you can use these ClearCase build tools for your prototype builds; however, the *build auditing* and *build avoidance* features are available only from dynamic views.

For more information about **clearmake** or **omake**, refer to their reference pages in *ClearCase Reference Manual* and to *Building Software with ClearCase*.

3.4 Canceling Checkouts

If you check out a file but don't want to check in your changes or want to start with a fresh copy, you can cancel the checkout as follows:

1. In Windows Explorer, select one or more checkouts. Then right-click.
2. On the shortcut menu, click **ClearCase→Undo checkout**.
3. Click **Yes** in the Confirm Undo Checkout dialog box. You can choose to save any of your changes in the file *filename***.keep**.

Under the Hood: Canceling Checkouts

When you cancel the checkout of a file element, ClearCase handles the request as follows:

1. It prompts you to rename the file in your view to *filename***.keep**.
2. It notifies the VOB that you no longer have the version checked out in your view.
3. In a snapshot view, ClearCase copies from the VOB the version that was in your view when you performed the checkout operation.

   In a dynamic view, ClearCase uses the config spec's version-selection rules to select a version.

Canceling Directory Checkouts

Although you rarely need to check out a directory explicitly, if you do and then cancel the checkout, ClearCase notifies the VOB that you no longer have the version of the directory checked out to your view. ClearCase does not prompt you to rename a canceled directory checkout to *directory-name***.keep**.

If you cancel a directory checkout after changing its contents, any changes you made with **cleartool rmname**, **mv**, and **ln** are lost. Any new elements you created with **mkelem** or **mkdir** become orphaned. (When you create elements with the GUI command **Add to source control**, ClearCase checks out the directory, adds the element, and checks in the directory, avoiding the creation of orphaned elements.) ClearCase moves orphaned elements (and any data that exists in the view at the pathname of the new element) to the VOB's `lost+found directory` under names of this form:

element-name.UUID

In such cases, **uncheckout** displays this message:

```
cleartool: Warning: Object "foo.c" no longer referenced.
cleartool: Warning: Moving object to vob lost+found directory as
"foo.c.5f6815a0a2ce11cca54708006906af65".
```

In a snapshot view, ClearCase does not remove *view-private objects* or start the update operation for the directory in the view. To return the directory in your view to its state before you checked it out, you must start the Update Tool. For information on starting the Update Tool, see Chapter 4, *Updating a Snapshot View*.

In a dynamic view, ClearCase does not remove view-private objects, but it does revert the view to its previous state.

To move an element from the `lost+found` directory to another directory within the VOB, use the **cleartool mv** command. To move an element from the `lost+found` directory to another VOB, use the **relocate** command.

To permanently delete an element in the `lost+found` directory, take note of the orphaned element's name and use this command:

cleartool rmelem *VOB-pathname*/**lost+found/***orphaned-element-name*

For example:

cleartool rmelem /vobs/lib/lost+found/foo.c.5f6815a0a2ce11cca54708006906af65

NOTE: In a snapshot view, ClearCase treats the `lost+found` directory, which is located immediately below the root directory of a VOB, as any other directory. To load the directory in your view, you must use a load rule that specifies either the element's parent directory or the directory itself. However, as with any other directory in a snapshot view, you do not need to load the `lost+found` directory to issue ClearCase commands for elements in the directory.

Canceling the Checkout of a Deleted File

If you check out a file element and then delete that file from your view (by using, for example, the **Delete** command in Windows Explorer), use this procedure to cancel the checkout:

1. In Windows Explorer, right-click the directory containing the deleted file.

2. On the shortcut menu, click **ClearCase→Find Checkouts**.
3. Complete the Find Criteria dialog box.
4. In the Find Checkouts window, select the file whose checkout you want to cancel and click **Undo Checkout**.

3.5 Checking In Files

Until you check in a file, ClearCase has no record of the work in your view. Checking in a file or directory element creates a new version in the VOB, which becomes a permanent part of the element’s history. We recommend you check in a file or directory any time you want to a record of its current state.

Ideally, your organization’s development strategy isolates your checked-in work from official builds and requires you to merge your work to official project versions at specified intervals.

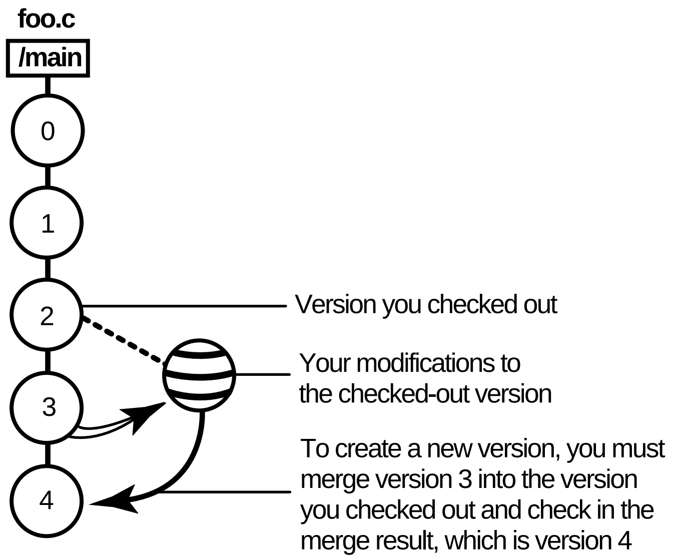
To Check In Files

1. In Windows Explorer, select one or more files.
2. Right-click a selected file. On the shortcut menu, click **ClearCase→Check In**.
3. In the Check In dialog box, ClearCase displays the comments you entered when you checked out the file. You can reuse these comments or modify them.

Merging with the Latest Version

If the version you checked out is not the latest version in the VOB, ClearCase requires you to merge the changes in the latest version into the version checked out in your view. (See Figure 12.)

Figure 12 Merging with the Latest Version


foo.c
/main
0
1
2
3
4
Version you checked out
Your modifications to the checked-out version
To create a new version, you must merge version 3 into the version you checked out and check in the merge result, which is version 4

The section *Under the Hood: What Happens when You Check Out a File or Directory* on page 28 describes the situations in which you may have to merge before checking in.

To Merge with the Latest Version

When you issue the **Check In** command for a non-latest version, ClearCase displays the dialog box to ask whether you want to merge the file now. If you choose to merge, ClearCase attempts to merge automatically, opening the Diff Merge tool if it needs your input to complete the merge. For information on using the Diff Merge tool, refer to ClearCase online help. After the merge, ClearCase prompts you to check in the file.

Under the Hood: Checking In Files

The steps ClearCase follows when you issue the checkin command vary depending on the kind of view you use.

From a Snapshot View

When you issue the **checkin** command from a snapshot view, ClearCase handles the request as follows:

1. It copies your modifications to the VOB as a new version.

   The version you check in remains in the view, regardless of the view's config spec.

2. It removes write permission for the file.

For any other instance of the file loaded into a snapshot view, ClearCase copies the new version from the VOB into your view. (As described in section *Under the Hood: VOB Links*, if your load rules specify an element that appears in more than one VOB location, the element is copied into each of the appropriate locations in your view's directory tree.)

When you check in a directory from a snapshot view, ClearCase does not update any other instances of the directory loaded in your view. As you add file elements to source control, ClearCase adds a copy of the element to all instances of a parent directory loaded in your view. For more information, see *Under the Hood: VOB Links*.

From a Dynamic View

When you issue the **checkin** command from a dynamic view, ClearCase handles the request as follows:

1. It copies your modifications to the VOB as a new version.

2. It uses the config spec's version-selection rules to select a version from the VOB. If the config spec selects a version other than the one you checked in, ClearCase displays a message. ClearCase may select another version if, for example, your view selects versions based on labels or time rules.

3. It removes the view-private file and provides transparent access to the version checked in to the VOB.

Updating a Snapshot View

4

The rules in your view's *config spec* are usually designed to select a discrete set of versions from the VOB. For example, your view is usually intended to contain a set of versions that build successfully. However, when other developers check in new versions from their views, a snapshot view may become out of date or inconsistent with the versions in the VOB. To make sure your view contains the set of versions the config spec selects, you must update it.

This chapter explains

- ➤ Starting an update operation
- ➤ What happens when you update a view
- ➤ Unloading elements

An update operation copies versions of elements from a VOB to your view. Only the checkin operation copies changes from your view back to a VOB.

4.1 Starting an Update Operation

You can start an update operation for

- ➤ The entire view
- ➤ At least one file or at least one directory tree

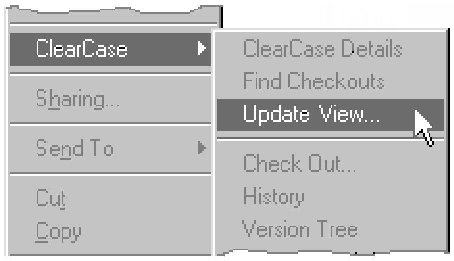
Updating the View

Update the entire view periodically to make sure you have the correct version of all loaded files and directories.

1. In Windows Explorer, select the root directory of the snapshot view.

2. Right-click to display the shortcut menu. Then click **ClearCase→Update View** (see Figure 13).

Figure 13 The Update View Command



3. To change default behavior for the update operation, click the **Advanced** tab in the Start Update dialog box and change the currently selected options. Any changes you make become the defaults for subsequent updates.

   If you do not change options on the **Advanced** tab, the defaults for the update operation are as follows:

   ➢ For any non-checked-out, nonhijacked file or directory, if the version the config spec selects is different from the version in the view, overwrite it with the version from the VOB.

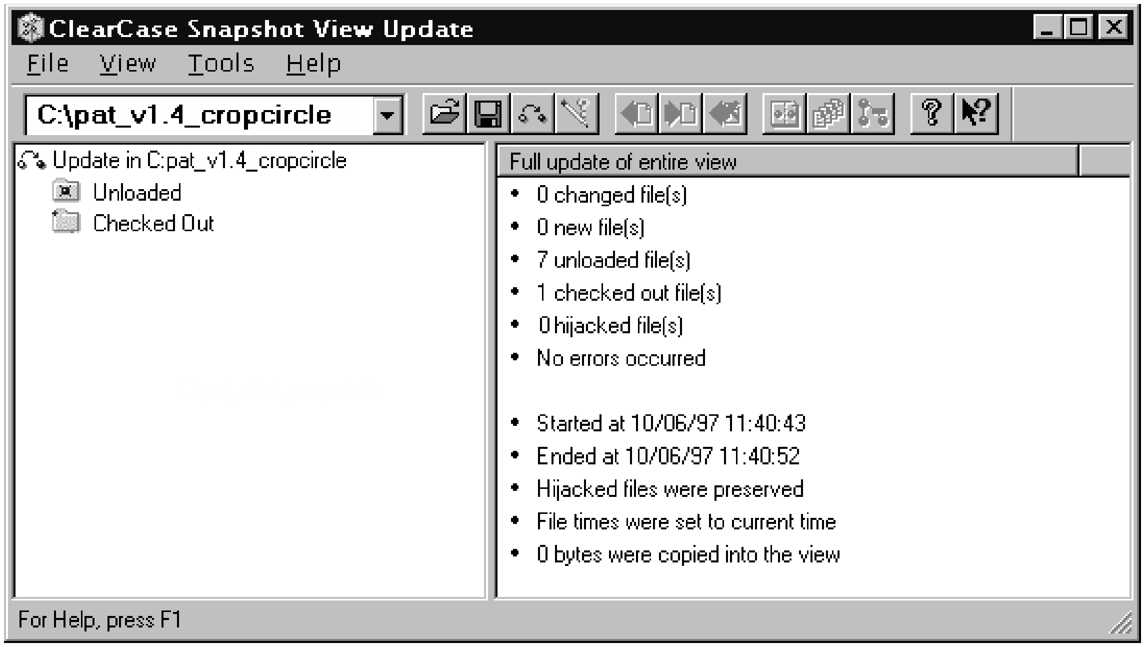
   ➢ Leave all hijacked files in the view with their current modifications.

   ➢ For any files or directories modified by the update operation, use the time stamp option specified when the view was first created.

4. Click **OK** to start the update.

   ClearCase begins the update procedure and displays a progress indicator. When the update is complete, the Snapshot View Update window displays a categorized list of the actions taken to update the view. (See Figure 14.) For a description of this window, use the online help.

Figure 14 The Snapshot View Update Window


ClearCase Snapshot View Update
File View Tools Help
C:\pat_v1.4_cropcircle
Update in C:pat_v1.4_cropcircle
Unloaded
Checked Out
Full update of entire view
For Help, press F1

- 0 changed file(s)
- 0 new file(s)
- 7 unloaded file(s)
- 1 checked out file(s)
- 0 hijacked file(s)
- No errors occurred

- Started at 10/06/97 11:40:43
- Ended at 10/06/97 11:40:52
- Hijacked files were preserved
- File times were set to current time
- 0 bytes were copied into the view

Updating Files and Directory Trees

To save time, you can update individual files or directories (ClearCase updates directories recursively). Updating only specific parts of your view may eventually cause your view to contain an inconsistent set of versions.

1. In Windows Explorer, select the files or directories you want to update.

2. Right-click to display the shortcut menu. Then click **ClearCase➔Update**.

   ClearCase begins the update procedure and displays a summary of its progress.

NOTE: You cannot update a checked-out file. To undo changes to a checked-out file and start over with the version in the VOB, cancel the checkout. See *Canceling Checkouts* on page 32.

