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CAVEMAN

Configuration And Version MANagement

User's Guide

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Kathleen M. Dyer

LLNL

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Introduction

The mission of the CAVEMAN project is to provide the tools for large code systems so that those who work on them can perform source control and configuration control on UNIX-based file servers, rather than the LC Crays.

An outside product called cvs has been chosen as the underlying source control system. The initials stand for "Concurrent Versions System". It is a freeware program that runs on most UNIX stations. To quote from the cvs man page:

"cvs is a front end to the rcs revision control system which extends the notion of revision control from a collection of files in a single directory to a hierarchical collection of directories consisting of revision controlled files. These directories and files can be combined together to form a software release. cvs provides the functions necessary to manage these software releases and to control the concurrent editing of source files among multiple software developers."

While cvs may be run directly, there are several tasks in our environment that it seemed either safer or easier to automate. CAVEMAN provides the needed functionality, generally in the form of wrappers to cvs.

Introduction

How to Use This Document

If you are new to CAVEMAN and cvs read the chapters or sections (they are all short):

- Table of Contents (to see what reference materials are available in the document).
- Notations
- CAVEMAN Or Vanilla CVS?
- Assumptions and Restrictions
- Documentation
- Where to Learn More
- Glossary

Then look over “Appendix B: Tutorial”, and “Appendix E: What if I want to... ?”.

Experienced CAVEMAN users should use this document as a reference. The most useful chapters are:

- The “cave” Tool
- Other CAVEMAN Tools
- Project Description File
- Tag File
- CVS Commands and Related Files
- Appendix C: The Modules File
- Appendix F: Cave Command Summary

Notations

The following conventions are used in this document:

bold	Literal values; commands, parameters, options, file names, directory names.
<i>italic</i>	Variable for which you supply values.
[]	In syntax lines, indicate optional items.
	Separates mutually exclusive commands or options.
...	You can repeat the preceding argument, delimiting the arguments by spaces.

Notations

CAVEMAN Or Vanilla CVS?

Although **CAVEMAN** and **cvs** look quite similar to the casual user, there are some significant differences.

It is very important to note that **CAVEMAN** is built entirely as a shell on top of **cvs**. There are no hacks to the **cvs** source code. In most cases, one can switch back and forth between **CAVEMAN** and **cvs**, if it is necessary.

CAVEMAN Advantages:

- Introduces the concept of a project, where sources may be spread among more than one root directory.
- Automatically forces any checked out files into a local directory structure which echoes that of the root directories. Any additional scripts you may need are a great deal easier to write, because the local files are in predictable locations.
- Allows additional locks to be set during some operations, ensuring that the repositories don't change unexpectedly.
- Scripts to make the log messages look nice.
- Additional hooks for user specified programs to be run before and after **checkout** and **commit**.
- Automatic tagging of all files in project when anything is committed.
- The **what** command to provide information about a project, such as who has access and what files are involved.
- The **pack** command, to collect files together for distribution to another machine.
- The **print** command, to send text files to a printer.
- A built in help package.
- Additional synonyms for several commands.
- A (mostly) order-independent execute line.
- More defaults on the execute line.
- Most commands have an option which allows the list of files to be processed to be read in from a command file.
- More error checking.

CAVEMAN Disadvantages:

- All the usual disadvantages of layered programs.
- More levels of directories in the local workspace.

- The way **CAVEMAN** enforces the directory structure causes some of the commands to require pathnames be given relative to a special project directory, not relative to what directory the user is actually in. This can be very confusing for beginners, and is not like normal UNIX. (If there is such a thing as normal UNIX.)
- The way **CAVEMAN** enforces the directory structure causes some of the fancier features of the **modules** file not to behave in the same manner as they do with plain **cv**s.
- Because of the enforced directory structure, there are some restrictions on names for the various components.
- Some of the commands are slightly different than the **cv**s equivalents. This may be confusing.

Assumptions and Restrictions

CAVEMAN is installed and maintained at LLNL:

Closed Labnet Peregrine (130.106.66.1), an A Division machine.

Open Labnet Contact the author.

Certain assumptions need to be made, and some restrictions enforced, in order to provide the automation that is required. (The terms used in this discussion are defined in the Glossary near the end of the document.)

The main tool in **CAVEMAN** is a perl script named **cave**. It acts as a front end to **cvs**, and provides several other capabilities as well.

A project is the set of files and directories under **cave** control which are used to create a given program. They may include source files, documents, make files, scripts, etc.

A project may use one or more root directories. The project may use one or more source repositories within each root directory.

The functions within **cave** are customized for an individual project through the use of a project description file. This is a text file which describes the project's root directories, source repositories, access rights, locks, and other information specific to a particular project. The path to the project description file may be set with the environment variable **CAVE_PD**.

The **modules** file is a special file used by **cvs** for administrative purposes. It is used to define alias's, and to define keys or pointers to the source repository, its subdirectories, and its source files. It is assumed that any **modules** file used by the project is set up so that a request to check out a source repository results in the entire source repository being checked out. It is also assumed that the **modules** file contains the standard **CVSROOT** keys:

```
# CVSROOT support
CVSROOT      -i /usr/local/bin/mkmodules CVSROOT
modules      -i /usr/local/bin/mkmodules CVSROOT modules
loginfo      -i /usr/local/bin/mkmodules CVSROOT loginfo
commitinfo   -i /usr/local/bin/mkmodules CVSROOT commitinfo
rcsinfo      -i /usr/local/bin/mkmodules CVSROOT rcsinfo
editinfo     -i /usr/local/bin/mkmodules CVSROOT editinfo
cvsignore    -i /usr/local/bin/mkmodules CVSROOT cvsignore
```

CAVEMAN forces any checked out files into a local directory structure which echoes that of the root directory. This is absolutely necessary, to ensure that later requests to

Assumptions and Restrictions

pack or commit the files result in the proper actions. This behavior is different than cvs, which does not enforce any sort of local directory structure.

The way CAVEMAN enforces the directory structure causes some of the fancier features of the **modules** file (such as the **-i**, **-o** and **-t** options) not to behave in the same manner as they do with plain cvs. For more information on restrictions and how to set up a **modules** file for CAVEMAN, see "Appendix C: The Modules File".

Because of the enforced directory structure, there are some restrictions on names for the various components. (In this context, "name" refers to the tail of the absolute pathname.) The name of the project should be unique. There should be no root directory, source repository, directory or file used by the project which has the same name as the project. Also, all root directory and source repository names used by a project should be unique.

There is an issue to consider when adding subdirectories to an existing source repository. When a user requests that **cvs/cave** add a subdirectory, it immediately adds an empty subdirectory at the correct place in the source repository, and creates a directory called **CVS** inside the local copy of the subdirectory. Most other commands to **cvs/cave** do not affect the source repository directly until a commit is done. The new, empty subdirectory in the source repository does not become populated until the commit. Some people may choose to wait until just before the commit process to add the subdirectory, so that the source repository doesn't get affected too early. There is a possible problem, however. The **CVS** directory and its contents are used by several commands in the CAVEMAN system to automate information handling. The **CVS** directory is created for a new directory by running **cvs/cave add**. Because of this, some may prefer to add the subdirectory immediately.

Documentation

This document, the *CAVEMAN User's Guide*, provides the most complete documentation for the CAVEMAN system. Copies are available from the author:

Kathleen Dyer

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A PostScript version of the document is also available with the CAVEMAN distribution.

The main tool for CAVEMAN is a perl script named `cave`. It has a help package. To access it, type:

```
cave help | more
```

The tools which are part of the `caveman` system have `man` pages. Use them as a quick reference.

The programs used by CAVEMAN (`cvs`, `rcs`, `diff3`, and `perl`) have `man` pages. Read them for more thorough descriptions of the programs. Also, a book about `perl` is available from O'Reilly & Associates—*Programming perl*.

Many of the descriptions for `cave` commands are borrowed in whole or in part from the `man` page descriptions of the related `cvs` and `rcs` commands. Much of the discussion of `cvs` is copied from its `man` page.

Where to Learn More

In addition to all the documentation, there is a very active cvs mailing list on Internet. To have your name added to the list, send an email message to:

`info-cvs-request@prep.ai.mit.edu`

To ask questions, report bugs or post cvs related information, send an email message to:

`info-cvs@prep.ai.mit.edu`

Where to Learn More

The “cave” Tool

While `cvs` may be run directly, there are several necessary tasks that it seems either safer or easier to automate. The CAVEMAN project provides tools to help with source control and configuration management.

The main tool is a perl script named `cave`. It acts as a front end to `cvs`, and provides several other capabilities as well. The execute line for `cave` is:

cave [-d *proj_desc*] [...] [-L] [*cave_command* [*command_options*]]

-d <i>proj_desc</i>	Name of the project description file used to describe the source control and configuration parameters for a project. If more than one -d command is entered, only the last one is used. This overrides the setting of the <code>CAVE_PD</code> environment variable.
-L	Ignore any locks (except for a panic lock) which are normally checked for and which may be set for the project. A message is sent to the standard output if any locks are present. A mail message is sent to anyone who has a lock which is ignored. The default for a <i>cave_command</i> which reads from or writes to a repository is to stop if locks are present.
<i>cave_command</i>	Select the required functionality. The default is “verify”. The commands are described on the following pages.
<i>command_options</i>	Each <i>cave_command</i> has a set of options which are described on the following pages.

`cave` reads information from the project description file into memory, and uses that information to set values needed by the different commands. Some commands do not require the project description file and do not read it, but it is not an error to include its name on the command line.

The project description file is described in the chapter “Project Description File”.

As much as possible, the options for each command match those used for the related `cvs` command.

add - Add a file or directory

This command to **cave** is used to add new files or directories to a source repository.

add [-R] [-k *kflag*] [-m *message*] [-F *list*] *file* ...

Synonym: **new**

-R	A flag to recursively descend into any directory given in the file list, and add its contents. The default is to not descend. You may not add a directory which is already known to cvs.
-k <i>kflag</i>	Specifies the default way that this file will be checked out. The <i>kflag</i> option is stored in the source file and can be changed with cvs admin . The possible values of <i>kflag</i> are described in the rcs(1) man page.
-m <i>message</i>	A quoted string containing a message to be included with the file(s). The message is stored in the file(s) when it is committed. It is considered "descriptive text" by rcs , and may be viewed by typing " cave log -t <i>file</i> ".
-F <i>list</i>	<i>list</i> is a file containing the names of files to be used with this command.
Each name must be in the same form as <i>file</i> .
Blank lines and leading blanks are allowed.
A "#" signals the start of a comment.
Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.
The -F option may be used in addition to or in place of <i>file</i> .
<i>file</i>	The name of a file or directory which already exists in the current local directory. Specifying a directory without using the -R option causes the directory to be added, but not its contents.

The files to add must exist in the current local directory, which must have been created by **cave checkout** or **cvs checkout** (it contains a CVS directory). The files are not placed in the source repository immediately. Rather, they are marked as new files and only placed in the source repository when a commit is done.

If *file* is actually the name of a directory, the process is a little different. The directory is immediately created at the correct place in the source repository, but it remains empty. The corresponding directory in the local workspace gains a CVS directory. You must then go into the local directory, and **add** the files. If the **-R** option is used, this is done automatically. These files are marked as new files, and placed in the source repository when a commit is done.

Use **add** to undo a **remove** command, unless the change has already been committed.

Returns:

	Standard Out/Error	exit value
Success	Message	0
Error	Error message.	1

The project description file is required when **cave** runs this command.

checkout - Check out files

This command to **cave** is used to check out source files from a cvs repository.

checkout [*cvs_checkout_opts*] [-res] [-F *list*] [*path* ...]

Synonym: **co**, **get**, **out**

-res

Reserve each directory or file as it is checked out. See the **cave reserve** command for a description of what it means to reserve something. If there is a conflict between something you wish to reserve and a previous reservation, the directory or file is still checked out but a warning message is sent stating that it could not be reserved.

-F *list*

list is a file containing the names of paths to be used with this command.

Each name must be in the same form as *path*.

Blank lines and leading blanks are allowed.

A "#" signals the start of a comment.

Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.

The **-F** option may be used in addition to or in place of *path*.

path

A pathname. In the simplest case, when a project only uses one root directory, it must be one of the following:

- A key, as defined in the **modules** file for this root directory.

module

- A pathname which must start with the tail of a source repository name. It may continue, to include the name of a subdirectory or file.

repository[/*dir*[/...]]

If a project uses more than one root directory, the pathname must start with the tail of the absolute root directory pathname. It may continue with:

- A key, as defined in the **modules** file for this root directory.

root_dir[/*module*]

- The relative pathname of a source repository and its contents.

root_dir[/repository[/dir[/...]]]

If *path* ends with a source repository or subdirectory name, all files contained within that source repository or directory are included (unless the **-l** option was used).

The files must exist in the source repository, and be under cave control. Do not include the **“,v”** suffix when specifying file names. The default is to check out all the files which are under cave control and are a part of the project.

The most common *cvs_checkout_opts* are:

- D date** Use the revision that was checked in at or before the specified *date* argument. The *date* is a single argument, date description specifying a date in the past. The formats are similar to those described in *co(1)*. Examples of valid date specifications include:
- 1 month ago
 - 2 hours ago
 - last Monday
 - yesterday
 - 3/31/92 10:00:07 PST
 - January 23, 1987 10:05pm
 - 22:00 GMT
- f** Forces the specified tag to match. Normally, if a tag is specified and the requested file does not contain the tag, the file is ignored. The **-f** option causes any file which does not contain the tag to be retrieved even when there is no match for the tag or date.
- l** Local. Do not recursively descend the directory structure.
- P** Prune directories that are empty. This does not remove the directory from the repository, only from your checked out copy.
- p** Pipe the files to standard output, rather than writing them to the local directory.
- Q** Causes the command to be really quiet.
- q** Causes the command to be somewhat quiet.
- r tag** Use the revision of the file which was marked with the symbolic tag *“tag”*. To avoid getting empty directories, combine this option with the **-P** option:

-P -r tag

The default is to check out the latest version.

The "cave" Tool

The more advanced *cvs_checkout_opts* are:

- A** Reset any sticky tags, dates or **-k** options. (If you get a working file using one of the **-r**, **-D**, or **-k** options, *cvs* remembers the corresponding tag, date or *kflag* and continues using it on future updates. Use the **-A** option to make *cvs* forget these specifications.)
- j branch** Merges the changes between two different branches of development. For more information, read the *cvs* man pages.
- k kflag** Alter the default processing of *rcs* keywords; all the **-k** options described in *rcs(1)* are available. Your *kflag* specification is "sticky" when you use it to create a private copy of a source file. That is, when you use this option with the **checkout** or **update** commands, *cvs* associates your selected *kflag* with the file, and continues to use it with future **update** commands on the same file until you specify otherwise. The *kflag* option is stored in the source file and can be changed with *cvs admin*.
- n** Causes the command not to run any **checkout** program as specified in the *modules* file.
- s** Display per-module status information within the *modules* file.

Returns:

	Standard Out/Error	exit value
Success	Message	0
Error	Error message.	1

The project description file is required when *cave* runs this command.

The checked out source files are placed in a directory named after the project, as determined from the project description file. They are placed so that the structure echoes that of the root directory.

Note: Checking out a file into a directory where it already exists has the same effect as running *cave update*.

The checkout process involves the following steps:

- Set an **extract** lock.
- Perform error checking of the command line.
- See if any of the directories and/or files to be checked out were reserved by someone else. Stop if there are any conflicts.

- Run any programs as specified by any **precheckout** lines in the project description file. Any program which exits with a non-zero status is assumed to have failed, and **cave** ends with an error exit.
- Run **cvs** to checkout the files.
- Run any programs as specified by any **postcheckout** lines in the project description file. Any program which exits with a non-zero status is assumed to have failed, and **cave** ends with an error exit.
- Release the lock.

Each root directory is assumed to contain the **cvs** administrative directory called **CVSROOT**. This directory and its files may be checked out, but it must be explicitly requested in *path*..:

	One root directory	More than one root directory
Path to use with checkout	CVSROOT modules	<i>root_dir/</i> CVSROOT <i>root_dir/</i> modules
File/directory created in local project directory	CVSROOT CVSROOT/modules	CVSROOT.root_dir CVSROOT.root_dir/modules

See the **export** command for another way to get files from a repository. Do not **export** and **checkout** files into the same directory.

commit - Commit files

This command to cave is used to commit source files to cvs root directories.

commit [-lnR] [-m *msg* | -f *file*] [-rrev] [-t *tag*] [-T] [-unres] [-F *list*] [*path* ...]

Synonym: **ci**, **in**, **put**

-l	Local. Do not recursively descend the directory structure. The default is to descend the directory structure.
-n	Causes the command not to run any commit program as specified in the modules file.
-R	Recursively descend into any subdirectories and commit any changes. This is the default.
-m <i>msg</i>	A quoted string containing a message to be included in the log file for this commit. If neither the -m or -f options are used, an editor is invoked to allow you to enter a log message.
-f <i>file</i>	The name of a file containing a message to be included in the log file for this commit. If neither the -m or -f options are used, an editor is invoked to allow you to enter a log message.
-rrev	Used to bring files up to a particular numeric revision. This affects any file specified in path which was checked out but not modified. (There is no space after the -r .)
-t <i>tag</i>
-T | These two options work together to determine which files are labeled with a tag, and the value of the tag.

-t <i>tag</i> Set the value of the tag to <i>tag</i> . It must not contain a semicolon, colon, dollar sign, at sign, comma or period (;:\$@,.). Determine the files to be tagged from <i>path</i> .

-T Use the tag line in the project description file to determine the name of a tag file. Get <i>tag</i> from this file, and increment it by one. Determine the files to be tagged from the tag line in the project description file. Put the incremented <i>tag</i> back into the tag file.

-t <i>tag</i> -T Set the value of the tag to <i>tag</i> . It must not contain a semicolon, colon, dollar |

sign, at sign, comma or period (;:\$@,.). Determine the files to be tagged from the **tag** line in the project description file. Put the new **tag** back into the tag file.

-unres Unreserve each directory or file as it is committed. See the **cave unreserve** command for a description of what it means to unreserve something. If there is a conflict between something you wish to unreserve and one of your own previous reservations, the directory or file is still committed but a warning message is sent stating that it could not be unreserved.

-F list *list* is a file containing the names of paths to be used with this command.
Each name must be in the same form as *path*.
Blank lines and leading blanks are allowed.
A "#" signals the start of a comment.
Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.
The **-F** option may be used in addition to or in place of *path*.

path Pathname, relative to the project directory, of a file or subdirectory to include in the commit. It must be under cave control in the *project* directory in your workspace. If *path* ends with a subdirectory name, all files contained within that directory and its subdirectories are included. Only files which have been modified are committed. If a file is specified in *path* and it is unchanged, cvs ignores it. The default is to commit all the files which are under cave control and have been changed in *project*.

Returns:

	Standard Out/Error	exit value
Success	Message	0
Error	Error message.	1

The project description file is required when cave runs this command.

The commit process involves the following steps:

- Set an **insert** lock.
- Perform error checking of the command line.
- See if any of the directories and/or files to be committed were reserved by someone else. Stop if there are any conflicts.

- Run **cvs commit** with the **-n** option. This causes cvs to attempt to execute the **commit**, but only to issue reports. It does not actually commit any files. This is done by **cave** as a final error check. It will catch problems, such as the case where a file you are trying to commit has been modified in the repository since you checked it out.
- Run any programs as specified by any **precommit** lines in the project description file. Any program which exits with a non-zero status is assumed to have failed, and **cave** ends with an error exit.
- Run **cvs** to commit the files.
- Tag files, as determined by the **tag** line in the project description file, and the **-t** and **-T** options.
- Run any programs as specified by any **postcommit** lines in the project description file. Any program which exits with a non-zero status is assumed to have failed, and **cave** ends with an error exit.
- If there is a **mail** line in the project description file, it is read to get a list of mail names. Everyone on the list is notified of the commit, and *path* is listed. If you would like to have a more complete message sent, consider using the **-u** option in **cmlog** or **cmlog_accum** instead. This causes a copy of the logfile message to be sent to anyone listed after the **-u**.
- See if any of the directories and/or files that were committed are to be unreserved. Attempt to do so.
- Release the lock.

Each root directory is assumed to contain the cvs administrative directory called **CVSROOT**. If this directory and its files were checked out with **cave**, they were placed in a directory named **CVSROOT** (if there is only one root directory in the project) or **CVSROOT.root_dir** (if there is more than one root directory in the project). This directory may be committed, but it must be explicitly requested in *path*.

diff - Compare working files with repository

This command to cave is a simple interface to the cvs diff command. It is used to compare working files with revisions in the source repository.

diff [-l] [*rcsdiff_options*] [[-r *rev1* | -D *date1*] [-r *rev2* | -D *date2*]] [-F *list*] [*file* ...]

- l** Local. Do not recursively descend the directory structure. The default is to descend the directory structure.
- r *rev*** File revision to diff.
- D *date*** Use the revision that was checked in at or before the specified *date* argument. The *date* is a single argument, date description specifying a date in the past. The formats are similar to those described in co(1). Examples of valid date specifications include:
- 1 month ago
 - 2 hours ago
 - last Monday
 - yesterday
 - 3/31/92 10:00:07 PST
 - January 23, 1987 10:05pm
 - 22:00 GMT
- F *list*** *list* is a file containing the names of files to be used with this command. Each name must be in the same form as *file*. Blank lines and leading blanks are allowed. A "#" signals the start of a comment. Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited. The -F option may be used in addition to or in place of *file*.
- file*** The name of a file to diff. The default is to report on all files and directories in the current local workspace.

The *rcsdiff_options*, which are passed to rcsdiff, are:

- ksubst** Affects keyword substitution when extracting revisions, as described in co(1). For example, "-kk -r1.1 -r1.2" ignores differences in keyword values when comparing revisions 1.1 and 1.2.
- q** Quiet mode. Reduces the number of messages to standard out.
- V_{*n*}** Emulate RCS version *n*. See co(1) for details.

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-xsuffixes Use *suffixes* to characterize RCS files. See *ci(1)* for details.

diff_options These options are passed to **diff**. They may vary, depending on the version of **diff** on your system.

If you don't specify a particular revision using the **-r** or **-D** options, your files are compared with the revisions they were based on. If two revisions are specified, you can see the differences between two revisions in the repository. The **-r** and **-D** commands may be mixed together, with at most two options ever specified.

This command must be called from within or below the project directory.

See the **man** pages **cvs**, **rcsdiff** and **diff** for more detailed explanations of the options.

Returns:

	Standard Out/Error	exit value
Success	Report.	0
Error	Error message.	1

The project description file is required when **cave** runs this command.

export - Check out files without CVS directories

This command to cave is used to check out source files from a cvs repository. It differs from `checkout` in that no CVS administrative directories are created.

export [-fnQq] -r *tag* [-D *date*] [-F *list*] [*module* ...]

Synonym: `read`

- f** Forces the specified tag to match. Normally, if a tag is specified and the requested file does not contain the tag, the file is ignored. The **-f** option causes any file which does not contain the tag to be retrieved even when there is no match for the tag or date.
- n** Causes the command not to run any checkout program as specified in the `modules` file.
- Q** Causes the command to be really quiet.
- q** Causes the command to be somewhat quiet.
- r *tag*** Use the revision of the file which was marked with the symbolic tag "*tag*".
- D *date*** Use the revision that was checked in at or before the specified *date* argument. The *date* is a single argument, date description specifying a date in the past. The formats are similar to those described in `co(1)`. Examples of valid date specifications include:
 - 1 month ago
 - 2 hours ago
 - last Monday
 - yesterday
 - 3/31/92 10:00:07 PST
 - January 23, 1987 10:05pm
 - 22:00 GMT
- F *list*** *list* is a file containing the names of modules to be used with this command. Each name must be in the same form as *module*. Blank lines and leading blanks are allowed. A "#" signals the start of a comment. Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited. The **-F** option may be used in addition to or in place of *module*.

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module

A key, as defined in the **modules** file for this root directory. If a project uses more than one root directory, *module* must start with the tail of the absolute root directory pathname and continue with the module, as defined in the **modules** file:

root_dir/module

The default is to use all the repository names defined for this project. If they are defined correctly in the **modules** file, this causes all the files under **cave** control to be exported.

Returns:

	Standard Out/Error	exit value
Success	Message	0
Error	Error message.	1

The project description file is required when **cave** runs this command.

This command requires that you specify a date or tag (with **-D** or **-r**).

The **-kv** option is always set when **export** is used. This causes any **rcs** keywords to be expanded such that an **import** done at some other site will not lose the keyword revision information. There is no way to override this.

The exported source files are placed in a directory named after the project, as determined from the project description file. They are placed so that the structure echoes that of the root directory. Since no **CVS** directories are created, these copies of the files cannot be committed back into the repository.

Each root directory is assumed to contain the **cvs** administrative directory called **CVSROOT**. This directory and its files may be exported, but it must be explicitly requested in *path*:

	One root directory	More than one root directory
Path to use with export	CVSROOT modules	<i>root_dir/</i> CVSROOT <i>root_dir/</i> modules
File/directory created in local project directory	CVSROOT CVSROOT/modules	CVSROOT.root_dir CVSROOT.root_dir/modules

See the **checkout** command for another way to get files from a repository.

Note: Do not **export** and **checkout** files into the same directory.

header - Add an rcs keyword to a file

This command to **cave** is used to add a comment line containing an **rcs** keyword to the top of an ASCII file in a local directory.

header [-q] [-c *chars*] [-k *keyword* [-k *keyword* ...]] [-F *list*] *file* [...]

- q** Quiet mode. Reduces the number of messages to standard out.
- c *chars*** Use *chars* as the first entry in the comment line. The default is to use "c". If *chars* contains a meta-character that may be interpreted by the shell, such as *, it should be protected with single quotes.
- k *keyword*** A keyword to add at the top of the file. The keyword is automatically bracketed by dollar signs (\$). The default is to use "Id".
- F *list*** *list* is a file containing the names of files to be used with this command.
Each name must be in the same form as *file*.
Blank lines and leading blanks are allowed.
A "#" signals the start of a comment.
Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.
The -F option may be used in addition to or in place of *file*.
- file* The name of a text file.

The keyword \$Id\$ is used by **cvs** and **rcs** to place modification information. Other keywords are Author, Date, Header, Locker, Log, RCSfile, Revision, Source and State. They are described in the **man** page **co(1)**.

Returns:

	Standard Out/Error	exit value
Success	A series of status messages.	0
Error	Error message.	1

The project description file is not required when **cave** runs this command.

To add a \$Id\$ keyword to all of the files in the current directory (assuming there are no subdirectories), type:

```
cave header *
```

To add the \$Id\$ and \$Log\$ keywords to all of the files in the current directory which have names starting with a or b, type:

```
cave header -k Id -k Log [a-b]*
```

To add the \$Id\$ keyword to all of the files in the current directory, and have the comment line start with "#", type:

```
cave header -c # *
```

NOTE: If you use the \$Log\$ keyword in a file, rcs places the log message in the file each time the file is committed. Unless told otherwise, it attempts to choose a comment character based on the file suffix. This may not be the character you want it to use. If this is the case, do the following:

- Commit the files.
- Go to the directory (or directories) in the repository that hold the files.
- Tell rcs what comment character(s) to use:

```
rcs -c"chars" file ...
```

There is no space between the -c and the first quotation mark.

help - Get information on how to use cave

This command to **cave** is used to get information on how to use the commands available in **cave**.

help [*command*]

command

Name of the **cave** command. The default is to provide a one line description of all the commands.

A description of the command, its options, and its functionality is returned. You might want to pipe the output through **more**:

cave help | more

Returns:

	Standard Out/Error	exit value
Success	Description of the command(s).	0
Error	Error message.	1

The project description file is not required when **cave** runs this command.

history - Report on activities affecting a source repository

This command to cave is a simple interface to the cvs **history** command. It is used to report on each use of cvs' **checkout**, **commit**, **rtag**, **update**, and **release** commands.

history [-d *root_dir*] [-report] [-flags] [-options] [-F *list*] [*file...*]

Synonym: **hi**

-d *root_dir* Tail of a root directory name. If a project uses more than one root directory, the **-d** command **must** be used. If the project uses only one root directory, the command is unnecessary.

One of the following **-report** arguments may be used to control what kind of report is generated. The default is **-o**.

-xtype Extract a particular set of record types. One or more types may be selected. They are:

O	checkout
F	release
T	rtag
W	update - working copy deleted because it was gone from the repository.
U	update - working file copied from repository.
G	update - merge was necessary, and it succeeded.
C	update - merge was necessary, but collisions were detected.
M	commit - file was modified.
A	commit - file was first added.
R	commit - file was removed.

For example, to see all files that were committed, use **-xMAR**.

-c Report each time **commit** was used (same as **-xMAR**).

-m *module* Report on a particular *module*. More than one **-m** option may be used.

-o Report on modules which were checked out but not committed or released (default).

-T Report on all tags (same as **-xT**).

-e Everything (same as **-xMACFROGWUT**).

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One of the following *-flags* arguments may be used to constrain the report.

- a** Show data for all users. The default is to show data only for the user executing the history command.
- l** Show last modification only.
- w** Show only the records for modifications done from the same working directory where **cave history** is executing.

One or more of the following *-options* arguments may be used to constrain the report.

- b *str*** Show data back to a record containing the string *str* in either the module name, the file name, or the repository path.
- D *date*** Show data since *date*.
- p *repository*** Show data for a particular source repository. You can specify several **-p** options on the same command line.
- r *rev*** Show records referring to revisions since the revision or tag named *rev* appears in individual **rcs** files. Each file is searched for the revision or tag.
- t *tag*** Show records since *tag* was last added to the history file. This differs from the **-r** option above in that it reads only the history file, not the **rcs** files, and is much faster.
- u *name*** Show records for user *name*. The default is to show the records for one's self.

Some of the *-report* arguments accept a list of file names. The reports which accept file names are **-c** and **-xWUGCMAR**.

- F *list*** *list* is a file containing the names of files to be used with this command.
Each name must be in the same form as *file*.
Blank lines and leading blanks are allowed.
A **"#"** signals the start of a comment.
Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.
The **-F** option may be used in addition to or in place of *file*.

file The name(s) may be the pathname relative to the root directory, or any substring contained therein.

It is necessary for the file **history** to exist in the **CVSROOT** directory in each root directory for this command to work properly. This file should be created at the time the root directory is set up.

Returns:

	Standard Out/Error	exit value
Success	Report	0
Error	Error message.	1

For example, if my user name is "me", any of the following will show which modules I have checked out without committing or releasing:

```
cave history -o -u me
```

```
cave hi -o
```

```
cave hi -u me
```

```
cave hi
```

To show all the files the user named "other" has committed since the history file was created, type:

```
cave hi -c -u other
```

To show all the files you committed since Midnight, January 1, 1990:

```
cave hi -c -D 'Jan 1 1990'
```

To show all the files committed since tag "TAG" was stored in the history file:

```
cave hi -c -a -t TAG
```

To show all the files committed since tag "TAG" was placed on the files:

```
cave hi -c -a -r TAG
```

History of user "user":

```
cave hi -e -u user
```

The project description file is required when cave runs this command.

lock - Create a lock

This command to **cave** is used to create a lock file for a project.

lock [-m *message*] *lock_type*

-m *message* A quoted string containing a message to be included in the lock file when creating a lock. The default is no message.

lock_type Type of lock. The types which normally are touched by the user are:

panic Emergency lock.

update General purpose lock.

The types which are created and removed within **cave** commands, and normally are not touched by the user are:

extract Lock while extracting information or files from the repository. This lock is created and removed from within any command that extracts things from the repository, such as **checkout** and **diff**. It is set so that the source repository doesn't change at the same time as files are being checked out or examined.

insert Lock while changing the repository. This lock is created and removed from within any command that changes the repository, such as **commit** and **rtag**.

If you want to lock the root directory while doing several operations, use the **update** lock instead of the **insert** lock. All **cave** commands that interact with a root directory check for the **panic** lock, the **update** lock, and the **insert** lock. Some also check for the **extract** lock.

Returns:

	Standard Out/Error	exit value
Success	Completion message, or information on who owns the lock, when it was set and any message it contains.	0
Error	Error message.	1

The project description file is required when **cave** runs this command.

log - Display log information for files

This command to cave is an interface to the rcs utility **rlog**. It is used to display log information about individual files in a local directory.

log [-l] [*rlog-options*] [-F *list*] [*file* ...]

Synonym: **rlog**

- l Local. Do not recursively descend the directory structure. The default is to descend the directory structure.
- rlog-options* See the **rlog(1)** man page for full explanations of all the options. Some of the more useful options are:
 - b Print information about the revisions on the default branch, normally the highest branch on the trunk.
 - ddates Print information about revisions with a check in date/time in the ranges given by the semicolon-separated list of dates. A range of the form *d1*<*d2* or *d2*>*d1* selects the revisions that were deposited between *d1* and *d2* inclusive. A range of the form <*d* or *d*> selects all revisions dated *d* or earlier. A range of the form *d*< or >*d* selects all revisions dated *d* or later. A range of the form *d* selects the single, latest revision dated *d* or earlier. The date/time strings *d*, *d1*, and *d2* are in the free format explained in **co(1)**. Quoting is normally necessary, especially for < and >. Note that the separator is a semicolon.
 - h Print only the rcs pathname, working pathname, head, default branch, access list, locks, symbolic names, and suffix.
 - R Print only the name of the rcs file. This is convenient for translating a working pathname into a repository pathname.
 - r[revisions] Prints information about revisions given in the comma-separated list of revisions and ranges. A range *rev1:rev2* means revisions *rev1* to *rev2* on the same branch, *:rev* means revisions from the beginning of the branch up to and including *rev*, and *rev:* means revisions starting with *rev* to the end of the branch containing *rev*. An argument that is a branch means all revisions on that branch. A range of branches means all revisions on the branches in that range. A branch followed by a . means the

latest revision in that branch. A bare `-r` with no revisions means the latest revision on the default branch, normally the trunk.

`-w[logins]` Prints information about revisions checked in by users with login names appearing in the comma-separated list *logins*. If *logins* is omitted, the user's login is assumed.

`-F list`

list is a file containing the names of files to be used with this command.

Each name must be in the same form as *file*.

Blank lines and leading blanks are allowed.

A `"#"` signals the start of a comment.

Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.

The `-F` option may be used in addition to or in place of *file*.

file

The name of a file or directory which was placed in the current local directory by `cvs`. The default is to report on all files and directories.

The files to check must exist in the current local directory or a subdirectory. The current directory must have been created by `cave checkout` or `cvs checkout` (it contains a CVS directory).

Without options, `rlog` prints the following information for each rcs file: rcs pathname, working pathname, head (i.e., the number of the latest revision on the trunk), default branch, access list, locks, symbolic names, suffix, total number of revisions, number of revisions selected for printing, and descriptive text. This is followed by entries for the selected revisions in reverse chronological order for each branch. For each revision, `rlog` prints revision number, author, date/time, state, number of lines added/deleted (with respect to the previous revision), locker of the revision (if any), and log message. All times are displayed in Coordinated Universal Time (UTC). The options above restrict this output.