Tip: Finding a Set of Files

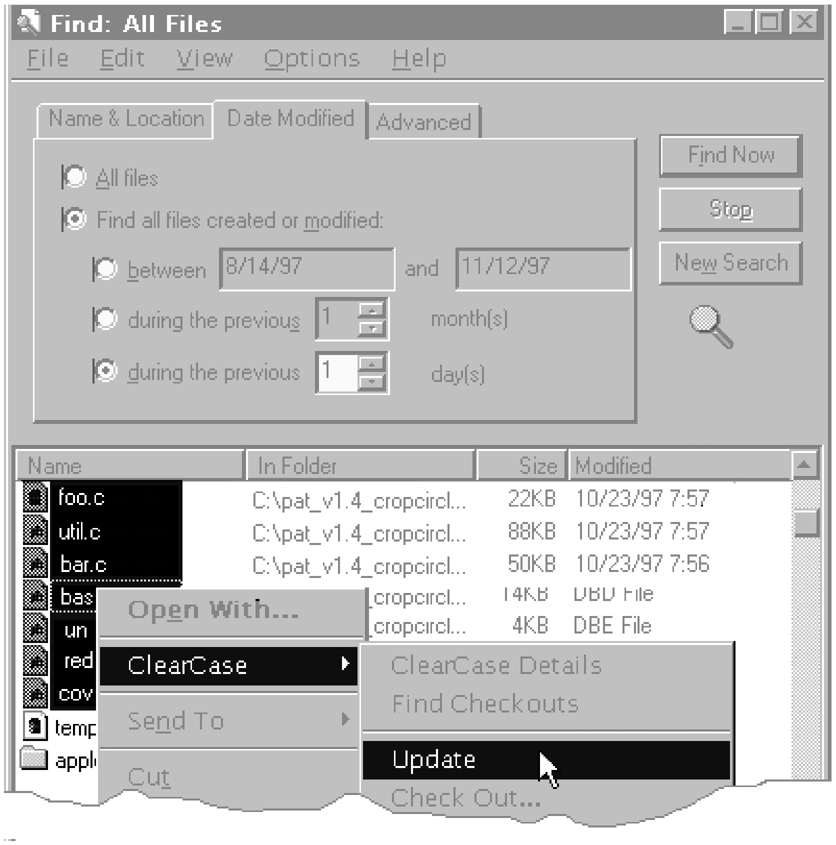
If you know that the files you want to update share a common attribute, such as a similar modification date, you can use the **Find** tool in Windows Explorer to find the set of files. Then, you can update the files from the Find dialog box.

1. In Windows Explorer, click **Tools➔Find➔Files or Folders**.
2. In the Find: All Files dialog box, enter the path to the view or to a specific directory in the view in the **Look In** box.
3. Use the **Date Modified** and **Advanced** tabs to specify search criteria.
4. Click **Find Now**.

   The Find: All Files dialog box expands to display the files and directories it finds.

5. As illustrated in Figure 15, select the files you want to update. On the shortcut menu, click **ClearCase➔Update**.

Figure 15   Using the Windows Find Tool to Find and Update Files



All files
[✓ Find all files created or modified:]
between 8/14/97 and 11/12/97
during the previous 1 month(s)
[✓ during the previous 1 day(s)]

Name	In Folder	Size	Modified
foo.c	C:\pat_v1.4_cropcircl...	22KB	10/23/97 7:57
util.c	C:\pat_v1.4_cropcircl...	88KB	10/23/97 7:57
bar.c	C:\pat_v1.4_cropcircl...	50KB	10/23/97 7:56
bas	cropcircl...	14KB	DBD File
un	cropcircl...	4KB	DBE File
red			
cov			
temp			
appl			

4.2 Under the Hood: What Happens when You Update a View?

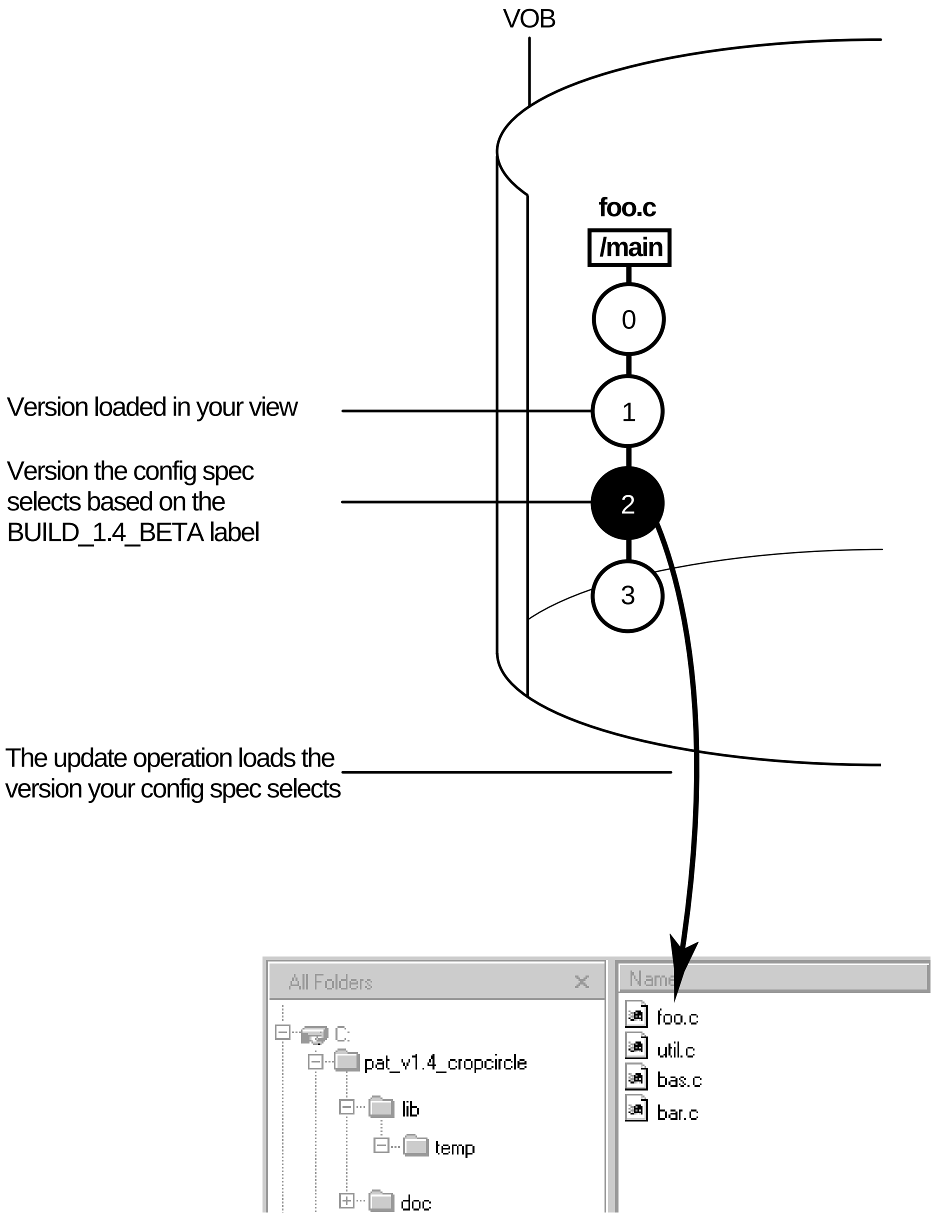
When you start an update operation, ClearCase compares the version of the elements loaded in the view with the version the config spec selects in the VOB. If the config spec selects a version in the VOB that is different from the version loaded in your view, ClearCase copies the version from the VOB into your view (see Figure 16). ClearCase does not make this comparison or otherwise modify versions currently checked out to the view.

The update operation takes into account the fact that updates are not instantaneous. As ClearCase updates your view, other developers may check in new versions of elements your view's load rules select. To avoid loading an inconsistent set of versions, **update** ignores versions in the VOB that meet both of the following conditions:

- The version was checked in after the moment the update began.
- The version is now selected by a config spec rule that involves the **LATEST** version label.

update adjusts for the possibility that the system clocks on different hosts in a network may be out of sync (clock skew).

Figure 16 The Update Operation


VOB
foo.c
/main
0
1
2
3
Version loaded in your view
Version the config spec selects based on the BUILD_1.4_BETA label
The update operation loads the version your config spec selects
All Folders
C:
pat_v1.4_cropcircle
lib
temp
doc
Name
foo.c
util.c
bas.c
bar.c

4.3 Unloading Elements

If a view's config spec no longer selects an element, ClearCase removes, or unloads, it from the view. Unloading does not affect view-private files or view-private directories.

Updating can cause an element to be unloaded from a view in the following situations:

➤ You remove the load rule that specifies the element (or that specifies a directory element somewhere above it). For information on removing load rules, see *To Change Which Elements Are Loaded into a Snapshot View* on page 74.

➤ The version-selection rules no longer select any version of the element. This can happen when your config spec selects a version of the parent directory that no longer contains a version of the file element.

Unloading Files

The action ClearCase takes to unload a file depends on the file's current state:

➤ For a file that is not checked out, ClearCase deletes the file from the view.

➤ For a *hijacked* file, ClearCase appends **.unloaded** to the file name, unless you set the Update Tool to delete hijacked files. (Hijacked files are discussed throughout Appendix A, *Working in a Snapshot View from a Remote Location*.) You change the settings on the **Advanced** tab in the Start Update dialog box. Refer to *Updating the View* on page 38.

➤ For a checked-out file, ClearCase appends **.unloaded** to the file name. The version remains checked out to your view.

Unloading Directories

ClearCase unloads directories recursively. To unload a directory element, ClearCase unloads the files in the directory. If any view-private objects, hijacked files, or checked-out files are in the directory, or if the directory is currently in use (for example, if your current working directory is in or below the directory) ClearCase appends **.unloaded** to the name of the directory. For example, if the directory **src** contains view-private files, ClearCase renames the directory to **src.unloaded**.

Working On a Team

5

The development cycle presented so far is a fairly simple one in which everyone in an organization contributes to the same development project. But a software development cycle often involves several concurrent development projects. For example:

➤ You may want to experiment with some changes to the GUI as a result of feedback from usability testing, but are not yet sure whether to include your changes in official builds.

➤ Another team may try to optimize the database schema without upsetting the current one.

➤ Another group may need to get a head start on a feature for the next release of the product.

This chapter describes the functions ClearCase provides to support parallel development, a style of working in which teams use the same set of source files for different, concurrent development projects:

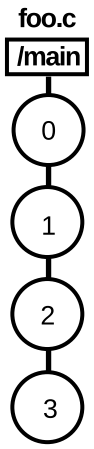
➤ Version trees
➤ Working on branches
➤ Merging

In addition, this chapter discusses sharing control of a branch with developers at other sites. (You do not need to read this section unless your project manager or MultiSite administrator directs you.)

5.1 The Version Tree

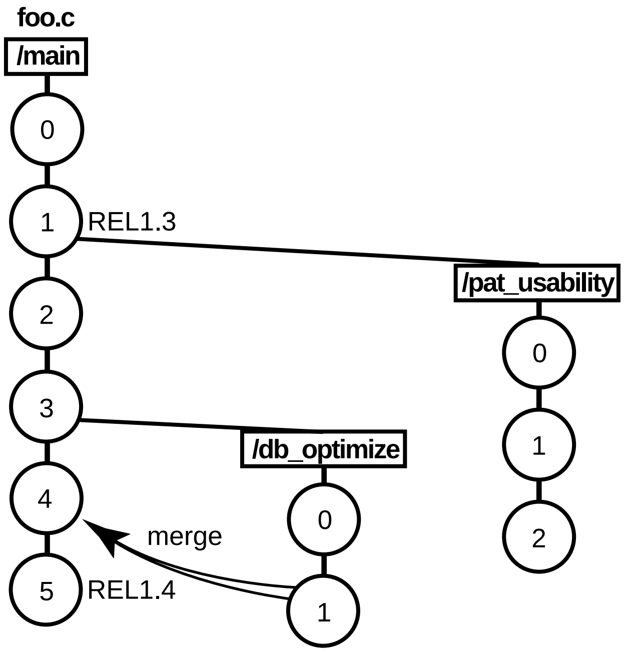
Each time you revise and check in an element, ClearCase creates a new version of the element in the VOB. Throughout this part of the book, this linear progression has been illustrated with a graphic similar to Figure 17.

Figure 17   Linear Progression of Versions



ClearCase can organize the different versions of an element in a VOB into a version tree. Like any tree, a version tree has branches. Each branch represents an independent line of development. Changes on one branch do not affect other branches until you merge. In Figure 18, **main**, **pat_usability**, and **db_optimize** are branches being used to develop different releases of the file element **foo.c** concurrently.

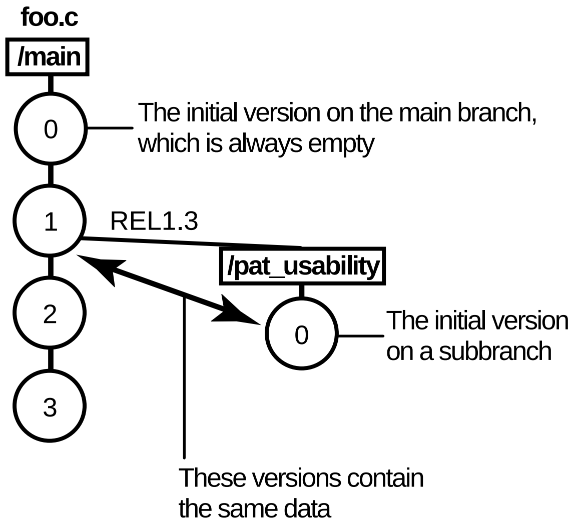
Figure 18 Version Tree of a File Element



Under the Hood: The Initial Version on a Subbranch

When you create a subbranch for an element, which is any branch below the **main** branch, the initial version contains the same data as the version from which you start the branch. See Figure 19. (The initial version on the **main** branch contains no data. For more information, see *Excluding Elements* on page 75.)