Returns:

	Standard Out/Error	exit value
Success	Report.	0
Error	Error message.	1

The project description file is required when `cave` runs this command.

pack - Collect files together for distribution

This command to cave is used to collect files together for distribution to another machine.

pack [*co_opts*] [*pack_opts*]

The *pack_opts* are:

- c** A flag to calculate checksums for all of the files in *dir* (except for the tag file). The results are placed in a file named *dir/sum_file*.
- d *dir*** The name of a directory to hold the collected files. The default is to name it "Pack".
If the name starts with a slash, it is assumed to be an absolute pathname. If it does not start with a slash, it is assumed to be relative to the *project* directory if one can be found, otherwise it is relative to the current directory.
The path up to the tail of the directory name must already exist. The tail does not have to exist, but it may. If it does exist, the directory must be empty.
If the **-T** option is used, the contents of the directory are replaced with a tar file. If the **-Z** option is used, the contents of the directory are replaced with a compressed tar file.
- w *from*** Location from which to collect files. The choices are:
 - both** Get files from the local workspace, and get any missing ones from the source repository.
 - local** Get files from the local workspace only.
 - repo** Get files from the source repository.The default is to use **both**.
- T** Place the collected files in a tar file.
- Z** Place the collected files in a compressed tar file.
- i *distrib*** The name of a distribution, as defined with the **pack** keyword in the project description file. This argument may be combined with the *path* argument. The default, if neither is used, is to include all the files which are under cave control and are a part of the project.
- F *list*** *list* is a file containing the names of paths to be used with this command.
Each name must be in the same form as *path*.
Blank lines and leading blanks are allowed.

A "#" signals the start of a comment.
Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.
The -F option may be used in addition to or in place of *path*.

-x *other*

The name of a directory or file which is within one of the root directories, yet not under cave control. In the simplest case, when a project only uses one root directory, *other* must be the pathname of a file or subdirectory relative to the root directory.

If a project uses more than one root directory, *other* must start with the tail of the root directory pathname, and must be followed by the relative pathname of a file or subdirectory.

If *other* ends with a directory name, all files contained within that directory are included.

A cave controlled file may be requested here. If so, the actual ",v" file from the repository is copied.

Note: These files are always collected from the root directory. The "-w from" argument has no effect.

path

A pathname. In the simplest case, when a project only uses one root directory, it must be one of the following:

- A key, as defined in the **modules** file for this root directory.

module

- A pathname which must start with the tail of a source repository name. It may continue, to include the name of a subdirectory or file.

repository[/dir[/...]]

If a project uses more than one root directory, the pathname must start with the tail of the absolute root directory pathname. It may continue with:

- A key, as defined in the **modules** file for this root directory.

root_dir[/module]

- The relative pathname of a source repository and its contents.

root_dir[/repository[/dir[/...]]]

If *path* ends with a source repository or subdirectory name, all files contained within that source repository or directory are included (unless the -I option was used).

The files must exist in the source repository, and be under

cave control. Do not include the "v" suffix when specifying file names. This argument may be combined with the **-i** argument. The default, if neither is used, is to include all the files which are under cave control and are a part of the project.

The *co_opts* are passed to the **cvs checkout** command if any files need to be retrieved from the source repository.

The most common *co_opts* are:

- D *date*** Use the revision that was checked in at or before the specified *date* argument. The *date* is a single argument, date description specifying a date in the past. The formats are similar to those described in **co(1)**. Examples of valid date specifications include:
 - 1 month ago
 - 2 hours ago
 - last Monday
 - yesterday
 - 3/31/92 10:00:07 PST
 - January 23, 1987 10:05pm
 - 22:00 GMT
- f** Forces the specified tag to match. Normally, if a tag is specified and the requested file does not contain the tag, the file is ignored. The **-f** option causes any file which does not contain the tag to be retrieved even when there is no match for the tag or date.
- l** Local. Do not recursively descend the directory structure.
- P** Prune directories that are empty. This does not remove the directory from the repository, only from your checked out copy.
- p** Pipe the files to standard output, rather than writing them to the local directory.
- Q** Causes the command to be really quiet.
- q** Causes the command to be somewhat quiet.
- r *tag*** Use the revision of the file which was marked with the symbolic tag "*tag*". To avoid getting empty directories, combine this option with the **-P** option:

-P -r *tag*

The default is to check out the latest version.

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The more advanced *co_opts* are:

- A** Reset any sticky tags, dates or **-k** options. (If you get a working file using one of the **-r**, **-D**, or **-k** options, **cvs** remembers the corresponding tag, date or *kflag* and continues using it on future updates. Use the **-A** option to make **cvs** forget these specifications.)
- j branch** Merges the changes between two different branches of development. For more information, read the **cvs man** pages.
- k kflag** Alter the default processing of **rcs** keywords; all the **-k** options described in **rcs(1)** are available. Your *kflag* specification is "sticky" when you use it to create a private copy of a source file. That is, when you use this option with the **checkout** or **update** commands, **cvs** associates your selected *kflag* with the file, and continues to use it with future **update** commands on the same file until you specify otherwise. The *kflag* option is stored in the source file and can be changed with **cvs admin**.
- n** Causes the command not to run any **checkout** program as specified in the **modules** file.
- s** Display per-module status information within the **modules** file.

Returns:

	Standard Out/Error	exit value
Success	Message.	0
Error	Error message.	1

The project description file is required when **cave** runs this command.

What to pack is determined by first collecting all the lists from **-i distrib**, **-F list**, **-x other**, and *path*. These are sorted into a list of **cave** controlled files and a list of other files. Any duplications within a given list are removed.

Files are moved into the Pack directory in the following order:

- If *from* is **both** or **repo**, the files are checked out from the repository.
- If *from* is **both** or **local**, the local files are moved over using **tar**. There is no checking for conflicts or updates. Any **CVS** directories present in the local workspace are automatically removed from the distribution.
Note: All files contained in any requested local directories are included, whether or not they are under **cave** control.
- If a **-x** option is used in the execute line or in a requested distribution, those files are moved over using **tar**.
- If the **-c** option is used, a checksum file is created.

- If there is a tag file defined by a tag line in the project description file, the file is included with the collected files.

Note: If the **-r** option was used to check out a particular version, the tag in the tag file may not match the tag that was given for **-r**.

Each root directory is assumed to contain the cvs administrative directory called **CVSROOT**. This directory and its files may be packed, but it must be explicitly requested in *path*..:

	One root directory	More than one root directory
Path to use with pack	CVSROOT modules	<i>root_dir/</i> CVSROOT <i>root_dir/</i> modules
File/directory created in local project directory	CVSROOT CVSROOT/modules	CVSROOT.root_dir CVSROOT.root_dir/modules

print - Print text files

This command to cave is used to send text files to a printer.

print [*co_opts*] [-w *from*] [-l] [-c] [-p "*lpr_line*"] [...] [-F *list*] [*path* ...]

Synonym: **lpr**

-w from

Location from which to collect files. The choices are:

both Get files from the local workspace, and get any missing ones from the source repository.

local Get files from the local workspace only.

repo Get files from the source repository.

The default is to use **both**.

-l

Local. Do not recursively descend the directory structure.

-c

"cat" the files contained in the same directory before printing them.

-p "*lpr_line*"

A quoted string containing a command line to send to the **lpr** print spooler. The default is to send the listings as given in the **print** lines in the project description file.

-F list

list is a file containing the names of paths to be used with this command.

Each name must be in the same form as *path*.

Blank lines and leading blanks are allowed.

A "#" signals the start of a comment.

Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.

The **-F** option may be used in addition to or in place of *path*.

path

A pathname. In the simplest case, when a project only uses one root directory, it must be one of the following:

- A key, as defined in the **modules** file for this root directory.

module

- A pathname which must start with the tail of a source repository name. It may continue, to include the name of a subdirectory or file.

repository[/dir[/...]]

If a project uses more than one root directory, the pathname must start with the tail of the absolute root directory pathname. It may continue with:

- A key, as defined in the **modules** file for this root directory.

root_dir[/module]

- The relative pathname of a source repository and its contents.

root_dir[/repository[/dir[/...]]]

If *path* ends with a source repository or subdirectory name, all files contained within that source repository or directory are included (unless the **-l** option was used).

The files must exist in the source repository, and be under cave control. Do not include the ",v" suffix when specifying file names. The default is to print all the files which are under cave control and are a part of the project.

The *co_opts* are passed to the **cvs checkout** command if any files need to be retrieved from the source repository.

The most common *co_opts* are:

-D *date*

Use the revision that was checked in at or before the specified *date* argument. The *date* is a single argument, date description specifying a date in the past. The formats are similar to those described in **co(1)**. Examples of valid date specifications include:

1 month ago
2 hours ago
last Monday
yesterday
3/31/92 10:00:07 PST
January 23, 1987 10:05pm
22:00 GMT

-f

Forces the specified tag to match. Normally, if a tag is specified and the requested file does not contain the tag, the file is ignored. The **-f** option causes any file which does not contain the tag to be retrieved even when there is no match for the tag or date.

-P

Prune directories that are empty. This does not remove the directory from the repository, only from your checked out copy.

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- p** Pipe the files to standard output, rather than writing them to the local directory.
- Q** Causes the command to be really quiet.
- q** Causes the command to be somewhat quiet.
- r tag** Use the revision of the file which was marked with the symbolic tag "*tag*". To avoid getting empty directories, combine this option with the **-P** option:

-P -r tag

The default is to check out the latest version.

The more advanced *co_opts* are:

- A** Reset any sticky tags, dates or **-k** options. (If you get a working file using one of the **-r**, **-D**, or **-k** options, **cvs** remembers the corresponding tag, date or *kflag* and continues using it on future updates. Use the **-A** option to make **cvs** forget these specifications.)
- j branch** Merges the changes between two different branches of development. For more information, read the **cvs man** pages.
- k kflag** Alter the default processing of **rcs** keywords; all the **-k** options described in **rcs(1)** are available. Your *kflag* specification is "sticky" when you use it to create a private copy of a source file. That is, when you use this option with the **checkout** or **update** commands, **cvs** associates your selected *kflag* with the file, and continues to use it with future **update** commands on the same file until you specify otherwise. The *kflag* option is stored in the source file and can be changed with **cvs admin**.
- n** Causes the command not to run any **checkout** program as specified in the **modules** file.
- s** Display per-module status information within the **modules** file.

Returns:

	Standard Out/Error	exit value
Success	Message	0
Error	Error message.	1

The project description file is required when **cave** runs this command.

Files are collected for printing in the following order:

- If *from* is **both** or **repo**, the files are checked out from the repository.
- If *from* is **both**, the local files are moved over using **tar**. There is no checking for conflicts or updates. If *from* is **local**, the local files are used directly. Any **CVS** directories present in the local workspace are automatically ignored. All files contained in any requested local directories are included, whether or not they are under **cave** control.

Each root directory is assumed to contain the cvs administrative directory called **CVSROOT**. This directory and its files may be printed, but it must be explicitly requested in *path*..:

	One root directory	More than one root directory
Path to use with print	CVSROOT modules	<i>root_dir/</i> CVSROOT <i>root_dir/</i> modules
File/directory created in local project directory	CVSROOT CVSROOT/modules	CVSROOT.root_dir CVSROOT.root_dir/modules

release - Cancel a check out

This command to **cave** is used to safely cancel the effects of a check out.

release [-dQq] [-F *list*] *module* [...]

Synonym: **rel**

- d** Delete the files, if the command succeeds.
- Q** Causes the command to be really quiet.
- q** Causes the command to be somewhat quiet.
- F *list*** *list* is a file containing the names of modules to be used with this command.
Each name must be in the same form as *module*.
Blank lines and leading blanks are allowed.
A "#" signals the start of a comment.
Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.
The -F option may be used in addition to or in place of *module*.
- module* A key, as defined in the **modules** file.

This command isn't strictly necessary, as a working directory can simply be deleted. It does provide some useful features, however. This command checks that no uncommitted changes are present, that you are executing it from inside or immediately above a **cvs** working directory, and that the repository name is good. It also leaves a record of its execution in the history file, which simply deleting the files will not do.

This command must be called from within or below the project directory. If it is called from within the project directory, it will descend at least one level.

Returns:

	Standard Out/Error	exit value
Success	Message	0
Error	Error message.	1

The project description file is required when **cave** runs this command.

remove - Remove a file

This command to **cave** is used to remove files from a source repository.

remove [-R] [-F *list*] [*file* ...]

Synonym: **rm**, **delete**

- R** A flag to recursively descend into any directory given in the file list, and remove its files. The default is to not descend. The directory itself cannot be removed.
- F *list*** *list* is a file containing the names of files to be used with this command.
Each name must be in the same form as *file*.
Blank lines and leading blanks are allowed.
A "#" signals the start of a comment.
Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.
The -F option may be used in addition to or in place of *file*.
- file*** The name of a file or directory which was placed in the current working directory by **cave**. The default is to remove all files in the current directory which are under **cave** control. Specifying a directory without using the -R option causes nothing to happen to the contents of the directory. The directory itself cannot be removed. Any directory involved in the **remove** must have been created by **cave checkout** or **cvs checkout** (it contains a CVS directory).

Marks the specified files as removed on purpose from the current directory in the source repository directory. The files may have been deleted already from the local directory. If they were not deleted, this command deletes them. In either case, they are marked to be removed. The files are not actually removed from the source repository until a commit is done. At that time, they are moved into the Attic directory.

Use **add** to undo a **remove** command, unless the change has already been committed.

Returns:

	Standard Out/Error	exit value
Success	Message	0
Error	Error message.	1

The project description file is required when **cave** runs this command.

reserve - Reserve a file or directory

This command to cave is used to reserve a file or directory so that no other user may modify it.

reserve [-m *message*] [-F *list*] *path* [...]

Synonym: **res**

-m *message* A quoted string containing a message to be included when reserving. The default is no message.

-F *list* *list* is a file containing the names of paths to be used with this command.
Each name must be in the same form as *path*.
Blank lines and leading blanks are allowed.
A "#" signals the start of a comment.
Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.
The -F option may be used in addition to or in place of *path*.

path A pathname.
In the simplest case, when a project only uses one root directory, it must start with the tail of a source repository name. It may continue, to include the name of a subdirectory or file.

repository[/dir[/...]]

If a project uses more than one root directory, the pathname must start with the tail of the absolute root directory pathname. It may continue with the relative pathname of a source repository and its contents.

root_dir[/repository[/dir[/...]]]

The files must exist in the source repository, and be under cave control. Do not include the ",v" suffix when specifying file names.

You may be thinking that this command runs against the philosophy and purpose of cvs. I agree completely.

Note that the **reserve** command is entirely independent of rcs locking.

Run **cave what reserve** to see what is currently reserved.

Let us consider a directory to be of higher rank than one of its subdirectories or files. When you attempt to reserve a directory and/or file, the rules of precedence are as follows.

- Error if it is not part of the project.
- Error if it is already reserved by someone else.
- Error if one of its parent directories is already reserved by someone else.
- Error if one of its subdirectories or files is already reserved by someone else.
- If more than one *path* is given and one outranks another, only the higher ranking *path* is reserved.
- If *path* is the same as one already reserved by you, keep the old reservation.
- If *path* is outranked by something already reserved by you, keep the old reservation.
- If *path* outranks something already reserved by you, remove the old reservation. Reserve *path*.
- If there are no conflicts, reserve *path*.

Returns:

	Standard Out/Error	exit value
Success	Message	0
Error	Error message.	1

The project description file is required when *cave* runs this command.

rtag - Assign symbolic tags to sources

This command to cave is used to assign symbolic tags to particular, explicitly specified source versions in the repository.

rtag [-aflnQqR] [-b] [-d] [-r *tag* | -D *date*] [-F *list*] *symbolic_tag module* ...

Synonym: **rfreeze**

- a** Look in the Attic for removed files that contain the specified tag. The tag is removed from these files, which makes it possible to reuse a symbolic tag.
- f** Forces the specified tag to match. Normally, if a tag is specified and the requested file does not contain the tag, the file is ignored. The -f option causes any file which does not contain the tag to be used even when there is no match for the tag or date.
- l** Local. Do not recursively descend the directory structure. The default is to descend the directory structure.
- n** Causes the command not to run any tag program as specified in the modules file.
- Q** Causes the command to be really quiet.
- q** Causes the command to be somewhat quiet.
- R** Recursively descend into any subdirectories. This is the default.
- b** Make the tag a "branch" tag, allowing concurrent, isolated development.
- d** Remove a symbolic tag from files.
- D *date*** Use the revision that was checked in at or before the specified *date* argument. The *date* is a single argument, date description specifying a date in the past. The formats are similar to those described in co(1). Examples of valid date specifications include:

- 1 month ago
- 2 hours ago
- last Monday
- yesterday
- 3/31/92 10:00:07 PST
- January 23, 1987 10:05pm
- 22:00 GMT

- r tag** Use this to tag only those files that already contain a certain symbolic *tag*. This is useful in combination with the **-d** option to rename a tag.
- F list** *list* is a file containing the names of modules to be used with this command. Each name must be in the same form as *module*. Blank lines and leading blanks are allowed. A "#" signals the start of a comment. Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited. The **-F** option may be used in addition to or in place of *module*.
- symbolic_tag* The tag must start with a letter, and must not contain a semicolon, colon, dollar sign, at sign, comma or period (;:\$@,.).
- module* A key, as defined in the **modules** file for this root directory. If a project uses more than one root directory, *module* must start with the tail of the absolute root directory pathname and continue with the module, as defined in the **modules** file:

root_dir/module

This command may be called from any local directory. It is similar to **tag**, but no local files need to be present.

Returns:

	Standard Out/Error	exit value
Success	Message	0
Error	Error message.	1

The project description file is required when **cave** runs this command.

status - Report on the current status of files

This command to **cave** is used to report what has been done to files in the working directory and the source repository.

status [-lR] [-v] [-F *list*] [*file* ...]

Synonym: **stat**

- l** Local. Do not recursively descend the directory structure. The default is to descend the directory structure.
- R** Recursively descend into any subdirectories, unless file names are given. This is the default.
- v** Display symbolic tags in the report.
- F *list*** *list* is a file containing the names of files to be used with this command.
Each name must be in the same form as *file*.
Blank lines and leading blanks are allowed.
A "#" signals the start of a comment.
Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.
The -F option may be used in addition to or in place of *file*.
- file* The name of a file or directory which was placed in the current local directory by cvs. The default is to report on all files and directories.

This command must be called from within or below the project directory. If it is called from within the project directory, it will descend at least one level.

Returns:

	Standard Out/Error	exit value
Success	Report.	0
Error	Error message.	1

The project description file is required when **cave** runs this command.

tag - Assign symbolic tags to sources

This command to **cave** is used to assign symbolic tags to source versions in the repository. The files to be tagged are determined by your local files.

tag [-lQqR] [-b] [-d] [-F *list*] *symbolic_tag* [*file*...]

Synonym: **freeze**

-l	Local. Do not recursively descend the directory structure. The default is to descend the directory structure.
-Q	Causes the command to be really quiet.
-q	Causes the command to be somewhat quiet.
-R	Recursively descend into any subdirectories. This is the default.
-b	Make the tag a "branch" tag, allowing concurrent, isolated development.
-d	Remove a symbolic tag from files.
-F <i>list</i>	<i>list</i> is a file containing the names of files to be used with this command. Each name must be in the same form as <i>file</i> . Blank lines and leading blanks are allowed. A "#" signals the start of a comment. Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited. The -F option may be used in addition to or in place of <i>file</i> .
<i>symbolic_tag</i>	The tag must start with a letter, and must not contain a semicolon, colon, dollar sign, at sign, comma or period (;:\$@,.).
<i>file</i>	Name of a local directory or file under cave control. The default is to include all the files and directories in the current directory.

This is similar to **rtag**, but the files to be tagged in the repository are determined by the files in your local directory.

This command must be called from within or below the project directory. If it is called from within the project directory, it will descend at least one level.

Returns:

The "cave" Tool

	Standard Out/Error	exit value
Success	Message	0
Error	Error message.	1

The project description file is required when `cave` runs this command.

unlock - Remove a lock

This command to **cave** is used to remove a lock file for a project.

unlock *lock_type* | **-n** *lock_name*

lock_type

Type of lock. The types which normally are touched by the user are:

panic Emergency lock.

update General purpose lock.

The types which are created and removed within **cave** commands, and normally are not touched by the user are:

extract Lock while extracting information or files from the repository. This lock is created and removed from within any command that extracts things from the repository, such as **checkout** and **diff**. It is set so that the source repository doesn't change at the same time as files are being checked out or examined.

insert Lock while changing the repository. This lock is created and removed from within any command that changes the repository, such as **commit** and **rtag**.

-n *lock_name*

The actual name of a lock file. The naming convention is described in the chapter "Project Description File". To determine the names of all lock files, run **cave what lock**.

Only the owner can remove a lock file. All **cave** commands that interact with a root directory check for the **panic** lock, the **update** lock, and the **insert** lock. Some also check for the **extract** lock.

Returns:

	Standard Out/Error	exit value
Success	Completion message, or information on who owns the lock, when it was set and any message it contains.	0
Error	Error message.	1

The project description file is required when **cave** runs this command.

unreserve - Unreserve a file or directory

This command to cave is used to unreserve a file or directory.

unreserve [-F *list*] *path* [...]

Synonym: **unres**

-F *list*

list is a file containing the names of paths to be used with this command.

Each name must be in the same form as *path*.

Blank lines and leading blanks are allowed.

A "#" signals the start of a comment.

Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.

The -F option may be used in addition to or in place of *path*.

path

A pathname.

In the simplest case, when a project only uses one root directory, it must start with the tail of a source repository name. It may continue, to include the name of a subdirectory or file.

repository[/dir[/...]]

If a project uses more than one root directory, the pathname must start with the tail of the absolute root directory pathname. It may continue with the relative pathname of a source repository and its contents.

root_dir[/repository[/dir[/...]]]

The files must exist in the source repository, and be under **cave** control. Do not include the ",v" suffix when specifying file names.

You think that this command runs against the philosophy and purpose of **cvs**. I agree completely. Enough said.

Note that the **reserve** command is entirely independent of **rcs** locking.

Run **cave what reserve** to see what is currently reserved.

Let us consider a directory to be of higher rank than one of its subdirectories or files. When you attempt to unreserve a directory and/or file, the rules of precedence are as follows.

- Error if it is not part of the project.
- Error if it was reserved by someone else.
- Error if one of its parent directories or subdirectories or files was reserved by someone else.
- If more than one *path* is given and one outranks another, only the higher ranking *path* is used.
- If *path* is the same as one already reserved by you, unreserve it.
- If *path* is outranked by something reserved by you, ignore *path*.
- If *path* outranks anything reserved by you, remove all the outranked reservations.

Returns:

	Standard Out/Error	exit value
Success	Message	0
Error	Error message.	1

The project description file is required when cave runs this command.

update - Make files current

This command to **cave** is used to make any local files current with any that have been modified in the source repository since the local files were checked out.

update [-AdflPpQq] [-j *branch*] [-r *tag* [-D *date*] [-I *name* [-I *name*...]] [-F *list*] [*file* ...]

- A** Reset any sticky tags, dates or **-k** options. (If you get a working file using one of the **-r**, **-D**, or **-k** options, **cvs** remembers the corresponding tag, date or *kflag* and continues using it on future updates. Use the **-A** option to make **cvs** forget these specifications.)
- d** Create any directories that exist in the repository if they are missing from the working directory.
- f** Forces the specified tag to match. Normally, if a tag is specified and the requested file does not contain the tag, the file is ignored. The **-f** option causes any file which does not contain the tag to be used even when there is no match for the tag or date.
- j *branch*** Merges the changes between two different branches of development. For more information, read the **cvs man** pages.
- l** Only process the current directory, ignoring any subdirectories.
- P** Prune directories that are empty. This does not remove the directory from the repository, only from your checked out copy.
- p** Pipe the files to standard output, rather than writing them to the local directory.
- Q** Causes the command to be really quiet.
- q** Causes the command to be somewhat quiet.
- D *date*** Use the revision that was checked in at or before the specified *date* argument. The *date* is a single argument, date description specifying a date in the past. The formats are similar to those described in **co(1)**. Examples of valid date specifications include:
 - 1 month ago
 - 2 hours ago
 - last Monday
 - yesterday

3/31/92 10:00:07 PST
 January 23, 1987 10:05pm
 22:00 GMT

- r tag** Use the revision number or symbolic tag specified by the *tag* argument instead of the usual "head" revision.
- I name** Ignore files whose names match *name*. By default, **update** ignores files whose names match any of the following:

RCSLOG	RCS	SCCS			
CVS*	cvslog.*				
tags	TAGS				
.make.state	.nse_depinfo				
~	##	.	*		
*.old	*.bak	*.orig	*.rej	.del-*	
*.a	*.o	*.Z	*.elc	*.ln	core

Use **"-I !"** to avoid ignoring any files at all.

- F list** *list* is a file containing the names of files to be used with this command.
 Each name must be in the same form as *file*.
 Blank lines and leading blanks are allowed.
 A **"#"** signals the start of a comment.
 Multiple lines are allowed. More than one entry may be on a line. If so, they must be blank delimited.
 The **-F** option may be used in addition to or in place of *file*.

file The name of a file or directory which was placed in the current local directory by **cvs** or **cave**. If no file name is given, all the files and directories in the current directory are updated.

This command must be called from within or below the project directory. If it is called from within the project directory, it will descend at least one level.

The current directory and any subdirectories are brought up-to-date, unless a list of files is given or the **-I** option used.

Any files which are in your local directory and were not changed by you are updated with any changes in the source repository. If a file was changed by you, and was also modified in the source repository, your file is copied to a file name that starts with **"#"**. The source repository file and your file are then merged together. The changed lines are bracketed by lines containing **">>>"** and **"<<<"**. The revision number at the top of the file, as contained in the **"\$Id\$"** string is modified to match the one in the source repository.

Note: It is up to you to resolve any conflicts. As far as **cvs** is concerned, your local file is now up-to-date.

Output is generated by **cvs** when updating the files to describe what actions are being taken:

- U file** The specified file was copied directly out of the source repository. This was done because one of the following was true:
- You had checked out an entire directory, and the file exists in the repository copy of the directory, but the file did not exist in the local workspace.
 - The file did exist, but you did not change it, and a newer revision had been placed in the root directory.
- A file** The file has been added locally by you, via the **add** command, but still needs to be committed to the source repository.
- R file** The file has been removed locally by you, via the **remove** command, but the change still needs to be committed to the source repository.
- M file** The file has been modified locally by you.
- C file** The file has been modified locally by you, and in the mean time was modified in the source repository. The merge process that is described above is performed.
- ? file** The file is in your working directory, but does not correspond to anything in the source repository, and is not in the list of files for the update to ignore.

Returns:

	Standard Out/Error	exit value
Success	Message	0
Error	Error message.	1

The project description file is required when **cave** runs this command.

Each root directory is assumed to contain the **cvs** administrative directory called **CVSROOT**. If this directory and its files were checked out with **cave**, they were placed in a directory named **CVSROOT** (if there is only one root directory in the project) or **CVSROOT.root_dir** (if there is more than one root directory in the project). This directory may be updated, but it must be explicitly requested in *file*.

verify - Check the project description file

This command to cave is used to check a project description file for correctness.

verify

All the error checking that is done whenever **cave** reads in a project description file is performed. It tries to find as many errors as possible before exiting.

Returns:

	Standard Out/Error	exit value
Success	Message stating the file was verified.	0
Error	Error message(s).	1

The project description file is required when **cave** runs this command.

version - Report cave's version number

This command to **cave** is used to report what version number of **cave** is in use.

version

Synonym: **vers**

Returns:

	Standard Out/Error	exit value
Success	Version number	0
Error	Error message(s).	1

The project description file not is required when **cave** runs this command.

what - Get information about a project

This command to cave is used to get information about a project from its project description file, and related files.

what [**is** | **are**] *key* [*args*]

The optional words "is" and "are" in the command are simply a way to make the command look more like a sentence.

One *key* is used to describe the type of information desired. Only the first three characters of each *key* are checked.

The possible key words are:

access A list of users with access to this project. See **access** in the chapter "Project Description File" for more information.

dirs [*dir* ...] A list of directories which are under cave control in the project. The Attic directories are not included. If *dir* is not given, all the directories are listed. When a project uses only one root directory, *dir* is a pathname relative to the root directory:

repository[/*dir*[/...]]

When a project uses more than one root directory, *dir* must start with the tail of the absolute root directory pathname:

root_dir[/*repository*[/*dir*[/...]]]

Regular expressions may be used in *dir*, if they are escaped with a backslash.

The list of returned directories is in the same format as *dir*.

files [*file* ...] A list of files which are under cave control in the project. Files in the Attic directories are not included. If *file* is not given, all the files are listed. The ",v" suffix is removed. When a project uses only one root directory, *file* is a pathname relative to the root directory:

repository[/*dir*[/...]]

When a project uses more than one root directory, *file* must start with the tail of the absolute root directory pathname:

root_dir[/*repository*[/*dir*[/...]]]

Regular expressions may be used in *file*, if they are escaped

with a backslash.

The list of returned files is in the same format as *file*.

group	The name of the group which owns the project. See group in the chapter "Project Description File" for more information.
lock	The types and current settings of any lock files defined for this project. See lock in the chapter "Project Description File" for more information.
mail	A list of users to whom mail is sent when files are committed to this project. See mail in the chapter "Project Description File" for more information.
pack	The distribution names and the directories and files which comprise each distribution. See pack in the chapter "Project Description File" for more information.
print	Command lines that are used with the lpr print spooler. See print in the chapter "Project Description File" for more information.
project	The name of this project. See project in the chapter "Project Description File" for more information.
repository	Absolute pathnames of source repositories used by this project. See repository in the chapter "Project Description File" for more information.
reserve	The names of any directories and files currently reserved for this project. See reserve in the chapter "Project Description File" for more information.
root_dir	Absolute pathnames of root directories used by this project. See root_dir in the chapter "Project Description File" for more information.
tag	Returns the current value of the tag as it exists in the tag file. See tag in the chapter "Project Description File" for more information.

Since only the first three characters of *key* are checked, all of the following are equivalent:

cave what is reserved

cave what res

cave what reserve

cave what are restoots

Returns:

	Standard Out/Error	exit value
Success	Value depending on the key word used.	0
Error	Error message.	1

The project description file is required when cave runs this command.

Other CAVEMAN Tools

There are other tools which are part of the CAVEMAN system. They are described on the following pages.

cmget

NAME

cmget - a simple interface to **ftp**.

SYNOPSIS

cmget **-m** *machine* [**-d** *directory*] [**-v**] [**-b**] *file* ...

DESCRIPTION

cmget provides a simple interface to **ftp**'s get utility. It would most likely be called from scripts, rather than directly by a user, as it hides some of the functionality of **ftp**.

-m <i>machine</i>	Name or IP address of remote machine to connect to.
-d <i>directory</i>	Name of directory on remote machine from which to get files. The default directory is the same as that used by ftp .
-v	Verbose. The default is quiet.
-b	Get files as binary. The default is ASCII.
<i>file</i>	File to transfer.

It attempts to find the user's name for the remote machine by looking for a **.netrc** file in the user's home directory on the local machine. If no **.netrc** file is found, the user's name is requested from the terminal. Any necessary password is requested by **ftp**.

FILES

~/netrc Login information for auto-login

SEE ALSO

ftp(1), **cmput(L)**

DIAGNOSTICS

Exit code 0 is returned for success, and exit code 1 is returned for failure.

BUGS

It is important to note that error messages from **ftp** may not be trapped, resulting in an exit value of 0 even though an error occurred.

cmput

NAME

cmput - a simple interface to **ftp**.

SYNOPSIS

cmput **-m** *machine* [**-d** *directory*] [**-v**] [**-b**] *file* ...

DESCRIPTION

cmput provides a simple interface to **ftp**'s put utility. It would most likely be called from scripts, rather than directly by a user, as it hides some of the functionality of **ftp**.

-m <i>machine</i>	Name or IP address of remote machine to connect to.
-d <i>directory</i>	Name of directory on remote machine on which to put files. The default directory is the same as that used by ftp .
-v	Verbose. The default is quiet.
-b	Put files as binary. The default is ASCII.
<i>file</i>	File to transfer.

It attempts to find the user's name for the remote machine by looking for a **.netrc** file in the user's home directory on the local machine. If no **.netrc** file is found, the user's name is requested from the terminal. Any necessary password is requested by **ftp**.

FILES

~/.netrc Login information for auto-login

SEE ALSO

ftp(1), **cmget(L)**

DIAGNOSTICS

Exit code 0 is returned for success, and exit code 1 is returned for failure.

BUGS

It is important to note that error messages from **ftp** may not be trapped, resulting in an exit value of 0 even though an error occurred.

cmlog

NAME

cmlog - processes cvs log messages.

SYNOPSIS

cmlog [-T] [-t *tag*] [-f *message_file*] [-m "*message*"] [-i] [-h] [-u *users*] *log_file*

DESCRIPTION

cmlog may be used in cvs' **loginfo** file to add a log message to a cvs log file. The available options are:

-T	Add a title to the log file containing the name of the user who did the commit, and a time stamp.
-t <i>tag</i>	Include a tag in the title, if the -T option is used.
-f <i>message_file</i>	Add the contents of the file <i>message_file</i> to the log file.
-m "<i>message</i>"	Add the quoted string " <i>message</i> " to the log file.
-i	Add the standard input to the log file.
-h	Place the log message the top of the log file. The default is to place it at the bottom.
-u <i>users</i>	A single user name or a quoted space delimited list of user names to whom a copy of the log entry is sent via Mail .
<i>log_file</i>	The absolute pathname of the cvs log file.

The text is added in the order shown above—first the title, then the contents of the *message_file*, then the *message* string, and finally the standard input.

An example of a **loginfo** file which uses **cmlog**:

```
# The "loginfo" file is used to control where "cvs commit" log
# information is sent. The first entry on a line is a regular
# expression which is tested against the directory that the change
# is being made to, relative to the $CVSROOT. If a match is found,
# then the remainder of the line is a filter program that should
# expect log information on its standard input.
#
# The filter program may use one and only one % modifier (a la
# printf). If %s is specified in the filter program, a brief
# title is included (enclosed in single quotes) showing the
# modified file names.
#
# If the repository name does not match any of the regular
# expressions in this file, the "DEFAULT" line is used, if it is
# specified.
#
DEFAULT      cmlog -i -h /codes/ours/logfiles/default.log
^foo1        cmlog -t -i -h /codes/ours/logfiles/foo.log
^foo2        cmlog -t -i -h /codes/ours/logfiles/foo.log
```

SEE ALSO

`cvs(1)`, `cvs(5)`, `cmlog_accum(L)`, `cmlog_prep(L)`

DIAGNOSTICS

Exit code 0 is returned for success, and exit code 1 is returned for failure.

cmlog_accum

NAME

cmlog_accum - process cvs log messages.

SYNOPSIS

cmlog_accum [-T] [-h] [-u *users*] [...] *log_file* %s

DESCRIPTION

cmlog_accum may be used in cvs' **loginfo** file to add a log message to a cvs log file.