Figure 19 The Initial Version on a Subbranch


foo.c
/main
0
The initial version on the main branch, which is always empty
1
REL1.3
2
3
/pat_usability
0
The initial version on a subbranch
These versions contain the same data

5.2 Working on Branches

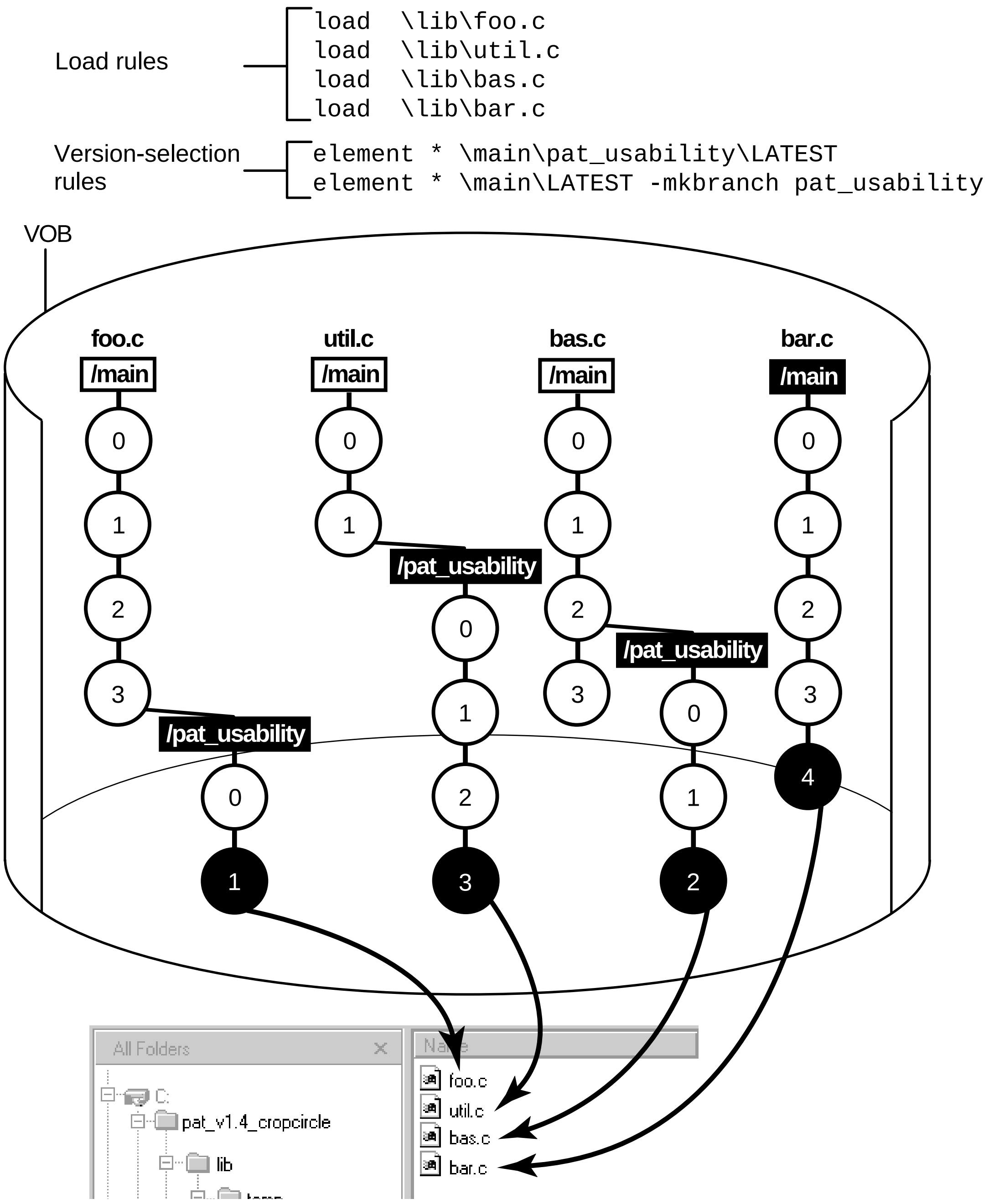
Your organization's policies may dictate that each development project use its own branch to isolate its changes from other development projects. To adhere to this policy, each member of a project team uses a view whose config spec specifies this information:

➤ The versions to select in the development project's specific branch. As Figure 20 illustrates, some or all source files for the project have at least one version on the specified branch. If an element does not have a version on the specified branch, other rules in the config spec select a version of the element. In Figure 20, because **bar.c** does not have a version on the **pat_usability** branch, the view selects the version on the **main** branch.

➤ A special *make branch* rule. When this view checks out a version, the make-branch rule creates the development project's branch (if it doesn't already exist).

For example, each member of the project team that is optimizing the database schema uses a view that selects versions on the **db_optimize** branch and creates new versions on that branch.

Figure 20 Elements Have Common Branches



Load rules

```
load  \lib\foo.c
load  \lib\util.c
load  \lib\bas.c
load  \lib\bar.c
```

Version-selection rules

```
element * \main\pat_usability\LATEST
element * \main\LATEST -mkbranch pat_usability
```

For more information on branches, refer to *Managing Software Projects with ClearCase* and the **mkbranch** reference page in *ClearCase Reference Manual*.

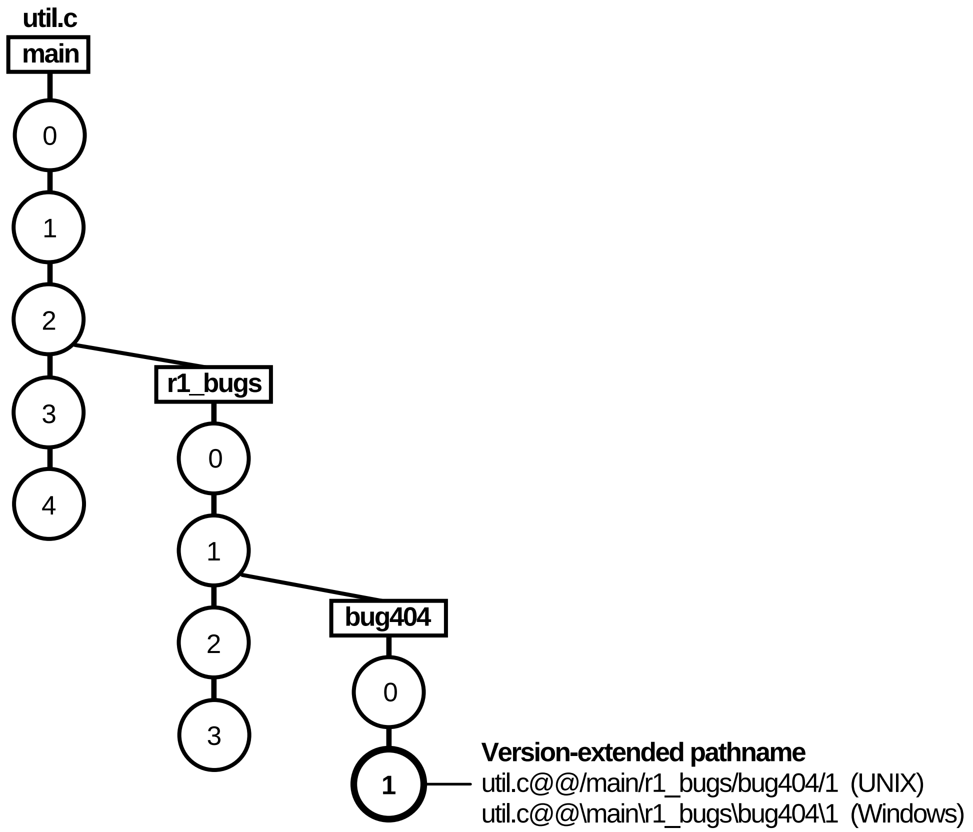
The Version-Extended Pathname

ClearCase commands and documentation use a special notation to specify a version of an element on a branch. For example, **util.c@@\main\2** specifies version 2 of **util.c** on the **main** branch; **util.c@@\main\r1_bugs\bug404\1** specifies version 1 of **util.c** on the **bug404** subbranch below the **r1_bugs** subbranch, which is below the **main** branch. (See Figure 21.)

From a command-line interface, you can use version-extended pathnames to access versions other than the ones currently selected by your view. To view the contents of a version that is not currently in a snapshot view, you must use the **cleartool get** command in addition to version-extended pathnames.

For a full description of the syntax for version-extended pathnames, see the **ccase_pathnames** reference page in *ClearCase Reference Manual*.

Figure 21 Version-Extended Pathnames


util.c
main
0
1
2
3
4
r1_bugs
0
1
2
3
bug404
0
1
Version-extended pathname
util.c@@/main/r1_bugs/bug404/1 (UNIX)
util.c@@\main\r1_bugs\bug404\1 (Windows)

5.3 Merging

In a parallel development environment, the opposite of branching is merging. In the simplest scenario, merging incorporates changes on a subbranch into the **main** branch. However, you can merge work from any branch into any other branch. ClearCase includes automated merge facilities for handling almost any scenario.

One of the most powerful of ClearCase features is versioning of directories. Each version of a directory element catalogs a set of file elements and directory elements. In a parallel development environment, directory-level changes may occur as frequently as file-level changes. All the merge scenarios discussed in this chapter apply to both directory and file elements.

This chapter describes the following merge scenarios:

- Merging all changes made on a single subbranch
- Merging selectively from a single subbranch
- Removing the contributions of some versions on a single subbranch
- Recording merges that occur outside ClearCase

ClearCase also supports merging work from many branches to a single branch, but this is typically a project manager's task and is described in *Managing Software Projects with ClearCase*.

Under the Hood: How ClearCase Merges Files and Directories

A merge combines the contents of two or more files or directories into a single new file/directory. The ClearCase merge algorithm uses the following files during a merge (see Figure 22):

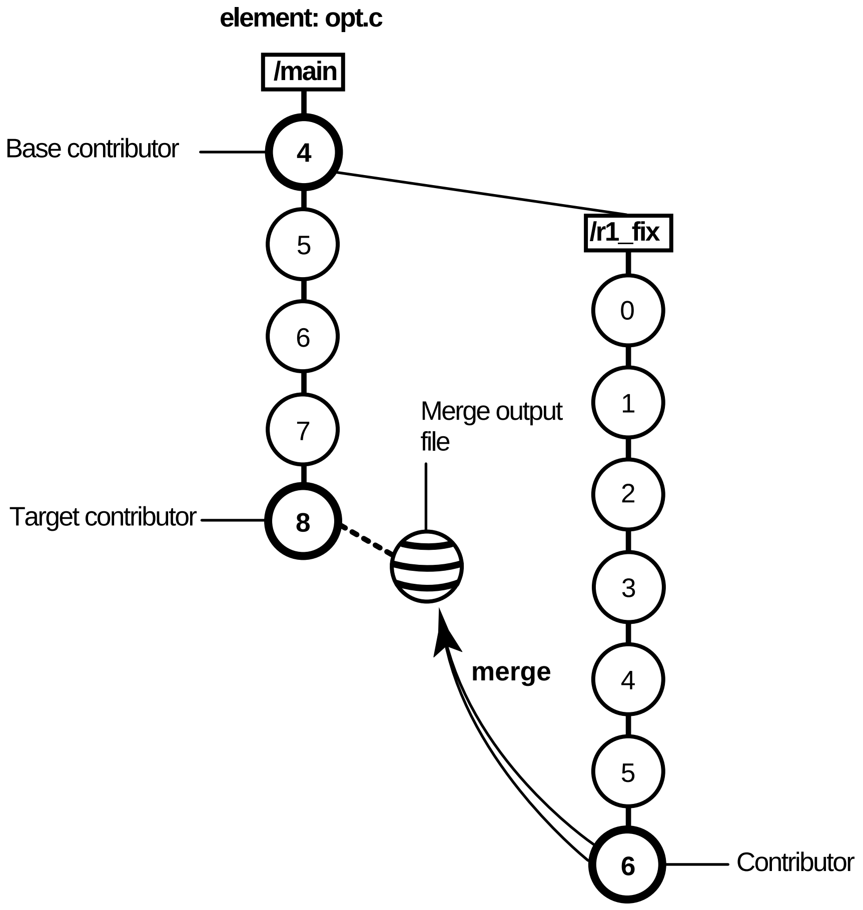
- Contributors, which are typically one version from each branch you are merging. (You can merge up to 15 contributors.) You specify which versions are contributors.

- The base contributor, which is typically the closest common ancestor of the contributors. (For selective merges, subtractive merges, and merges in an environment with complex branch structures, the base contributor may not be the closest common ancestor.) ClearCase determines which contributor is the base contributor.

- The target contributor, which is typically the latest version on the branch that will contain the results of the merge. You determine which contributor is the target contributor.

- The merge output file, which contains the results of the merge and is usually checked in as a successor to the target contributor. By default, the merge output file is the checked-out version of the target contributor, but you can choose a different file to contain the merge output.

Figure 22 Versions Involved in a Typical Merge



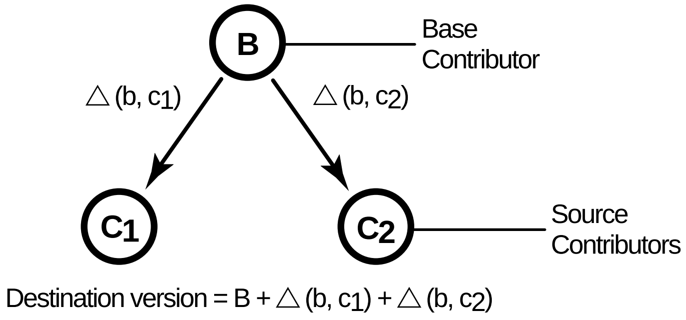
To merge files and directories, ClearCase takes the following steps:

1. It identifies the base contributor.
2. It compares each contributor against the base contributor. (See Figure 23.)
3. For any line that is unchanged between the base contributor and any other contributor, ClearCase copies the line to the merge output file.
4. For any line that has changed between the base contributor and one other contributor, ClearCase accepts the change in the contributor; depending on how you started the merge operation, ClearCase may copy the change to the merge output file. However, you can

disable the automated merge capability for any given merge operation. If you disable this capability, you must approve each change to the merge output file.