-T	Add a title to the log file containing the name of the user who did the commit, and a time stamp.
-h	Place the log message at the top of the log file. The default is to place it at the bottom.
-u <i>users</i>	A single user name or a quoted space delimited list of user names to whom a copy of the log entry is sent via Mail .
<i>log_file</i>	The absolute pathname of the cvs log file.
%s	Signals the cvs loginfo file to include a single-quoted list of modified files. This has to be given in the execute line, or cvs will not include the list of modified files.

This script, when used with **cmlog_prep**, provides a way to combine individual messages from a multi-directory commit into a single log message. If this is not done, you may see the same log message repeated for every directory involved in a commit. To use **cmlog_prep** and **cmlog_accum**, do the following. In the cvs **commitinfo** file, put in a line to call **cmlog_prep**. For example:

```
ALL      cmlog_prep
```

In the **loginfo** file, put in a line to call **cmlog_accum**. For example:

```
ALL      cmlog_accum -T -h /codes/ours/logfiles/foo.log %s
```

Now, when you run **cave commit**, the following happens:

- Just before any files are committed, **commitinfo** runs **cmlog_prep**, which creates a file in the **/tmp** directory. This file lists all directories involved in the commit.
- The files are committed. As they are committed, **loginfo** runs **cmlog_accum** to accumulate the individual messages in **/tmp**.

- When the last file has been committed, **cmlog_accum** finishes processing the accumulated messages, and sends them to the permanent log file.
- The files in **/tmp** are deleted.

SEE ALSO

cvs(1), **cvs(5)**, **cmlog_prep(L)**, **cmlog(L)**

DIAGNOSTICS

Exit code 0 is returned for success, and exit code 1 is returned for failure.

BUGS

The **cmlog_accum/cmlog_prep** combination does not work when **cvs import** is used. In this case, **cvs** checks the **loginfo** file for a program to run, but does not check the **commitinfo** file. Because of this, the file that **cmlog_prep** creates does not exist when **cmlog_accum** looks for it.

cmlog_prep

NAME

cmlog_prep - process cvs log messages.

SYNOPSIS

cmlog_prep

DESCRIPTION

cmlog_prep may be used in cvs' **loginfo** file to add a log message to a cvs log file.

This script, when used with **cmlog_accum**, provides a way to combine individual messages from a multi-directory commit into a single log message. If this is not done, you may see the same log message repeated for every directory involved in a commit. To use **cmlog_prep** and **cmlog_accum**, do the following. In the cvs **commitinfo** file, put in a line to call **cmlog_prep**. For example:

```
ALL      cmlog_prep
```

In the **loginfo** file, put in a line to call **cmlog_accum**. For example:

```
ALL      cmlog_accum -T -h /codes/ours/logfiles/foo.log %s
```

Now, when you run **cave commit**, the following happens:

- Just before any files are committed, **commitinfo** runs **cmlog_prep**, which creates a file in the **/tmp** directory. This file lists all directories involved in the commit.
- The files are committed. As they are committed, **loginfo** runs **cmlog_accum** to accumulate the individual messages in **/tmp**.
- When the last file has been committed, **cmlog_accum** finishes processing the accumulated messages, and sends them to the permanent log file.
- The files in **/tmp** are deleted.

SEE ALSO

cvs(1), **cvs(5)**, **cmlog_accum(L)**, **cmlog(L)**

DIAGNOSTICS

Exit code 0 is returned for success, and exit code 1 is returned for failure.

BUGS

The **cmlog_accum/cmlog_prep** combination does not work when **cvs import** is used. In this case, **cvs** checks the **loginfo** file for a program to run, but does not check the **commitinfo** file. Because of this, the file that **cmlog_prep** creates does not exist when **cmlog_accum** looks for it.

cmsum

NAME

cmsum - calculate the checksums of files.

SYNOPSIS

cmsum [-l] [-s *sum_file*] [-m] *file* [...]

DESCRIPTION

cmsum produces a report on the checksums of files, similar to that produced by the **sum(1)** command.

-l	Local. Do not recursively descend the directory structure. The default is to descend the directory structure.
-s <i>sum_file</i>	File containing a list of files and checksums from a previous run of cmsum . It is used to compare with the checksum(s) of the file(s) given by <i>file</i> . The default is to do no comparison.
-m	Flag to require an exact match between the file names in <i>sum_file</i> and the file names given in the argument list. This is used to see if any files are missing or added. The default is to compare only the files from the argument list, and to ignore any extra files in <i>sum_file</i> . However, it is still an error if a file is given in the argument list and there is no corresponding entry in <i>sum_file</i> .
<i>file</i>	Name of a file or directory to checksum.

SEE ALSO

sum(1)

DIAGNOSTICS

Exit code 0 is returned for success, and exit code 1 is returned for failure.

cmvers

NAME

cmvers - report the value of a tag in a cave tag file.

SYNOPSIS

cmvers [-s *separator*] *tag_file*

DESCRIPTION

cmvers reports the value of a tag in a cave tag file.

-s separator When reporting, replace the field separator as given in the tag file with *separator*. The tag file itself is not changed.

tag_file Name of the tag file.

cvs restricts the characters that may be used in tags—they may not contain a semicolon, colon, dollar sign, at sign, comma or period (;:\$@,.). The -s argument is supplied so that the user may replace the tag's field separator with one of these forbidden characters and use the tag for some other purpose, such as a version number. For example, if the tag file named **a.tag** contained the following:

```
project V_002_a0 _ fixed
```

Then,

```
cmvers a.tag
```

returns the value

```
V_002_a0
```

But

```
cmvers -s . a.tag
```

returns the value

```
V.002.a0
```

SEE ALSO

cave(L), **cvs(1)**, **cvs(5)**

DIAGNOSTICS

Exit code 0 is returned for success, and exit code 1 is returned for failure.

Project Description File

File Format

A project description file is a text file which describes the root directories, source repositories, subdirectories and locks used by a project. It contains the information needed to customize the operation of the cave tool. The `CAVE_PD` environment variable may be set to the full path name of the project description file. Note that you do not need to set the `CVSROOT` environment variable yourself in order to use cave.

The file may contain blank lines. The symbol `#` is the comment symbol. Everything after it on a line is ignored. Long lines may be continued to the next line by typing a backslash (`\`) first.

All other lines must start with a keyword. Keyword lines which apply to the entire project may be in any order (i.e. `group` and `access`).

Lines which come after a `root_dir` line apply to the specified root directory, until a `root_dir end` line.

Lines which come after a `repository` line apply to the specified root directory, until a `repository end` line.

Project Description File

Please note that each root directory is assumed to contain the cvs administrative directory called CVSROOT. This does not need to be specified in the project description file.

project <i>project_name</i>	(Required)
group <i>group_name</i>	(Required)
access [<i>group</i>] <i>user_name</i> [...]	(Required)
mail [<i>access</i>] <i>user_name</i> [...]	(Optional)
lock <i>lock_dir</i> [<i>lock_type</i> ...]	(Optional)
login_grp <i>yes</i> <i>no</i>	(Optional)
pack <i>distribution</i> [[<i>path</i> <i>-x other</i>] ...]	(Optional. Repeat as needed.)
print <i>lpr_line</i>	(Optional. Repeat as needed.)
precheckout <i>prog</i> [<i>arg</i> <i>s_arg</i> ...]	(Optional. Repeat as needed.)
postcheckout <i>prog</i> [<i>arg</i> <i>s_arg</i> ...]	(Optional. Repeat as needed.)
precommit <i>prog</i> [<i>arg</i> <i>s_arg</i> ...]	(Optional. Repeat as needed.)
postcommit <i>prog</i> [<i>arg</i> <i>s_arg</i> ...]	(Optional. Repeat as needed.)
reserve <i>reserve_dir</i>	(Optional)
tag <i>tag_file</i> [<i>module</i> ...]	(Optional.)
root_dir <i>name</i>	(Must be one root_dir name line for each root directory in the project.)
repository <i>name</i>	(Must be one repository name line for each source repository in the preceding root_dir .)
repository <i>end</i>	(Must be one repository end line for each repository name line.)
[Repeat repository keyword line as needed.]	
root_dir <i>end</i>	(Must be one root_dir end line for each root_dir name line.)
[Repeat root_dir keyword line as needed.]	

Keywords

access *[group] user_name [...]*

group All members of the *group_name* given with the **group** keyword.

user_name Name of user.

Optional: no
Repeatable: no
Applies to: entire project

Determines who has access to the project. The access list is the union of the group members (if requested) and the list of user names.

It is important to note that access to the directories and files is controlled by the Unix file permissions (rwx). The only thing the **access** does is to add some error checking which has proven to be useful with beginners working on multiple projects.

This information is used by most of the **cave** commands.

group *group_name*

group_name Name of the group for the project.

Optional: no
Repeatable: no
Applies to: entire project

This determines group ownership for the repository, and any new files.

This information is used by most of the **cave** commands.

lock *lock_dir* [*lock_type* ...]

lock_dir Absolute pathname of a directory to hold the lock files.

lock_type Type of lock to be used with this project, The default is to use all available types.

Optional: yes

Repeatable: yes

Applies to: entire project

The available types of locks are:

extract Lock name: **extract.project.pid**
Created by: **checkout, diff, export, history, pack, print, status, update**
When: Extracting information or files from the repository.
Checked by: **All cave commands that change the repository.**
Note: This lock should not be touched by the user under normal circumstances. More than one extract lock may be present at a time.

insert Lock name: **insert.project**
Created by: **add, commit, release, rtag, tag**
When: Changing the repository.
Checked by: **All cave commands that use information from the repository.**
Note: This lock should not be touched by the user under normal circumstances.

panic Lock name: **panic.project**
Created by: **user**
When: A panic situation arises
Checked by: **All cave commands that use information from the repository.**
Note: To be used for emergencies only.

update Lock name: **update.project**
Created by: **user**
When: A general lock of the project is needed while doing several operations, which may not be under cave's control.
Checked by: **All cave commands that use information from the repository.**
Note: A general purpose lock.

If a particular type of lock is not defined by the **lock** line in the project description file, any commands which check for that type of lock assume that none is required.

login_grp yes | no

Optional: yes
Repeatable: no
Applies to: entire project

If this command is not used, **cave** assume that **login_grp** is set to "yes".

When **login_grp** is "yes", **cave** checks that the user is logged in under the correct group when running any **cave** command that changes the repository. If the user is not, **cave** stops and advises that **newgrp** be run. Note that this is not the same as checking if the user is a member of the correct group.

The reason for checking the current group of a user is that **cvs** commits files under the group that the user is logged in under. It ignores what the file's group id is in the user's local workspace and in the repository.

If you wish to avoid this check, and still ensure that files maintain the correct group id, run the shell command:

```
chmod -R g+s root_dir
```

on each root directory in the project. This forces any committed files to be the correct group.

This information is used by the **cave** command **commit**, **lock**, **reserve**, **rtag**, **tag** and **unreserve..**

mail [access] *user_name* [...]

access Flag to send mail to everyone with access to the root directory, as defined by the **access** keyword line. If used, this flag must be before any *user_name*.

user_name Name(s) of additional user(s) to receive mail.

Optional: yes
Repeatable: no
Applies to: entire project

If the **mail** keyword is used, mail is sent to everyone on the list whenever one or more files are committed to this project.

This information is used by the **cave** command **commit**.

pack *distribution* *[[path | -x other]...]*

distribution Name to assign to this distribution.

-x other The name of a directory or file which is within one of the root directories, yet not under **cave** control. It must start with the tail of a root directory pathname, and **must** be followed by the relative pathname of a file or subdirectory. If *other* ends with a directory name, all files contained within that directory are included.
Note: These files are always collected from the root directory. The “-w *from*” argument in **cave pack** has no effect.

path This is a pathname which must start with the tail of a root directory pathname, and may be followed by the relative pathname of a file or subdirectory under **cave** control. If *path* ends with a directory name, all files contained within that directory are included. The subdirectory and file names must be the names as they exist in the repository (without the “,v” suffix), not the names of keys defined in the **modules** file.

Optional: yes
Repeatable: yes
Applies to: entire project

If the **pack** key line is used, and no *path* or *-x other* is given, the default is to include all of the files in the project which are under **cave** control.

This information is used by the **cave** command **pack**.

postcheckout *prog* [*arg* | *s_arg* ...]

prog Full pathname of program or script to run as part of the **checkout** command, right after checking out files from the repository.

arg Argument to *prog*.

s_arg A symbol for **cave** to substitute a string containing information about which root directories and files were requested by the user. Any default values are filled in. The symbols and their resulting space delimited strings are:

%s The full path name of each root directory requested for the checkout. Each root directory is followed by a list of requested directories and/or files. The pathnames of the directories and files are relative to the root directory.

%sp The pathnames, relative to the root directory, of the directories and files requested for the checkout.

%sr The full path name of each root directory requested for the checkout.

Optional: yes
Repeatable: yes
Applies to: entire project

Each **postcheckout** program is run in sequence whenever the **checkout** command is used. Any program which exits with a non-zero status is assumed to have failed, and **cave** ends with an error exit. See the description of the **checkout** command for information on exactly when the **postcheckout** programs are run in relation to other programs used during the checkout process.

Multiple spaces in the **postcheckout** line are compressed to one space.

Suggestion: If *prog* is your own script or executable, make any messages it sends to the terminal distinct by prepending the name *prog* to the message. Without this, it can be difficult to tell what is responsible for a message.

postcommit *prog* [*arg* | *s_arg* ...]

<i>prog</i>	Full pathname of program or script to run as part of the commit command, right after committing files to the repository.						
<i>arg</i>	Argument to <i>prog</i> .						
<i>s_arg</i>	A symbol for cave to substitute a string containing information about which root directories and files were requested by the user. Any default values are filled in. The symbols and their resulting space delimited strings are: <table><tbody><tr><td>%s</td><td>The full path name of each root directory requested for the commit. Each root directory is followed by a list of requested directories and/or files. The pathnames of the directories and files are relative to the project directory.</td></tr><tr><td>%sp</td><td>The pathnames, relative to the project directory, of the directories and files requested for the commit.</td></tr><tr><td>%sr</td><td>The full path name of each root directory requested for the commit.</td></tr></tbody></table>	%s	The full path name of each root directory requested for the commit. Each root directory is followed by a list of requested directories and/or files. The pathnames of the directories and files are relative to the project directory.	%sp	The pathnames, relative to the project directory, of the directories and files requested for the commit.	%sr	The full path name of each root directory requested for the commit.
%s	The full path name of each root directory requested for the commit. Each root directory is followed by a list of requested directories and/or files. The pathnames of the directories and files are relative to the project directory.						
%sp	The pathnames, relative to the project directory, of the directories and files requested for the commit.						
%sr	The full path name of each root directory requested for the commit.						

Optional: yes
Repeatable: yes
Applies to: entire project

Each **postcommit** program is run in sequence whenever the **commit** command is used. Any program which exits with a non-zero status is assumed to have failed, and **cave** ends with an error exit. See the description of the **commit** command for information on exactly when the **postcommit** programs are run in relation to other programs used during the commit process.

This is different than what is done with **cvs**' **loginfo** file, which keys off of module names in determining which programs to run after committing files.

Multiple spaces in the **postcommit** line are compressed to one space.

Suggestion: If *prog* is your own script or executable, make any messages it sends to the terminal distinct by prepending the name *prog* to the message. Without this, it can be difficult to tell what is responsible for a message.

precheckout *prog* [*arg* | *s_arg* ...]

<i>prog</i>	Full pathname of program or script to run as part of the checkout command, right before checking out files from the repository.
<i>arg</i>	Argument to <i>prog</i> .
<i>s_arg</i>	<p>A symbol for cave to substitute a string containing information about which root directories and files were requested by the user. Any default values are filled in. The symbols and their resulting space delimited strings are:</p> <p>%s The full path name of each root directory requested for the checkout. Each root directory is followed by a list of requested directories and/or files. The pathnames of the directories and files are relative to the root directory.</p> <p>%sp The pathnames, relative to the root directory, of the directories and files requested for the checkout.</p> <p>%sr The full path name of each root directory requested for the checkout.</p>

Optional: yes
Repeatable: yes
Applies to: entire project

Each **precheckout** program is run in sequence whenever the **checkout** command is used. Any program which exits with a non-zero status is assumed to have failed, and **cave** ends with an error exit. See the description of the **checkout** command for information on exactly when the **precheckout** programs are run in relation to other programs used during the checkout process.

Multiple spaces in the **precheckout** line are compressed to one space.

Suggestion: If *prog* is your own script or executable, make any messages it sends to the terminal distinct by prepending the name *prog* to the message. Without this, it can be difficult to tell what is responsible for a message.

precommit *prog* [*arg* | *s_arg* ...]

<i>prog</i>	Full pathname of program or script to run as part of the commit command, right before committing files to the repository.
<i>arg</i>	Argument to <i>prog</i> .
<i>s_arg</i>	<p>A symbol for cave to substitute a string containing information about which root directories and files were requested by the user. Any default values are filled in. The symbols and their resulting space delimited strings are:</p> <p>%s The full path name of each root directory requested for the commit. Each root directory is followed by a list of requested directories and/or files. The pathnames of the directories and files are relative to the project directory.</p> <p>%sp The pathnames, relative to the project directory, of the directories and files requested for the commit.</p> <p>%sr The full path name of each root directory requested for the commit.</p>

Optional: yes
Repeatable: yes
Applies to: entire project

Each **precommit** program is run in sequence whenever the **commit** command is used. Any program which exits with a non-zero status is assumed to have failed, and **cave** ends with an error exit. See the description of the **commit** command for information on exactly when the **precommit** programs are run in relation to other programs used during the commit process.

This is different than what is done with **cvs**' **commitinfo** file, which keys off of module names in determining which programs to run before committing files.

Multiple spaces in the **precommit** line are compressed to one space.