5. For any line that has changed between the base contributor and more than one other contributor, ClearCase requires that you resolve the conflicting difference.

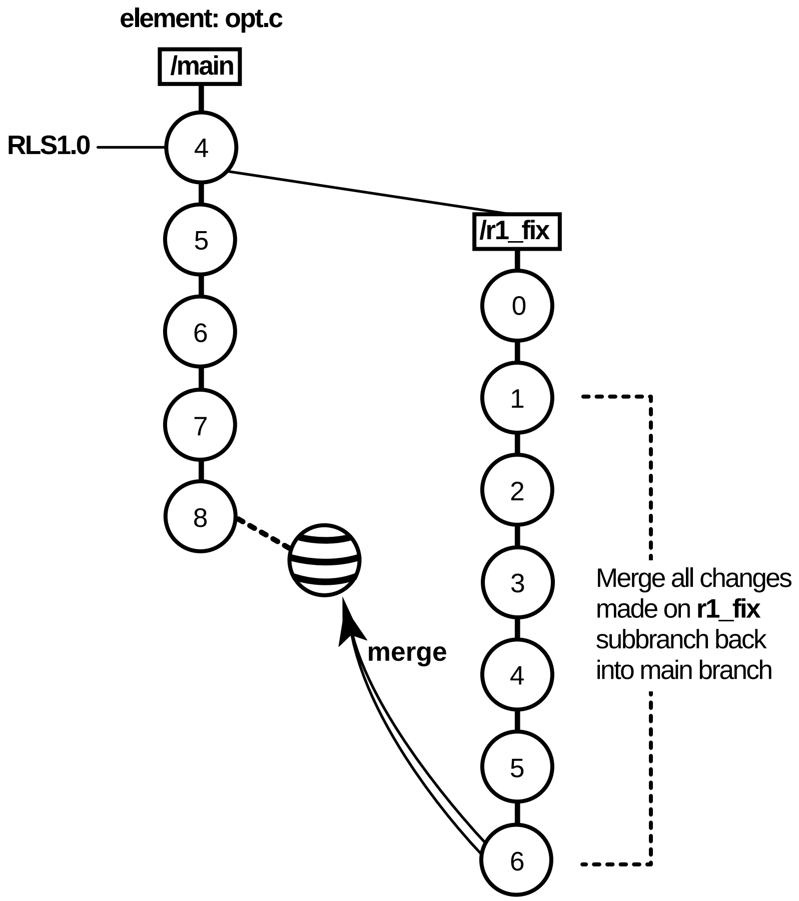
Figure 23 ClearCase Merge Algorithm



Scenario: Merging All Changes Made on a Subbranch

This is the simplest and most common case. Bug fixes for an element named **opt.c** are being made on branch **r1_fix**, which was created at the baseline version **RLS1.0** (**\main\4**). Now, all the changes made on the subbranch are to be incorporated into **main**, where a few new versions have been created in the meantime. (See Figure 24.)

Figure 24 Merging All Changes from a Subbranch


element: opt.c
/main
RLS1.0
4
5
6
7
8
merge
/r1_fix
0
1
2
3
4
5
6
Merge all changes made on **r1_fix** subbranch back into main branch

Task Overview

Merging the changes from the **r1_fix** branch involves the following tasks:

1. Start a dynamic view or change directories to a snapshot view. The view must select the target version, which in Figure 24 is **opt.c@@\main\8**.

2. If the target versions are checked out to your view for other revisions, create a pre-merge checkpoint by checking them in. To make it easier to find this pre-merge checkpoint, consider labeling the versions.

3. Use the Merge Manager to find elements with versions on a specific subbranch. In Figure 24, you use the Merge Manager to find elements with versions on the **r1_fix** subbranch.

4. Use Diff Merge to resolve any conflicting differences between merge contributors.

5. Test the merge results in the view you start in Step #1. Then check in the target versions (which contain the results of the merge).

Getting More Information

For detailed information on completing this task, see ClearCase online help:

1. From ClearCase HomeBase, on the **Getting Started** tab, click **ClearCase Help**.

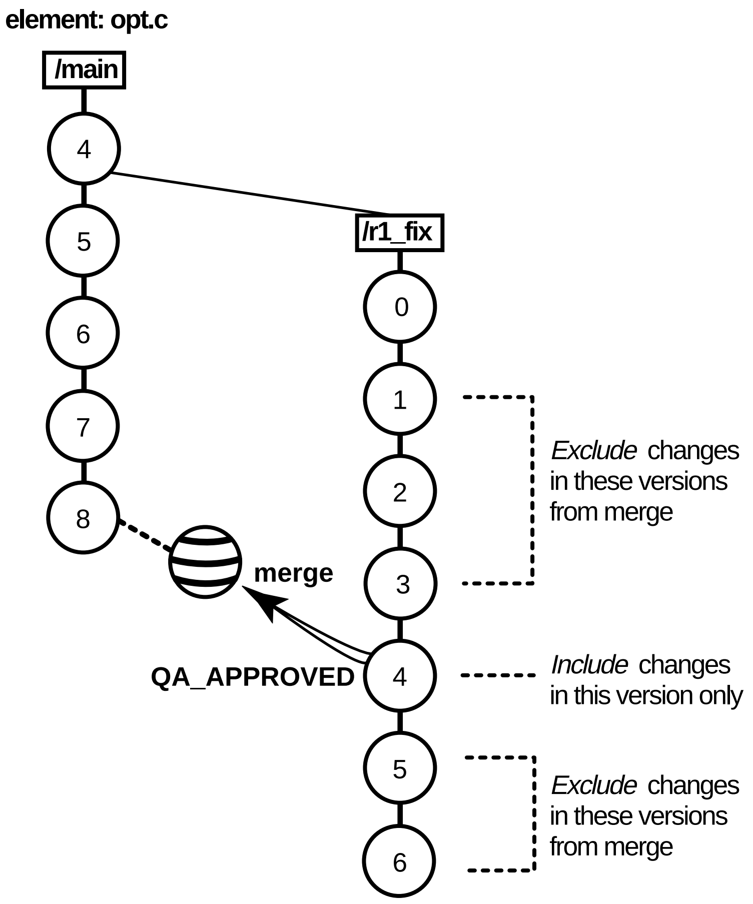
2. In the Help for ClearCase window, click **Help Topics**.

3. On the **Contents** tab of the Help Contents window, click **Developing Software**➔**Working in base ClearCase**➔**How to**➔**Merge Files and Directories**.

Scenario: Selective Merge from a Subbranch

In this scenario, the project manager wants to incorporate into new development several lines of code that were added in version **\main\r1_fix\4**. It's critical that you merge only the lines of code as written in this version: it's the only version to be approved by testing. (See Figure 25.)

Figure 25 Selective Merge from a Subbranch


element: opt.c
/main
4
5
6
7
8
/r1_fix
0
1
2
3
4
5
6
merge
QA_APPROVED
Exclude changes in these versions from merge
Include changes in this version only
Exclude changes in these versions from merge

Selective merges can be tricky: versions you exclude as contributors to the merge may contain needed revisions. For example, if the function you added in **\main\r1_fix\4** relies on a variable definition that was added in **\main\r1_fix\2**, you must include version 2 in the merge.

Merging a Range of Versions

You can also specify a single range of consecutive versions to contribute to the merge. For example, if you need the variable definitions added in **\main\r1_fix\2** as well as the code added in **\main\r1_fix\4**, you can include versions 2 through 4 in the merge.

Task Overview

Merging selective versions from the **r1_fix** branch involves the following tasks:

1. Start a dynamic view or change directories to a snapshot view. The view must select the target version, which in Figure 25 is **opt.c@@\main\8**.

2. If the target version is checked out to your view for other revisions, create a pre-merge checkpoint by checking it in.

3. To determine which versions contain changes you want to merge to the target version, use the Version Tree Browser and the History Browser. From a snapshot view, use either the **cleartool get** command or the Version Tree Browser or History Browser's **Send To** command to see the contents of versions not loaded into your view. (For information about opening a version not currently in your view, see ClearCase online help.)

4. To start the merge, check out the target version, and then issue the **cleartool merge** command with the **–insert –graphical** arguments. (You cannot start a selective merge from the Diff Merge tool.)

   For example, the following commands merge only the changes in version 4 on the **r1_fix** branch:

   ```
   Z:\avob> cleartool checkout opt.c
   Z:\avob> cleartool merge –graphical –to opt.c –insert –version \main\4
   ```

   These commands merge only the changes in versions 2 through 4 on the **r1_fix** branch:

   ```
   Z:\avob> cleartool checkout opt.c
   Z:\avob> cleartool merge –graphical –to opt.c –insert –version \main\r1_fix\2 \main\4
   ```

5. In Diff Merge, complete the merge. Then save the results and exit. For information on using Diff Merge, refer to the online help.

6. Test the merge results in the view you start in Step #1. Then check in the target version.

NOTE: In a selective merge, ClearCase does not create a merge arrow. A merge arrow indicates that all of a version's data has been merged, not just parts of it.

Getting More Information

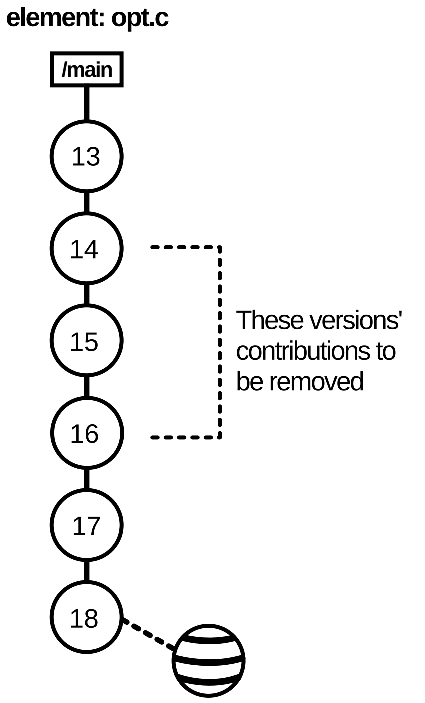
For detailed information on completing this task, see the **merge** and **version_selector** reference pages in *ClearCase Reference Manual* or the ClearCase online help:

1. From ClearCase HomeBase, on the **Getting Started** tab, click **ClearCase Help**.
2. In the Help for ClearCase window, click **Help Topics**.
3. On the **Contents** tab of the Help Contents window, click **Developing Software➔Working in base ClearCase➔How to➔Merge Files and Directories**.

Scenario: Removing the Contributions of Some Versions

The project manager has decided that a new feature, implemented in versions 14 through 16 on the **main** branch, will not be included in the product. You must perform a subtractive merge to remove the changes made in those versions. See Figure 26.

Figure 26 Removing the Contributions of Some Versions



Task Overview

Performing a subtractive merge involves the following tasks:

1. Start a dynamic view or change directories to a snapshot view. The view must select the branch from which you want to remove revisions.

2. If the target version is checked out to your view for other revisions, create a pre-merge checkpoint by checking it in. In Figure 25, the target version is **opt.c@@\main\8**.

3. To determine which versions contain changes you want to remove, use the Version Tree Browser and the History Browser. From a snapshot view, use either the **cleartool get** command or the Version Tree Browser or History Browser's **Send To** command to see the contents of versions not loaded into your view. (For information about opening a version not currently in your view, see ClearCase online help.)

4. To perform the merge, check out the target version, and then use the **cleartool merge** command with the **–delete –graphical** arguments. (You cannot start a subtractive merge from the Diff Merge tool).

   For example, the following commands remove revisions to versions 14 through 16 on the **main** branch:

   ```
   Z:\avob> cleartool checkout opt.c
   Z:\avob> cleartool merge –graphical –to opt.c –delete –version \main\14 \main\16
   ```

5. In Diff Merge, complete the merge. Then save the results and exit. For information on using Diff Merge, refer to online help.

6. Test the merge results in your view. Then check in the target version (which contains the results of the merge).

NOTE: In a subtractive merge, ClearCase does not create a merge arrow. A merge arrow indicates that data has been merged, not removed.

Getting More Information

For detailed information on completing this task, see the **merge** and **version_selector** reference pages in *ClearCase Reference Manual* or the ClearCase online help:

1. From ClearCase HomeBase, on the **Getting Started** tab, click **ClearCase Help**.

2. In the Help for ClearCase window, click **Help Topics**.

3. On the **Contents** tab of the Help Contents window, click **Developing Software→Working in base ClearCase→How to→Merge Files and Directories**.

Recording Merges that Occur Outside ClearCase

You can merge versions of an element manually or with any available analysis and editing tools. To update an element's version tree with a merge that occurs outside ClearCase, check out the target version, perform the merge with your own tools, and check it back in. Then record the merge by drawing a merge arrow from the contributors to the new version that contains the result of the merge. After you've drawn the merge arrow, your merge is indistinguishable from one performed with ClearCase tools.

For example, use the following commands to merge a version of **nextwhat.c** on the **enhance** branch to the branch currently selected by your view:

```
Z:\avob> cleartool checkout nextwhat.c
Checkout comments for "nextwhat.c":
merge enhance branch
.
Checked out "nextwhat.c" from version "\main\1".

Z:\avob> <invoke your own tools to merge data into checked-out version>

Z:\avob> cleartool merge –to nextwhat.c –ndata –version ...\enhance\LATEST
Recorded merge of "nextwhat.c".
```

Getting More Information

For detailed information on completing this task, see the **merge** and **version_selector** reference pages in *ClearCase Reference Manual* or the ClearCase online help:

1. From ClearCase HomeBase, on the **Getting Started** tab, click **ClearCase Help**.
2. In the Help for ClearCase window, click **Help Topics**.
3. On the **Contents** tab of the Help Contents window, click **Developing Software**➔**Working in base ClearCase**➔**How to**➔**Merge Files and Directories**.

5.4 Sharing Control of a Branch with Developers at Other Sites

NOTE: This section describes how to request control of a branch from another development site. You do not need to read this section unless your project manager or MultiSite administrator directs you to.

If your company uses MultiSite to distribute development among multiple geographical sites, you may share source files with developers at other sites. Each site has its own replica of the VOB, and developers work in their site-specific replica. Each replica controls (masters) a particular branch of an element, and only developers at that replica's site can work on that branch. In this scenario, MultiSite branch mastership does not affect you, and you can do your work as usual.

However, sometimes elements cannot have multiple branches. For example, some file types cannot be merged, so development must occur on a single branch. In this scenario, all developers must work on a single branch (usually, the main branch). MultiSite allows only one replica to master a branch at any given time. Therefore, if a developer at another site needs to work on the element, she must request mastership of the branch.

For example, the file **doc_info.doc** cannot be merged, but developers at different sites need to make changes to it. If the branch is currently mastered by your local replica, you can check out the file. If the branch is mastered by another replica, you cannot check out the file. If you try to check out the file, ClearCase presents an error message:

```
cleartool: Error: Unable to perform operation "checkout" in replica
"lexington" of VOB "\lib".
cleartool: Error: Master replica of branch "\main" is "raleigh".
cleartool: Error: Unable to check out "file1.txt".
```

For you to check out the file, your local replica must master the branch. ClearCase provides a special **cleartool** command you can use to request mastership. This command determines which replica masters the branch and sends your request to that replica.

If you are allowed to request mastership from that replica, and mastership requests are enabled at the replica level, branch type level, and branch level, the mastership change is made and a MultiSite update packet containing the change is sent to your local replica. When your local replica imports the packet, it receives control of the branch and you can check out the file.

NOTE: Authorizing developers to request mastership and enabling mastership requests at a replica are tasks performed by the MultiSite administrator. For more information, see the *ClearCase MultiSite Manual*.

When you use mastership requests to transfer control of a branch, you can use either of two methods to do your work:

- Request mastership of the branch and wait for mastership to be transferred to your local replica; then perform a reserved checkout. You must use this method if you cannot or do not want to merge versions of the element.
- Request mastership of the branch and check out the branch immediately. You must perform a nonmastered checkout. Also, you may have to perform a merge before you can check in your work.

The following sections describe both methods.

Waiting for Mastership to Be Transferred

To request mastership:

1. At a command prompt, enter a **cleartool reqmaster** command for the branch you need to check out.

   cleartool reqmaster –c "add info re new operating systems" read_me_first.doc@@\main

2. Wait for mastership to be transferred to your local replica. To list the mastering replica of a branch, use **describe**:

   cleartool describe read_me_first.doc@@\main
   ```
   branch "read_me_first.doc@@\main"
     created 15-May-99.13:32:05 by sg.user
     branch type: main
     master replica: doc_lex@\doc
   ...
   ```

3. Perform a reserved checkout, edit the file, and check in your work.

Checking Out the Branch Before Mastership is Transferred

If you can merge versions of the element you need to check out, you can work on the file while you wait for mastership to be transferred to your replica. To use this method:

1. Enter a **reqmaster** command for the branch you need to check out.

   cleartool reqmaster –c "fix bug #28386" foo.c@@\main\integ

2. Use the **cleartool edcs** command to edit your config spec to select the appropriate version of the file. For example, your config spec may look like this:

   ```
   element * CHECKEDOUT
   element \lib\foo.c \main\integ\LATEST
   element \lib\foo.c \main\LATEST –mkbranch integ
   element * \main\LATEST
   ```

3. Use **cleartool checkout –unreserved –nmaster** to perform a nonmastered checkout.

   cleartool checkout –c "fix bug #28386" –unreserved –nmaster foo.c@@\main\integ

4. Edit the file.

5. Wait for mastership to be transferred to your local replica. To list the mastering replica of a branch, use **describe**:

   cleartool describe \lib\foo.c@@\main
   ```
   branch "\lib\foo.c@@\main"
     created 15-May-99.13:32:05 by nlg.user
     branch type: main
     master replica: lib_london@\lib
   ...
   ```

6. Check in the file. If the checkin succeeds, you're finished.

   cleartool checkin –nc foo.c
   ```
   Checked in "foo.c" version "\main\65".
   ```

   If the checkin fails because you have to perform a merge, proceed to Step #7:

   cleartool checkin –nc foo.c
   ```
   cleartool: Error: The most recent version on branch "\main" is not the
   predecessor of this version.
   cleartool: Error: Unable to check in "foo.c".
   ```

7. Merge from the latest version on the branch to your checked-out version.

   cleartool merge –to foo.c –version \main\LATEST
   (if necessary, you are prompted to resolve conflicts)
   ```
   Moved contributor "foo.c" to "foo.c.contrib".
   Output of merge is in "foo.c".
   Recorded merge of "foo.c".
   ```

8. Check in the file.

Troubleshooting

If the **cleartool reqmaster** command returns errors, check the file name and branch name you typed in the command. Make sure you are specifying the correct branch. If you continue to receive errors, contact your project manager or MultiSite administrator.

Other Tasks

6

Chapter 3, *Working in a View*, describes tasks you perform daily or weekly. You may need to perform some of these tasks less often:

➤ Add files and directories to source control
➤ Access elements not loaded into a snapshot view
➤ Adjust the scope of a view
➤ Assign snapshot views to drive letters
➤ Assign dynamic views to drive letters
➤ Register snapshot views
➤ Move views
➤ Regenerate a snapshot view's **view.dat** file
➤ Accessing UNIX views and VOBs from Windows

6.1 Adding Files and Directories to Source Control

You can add files or directories to source control at any time. Usually, you add a few files to a directory that is already under source control. Less frequently, you may need to add an entire directory tree to source control.

This section explains these tasks:

➤ Adding files and directories to an existing directory
➤ Adding a directory tree for a new development project

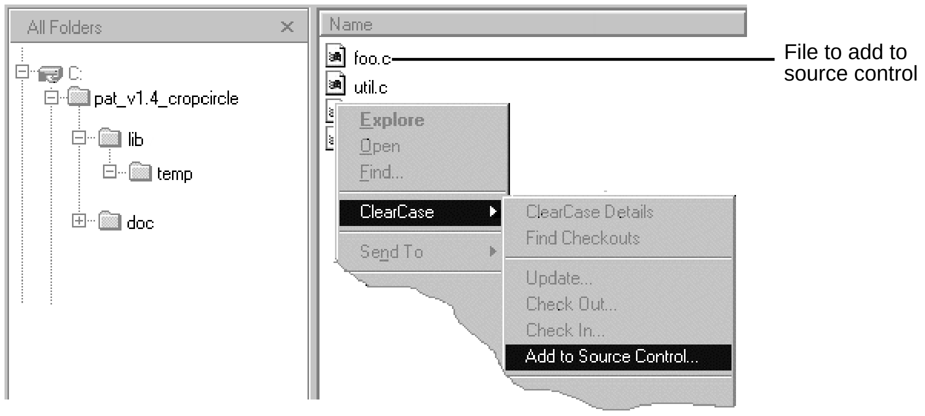
Adding Elements to an Existing Directory Tree

NOTE: Your view's version-selection rules determine on which branch an element's first version is created. Make sure the view you use to add elements creates versions on an appropriate *branch*.

To add files and directories to source control from an existing directory tree:

1. In Windows Explorer, navigate to the view used for your development task.
2. Navigate to the parent directory into which you want to add the files or directories.
3. If the files or directories are not present, drag them to the parent directory.
4. Select the files and directories you want to add to source control.
5. As illustrated in Figure 27, right-click one of the selected objects. On the shortcut menu, click **ClearCase→Add to Source Control**.
6. Click **OK**.

Figure 27 Adding Elements to Source Control



Under the Hood: What Happens when You Add a File or Directory to Source Control

The **mkelem** or **Add to Source Control** command always creates an element and initializes its version tree by creating a single branch (named **main**) and a single, empty version (version 0) on that branch. The following arguments for the **mkelem** command or options in the Add to Source Control dialog box determine optional ClearCase behavior:

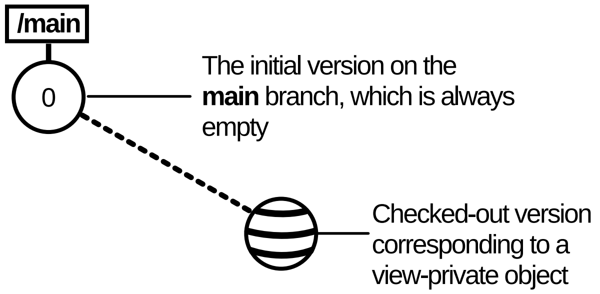
- Selecting the **Keep checked out** check box or using **mkelem** with no arguments checks out the element. Any view-private data that corresponds to the element pathname remains in your view only and is added to version 1 in the VOB when you check in. (See Figure 28.)

- Clearing the **Keep checked out** check box or using **mkelem –ci** checks in the element, using any existing view-private data that corresponds to the element pathname as the content for version 1. Your view's config spec determines the branch on which ClearCase creates version 1.

- Using **mkelem –nco** suppresses automatic checkout; **mkelem** creates the new element, along with the **main** branch and version **\main\0**, but does not check it out. If *element-pathname* exists, it is moved aside to a **.keep** file.

Other views do not see the element until you check in the element's parent directory (the **Add to Source Control** command does this for you) and check in the file or directory.

Figure 28 Creating an Element


/main
0
The initial version on the **main** branch, which is always empty
Checked-out version corresponding to a view-private object

NOTE: As described in *Under the Hood: VOB Links*, *VOB links* make it possible to have more than one copy of a directory in a snapshot view. When you add a file or directory to a snapshot view, ClearCase updates all other instances of the parent directory that are loaded into your view.

Adding Elements for a New Development Task

NOTE: This procedure assumes that a VOB exists. For information on creating VOBs, see *Managing Software Projects with ClearCase*.

1. In Windows Explorer, navigate to the view you created for the development task.

2. If you work in a snapshot view, create a folder in the view that corresponds to each VOB to which you want to add files and directories.

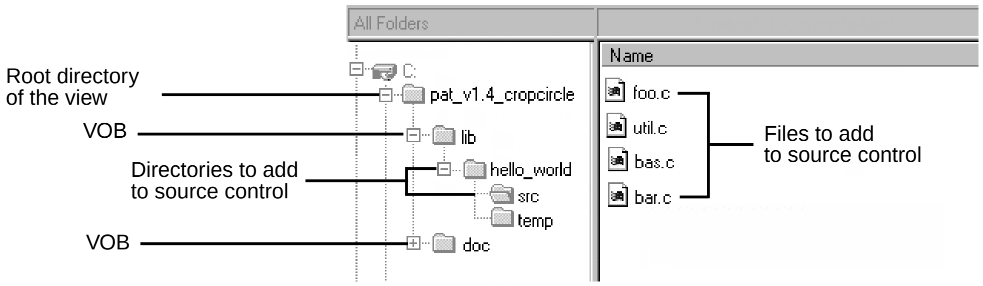
   If you work in a dynamic view, make sure that each VOB to which you want to add files and directories is accessible from your view. If a VOB isn't accessible, activate it on your computer by clicking **Mount VOB** on the **VOBs** tab in ClearCase Home Base.

3. Under each VOB, do one of the following:

   ➢ Create a directory structure.
   ➢ If files and directories already exist, copy them into the appropriate location within the directory tree.

   When you are finished, the view resembles Figure 29.

Figure 29 Directory Structure in a Snapshot View


Root directory of the view
VOB
Directories to add to source control
VOB
All Folders
C:
pat_v1.4_cropcircle
lib
hello_world
src
temp
doc
Name
foo.c
util.c
bas.c
bar.c
Files to add to source control

4. In the right pane of Windows Explorer, select files and directories.

   We recommend you select items that are the furthest from the root of the directory tree: the **Add to Source Control** command for any given file or directory also adds any parent directories (up to the VOB root directory) that are not already *elements*. For example, in Figure 29, if neither **\lib\hello_world** nor **\lib\hello_world\src** are elements, you can add both directories to source control by adding **\lib\hello_world\src** to source control.

5. As illustrated in Figure 27, right-click one of the selected objects. On the shortcut menu, click **ClearCase➔Add to Source Control**.

The clearimport and clearexport Commands

If you're adding a large number of files and directories to source control, use the **clearexport_ffile** command (or other **clearexport** commands) and **clearimport** command. For more information, see the **clearexport_ffile** and **clearimport** reference pages in *ClearCase Reference Manual*.

6.2 Accessing Elements Not Loaded into a Snapshot View

Although a view filters the data in the VOB so that you work only with a specified set of versions, you may need to see a version of an element that is not loaded into your snapshot view. To do so, you must use **cleartool**, which is the command-line interface to ClearCase. This section explains how to use **cleartool** commands to perform the following tasks:

➤ Listing all files in a VOB directory
➤ Viewing ClearCase metadata
➤ Copying a nonloaded version into your snapshot view

Listing All Elements in the VOB Namespace

You can use the **cleartool ls** command to see all elements in the VOB namespace, even if they are not loaded into your snapshot view. This command lists the names of elements cataloged in the VOB namespace that your view's config spec selects. The output of **cleartool ls** includes this information:

➤ The version-ID of the particular version the view selects
➤ The version-selection rule in the config spec that selects this version

To see all elements in a directory:

1. In Windows Explorer, right-click a directory in a snapshot view.
2. On the shortcut menu, click **ClearCase→Command Prompt** to display a **cleartool** prompt.
3. At the prompt, type the **cleartool ls** command using the following syntax:

   ls *pathname...*

For example, **ls lib\hello_world** lists all the elements in the **lib\hello_world** directory as currently selected by your config spec.