Suggestion: If *prog* is your own script or executable, make any messages it sends to the terminal distinct by prepending the name *prog* to the message. Without this, it can be difficult to tell what is responsible for a message.

print *lpr_line*

lpr_line Line to be used with the **lpr** print spooler.

Optional: yes
Repeatable: yes
Applies to: entire project

Multiple **print** lines are allowed, so that each user's output command may be customized.

This information is used by the **cave** command **print**.

project *project_name*

project_name Name of the project.

Optional: no
Repeatable: no
Applies to: entire project

This information is used by most of the **cave** commands.

reserve *reserve_dir*

reserve_dir Absolute pathname of a directory to hold information about reserved directories and files. This directory should not be used for any other purpose.

Optional: yes
Repeatable: no
Applies to: entire project

The presence of this line in the project description file causes **cave** to check for reserved directories and files before allowing the **checkout** and **commit** operations. It allows the **reserve** and **unreserve** commands to be used.

Project Description File

root_dir *name*
root_dir **end**

name

Absolute pathname of the **cvs** root directory. This is the value to which the environment variable **CVSROOT** is set. You do not need to set **CVSROOT** yourself in order to use **cave**.

Optional: no
Repeatable: yes
Applies to: entire project

There must be one **root_dir** *name* line for each root directory in the project. Lines which come after a **root_dir** *name* line apply to the specified root directory, until the next **root_dir** **end** line.

This information is used by most of the **cave** commands.

repository *name*
repository **end**

name

Name of the source repository, relative to the root directory.

Optional: no
Repeatable: yes
Applies to: root directory

There must be one **repository** *name* line for each source repository in the project. Lines which come after a **repository** *name* line apply to the specified source repository, until the next **repository** **end** line. Please note that each root directory is assumed to contain the **cvs** administrative directory called **CVSROOT**. This does not need to be specified in the project description file.

This information is used by most of the **cave** commands.

tag *tag_file* [*module* ...]

tag_file Absolute pathname to a tag file containing information about the tag to use when committing files.

module A key, as defined in the **modules** file.
If a project uses more than one root directory, the *module* must start with the tail of the absolute root directory pathname and continue with the module, as defined in the **modules** file:

root_dir/module

These keys determine what files to tag. If the **tag** key line is used, and no *module* is given, the default is to use the names of all the source repositories in this project.

Optional: yes
Repeatable: no
Applies to: entire project

This insures that all relevant files get tagged, even if they were not directly involved with a commit. If no **tag** key line is used, no files are tagged.

The tag file is a text file. See the chapter "Tag File" for a description of the correct format for a tag file.

This information is used by the **cave** command **commit**.

Tag File

The tag file is a text file which contains the value of the last tag which was used for the project. The file is referenced in the project description file, and is used during a commit. It may contain any number of lines, but the first line must be in the following format:

```
project tag_value [field_separator [fixed | variable]]
```

The values in this line are:

<i>tag_value</i>	The current value of the tag. The tag must start with a letter, and must not contain a semicolon, colon, dollar sign, at sign, comma or period (;:\$@,.).
<i>field_separator</i>	Field separator for the tag. The default is to use an underscore (_).
fixed variable	This tells if the field lengths should remain constant. The default is to use variable.

Any fields which might be incremented may contain any combination of digits and letters. For example, if the first line of the file looks like this before a commit:

```
project V_001_a9 _ fixed
```

It would look like this after a commit:

```
project V_001_b0 _ fixed
```

The default is to increment the rightmost field by one. Note that for the fixed field mode, the number of characters in each field remained constant. If a field reached its maximum value, the next field gets incremented:

```
project V_001_z9 _ fixed
```

becomes:

```
project V_002_a0 _ fixed
```

In contrast, a tag with a variable field might look like this before it is incremented:

```
project V_1_9
```

and like this after:

```
project V_1_10
```


CVS Commands and Related Files

General Information

Read the `cvs(1)` man page for a complete description of the `cvs` command and its options.

The execute line for `cvs` is:

```
cvs [cvs_options] cvs_command [command_options] [command_args]
```

The `cvs` command line can include *cvs_options*, which apply to the overall `cvs` program; a *cvs_command*, which specifies a particular action on the source repository; and *command_options* and *command_args* to fully specify what the *cvs_command* will do.

Warning: you must be careful of precisely where you place options relative to the *cvs_command*. The same option can mean different things depending on whether it is in the *cvs_options* position (to the left of a `cvs` command) or in the *command_options* position (to the right of a `cvs` command).

There are only two situations where you may omit *cvs_command*: “`cvs -H`” elicits a list of available commands, and “`cvs -v`” displays version information on `cvs` itself.

The *cvs_options* control the overall `cvs` program:

-H	Display usage information about the specified <i>cvs_command</i> (but do not actually execute the command). If you don't specify a command name, “ <code>cvs -H</code> ” displays a summary of all the commands available.
-Q	Causes the command to be <i>really</i> quiet; the command will generate output only for serious problems.
-q	Causes the command to be somewhat quiet; informational messages, such as reports of recursion through subdirectories, are suppressed.
-b <i>bindir</i>	Use <i>bindir</i> as the directory where <code>rcs</code> programs are located. Overrides the setting of the <code>RCSBIN</code> environment variable. This value should be specified as an absolute pathname.
-d <i>CVS_root_directory</i>	Use <i>CVS_root_directory</i> as the root directory pathname of the master <code>rcs</code> source repository. Overrides the

setting of the CVSROOT environment variable. This value should be specified as an absolute pathname.

- e *editor*** Use *editor* to enter revision log information. Overrides the setting of the EDITOR environment variable.
- l** Do not log the *cvs_command* in the command history (but execute it anyway). See the description of the **history** command for information on command history.
- n** Do not change any files. Attempt to execute the *cvs_command*, but only to issue reports; do not remove, update, or merge any existing files, or create any new files.
- t** Trace program execution; display messages showing the steps of cvs activity. Particularly useful with **-n** to explore the potential impact of an unfamiliar command.
- r** Makes new working files read-only. Same effect as if the CVSREAD environment variable is set.
- v** Displays version and copyright information for cvs.
- w** Makes new working files read-write (default). Overrides the setting of the CVSREAD environment variable.

Commands

There are equivalent **cave** commands for most of the **cv**s commands. The following commands, however, must be run directly from **cv**s.

admin [*rcs-options*] *files* ...

Requires: repository, working directory

Changes: repository

Synonym rcs

This is the **cv**s interface to assorted administrative **rcs** facilities, documented in **rcs(1)**. '**cv**s **admin**' simply passes all its options and arguments to the **rcs** command; it does no filtering or other processing. This command does work recursively, however, so extreme care should be used.

import [*-options*] *repository vendortag releasetag* ...

Requires: repository, source distribution directory

Changes: repository

Use this command to incorporate an entire source distribution from an outside source into your root directory. You can use this command both for initial creation of a repository, and for wholesale updates to the module from an outside source.

The *repository* name gives a directory name under the **cv**s root directory. If the directory does not exist, **import** creates it. The *vendortag* and *releasetag* arguments are tags to identify the initial source and to distinguish it from subsequent imports.

rdiff [-*flags*] [-V *vn*] [-r *t* | -D *d* [-r *t2* | -D *d2*]] *modules...*

Requires: repository

Changes: nothing

Synonym patch

Builds a Larry Wall format **patch(1)** file between two releases, that can be fed directly into the patch program to bring an old release up-to-date with the new release. (This is one of the few cvs commands that operates directly from the repository, and doesn't require a prior checkout.) The diff output is sent to the standard output device. You can specify (using the standard -r and -D options) any combination of one or two revisions or dates. If only one revision or date is specified, the patch file reflects differences between that revision or date and the current "head" revisions in the rcs file.

Note that if the software release affected is contained in more than one directory, then it may be necessary to specify the -p option to the patch command when patching the old sources, so that patch is able to find the files that are located in other directories.

If you use the option -V *vn*, rcs keywords are expanded according to the rules current in rcs version *vn* (the expansion format changed with rcs version 5).

The standard option *flags* -f, -l, -Q, and -q are available with this command. There are also several special options flags:

- s No patch output is produced. Instead, a summary of the changed or added files between the two releases is sent to the standard output device. This is useful for finding out, for example, which files have changed between two dates or revisions.
- t A diff of the top two revisions is sent to the standard output device. This is most useful for seeing what the last change to a file was.
- u The patch output uses the newer "unidiff" format for context diffs.
- c Explicitly specify the "diff -c" form of context diffs (which is the default).

Support Files

cvs has several support files. None of them are necessary for **cvs** to run, however they allow the user to customize the operation of the system. The files exist in the directory **\$CVSROOT/CVSROOT**, where **\$CVSROOT** is the pathname to the root directory which hold the repositories. The files are:

\$CVSROOT/CVSROOT/modules,v

\$CVSROOT/CVSROOT/commitinfo,v

\$CVSROOT/CVSROOT/logininfo,v

\$CVSROOT/CVSROOT/rcsinfo,v

\$CVSROOT/CVSROOT/editinfo,v

\$CVSROOT/CVSROOT/cvsignore,v

\$CVSROOT/CVSROOT/history

Here are short descriptions of the files. For more detailed information, read the **cvs(5)** **man** page.

modules

Define symbolic names or aliases for files or groups of files.

commitinfo

Define programs to run just before running **cvs commit**.

logininfo

Define programs to run after **cvs commit**, to send log messages to a file.

rcsinfo

Define forms for the log messages.

editinfo

Define programs to validate the log messages.

cvsignore

Specify a list of files to ignore during **cvs update**.

history

A file which holds a record of **cv**s commands which affect the repository, such as **commit** or **tag**. It can be read with the **cv**s **history** command.

Support Programs

cvsinit

A shell script that can be used to set up an initial **\$CVSROOT/CVSROOT** directory, where **\$CVSROOT** is the pathname to the root directory which holds the repositories. This only needs to be done once, at the time a cvs root directory is being created. The files created by **cvsinit**¹ are described earlier in this chapter, under **Support Files**. These files need to be edited, to customize them for a particular root directory.

mkmodules *directory*

Rebuilds the modules database that **cvs(1)** uses whenever the **modules** or **loginfo** files are changed. The *directory* is expected to contain the **modules,v** and **loginfo,v** files. For more detailed information, read the **mkmodules(1)** man page.

¹Our version of **cvsinit** on the Peregrine machine at LLNL has a small modification which allows it to be run from any directory. If you are using the unmodified version, you must find the directory that contains the source distribution for cvs. It is probably located somewhere in **/usr/local**. On our machine, for example, it is in **/usr/local/src/gnu/cvs/v1.3**. This directory should contain the script called **cvsinit**. It must be run from within the cvs source directory (i.e. **/usr/local/src/gnu/cvs/v1.3**).

Appendix A: Installing CAVEMAN

CAVEMAN is installed and maintained at LLNL:

Closed Labnet Peregrine (130.106.66.1), an A Division machine.

Open Labnet Contact the author.

The tools needed to install it on other platforms are listed below.

It is comprised of several scripts which must be preprocessed. The scripts and a make file to do the preprocessing are available on Peregrine in /codes/CAVEMAN_take.

The CAVEMAN system uses several free software programs that are available via anonymous ftp from any one of several UNIX archives. Possible sources are:

prep.ai.mit.edu	18.71.0.38
uunet.uu.net	192.48.96.2
tut.cis.ohio-state.edu	128.146.8.60
jpl-devvax.jpl.nasa.gov	128.149.1.143

The programs are available from the Free Software Foundation under the terms of the GNU General Public License or the Artistic License. The conditions of use of the programs are included with the source code. The user is responsible for following any requirements, restrictions and rules.

Each program comes with documentation, including **man** pages and README files.

The programs required by CAVEMAN are:

Appendix A: Installing CAVEMAN

Program	Version	Notes
rcs	5.6	Revision Control System. Automates the storage, retrieval, logging, identification and merging of source revisions. It was originally designed and built by Walter F. Tichy of Purdue University.
diff3	1.15 (or later)	Shows the differences between files. GNU DIFF was written by Mike Haertel, David Hayes, Richard Stallman and Len Tower.
cvs	1.3	Concurrent Versions System. cvs is a front end to the rcs control system. Several people have contributed to cvs . The two main authors are Brian Berliner of Sun Microsystems, Inc. and Jeff Polk of BSDI.
perl	4.0.1.4 Patch level 10	perl is a scripting language for manipulating text, files and processes. It was written by Larry Wall of JPL.

Appendix B: Tutorial

The **CAVEMAN** system is a front end to **cvs** (Concurrent Versions System), which is in turn a front end to the **rcs** revision control system.

It maintains files in directories called repositories. The repositories are contained in a directory called a root directory. In addition to the repositories, this root directory contains a special directory named **CVSROOT** which holds several special files used by **cvs** for administrative purposes. The root directory may also contain any other files and directories you care to put in it, such as log files and project description files.

The files in the repositories should never be changed directly. The files are “checked out” into the user’s local workspace, where any changes are made. The modified files are then “committed” back into the repository. More than one person may check out the same files at the same time. Any conflicts are caught by **cvs** at commit time.

cvs keeps track of all changes, so that older revisions of the files may also be checked out.

The main tool in **CAVEMAN** is named **cave**. It has several commands. The only ones you need to actually change files in a repository are:

cave checkout *path* ...

Creates your private copy of all or part of the files in the repository.

cave update

Updates your private copies of the files with changes made to the repository since the files were checked out.

cave add *file* ...

Marks new files to be added to an existing repository. They are not actually added until **cave commit** is run.

cave remove *file* ...

Marks files to be deleted from an existing repository. They are not actually removed until **cave commit** is run.

cave commit *path* ...

Incorporates your changes into the repository.

Appendix B: Tutorial

Read the chapter "Assumptions and Restrictions". It is located in the early part of this document.

I repeat, read the chapter "Assumptions and Restrictions". It also won't hurt to read the cvs man pages.

There is a glossary at the end of this document which defines some of the common terms.

Pictorial Overview of a Project

Let us look at a project named **ours**. It has the following parts:

- A project description file named `/codes/our_sources/OurPD`.
- A root directory named `/codes/our_sources` which contains two repositories—**foo** and **fum**.
- A root directory named `/stuff/other_sources` which contains two repositories—**boo** and **bar**.
- A single log file named `/codes/our_sources/related/our.log`.
- A tag file named `/codes/our_sources/related/tag.file`.

The layout of the directories is :

The project description file for this example looks like:

```

# Project description file for the OURS project.
#

project      ours
group        our_group
  
```

```
access      group
mail        access
lock        /codes/our_sources/related
pack        all
print -Pmy.printer
tag         /codes/our_sources/related/tag.file
```

```
root_dir /codes/our_sources
  repository foo
  repository end
```

```
  repository fum
  repository end
root_dir end
```

```
root_dir /stuff/other_sources
  repository boo
  repository end
```

```
  repository bar
  repository end
root_dir end
```

Installing the Initial Sources

A root directory is a directory that contains cvs repositories and a subdirectory named **CVSROOT** which contains several cvs administration files.

Let us assume you wish to create a new root directory called **/codes/our_sources** and have it contain one repository named **foo**. The repository is to contain two subdirectories named **a_dir** and **b_dir**.

As you go through the procedure, make sure that any files and directories you create have the correct group id and access controls for your purposes.

Note: To make these instructions easier to follow, several of the messages sent by cvs are eliminated in this example.

First, set the environment variable **CVSROOT** to the name of your new root directory. This needs to be set before running **cvs**.

```
setenv CVSROOT /codes/our_sources
```

Run **cvsinit²** to create the root directory and set up the administration files.

```
cvsinit
```

Move to the new root directory. Put in directories for anything else you may want to store here, such as the project description file, tag files, log files or scripts. These files may be stored in any directory, but it is easier to find them if they are within the root directory.

Assume the log file is to be named **our.log**, and is to be placed in a directory named **related**.

```
cd /codes/our_sources
```

```
mkdir related
```

You may wish to set up a header for your log file, at this time, or at least create an empty log file:

```
cat - > related/our.log
#
#           OUR.LOG
#
#####
ctrl-d
```

²Our version of **cvsinit** on the Peregrine machine at LLNL has a small modification which allows it to be run from any directory. If you are using the unmodified version, you must find the directory that contains the source distribution for cvs. It is probably located somewhere in **/usr/local**. On our machine, for example, it is in **/usr/local/src/gnu/cvs/v1.3**. This directory should contain the script called **cvsinit**. It must be run from within the cvs source directory (i.e. **/usr/local/src/gnu/cvs/v1.3**).

Assume the tag file is to be named `tag.file`, and is also to be placed in `related`:

```
cat - > related/tag.file
project v_1_0
ctrl-d
```

Create a project description file as defined earlier in this document. Let us call it **OurPD**, and place it in `/codes/our_sources`. The tag file and project description file may be stored in any directory, but it is easier for people to find them if they are within the root directory.

The project description file for this example looks like this:

```
# Project description file for the OURS project.
#

project      ours
group        our_group
access       group
mail         access
lock         /codes/our_sources/related
pack         all
print -Pmy.printer
tag          /codes/our_sources/related/tag.file

root_dir     /codes/our_sources
repository   foo
repository   end
root_dir     end
```

Now we need to edit the administrative files, such as **modules** and **loginfo**. These were created by `cvshint`. Also, samples of these files come with `cv`s. If you know where the `cv`s source directory is on your machine, look in a subdirectory called **examples**.

Move to some directory not contained in `/codes/our_sources`. Let us assume it is called `/home/me/work`. Check out **CVSROOT**.

```
cd /home/me/work

cvs checkout CVSROOT

cd CVSROOT
```

The directory structure should now look like this:

Edit any of the files as needed.

The logininfo file can use any sort of filter program, such as `cat`, to send output to a log file. Here is an example that uses a local script called `cmlog`:

```

# $Id$
#
# The "logininfo" file is used to control where "cvs commit" log
# information is sent. The first entry on a line is a regular
# expression which is tested against the directory that the change
# is being made to, relative to the $CVSROOT. If a match is found,
# then the remainder of the line is a filter program that should
# expect log information on its standard input.
#
# The filter program may use one and only one % modifier (a la
# printf). If %s is specified in the filter program, a brief
# title is included (enclosed in single quotes) showing the
# modified file names.
#
# If the repository name does not match any of the regular
# expressions in this file, the "DEFAULT" line is used, if it is
# specified.
#
^foo          cmlog -i -h /codes/our_sources/related/our.log

```

The `modules` file should look something like this:


```
#
# $Id$
#
# CVS Modules file for our sources
#
# Three different line formats are valid:
#   key      -a    aliases...
#   key [options] directory
#   key [options] directory files...
#
# Where "options" are composed of:
#   -i prog   Run "prog" on "cvs commit" from top-level of module.
#   -o prog   Run "prog" on "cvs checkout" of module.
#   -t prog   Run "prog" on "cvs rtag" of module.
#   -d dir    Place module in directory "dir" instead of module name.
#   -l        Top-level directory only. -- do not recurse.
#
# And "directory" is a path to a directory relative to $CVSROOT.
#
# The "-a" option specifies an alias. An alias is interpreted as
# if everything on the right of the "-a" had been typed on the
# command line.
#
# Convenient aliases
world      -a .

# CVSROOT support
CVSROOT    -i mkmodules CVSROOT
modules    -i mkmodules CVSROOT modules
loginfo    -i mkmodules CVSROOT loginfo
commitinfo -i mkmodules CVSROOT commitinfo
rcsinfo    -i mkmodules CVSROOT rcsinfo
editinfo   -i mkmodules CVSROOT editinfo

# Packages and files in "foo"
foo        foo
a_dir      foo/a_dir
b_dir      foo/b_dir
```

For more information on how to set up a **modules** file for **CAVEMAN**, see "Appendix C: The Modules File".

You may want to create a **cvsignore** file, which is used to specify a list of files to ignore during **update**. I recommend creating this file, even if it only contains a blank line. If you don't, **cvs** tells you at almost every opportunity how nice it would be to have a **cvsignore** file.

Create the **cvsignore** file in the **/home/me/work/CVSROOT** directory. Then type the following:

```
cvs add -m "New cvsignore file." cvsignore
```

Now, commit all the changes:

```
cvs commit -m "Initial changes to CVSROOT files."
```

You may now remove the **CVSROOT** directory in **/home/me/work**.

The source needs to be prepared. Put the source in some directory not contained in **our_sources**. Let us assume it is **/home/me/work**. Divide the source into directories and files, with the same hierarchy as you want them maintained by **cvs**.

Optional: Put a comment line containing **"\$Id\$"** at or near the top of each file. **cvs** then places information about the version number and date into the comment line whenever the file is checked in. Suppose you insert a line that looks like this in file **a1**:

```
c $Id$
```

After the file is placed under **cave** control, the line looks something like this:

```
c $Id: a1,v 1.0 1992/02/02 13:53:36 me Exp $
```

Optional: Put a comment line containing **"\$Log\$"** at or near the top of each file. **cvs** puts a log message at this location each time the file is committed. The log messages are cumulative.

The process of adding the **\$Id\$** and **\$Log\$** can be automated by using **cave header**.

Move to **/home/me/work/foo**, the top level directory of your source. To install the source, with a tag of **"FOO"** and a version number of **"v_1_0"**, type:

```
cvs import -m 'Initial installation of foo.' foo FOO v_1_0
```

The directory **/codes/our_sources/foo** should now contain files that have the same names as the source files, with a **"v"** appended. The root directory should look like:

Make sure that any files and directories you created have the correct group id and access controls for your purposes. You may want to use the shell command:

```
chmod -R g+s /codes/our_sources
```

This forces any committed files to be the correct group. This ensures that any files committed in the future will have the correct group in the repository.

You may now remove the files in `/home/me/work/foo`.

Adding a Second Root Directory to a Project

A root directory is a directory that contains cvs repositories and a subdirectory named **CVSROOT** which contains several cvs administration files.

As you go through the procedure, make sure that any files and directories you create have the correct group id and access controls for your purposes.

Note: To make these instructions easier to follow, several of the messages sent by cvs are eliminated in this example.

Let us assume you have a project named **ours**. It uses one source repository named **foo**, which is in a root directory called **/codes/our_sources**. The project description file is **/codes/our_sources/OurPD**. The repository contains two subdirectories named **a_dir** and **b_dir**:

The project description file for this example looks like this:

```

# Project description file for the OURS project.
#

project      ours
group        our_group
access       group
mail         access
lock         /codes/our_sources/related
pack         all
print        -Pmy.printer
tag          /codes/our_sources/related/tag.file

root_dir     /codes/our_sources
repository   foo
  
```

```
repository end
root_dir end
```

You wish to add a root directory named `/stuff/other_sources` to the project. It does not yet exist. It is to contain two repositories named `boo` and `bar`.

First, set the environment variable `CVSROOT` to the name of your new root directory. This needs to be set before running `cvs`.

```
setenv CVSROOT /stuff/other_sources
```

Run `cvsinit` to create the root directory and set up the administration files.

```
cvsinit
```

Now we need to edit the administrative files, such as `modules` and `loginfo`. These were created by `cvsinit`. Also, samples of these files come with `cvs`. If you know where the `cvs` source directory is on your machine, look in a subdirectory called `examples`.

Move to some directory not contained in `/stuff/other_sources`. Let us assume it is called `/home/me/work`. Check out `CVSROOT`.

```
cd /home/me/work
cvs checkout CVSROOT
cd CVSROOT
```

The directory structure should now look like this:

Edit any of the files as needed.

The `loginfo` file can use any sort of filter program, such as `cat`, to send output to a log file. Here is an example that uses a local script called `cmlog`:

```
# $Id$
#
# The "loginfo" file is used to control where "cvs commit" log
# information is sent. The first entry on a line is a regular
# expression which is tested against the directory that the change
# is being made to, relative to the $CVSROOT. If a match is found,
# then the remainder of the line is a filter program that should
# expect log information on its standard input.
#
# The filter program may use one and only one % modifier (a la
# printf). If %s is specified in the filter program, a brief
# title is included (enclosed in single quotes) showing the
# modified file names.
#
# If the repository name does not match any of the regular
# expressions in this file, the "DEFAULT" line is used, if it is
# specified.
#
DEFAULT      cmlog -i -h /stuff/other_sources/related/our.log
^boo        cmlog -i -h /stuff/other_sources/related/our.log
^bar        cmlog -i -h /stuff/other_sources/related/our.log
```

The modules file should look something like this:

```
#
# $Id$
#
# CVS Modules file for our sources
#
# Three different line formats are valid:
#   key      -a   aliases...
#   key [options] directory
#   key [options] directory files...
#
# Where "options" are composed of:
# -i prog    Run "prog" on "cvs commit" from top-level of module.
# -o prog    Run "prog" on "cvs checkout" of module.
# -t prog    Run "prog" on "cvs rtag" of module.
# -d dir     Place module in directory "dir" instead of module name.
# -l        Top-level directory only. -- do not recurse.
#
# And "directory" is a path to a directory relative to $CVSROOT.
#
# The "-a" option specifies an alias. An alias is interpreted as
# if everything on the right of the "-a" had been typed on the
# command line.
#
# Convenient aliases
world      -a .

# CVSROOT support
CVSROOT    -i mkmodules CVSROOT
modules    -i mkmodules CVSROOT modules
loginfo    -i mkmodules CVSROOT loginfo
commitinfo -i mkmodules CVSROOT commitinfo
rcsinfo    -i mkmodules CVSROOT rcsinfo
editinfo   -i mkmodules CVSROOT editinfo

# Packages and files in "boo"
# Note we choose to define modules that refer to individual files
boo        boo
c1         boo c1
c2         boo c2

# Packages and files in "bar"
# Note we don't define modules that refer to individual files
bar        bar
```

For more information on how to set up a **modules** file for **CAVEMAN**, see "Appendix C: The Modules File".

You may want to create a **cvsignore** file, which is used to specify a list of files to ignore during **update**. I recommend creating this file, even if it only contains a blank line. If you don't, cvs tells you at almost every opportunity how nice it would be to have a **cvsignore** file.

Create the `cvsignore` file in the `/home/me/work/CVSRROOT` directory. Then type the following:

```
cv's add -m "New cvsignore file." cvsignore
```

Now, commit all the changes:

```
cv's commit -m "Initial changes to CVSRROOT files."
```

You may now remove the `CVSRROOT` directory in `/home/me/work`.

The source needs to be prepared. Put the source in some directory not contained in `our_sources`. Let us assume it is `/home/me/work`. Divide the source into directories and files, with the same hierarchy as you want them maintained by `cvs`.

Optional: Put a comment line containing “`$Id$`” at or near the top of each file. `cvs` then places information about the version number and date into the comment line whenever the file is checked in. Suppose you insert a line that looks like this in file `c1`:

```
c $Id$
```

After the file is placed under `cave` control, the line looks something like this:

```
c $Id: c1,v 1.0 1992/02/02 13:53:36 me Exp $
```

Optional: Put a comment line containing “`$Log$`” at or near the top of each file. `cvs` puts a log message at this location each time the file is committed. The log messages are cumulative.

The process of adding the `$Id$` and `$Log$` can be automated by using `cave header`.

Move to `/home/me/work/boo`, the top level directory of your first source. Assume the value of the version number in `/codes/our_sources/related/tag.file` is “`v_1_22`”. To install the source, with a tag of “`BOO`” and a version number of “`v_1_22`”, type:

```
cv's import -m 'Initial installation of boo.' boo BOO v_1_22
```

Move to `/home/me/work/bar`, and do the same:


```
cv$ import -m 'Initial installation of bar.' bar BAR v_1_22
```

The directory `/stuff/other_sources/boo` should now contain files that have the same names as the source files, with a “,v” appended. The root directory should look like:

Make sure that any files and directories you created have the correct group id and access controls for your purposes. You may want to use the shell command:

```
chmod -R g+s /stuff/other_sources
```

This forces any committed files to be the correct group. This ensures that any files committed in the future will have the correct group in the repository.

You may now remove the files in `/home/me/work`.

Add the new root directory information to the project description file, `/codes/our_sources/OurPD`:

```
# Project description file for the OURS project.
#
project      ours
group        our_group
access       group
mail         access
lock         /codes/our_sources/related
pack         all
print        -Pmy.printer
tag          /codes/our_sources/related/tag.file

root_dir     /codes/our_sources
  repository  foo
  repository  end
root_dir     end

root_dir     /stuff/other_sources
  repository  boo
  repository  end
root_dir     end
```

Adding a Repository to an Existing Root Directory

A root directory is a directory that contains `cvs` repositories and a subdirectory named `CVSROOT` which contains several `cvs` administration files.

Let us assume you have a root directory called `/codes/our_sources` and it contains one repository named `foo`, the `cvs` administrative directory called `CVSROOT`, and a directory containing related files. The project description file used by `cave` is called `OurPD`.

You wish to add a second repository named `fum`. The repository is to contain two files named `b1` and `b2`.

As you go through the procedure, make sure that any files and directories you create have the correct group id and access controls for your purposes.

Note: To make these instructions easier to follow, several of the messages sent by `cvs` are eliminated in this example.

First, set the environment variable `CVSROOT` to the name of your root directory. This needs to be set before running `cvs`. You may want to set this in your `.cshrc` file.

```
setenv CVSROOT /codes/our_sources
```

Let us create the new repository.

```
cd /codes/our_sources
mkdir fum
```

The source needs to be prepared. Put the source in some directory not contained in `our_sources`, such as `/home/me/work`. Divide the source into directories and files, with the same hierarchy as you want them maintained by `cvs`.

Optional: Put a comment line containing "\$Id\$" at or near the top of each file. cvs then places information about the version number and date into the comment line whenever the file is checked in. Suppose you insert a line that looks like this in file **b1**:

```
c $Id$
```

After the file is placed under cave control, the line looks something like this:

```
c $Id: b1,v 1.0 1992/02/04 11:53:46 me Exp $
```

Optional: Put a comment line containing "\$Log\$" at or near the top of each file. cvs puts a log message at this location each time the file is committed. The log messages are cumulative.

The process of adding the \$Id\$ and \$Log\$ can be automated by using **cave header**.

Move to **/home/me/work/fum**, the top level directory of your source. To install the source, with a tag of "FUM" and a version number of "v_1_0", type:

```
cvs import -m 'Initial installation of fum.' fum FUM v_1_0
```

The directory **/codes/our_sources/fum** should now contain files that have the same names as the source files, with a ",v" appended. The root directory should look like:

You may now remove the directory `/home/me/work/fum`.

Now we need to edit the administrative files, such as `modules` and `loginfo`. Move to some directory not contained in `/codes/our_sources`. Let us assume it is called `/home/me/work`. Check out `CVSROOT`.

```
cd /home/me/work
cvs checkout CVSROOT
cd CVSROOT
```

The directory structure should now look like this:

Edit any of these files which need to know about the new repository.

Now, commit the changes:

```
cvs commit -m "Changes to CVSROOT files for new repo fum."
```

You may now remove the `CVSROOT` directory in `/home/me/work`.

Don't forget to edit the project description file `/codes/our_sources/OurPD`. It should look something like this:

```
# Project description file for the OURS project.
#
project      ours
group        our_group
access       group
mail         access
lock         /codes/our_sources/related
pack         all
print -Pmy.printer
tag          /codes/our_sources/related/tag.file

root_dir     /codes/our_sources
repository   foo
repository   end
```

```
repository fum  
repository end  
root_dir end
```

Make sure that any files and directories you created have the correct group id and access controls for your purposes.

Retrieving Files From a Repository

Use the **cave checkout** command to retrieve files from a repository.

The checked out source files are placed in a directory named after the project, as determined from the project description file. They are placed so that the structure echoes that of the root directory.

Let us assume you have a project named **ours**. It uses one source repository named **foo**, which is in a root directory called **/codes/our_sources**. The project description file is **/codes/our_sources/OurPD**. The repository contains two subdirectories named **a_dir** and **b_dir**:

The project description file for this example looks like this:

```

# Project description file for the OURS project.
#

project      ours
group        our_group
access       group
mail         access
lock         /codes/our_sources/related
pack         all
print        -Pmy.printer
tag          /codes/our_sources/related/tag.file

root_dir     /codes/our_sources
  repository foo
  repository end
root_dir     end
  
```

While in a directory named `/home/me/work`, which is empty, you decide to check out the subdirectory `a_dir`. You can type:

```
cave -d /codes/our_sources/OurPD checkout foo/a_dir
```

Assume you had earlier set the environment variable `CAVE_PD` to the path name of the project description file:

```
setenv CAVE_PD /codes/our_sources/OurPD
```

Then the call to `cave checkout` could have been shorter:

```
cave checkout foo/a_dir
```

If the `modules` file contained a key for `a_dir`, such as:

```
a_dir          foo/a_dir
```

You could have typed:

```
cave checkout a_dir
```

And if you like to type as little as possible, you could have used one of the synonyms for `checkout`, such as `co` or `get`.

```
cave co a_dir
```

However you type the command line, the following directory structure results:

Note also that the project name **ours** is used to name a directory which contains a structure resembling that of the root directory. Many of the commands in **cave** look for a directory named after the project in order to orient themselves within the local directory structure.

You may now make changes to the **a_dir** directory, such as editing files, adding files and removing files. Do not make any changes to the **CVS** directory.

Since you don't want to type the name of the project description file every time you run **cave**, let us assume that you set the environment variable **CAVE_PD**, as described above.

Now, you decide to check out the **b_dir** subdirectory as well. While in **/home/me/work**, or anywhere in the directory chain headed by **ours**, run **cave** again:

```
cave checkout our_sources/foo/b_dir
```

The directory structure now looks like:

Now, let us look at the case where a project has more than one root directory.

Suppose you have the same root directory described above—**/codes/our_sources**. You also need to use a root directory named **/stuff/other_sources**. The project description file is still **/codes/our_sources/OurPD**, but now it lists **/codes/our_sources** as the first root directory, and **/stuff/other_sources** as the second root directory. The second root directory looks like:

The project description file for this example looks like:

```

# Project description file for the OURS project.
#

project      ours
group        our_group
access       group
mail         access
lock         /codes/our_sources/related
pack         all
print -Pmy.printer
tag          /codes/our_sources/related/tag.file

root_dir /codes/our_sources
  repository foo
  repository end
root_dir end

root_dir /stuff/other_sources
  repository boo
  repository end
root_dir end
  
```

While in a directory named **/home/me/work**, which is empty, you decide to check out the subdirectory **a_dir** from the root directory **/codes/our_sources**:

```
cave checkout our_sources/foo/a_dir
```

The following directory structure results:

Now you decide to check out **boo** from the second root directory:

```
cave checkout other_sources/boo
```

The following directory structure results:

Now you decide to check out file **b1** from the subdirectory **b_dir** in the root directory **our_sources**:

```
cave checkout our_sources/foo/b_dir/b1
```

The following directory structure results:

The project description file is described in the chapter “Project Description File”.

Adding a Directory to a Repository

Use the **cave add** command to add files and directories to a repository.

Let us assume you have a project named **ours**. It uses one source repository named **foo**, which is in a root directory called **/codes/our_sources**. The project description file is **/codes/our_sources/OurPD**. The repository contains two subdirectories named **a_dir** and **b_dir**:

You wish to add another directory to **foo** named **c_dir** that contains the files **c1** and **c2**.

As you go through the procedure, make sure that any files and directories you create have the correct group id and access controls for your purposes.

Note: To make these instructions easier to follow, several of the messages sent by **cave** and **cv**s are eliminated in this example.