For more information, see the **ls** reference page in *ClearCase Reference Manual*.

Viewing ClearCase Metadata for Nonloaded Elements

You can use **cleartool** commands to see information about an element not loaded into the snapshot view:

- The Version Tree Browser displays an element's version tree, which represents the relationships of an element's versions.
- The History Browser displays a history of version-creation comments and of ClearCase operations that affect the element.
- An element's property sheet displays the element's name, creator and creation date, and any labels attached to the version currently selected by the config spec.

To Open the Version Tree Browser for Nonloaded Elements

1. In Windows Explorer, right-click a directory in a snapshot view.
2. On the shortcut menu, click **ClearCase➔Command Prompt** to display a **cleartool** prompt.
3. At the prompt, type this command:

   lsvtree –graphical *pathname*

   For example:

   ```
   cleartool> lsvtree –graphical c:\pat_v1.4_cropcircle\lib\batch\not_loaded.c
   ```

To Open the History Browser for Nonloaded Elements

1. In Windows Explorer, right-click a directory in a snapshot view.
2. On the shortcut menu, click **ClearCase➔Command Prompt** to display a **cleartool** prompt.

3. At the prompt, type this command:

lshistory –graphical *pathname*

For example:

`cleartool>` **lshistory –graphical c:\pat_v1.4_cropcircle\lib\batch\not_loaded.c**

To Open ClearCase Properties for Nonloaded Elements

1. In Windows Explorer, right-click a directory in a snapshot view.

2. On the shortcut menu, click **ClearCase→Command Prompt** to display a **cleartool** prompt.

3. At the prompt, type this command:

describe –graphical *pathname*

For example:

`cleartool>` **descrige –graphical c:\pat_v1.4_cropcircle\lib\batch\not_loaded.c**

Copying a Nonloaded Version into Your View

To access a version of a file not loaded into your view, use the **cleartool get** command, which copies the version you specify into your view. When the file is in your view, you can read its contents and use it for build purposes, but you cannot check it out. Only file elements that are loaded into the view can be checked out.

NOTE: You cannot use **cleartool get** for directory elements.

To copy a nonloaded version of a file element into your view :

1. In Windows Explorer, right-click a directory in a snapshot view.

2. On the shortcut menu, click **ClearCase→Command Prompt** to display a **cleartool** prompt.

3. Type the **cleartool get** command using the following syntax:

get –to *filename version-extended-pathname*

For example, **get –to foo.c.previous.version foo.c@@/main/v3.1_fix/10** copies **foo.c@@/main/v3.1_fix/10** into your view under the name of **foo.c.previous.version**.

6.3 Adjusting the Scope of a View

At any time during a development cycle, you may need to change the set of files and directories in your view. Two factors determine which files and directories are in your view:

➤ The set of elements available to your view. In a snapshot view, *load rules* in the config spec determine which elements are available. In a dynamic view, all elements in all VOBs active on your computer are available.

➤ Within the set of available elements, the *version-selection rules* in the config spec select specific versions.

This section describes the following tasks:

➤ Changing which elements are loaded into a snapshot view
➤ Excluding elements
➤ Activating or deactivating VOBs
➤ Changing which versions the view selects

To Change Which Elements Are Loaded into a Snapshot View

1. In ClearCase Home Base, click the **Views** tab and click **Edit View Properties**.

2. In the Edit View Properties dialog box, select the view and click **Edit**.

3. In the Properties dialog box, click the **Load Rules** tab.

4. On the **Load Rules** tab, click **Edit Load Rules**.

5. In the Choose Elements to Load dialog box, click **Add** to load another element into the view, or click **Remove** to unload a file or directory from the view.

6. Click **OK**.

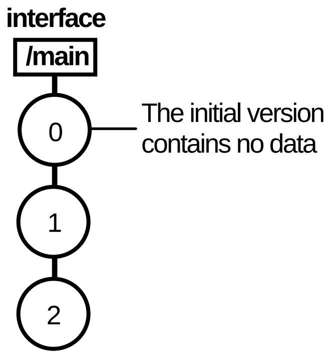
ClearCase starts the update operation to match the modified config spec. Fore more information, see *Under the Hood: What Happens when You Update a View?* on page 42.

Excluding Elements

ClearCase loads all directory elements recursively. If you want to load only a few elements from a given parent directory, you can use the VOB Namespace Browser to add each element separately. For each element you add, the VOB Namespace Browser creates a separate *load rule* in the *config spec*.

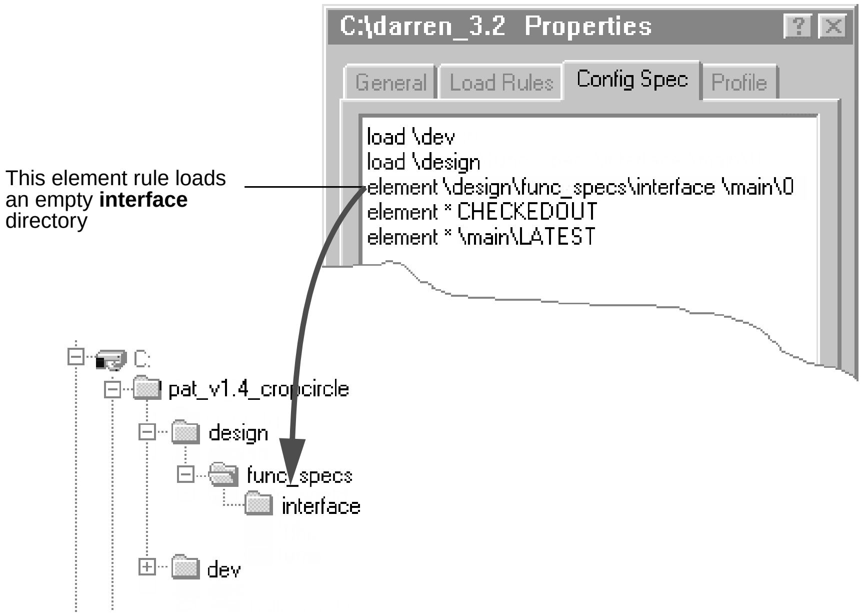
To exclude some elements, you can use an element rule in the *config spec* that selects an element's initial version on the **main** *branch*. For all ClearCase elements, the initial version on the **main** branch (illustrated in Figure 30) contains no data. (See Chapter 5, *Working On a Team* for a description of branches.)

Figure 30 Initial Version on the Main Branch



For example, to load all elements in the **design** VOB except elements below the **interface** directory, you can create a load rule that specifies the **design** VOB and an element rule that selects the initial, or empty, version of the **interface** directory (see Figure 31). When you specify the initial version of the **interface** directory, the entire subtree below it is no longer selected by the config spec and is not loaded.

Figure 31 Excluding the interface Directory



```
load \dev
load \design
element \design\func_specs\interface \main\0
element * CHECKEDOUT
element * \main\LATEST
```

To Load an Empty Version of an Element

1. In ClearCase Home Base, click the **Views** tab and click **Edit View Properties**.
2. In the Edit View Properties dialog box, select the view and click **Edit**.
3. In the Properties dialog box, click the **Config Spec** tab.
4. On the **Config Spec** tab, click **Edit** to make the rules on the **Config Spec** tab editable.
5. As illustrated in Figure 31, type an element rule specifying the initial version of the element you want to exclude by using the following syntax:

   element *path* **\main\0**

   The path must start from the VOB directory.
6. In the Properties dialog box, click **OK**.

Activating or Deactivating VOBs

Activating a VOB on your computer makes its files and directories available to your dynamic views. Deactivating a VOB frees your computer's resources.

To Activate VOBs

1. In ClearCase Home Base, click the **VOBs** tab and click **Mount VOB**.
2. In the Mount VOB dialog box, select the VOBs containing your source files.
3. Select **Reconnect at Logon** to activate the VOBs when you log on.
4. Click **OK**.

After activating VOBs, access the directory tree of source files from the drive letter you assigned to the view, or if you did not assign a drive letter to the view, from the *dynamic-views drive* (**M:** by default).

To Deactivate VOBs

1. In ClearCase Home Base, click the **VOBs** tab and click **Unmount VOB**.
2. In the Unmount dialog box, select one or more VOBs.
3. Click **Unmount**.

To Change the Versions the View Selects

Before completing these steps, refer to *Working on Branches* on page 48. Depending on your organization's development policies, your view's version-selection rules may select versions on a specific branch.

1. In ClearCase Home Base, click the **Views** tab and click **Edit View Properties**.
2. In the Edit View Properties dialog box, select the view and click **Edit**.
3. In the Properties dialog box, click the **Config Spec** tab.

4. On the **Config Spec** tab, click **Edit**. Modify the version-selection rules either by creating your own rules or using the Windows clipboard to paste a set of rules into the config spec.

To learn more about *version-selection rules*, refer to the **config_spec** reference page in *ClearCase Reference Manual* or to *Managing Software Projects with ClearCase*.

6.4 Assigning Snapshot Views to Drive Letters

If your makefiles or other files require absolute pathnames or if using a persistently mapped drive letter is more convenient than navigating to the view, assign it to a drive letter.

Depending on your computer's configuration, two methods are available:

➤ Make the snapshot view a shared directory and then assign it to a drive letter.
➤ Use the **subst** command.

Assign Only the Root Directory. You must assign only the snapshot view's root directory to a drive letter. The root directory of the snapshot view contains a hidden file named **view.dat**. ClearCase searches for this file to determine whether the current directory is in a snapshot view.

If you assign a directory below the view's root to a drive letter, ClearCase cannot find the view's **view.dat** file and assumes that the current directory is not a snapshot view.

Furthermore, to establish a *view context*, ClearCase tools such as ClearCase Details require that an element's pathname include a view's root directory. ClearCase tools use the view context to determine which version of an element to display.

Creating a Shared Directory and Assigning It to a Drive Letter

From Windows NT hosts, you can create a shared directory and assign it to a drive letter. With this method, you can access a view through Network Neighborhood, but the performance is slightly slower than if you use the **subst** command to assign the view to a drive letter.

From Windows 95/98 hosts, you can assign a shared directory to a drive letter only if the directory is on some other host; for example, you can use this method to assign someone else's view to a drive letter. To assign your own Windows 95/98 view to a drive letter, you must use the **subst** command.

To Create a Shared Directory

NOTE: If you want to share a directory on a Windows 95/98 computer (for example, so team members can assign your view to a drive letter on their computers), you must enable file sharing before using this procedure.

1. In Windows Explorer, click the snapshot view's root directory; then click **File→Sharing**.
2. On the **Sharing** tab click **Shared As**.
3. For the sake of consistency, accept the default value in the **Share Name** box. (Make the share name the same as the leaf name of the snapshot view's root directory.)
4. Click **OK**.

To Assign the Root Directory to a Drive Letter

NOTE: If you prefer to use the command line, you can use the **net use** command instead of the following procedure.

1. In Network Neighborhood, navigate to the view's root directory.
2. Right-click the folder; on the shortcut menu, select **Map Network Drive**.
3. In the Map Network Drive dialog box, select a drive letter from the **Drive** box.
4. Click **OK**.

Using the subst Command

Assigning a view to a drive letter with the **subst** command provides slightly better performance than making the snapshot view a shared directory; however, only shared directories are accessible through Network Neighborhood.

1. Open a command shell.

2. Enter **subst** *drive-letter***:** *view's-path*. For example, the command

   subst Y: C:\library\pat_v1.4_cropcircle

   maps the **pat_v1.4_cropcircle** directory to the **Y:** drive. Assign only the view's root directory to a drive letter.

For more information on the **subst** command, type **help subst** in a command shell.

6.5 Assigning Dynamic Views to Drive Letters

If your makefiles or other files require absolute pathnames or if using a persistently mapped drive letter is more convenient than navigating to the view, assign it to a drive letter.

When you use a wizard to create a view, ClearCase prompts you to assign the dynamic view to a drive letter. In addition, you can assign a dynamic view to a drive letter from Windows Explorer.

You may also want to do the following task:

➤ Undo an existing assignment

To Assign a Dynamic View to a Drive Letter

NOTE: If you prefer to use the command line, you can use the **net use** command instead of the following procedure.

1. Click **Tools→Connect Network Drive**.
2. In the Drive list of the Map Network Drive dialog box, choose a drive letter.
3. To connect to this drive letter next time you log on, select the **Reconnect at Logon** check box.
4. In the Shared Directories list, open a folder under **ClearCase Dynamic Views**, and then choose a view.
5. Click **OK**.

To Undo an Existing Assignment

1. In Windows Explorer, click **Tools➔Disconnect Network Drive**.
2. In the Disconnect Network Drive dialog box, click the drive letter you want to disconnect and click **OK**.

6.6 Registering a Snapshot View

When you create a snapshot view, ClearCase registers it in your Windows User Profile. ClearCase recognizes files and directories below a registered snapshot view as ClearCase objects.

If you access someone else's view through Network Neighborhood, ClearCase does not recognize the files or directories in the view as ClearCase objects until you register the view.

NOTE: You cannot register a snapshot view that was created from a UNIX host.

For example, if you use Windows Explorer to navigate to a team member's view on a different computer and right-click a file in the view, ClearCase options are not available from the shortcut menu. To perform ClearCase operations on the files in a team member's view, register the view as follows:

1. In Windows Explorer, navigate to the root directory of the view you want to register.
2. Right-click the root directory of the view.

   When you right-click the root directory of the view, ClearCase registers the view by adding an entry to your Windows User Profile.

6.7 Moving Views

This section discusses the following tasks:

➤ Changing the physical location of a snapshot view's directory tree
➤ Moving a view storage directory

For information on changing the drive letter assigned to a view, see *Assigning Snapshot Views to Drive Letters* on page 78 and *Assigning Dynamic Views to Drive Letters* on page 80. For information on changing a view-tag, see the **mktag** reference page in *ClearCase Reference Manual*. (For more information on *view-tags* see *Using the View-Tag* on page 9.)

Changing the Physical Location of a Snapshot View

If you accepted the View Creation Wizard's default view configuration, you can use standard Windows commands (such as the **Cut** and **Paste** or drag and drop commands) to move the snapshot view's directory tree of loaded elements and view-private files. You can move the view to a different computer, but the computer must run a Windows operating system.

CAUTION: If the view storage directory is located below the root directory of the view (which you can do in the View Creation's Advanced Options dialog box), **do not use** standard Windows commands to move the snapshot view. Instead, see *Moving a View Storage Directory*.

To Find the Location of the View Storage Directory

1. In Windows Explorer, right-click the view's root directory.

2. In the View Properties dialog box, click **Advanced**.

The Host Path field displays the pathname for the view storage directory.

Registering the View

If you move a view to a different computer, you must register its new location. Until you register its new location, the ClearCase user interface continues to present the old location. For information on registering a snapshot view, see *Registering a Snapshot View* on page 81.

Moving a View Storage Directory

Each dynamic view and snapshot view includes a view storage directory, which ClearCase uses to maintain the view. **Do not use** standard Windows commands (such as the **Cut** and **Paste** or drag and drop commands) to move a view storage directory for the following reasons:

- ➤ The view storage directory includes a database. Moving the database without first shutting down the view’s **view_server** process can corrupt the database.

- ➤ ClearCase stores the location of view storage directories in its own set of registries. The information in these registries must be correct for you to perform ClearCase operations in your views. In a dynamic view, the location in ClearCase registries must be correct for you to access any file or directory in the view.

We suggest that you ask your ClearCase administrator to move view storage directories because it may affect other, potentially many other, ClearCase users at your site. *Administering ClearCase* describes the procedure for moving view storage directories.

CAUTION: You will lose data (including view-private files in a dynamic view) if you move a view storage directory without following the procedure described in *Administering ClearCase*.

6.8 Regenerating a Snapshot View's view.dat File

The root directory of a snapshot view contains a hidden file, **view.dat**. If you delete this file inadvertently, ClearCase no longer identifies the view as a ClearCase object, and you can no longer perform ClearCase operations on files or directories loaded in the view.

To Regenerate the view.dat File

1. Open a command shell.
2. Type this command:

   ccperl *ccase-home-dir***\etc\utils\regen_view_dot_dat.pl**
   ^ [**–tag** *snapshot-view-tag*] *snapshot-view-pathname*

   For example:

   ccperl c:\atria\etc\utils regen_view_dot_dat.pl
   ^ –tag pat_v1.4_cropcircle
   ^ c:\pat_v1.4_cropcircle

   If the view storage directory is under the root directory of the view, you do not need to use the **–tag** *snapshot-view-tag* argument.

   For more information about the view storage directory, refer to *Under the Hood: A Snapshot View Storage Directory*.

6.9 Accessing UNIX Views and VOBs from Windows

The following discussion applies to attempts to access UNIX views and VOBs from Windows computers. UNIX computers cannot access Windows views and VOBs. Depending on how your shared source files handle line termination sequences, you may need to specify a special text mode in VOBs and views that are used across platforms.

Accessing UNIX Dynamic Views

From Windows computers that are configured to support dynamic views, you can start UNIX dynamic views that have view-tags registered in the current network region.

For more information, see the following:

➤ For information on registering UNIX view-tags in a Windows network region, see *Administering ClearCase*.

➤ For information on starting dynamic views, see ClearCase online help.

Accessing UNIX Snapshot Views

You can access a UNIX snapshot view directory as you would access any other UNIX directory from a Windows computer: set up an NFS product and set up the proper permissions for the UNIX directory. You cannot, however, issue ClearCase commands for a UNIX snapshot view from a Windows computer.

Accessing UNIX VOBs

If your ClearCase administrator registers a UNIX VOB's *VOB-tag* in the current Windows network region, a view on a Windows computer can access the data stored in the UNIX VOB just as it accesses data stored in a Windows VOB. (See *Administering ClearCase* for information on registering UNIX VOB-tags in a Windows network region.)

When accessing data in UNIX VOBs, consider using interop text mode for your view. The following sections describe ClearCase text modes and working in interop text mode views:

➤ Text modes for views
➤ When to use interop text mode views
➤ Rules for using interop text mode views
➤ Fixing an incorrect checkin

Text Modes for Views

Different operating systems sometimes use different character sequences to terminate lines in text files. Typically, UNIX systems terminate lines with a single **<LF>** (line feed, or new line) character and Windows systems terminate lines with a two-character **<CR><LF>** (carriage return, line feed) character sequence. Some Windows applications can read and display files in either format, some Windows applications always write files using the <CR><LF> format, and some Windows applications can be configured to determine which format they should use.

To support parallel development in mixed operating system environments, each ClearCase view has a text mode that manages line terminator sequences for text files in that view. ClearCase supports two text modes:

➤ **Transparent Text Mode**. In a view created in transparent text mode, ClearCase does no processing on line terminators. (ClearCase documentation and interfaces may refer to this mode as **UNIX Text Mode**.)

➤ **Interop Mode**. In a view created in interop mode, ClearCase removes every <CR> that is followed by a <LF> from files as they're checked in. Also, when a file is opened for reading in an interop mode view, ClearCase inserts a <CR> character before every <LF> character. (ClearCase documentation and interfaces may refer to this mode as **MSDOS Text Mode**.)

You determine a view's text mode when you create the view; after creating the view, you cannot change its mode. By default, ClearCase creates views in the transparent text mode. To create a view in interop mode, do one of the following:

➤ When creating a view with the View Creation Wizard, go to the Advanced Options dialog box and select **Use Interop (MS-DOS) text mode**.

➤ When creating a view with **cleartool mkview**, use the **–tmode** option.

For a snapshot view that is in interop mode, ClearCase adds the <CR> characters whenever it updates the view. For a dynamic view in interop mode, ClearCase adds the <CR> characters as you open and read files. For both snapshot views and dynamic views, ClearCase removes the <CR> characters during the **checkin** process.

When to Use Transparent Text Mode Views

Use transparent text mode views when you work with text file elements that are always accessed by users running on the same operating system type (UNIX or Windows). That is, in an all-Windows or all-UNIX environment, use transparent text mode.

When to Use Interop Text Mode Views

Use an interop text mode view when *both* of the following conditions are true:

➤ You work with text file elements that are accessed by users on both Windows and UNIX computers.

NOTE: Your project manager must activate interop-enabled mode for any VOB that will be accessed by an interop text mode view. For more information, see *Administering ClearCase*.

- Users on Windows use development tools (such as Microsoft Visual Studio) that expect or add **<CR>** characters in text files.

Rules for Using Interop Text Mode Views

To prevent problems with shared text files, adhere to these rules:

- When in interop text mode, access text file versions only with text editors that work with Windows-style line terminators (**<CR><LF>**).
- When in transparent text mode, access text file versions only with editors that work with UNIX-style line terminators (**<NL>**).

  If the text editor and view text mode do not match, the undesirable results that are typically produced include either unwanted **<CR>** characters embedded in element versions or missing **<CR>** characters where they are expected.
- Always check in file versions from the view text mode that corresponds to the line terminators in the modified, checked-out version. For example, do not check out a file in a transparent text mode view, edit it in a Windows utility that appends **<CR>** characters, and check it back in.
- Create interop text mode views only on Windows computers. This minimizes the risk of using interop text mode views being used with UNIX-style editors.
- Use interop text mode views to access only VOBs that have been interop-enabled with the **msdostext_mode** command. See *Administering ClearCase*.

Fixing an Incorrect Checkin

If you inadvertently check in a file from the wrong kind of view, ClearCase creates a version with the wrong line termination. Correct the problem as follows:

1. Move to a view with the correct text mode.
2. Check out the file then check it in.

A Working in a Snapshot View from a Remote Location

If you want to work at home or need to work while traveling on business, you can continue working with the files in a snapshot view. You do not need to install ClearCase on the computer in the remote location. If ClearCase is installed and the computer supports TCP/IP connectivity, you can update your view from the remote location. If ClearCase is not installed, you can use the ClearCase Web interface to access ClearCase information about the versions in your view.

This chapter describes the following tasks:

- ➤ Setting up your environment
- ➤ Preparing the view
- ➤ Transferring the view
- ➤ Working in the view
- ➤ Connecting to the network
- ➤ Using the Update Tool

A.1 Setting Up Your Environment

To set up your environment for working from a remote location, complete the following tasks:

- ➤ Set up a view for your hardware configuration
- ➤ Set up a remote computer to connect to ClearCase (optional)

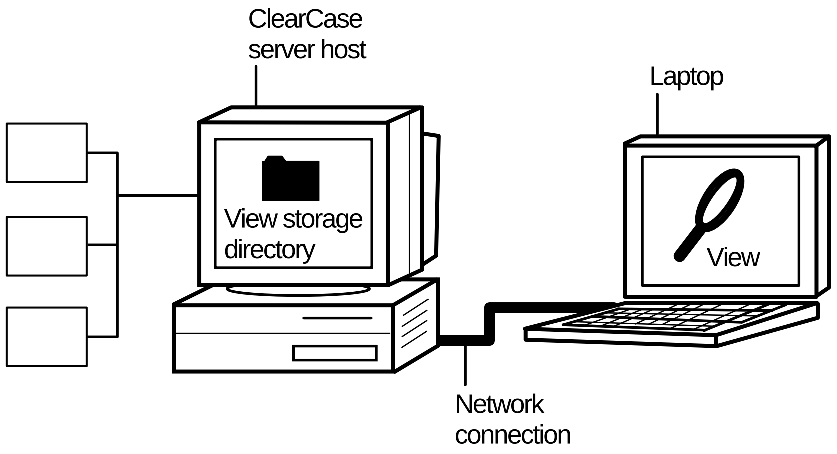
Setting Up a View for Your Hardware Configuration

You can work from a remote location using one of several hardware configurations. We recommend a configuration in which the view's directory tree, which is a standard Windows directory tree, is on a device you carry with you to a remote location. We do not recommend that you load a view initially over a modem connection; the performance can be unsatisfactory.

This chapter describes the following recommended configurations:

➤ Creating and using the view on a laptop computer that connects to the network (see Figure 33).

Figure 33 View on a Laptop



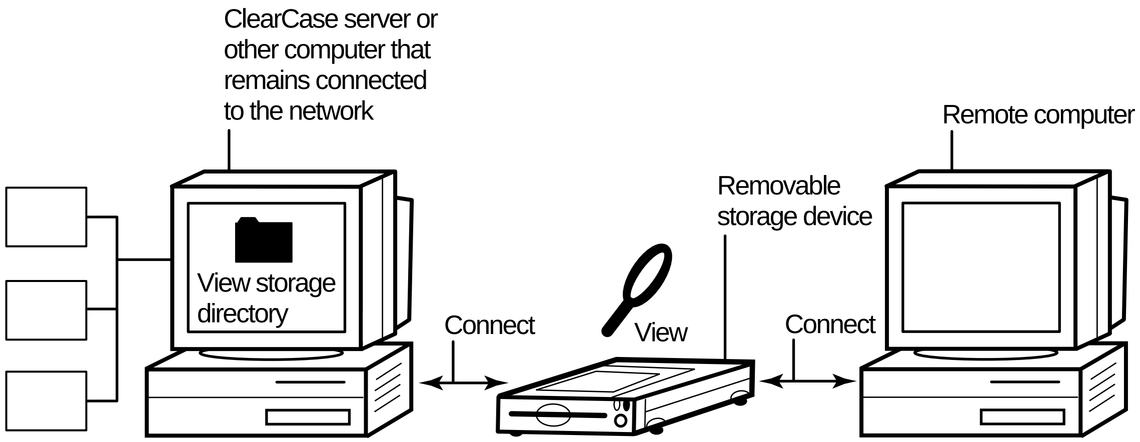
Even if your laptop is a ClearCase host, we recommend locating the view storage directory on a host that remains connected to the network. For more information, see *Location of the View Storage Directory in Remote-Use Configurations* on page 112.

NOTE: The laptop computer must run a Windows operating system.

➤ Creating and using the view on a removable storage device such as an external hard drive or some other device (such as a Jaz^{TM} drive) that provides satisfactory read/write performance (see Figure 34).

NOTE: The remote computer must run a Windows operating system.

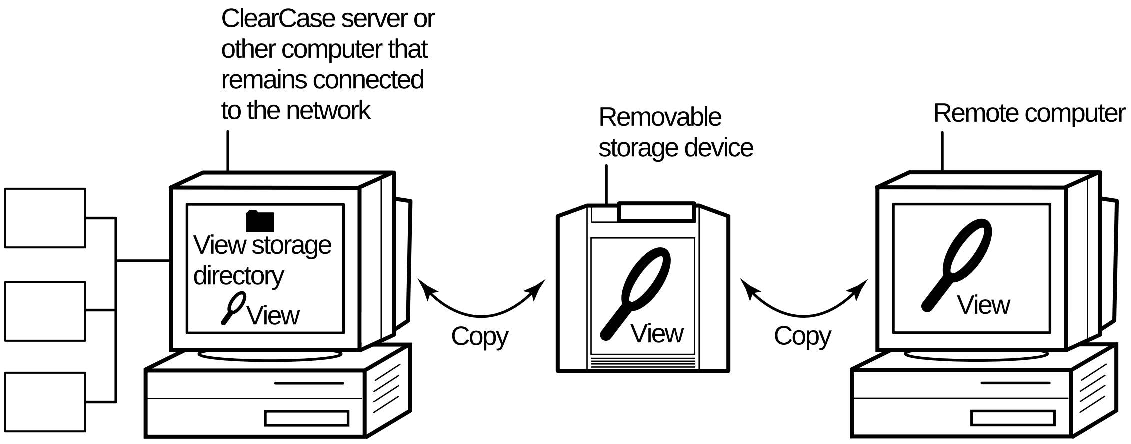
Figure 34 View On a Removable Storage Device



➤ Copying the view from a ClearCase host to a temporary, removable storage device such as a diskette or a tape drive, which usually does not provide satisfactory read/write performance, and then copying the view from the storage device to a remote computer (see Figure 35).

  NOTE: The remote computer must run a Windows operating system.

Figure 35 Copy the View



Location of the View Storage Directory in Remote-Use Configurations

In all of the configurations recommended for remote use, the view storage directory is on a host that remains connected to the network (which is the configuration the View Creation Wizard creates by default). We recommend (and in the case of a removable storage device, we enforce) this configuration for the following reasons:

➤ A view's **view_server** process runs on the host that contains the view storage directory. A **view_server** is a long-lived process that manages activity for a specific view. If you remove the view storage directory while the **view_server** process is writing to it, you can corrupt the data ClearCase uses to maintain your view.

➤ ClearCase performance relies partially on the communications ability of various ClearCase server processes. If you connect to the network from a remote location, ClearCase performs more quickly if your view's **view_server** process communicates through a LAN instead of a modem.

For more information, see *Under the Hood: A Snapshot View Storage Directory* on page 10.

Setting Up a Remote Computer to Connect to ClearCase (optional)

If ClearCase Is Installed

If ClearCase is installed on the computer you use at the remote location, you can connect to the network to update your view. You can perform other ClearCase operations, but with standard modem speeds, performance can be slow.

To perform ClearCase operations from a remote computer, the computer must support TCP/IP connectivity. Set up the computer so that you can see these items from Windows Explorer when you dial in to the network:

- The VOB servers
- The view's view storage directory
- The ClearCase license and registry hosts

You can use Windows Dial-Up Networking to satisfy these requirements.

Using the ClearCase Web Interface

Whether or not ClearCase is installed on the remote machine, you can use the ClearCase Web interface to access ClearCase information about the versions in your view. You cannot use the Web interface to *update* your view or to check out elements, but you can use it to view the contents of elements that are not loaded into your view and to see other VOB information (e.g., version history). Talk to your ClearCase administrator to see whether the ClearCase Web interface has been configured at your site and what URL you need to supply to your Web browser to access it.

A.2 Preparing the View

Before you transfer the view, complete these tasks:

- Update the view to establish a checkpoint. (For information on updating the view, see *Updating the View* on page 121.)

- Check out the files you expect to modify. After you're disconnected from the network, you cannot check out files, although there are workarounds. (See *Hijacking a File* on page 116.)

When you are no longer connected to the network you cannot use most ClearCase commands. At this point, a laptop or remote computer does not distinguish a snapshot view directory from any other directory in the file system.

A.3 Transferring the View

How you transfer the view depends on which hardware configuration you use. This section describes transferring the view for the following hardware configurations:

- View on a laptop
- View on a removable storage device
- Copying the view

Hardware Configuration: View on a Laptop

If the view is located on a laptop, you must deactivate the ClearCase integrations with Windows Explorer and other developer tools before you transfer the view. Most ClearCase operations communicate with various ClearCase servers. Even if you install view server software on your host, almost any time you start a ClearCase operation (even an operation as simple as displaying the ClearCase shortcut menu from Windows Explorer) your host must connect to the ClearCase license server. The ClearCase integration with Microsoft Visual Studio attempts to connect to the license server periodically. If you are disconnected from the network, the application that attempts to connect to the ClearCase license server locks for several seconds until it returns an error message. Although the application doesn't fail, such interruptions are unnecessary.

To Deactivate ClearCase Integrations

1. In the Windows Control Panel, click **ClearCase**.
2. Click the **Options** tab and clear the **Enable ClearCase network operations** check box.
3. Disconnect the laptop from the network.

Deactivating the integrations removes ClearCase commands from the Windows Explorer shortcut menus.

Hardware Configuration: View on a Removable Storage Device

If the view is located on a removable storage device, there are no special procedures for transferring the view. To transfer the view, disconnect the removable storage device from the network computer and reconnect the media to the remote computer.

Hardware Configuration: View Copied to a Storage Device

If you do not have a storage device with satisfactory read/write performance, use the **xcopy** command to copy files from your view to the storage media and from the storage media to the remote computer as follows:

xcopy *path*\snapshot-view-directory *destination* [**/D** [**:***m-d-y*] | **/M**] **/S /K /R**

For example, **xcopy c:\Library\pat_v1.4_cropcircle e:\temp /D /S /K /R**

The command options accomplish the following:

➤ The **/D** option instructs **xcopy** to copy only the files that have changed, which is useful if you frequently alternate between the network computer and the nonnetwork computer. Use **/D** if you configured the Update Tool to set the time stamp of updated files to the time at which the files are loaded into the view. You can view or change the Update Tool's time stamp option on the **Advanced** tab of the Start Update dialog box. For more information, refer to Step #3 of *Updating the View* on page 121.

  If you set the Update Tool to create timestamps based on the version-creation time, consider using the **/M** option, which causes **xcopy** to copy the files with the archive attribute set. The **/M** option is less reliable than the **/D** option, because some applications alter the archive attribute without writing the file.

➤ The **/S** option instructs **xcopy** to copy all subdirectories of the snapshot view.

➤ The **/K** option keeps the read-only file attribute as established by ClearCase.

➤ The **/R** option allows **xcopy** to overwrite read-only files.

A.4 Working in the View

You cannot use most ClearCase commands when disconnected from the network. Yet you may need to work on files that you did not check out or locate files you have modified. This section provides workarounds for these ClearCase operations.

Hijacking a File

If you need to modify a loaded file element that you have not checked out, you can *hijack* the file. ClearCase considers a file hijacked when you modify it without checking it out. For more information, see *Under the Hood: How ClearCase Determines Whether a File is Hijacked* on page 120.

When you reconnect to the network, you use the Update Tool to find the files you hijacked. You can do the following with a hijacked file:

➤ Check out the file. You can then continue to modify it and, when you're ready, check in your changes.

➤ Undo the hijack. For more information, see *Undoing a Hijack* on page 120.

To Hijack a File

1. In Windows Explorer, right-click the file you want to hijack.
2. On the shortcut menu, click **Properties** to display the file's property sheet.
3. On the **General** tab, clear the **Read-Only** check box.

Finding Modified Files While Disconnected

You can use Windows Explorer to find all files that have been modified after a specified date.

1. In Windows Explorer, click **Tools**➔**Find**➔**Files or Folders**.
2. In the Find: All Files dialog box, type the path to the view or to a specific directory in the view in the **Look In** box.
3. Use the **Date Modified** tab to define your search criteria.

4. Click **Find Now**.

   The **Find: All Files** dialog box expands to display the files and directories it finds.

A.5 Connecting to the Network

Connect to the network when you're ready to check in your changes to the VOB. If ClearCase is installed on your remote computer, you also can connect to the network to update the view or to perform other ClearCase operations.

This section describes the following tasks:

- ➤ Connecting from a remote computer
- ➤ Connecting directly to the LAN

Connecting from a Remote Computer

1. Establish your network connection. (Refer to *Setting Up a Remote Computer to Connect to ClearCase (optional)* on page 113.)
2. Activate the ClearCase integration:
   a. In the Windows Control Panel, click **ClearCase**.
   b. In the ClearCase Control Panel, click the **Options** tab and select the **Enable ClearCase network operations** check box.

Connecting Directly to the LAN

When you return to the office and can access the network directly, do one of the following, depending on your hardware configuration.

Hardware Configuration: View on a Laptop

If you're using the view on a laptop, connect the laptop to the network. If ClearCase is installed on the laptop, activate the ClearCase integrations as follows:

1. In the Windows Control Panel, click **ClearCase**.

2. Click the **Options** tab and select the **Enable ClearCase network operations** check box.

Hardware Configuration: View on a Removable Storage Device

If you're using the view on a removable storage device, connect the removable storage device to the computer on the network.

Hardware Configuration: View Copied to a Storage Device

If you copied the view onto removable media, use **xcopy** with the [**/D** | **/M**] **/S /K /R** options to copy files back to the original location on the network computer.

A.6 Using the Update Tool

When you're connected to the network, use the Update Tool for the following tasks:

- ➤ Determine how to handle hijacked files
- ➤ Update the view

Determining How to Handle Hijacked Files

Handling hijacked files involves the following tasks:

- ➤ Finding hijacked files
- ➤ Comparing a hijacked file to the version in the VOB
- ➤ Checking out a hijacked file
- ➤ Undoing a hijack
- ➤ Choosing other ways to handle hijacked files

NOTE: For information on handling hijacked VOB links, see *Under the Hood: VOB Links* on page 17.

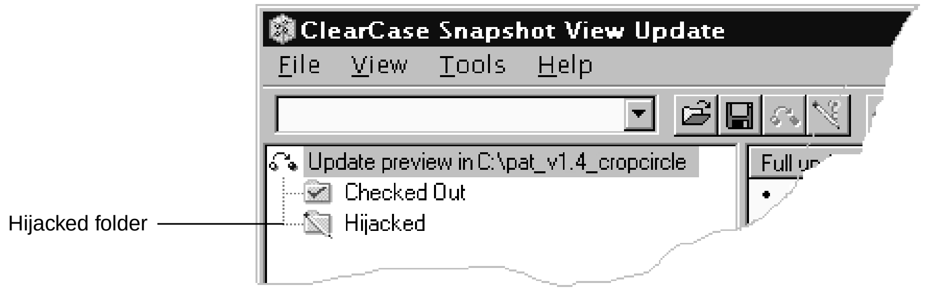
To Find Hijacked Files

1. In Windows Explorer, right-click the root directory of the snapshot view.

2. On the shortcut menu, click **ClearCase→Find Modified Files**.

3. If any hijacked files are in your view, the ClearCase Snapshot View Update window displays a folder in the left pane titled **Hijacked**. See Figure 36.

Figure 36 Hijacked Files in the Results Window


ClearCase Snapshot View Update
File View Tools Help
Update preview in C:\pat_v1.4_cropcircle
Checked Out
Hijacked
Full up
Hijacked folder

To Compare a Hijacked File to the Version in the VOB

You can use the Diff Merge tool to see how the hijacked file differs from the checked-in version of the file:

1. In the right pane of the ClearCase Snapshot View Update window, right-click a hijacked file.

2. On the shortcut menu, click **Compare with Original Version**. For information on using the Diff Merge tool, use the online help.

Checking Out a Hijacked File

To keep the modifications in a hijacked file, check out the file:

1. In the right pane of the ClearCase Snapshot View Update window, right-click a hijacked file.

2. On the shortcut menu, click **Check Out**.

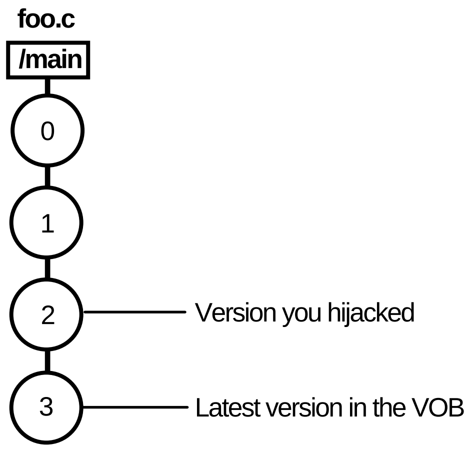
3. ClearCase treats a checked-out hijacked file as it does any other checkout.

When you're ready, you can check in the file or, if necessary, merge your changes with a version in the VOB.

You May Be Prompted to Merge

If you're working with a shared set of versions and someone has checked in a newer version of the file while it was hijacked in your view (illustrated in Figure 37), you have to merge the hijacked file with the newer version in the VOB at checkout. Refer to *To Merge with the Latest Version* on page 35 for more information.

Figure 37 Hijacked Version May Not Be the Latest Version



Undoing a Hijack

If, for specific hijacked files, you want to discard your changes and get a fresh copy of the version from the VOB, you can undo the hijack.

1. In the right pane of the ClearCase Snapshot View Update window, select one or more hijacked files.
2. Right-click the selected files, and on the shortcut menu, click **Undo Hijack**.

ClearCase overwrites the hijacked file with the version that was loaded in the view. If you want to overwrite hijacked files with the versions the config spec selects in the VOB, refer to Step #3 in *Updating the View* on page 121.

Under the Hood: How ClearCase Determines Whether a File is Hijacked

To keep track of file modifications in a snapshot view, ClearCase stores a loaded file's size and last-modified time stamp (as reported by the Windows file system). ClearCase updates these values each time you check out a file, check in a file, or load a new version into the view.

To determine whether a file is hijacked, ClearCase compares the current size and last-modified time stamp of a non-checked-out file with the size and time stamp recorded in the view database. If either value is different from the value in the view database, ClearCase considers the file hijacked.

Changing a non-checked-out file's read-only attribute alone does not necessarily mean ClearCase considers the file hijacked.

Other Ways to Handle Hijacked Files

While updating the view, you can handle hijacked files in any of the following ways:

- Leave hijacked files in place
- Rename the hijacked files and load the version from the VOB
- Overwrite hijacked files with the version the config selects in the VOB

See *Updating the View* for more information.

Updating the View

1. In Windows Explorer, select the snapshot view's root directory.

2. Right-click to display the shortcut menu and click **ClearCase➔Update View**.

3. To configure the Update Tool for handling hijacked files, in the Start Update dialog box click the **Advanced** tab and select a method for handling the remaining hijacked files. You have three choices:

   - Leave hijacked files in place
   - Rename the hijacked files and load the version from the VOB
   - Overwrite hijacked files with the version the config selects in the VOB

4. To start the update, click **OK**.

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