Since you don't want to type the name of the project description file every time you run **cave**, let us assume that you have set the environment variable **CAVE_PD**:

```
setenv CAVE_PD /codes/our_sources/OurPD
```

Move to your working directory. Let us assume it is called **/home/me/work**. Check out something from **foo**, such as **a_dir**, so that the CVS directory is created. Do not change anything in any directory named **CVS**.

```
cave checkout foo/a_dir
```

If the **modules** file contained a key for **a_dir**, such as:

```
a_dir          foo/a_dir
```

And if you used one of the synonyms for **checkout**, such as **co** or **get**, you could have typed:

```
cave co a_dir
```

However you type the command line, the following directory structure results:

The source needs to be prepared. Move to `/home/me/work/ours/foo`. Create a new directory:

```
mkdir c_dir
```

```
cd c_dir
```

Divide the source into files, with the same hierarchy as you want them maintained by **cvs**.

Optional: Put a comment line containing “\$Id\$” at or near the top of each file. cvs then places information about the version number and date into the comment line whenever the file is checked in. Suppose you insert a line that looks like this in file `c1`:

```
c $Id$
```

After the file is placed under cave control, the line looks something like this:

```
c $Id: c1,v 1.0 1992/02/06 14:03:16 me Exp $
```

Optional: Put a comment line containing “\$Log\$” at or near the top of each file. cvs puts a log message at this location each time the file is committed. The log messages are cumulative.

The process of adding the \$Id\$ and \$Log\$ can be automated by using **cave header**.

Move back up a level to **foo**:

```
cd ..
```

Run **cave add**. Note that running **cave add** does not place the files in the repository. It simply marks these files as new files that will be committed in the future.

```
cave add -R c_dir
```

Now the local directory should look like this:

The repository `/codes/our_sources/foo` should now contain `c_dir`, but not its files:

Remember, you may want to update the **modules** file from **CVSROOT** so that it knows about the new directory. If so, check out **modules**:

```
cave co modules
```

Now the local directory should look like this:

Make any necessary changes to the `modules` file.

When you are ready to make all the changes permanent, run `cave commit` from within `/home/me/work/ours` or one of its subdirectories:

```
cave commit -m 'Committing c_dir files' foo CVSROOT
```

The directory `/codes/our_sources/foo` should now contain `c_dir` and its files:

Make sure that any files and directories you created have the correct group id and access controls for your purposes.

You may now delete the directories in `/home/me/work/ours`.

Deleting a Directory From a Repository

Directories cannot be deleted via cvs. The files within them may be removed, but the Attic directory must remain so that older versions of the files may be checked out.

If you decide that the directory is truly obsolete, and will never be needed, simply delete it the way you would any other UNIX directory.

Adding a File to a Repository

Use the **cave add** command to add files and directories to a repository.

Let us assume you have a project named **ours**. It uses one source repository named **foo**, which is in a root directory called **/codes/our_sources**. The project description file is **/codes/our_sources/OurPD**. The repository contains two subdirectories named **a_dir** and **b_dir**:

You wish to add another file to **a_dir** in **foo** named **a3**.

As you go through the procedure, make sure that any files and directories you create have the correct group id and access controls for your purposes.

Note: To make these instructions easier to follow, several of the messages sent by **cave** and **cvs** are eliminated in this example.

Since you don't want to type the name of the project description file every time you run **cave**, let us assume that you have set the environment variable **CAVE_PD**:

```
setenv CAVE_PD /codes/our_sources/OurPD
```

Move to your working directory. Let us assume it is called **/home/me/work**. Check out **a_dir**, so that the CVS directory is created. Do not change anything in any directory named **CVS**.

```
cave checkout foo/a_dir
```

If the **modules** file contained a key for **a_dir**, such as:

```
a_dir          foo/a_dir
```

And if you used one of the synonyms for **checkout**, such as **co** or **get**, you could have typed:

```
cave co a_dir
```

However you type the command line, the following directory structure results:

The source needs to be prepared. Move to `/home/me/work/ours/foo/a_dir`. Create the new file **a3**, or copy it in from some other location.

Optional: Put a comment line containing “\$Id\$” at or near the top of each file. cvs then places information about the version number and date into the comment line whenever the file is checked in. Suppose you insert a line that looks like this in file a3:

```
c $Id$
```

After the file is placed under cave control, the line looks something like this:

```
c $Id: a3,v 1.0 1992/02/06 14:03:16 me Exp $
```

Optional: Put a comment line containing “\$Log\$” at or near the top of each file. cvs puts a log message at this location each time the file is committed. The log messages are cumulative.

The process of adding the \$Id\$ and \$Log\$ can be automated by using **cave header**.

Run **cave add**. Note that running **cave add** does not place the file in the repository. It simply marks the file as a new file that will be committed in the future.

```
cave add a3
```

Remember, you may want to update the **modules** file from **CVSROOT** so that it knows about the new file. If so, check out **modules**:

```
cave co modules
```

Now the local directory should look like this:

Make any necessary changes to the `modules` file

When you are ready to make all the changes permanent, run `cave commit` from within `/home/me/work/ours` or one of its subdirectories:

```
cave commit -m 'Adding the file a_dir/a3' foo CVSROOT
```

The directory `/codes/our_sources/foo` should now contain the new file:

Make sure that any files and directories you created have the correct group id and access controls for your purposes.

You may now delete the directories in `/home/me/work/ours`.

Deleting a File From a Repository

Use the **cave remove** command to delete files from a repository.

Let us assume you have a project named **ours**. It uses one source repository named **foo**, which is in a root directory called **/codes/our_sources**. The project description file is **/codes/our_sources/OurPD**. The repository contains two subdirectories named **a_dir** and **b_dir**:

You wish to remove the file in **foo/a_dir** named **a3**.

Note: To make these instructions easier to follow, several of the messages sent by **cave** and **cvs** are eliminated in this example.

Since you don't want to type the name of the project description file every time you run **cave**, let us assume that you have set the environment variable **CAVE_PD**:

```
setenv CAVE_PD /codes/our_sources/OurPD
```

Move to your working directory. Let us assume it is called **/home/me/work**. Check out **a_dir**, so that the **CVS** directory is created. Do not change anything in any directory named **CVS**.

```
cave checkout foo/a_dir
```

If the **modules** file contained a key for **a_dir**, such as:

```
a_dir          foo/a_dir
```

And if you used one of the synonyms for **checkout**, such as **co** or **get**, you could have typed:

```
cave co a_dir
```

However you type the command line, the following directory structure results:

Move to `/home/me/work/ours/foo/a_dir`. Run `cave remove`. Note that running `cave remove` does not immediately remove the file from the repository. It simply marks the file as a file that will be removed in the future.

```
cave remove a3
```

Now the local directory should look like this:

Remember, you may want to update the **modules** file from **CVSROOT** so that it knows about the new file. If so, check out **modules**:

```
cave co modules
```

Now the local directory should look like this:

Make any necessary changes to the **modules** file

When you are ready to make all the changes permanent, run **cave commit** from within **/home/me/work/ours** or one of its subdirectories:

```
cave commit -m Removing the file a_dir/a3' foo CVSR00T
```

The directory **/codes/our_sources/foo** should now look like:

You may now delete the directories in **/home/me/work/ours**.

Appendix C: The Modules File

The **modules** file is a special file used by **cvs** for administrative purposes. It is used to define symbolic names or aliases for files or groups of files. It exists in the directory **\$CVSROOT/CVSROOT**, where **\$CVSROOT** is the pathname to the root directory which hold the repositories.

A **module** is a name or key assigned in the **modules** file to reference subdirectories and files in a source repository. For example, you could define "my.pkg" to mean all the files in the directory "foo/my.pkg". The key may be different than the real name of the subdirectory or file in the source repository.

The **modules** file should look something like this:

```
#
# CVS Modules file for our sources
#

# CVSROOT support
CVSROOT      -i mkmodules CVSROOT
modules      -i mkmodules CVSROOT modules
loginfo      -i mkmodules CVSROOT loginfo
commitinfo   -i mkmodules CVSROOT commitinfo
rcsinfo      -i mkmodules CVSROOT rcsinfo
editinfo     -i mkmodules CVSROOT editinfo

# Packages and files in "foo"
foo          foo
a_dir       foo/a_dir
b_dir       foo/b_dir
some_of_a   foo/a_dir file1 file2

# Packages and files in "bar"
bar         bar
my_file     bar my_file.f
```

The six lines near the top containing the work "mkmodules" are standard for most **modules** files. They are there to make sure that the correct procedure is followed whenever any of the **cvs** administrative files are changed. Below these lines are the ones that define the modules. There is a repository named **foo**, and the key to it is unimaginatively named **foo**. To save some typing, keys have been defined for the directories **foo/a_dir** and **foo/b_dir**. So, to check out all of the files in **foo/a_dir**, we could type:

```
cave co foo/a_dir
```

or, we could type:

```
cave co a_dir
```

There is also a module named `some_of_a`, which would get just `file1` and `file2`. So, we could type:

```
cave co foo/a_dir{file1,file2}
```

or, we could type:

```
cave co some_of_a
```

`cave` forces any checked out files into a local directory structure which echoes that of the root directory. This is absolutely necessary, to ensure that later requests to pack or commit the files result in the proper actions. This behavior is different than `cvs`, which does not enforce any sort of local directory structure.

The way `cave` enforces the directory structure causes some of the fancier features of the `modules` file not to behave in the same manner as they do with plain `cvs`. Let us look at each of these line formats and options.

The standard `modules` file has the following header:

```
# Three different line formats are valid:
#   key      -a    aliases...
#   key [options] directory
#   key [options] directory files...
#
# Where "options" are composed of:
# -i prog    Run "prog" on "cvs commit" from top-level of module.
# -o prog    Run "prog" on "cvs checkout" of module.
# -t prog    Run "prog" on "cvs rtag" of module.
# -d dir     Place module in directory "dir" instead of module name.
# -l         Top-level directory only. -- do not recurse.
#
# And "directory" is a path to a directory relative to $CVSROOT.
#
# The "-a" option specifies an alias. An alias is interpreted as
# if everything on the right of the "-a" had been typed on the
# command line.
#
# You can encode a module within a module by using the special '&'
# character to interpose another module into the current module.
# This can be useful for creating a module that consists of many
# directories spread out over the entire source repository.
```

The simplest cases were shown in the earlier example:

```
key directory      ---> b_dir      foo/b_dir
key directory files... ---> some_of_a  foo/a_dir  file1  file2
```

The **-l** and **-d** options are regarded by **cave** as errors, as they would bypass the enforced directory structure.

The **-i**, **-o** and **-t** options only work if:

- The module key and the actual directory name are the same.
- The module refers to a directory which contains files in the next level down. There may be subdirectories present, but they will not be acted upon.

So if we had included the **-i** option in the earlier examples:

```
# Packages and files in "foo"
foo      -i myprog1 foo
a_dir    -i myprog1 foo/a_dir
b_dir    -i myprog1 foo/b_dir
some_of_a -i myprog1 foo/a_dir file1 file2

# Packages and files in "bar"
bar      -i myprog2 bar
my_file  -i myprog3 bar my_file.f
```

Then **myprog2** would run whenever **bar** or any of its components were committed. However **myprog1** and **myprog3** would never run. This is because **cave** cracks the modules database and always calls **cvs** with the pathname rather than the module name, so that the directory structure remains correct. This means that **cvs** never knows that the module was specified.

cave can interpret the **-a** option. It assumes that everything to the right of the **-a** is either a pathname or a module key. This option allows several different directories to be referred to as a group by one name.

```
b_dir      foo/b_dir
some_of_a  foo/a_dir file1 file2
bar        bar

special    -a b_dir some_of_a bar
```

cave can interpret the **&** character. Use this if there is a module you want to check out every time another module is checked out. For example:

```
some      foo/a_dir file1 &bar

bar       bar
```

This causes **bar** to be checked out whenever **some** is checked out.

There are some restrictions. None of the modules which use an **&** may point to a module which itself uses an **&** or a **-a**. None of the modules which use a **-a** may point to a module which itself uses a **-a**.

If the module key and the actual directory name are the same, use the **-a** option rather than an **&**. If you use the **&**, some things may get checked out twice and placed in two different locations. For example:

Appendix C: The Modules File

Good:

```
a_dir          foo/a_dir
bar            -a bar  foo/a_dir
```

Bad:

```
a_dir          foo/a_dir
bar            bar   &a_dir
```

cave assumes that any **modules** file used by the project is set up so that a request to check out a source repository results in the entire source repository being checked out. It also assumes that the **modules** file contains the standard CVSR00T keys:

```
# CVSR00T support
CVSR00T      -i mkmodules CVSR00T
modules      -i mkmodules CVSR00T modules
loginfo      -i mkmodules CVSR00T loginfo
commitinfo   -i mkmodules CVSR00T commitinfo
rcsinfo      -i mkmodules CVSR00T rcsinfo
editinfo     -i mkmodules CVSR00T editinfo
cvsignore    -i mkmodules CVSR00T cvsignore
```

Appendix D: Using Cave—Scenarios

The following pages show some possible scenarios for using **cave** in a production environment. Adapt one or more of these to fit your own situation.

Sources and executables on one workstation.

To make changes to the source files, do the following.

1. Run **cave checkout** to get private copies of the files you want to change.
2. Edit your private copies of the files.
3. Run **cave update** or **cave status** occasionally if you wish to keep up-to-date with any changes to the files in the repository.
4. Use **make** to compile the executable in your private workspace.
5. Test the executable.

Repeat the preceding steps as needed, until you are ready to make the changes permanent. When you are ready to install the changes, do the following.

6. Run **cave lock update** to set an update lock.
7. Run **cave update** to bring the local files up-to-date with any changes to the repository. Resolve any conflicts. You may need repeat steps 2-5 if there have been changes.
8. Run **cave commit** to put the changed files into the repository.
9. Use **make** to compile the executable in your private workspace.
10. Use **make** to install the executable in a public area. The installation procedure may include several checks. For example:
 - Use **cmsum** to make sure no files were changed after they were installed in the repository.
 - Use **cmvers** to compare the value in the tag file in the repository with a file stored in some other location.

- Use **cmvers** to determine a version number to tack onto the end of file names, and compare the new file names with those in the public area.

11. Run **cave unlock** to release the update lock.

Sources on a workstation and executables on another platform.

To make changes to the source files, do the following.

On the workstation:

1. Run **cave checkout** to get private copies of the files you want to change.
2. Edit your private copies of the files.
3. Run **cave update** or **cave status** occasionally if you wish to keep up-to-date with any changes to the files in the repository.
4. Run **cave pack** when you are ready to collect the files for transport to the remote workstation.
5. Run **cmput** or **ftp** to transport the files to the remote workstation.

On the remote workstation:

6. Use **make** to compile the executable in your private workspace.
7. Test the executable.

Repeat the preceding steps as needed, until you are ready to make the changes permanent. When you are ready to install the changes, do the following.

On the workstation:

8. Run **cave lock update** *.i.lock:command; .i.lock:update; .i.lock:types:update; .i.update lock;* to set an update lock.
9. Run **cave update** to bring the local files up-to-date with any changes to the repository. Resolve any conflicts. You may need repeat steps 2–7 if there have been changes.
10. Run **cave commit** to put the changed files into the repository.
11. Run **cave pack** to collect the files together for transport to the remote workstation.
12. Run **cmput** or **ftp** to transport the files to the remote workstation.

On the remote workstation:

13. Use **make** to compile the executable in your private workspace.
14. Use **make** to install the executable in a public area, such as **/usr/local/apps**. The installation procedure may include several checks. For example:
 - Use **cmsum** to make sure no files were changed on the remote workstation after they were moved up from the workstation.
 - Use **cmvers** to compare the value in the tag file moved up from the workstation with a file stored on the remote workstation.
 - Use **cmvers** to determine a version number to tack onto the end of file names, and compare the new file names with those in **/usr/local/apps**.
 - Use **cmput** to send a message file back to the workstation indicating the success or failure of the installation.

On the workstation:

15. Check for any message files you sent back.
16. Run **cave unlock** to release the update lock.

Appendix E: What if I want to... ?

What do I do if I want to get rid of the files I checked out earlier, without committing any changes back into the repository?

The simplest way is to delete them the same as you would any other file. A nicer way, if you reference the history file occasionally, is to run **cave release**. This command checks that no uncommitted changes are present, that you are executing it from inside or immediately above a **cvs** working directory, and that the repository name is good. It also leaves a record of its execution in the history file, which simply deleting the files will not do.

What do I do if I want to change the name of a file which already exists in the repository?

Check out the file using **cave checkout**. Rename the file in your local workspace from *old_name* to *new_name*. Then run **cave remove old_name** and **cave add new_name**. Finally, commit the change with **cave commit**.

What do I do if I want to change the name of a directory which already exists in the repository?

I would advise not changing it. However, if you think it is necessary, do the following. Make sure nobody has that directory or any subdirectories or files checked out. Using the regular Unix **mv** command, change the name of the directory. If you refer to the directory in any of the files in **CVSROOT**, check those files out and change the name in them. Commit the files back in.

What do I do if I want to put a file which was removed earlier by running **cave remove** back into a repository?

If the change hasn't been committed yet, run **cave add**.

A file which is removed from a repository is stored in a directory named **Attic**, which is located in the same directory as that which originally contained the file. The only way to retrieve a removed file is manually, by using the normal **mv** command to move the file out of **Attic**.

What do I do if I want to get all the files as they existed on a particular date?

Appendix E: What If I want to...

Run **cave checkout**, using the **-D** and **-P** options.

What if I want to see which of my local files I have changed?

Run **cave status**. Another possibility is to run “**cvs -n update**”. The “-n” option tells **cvs** to give a report as if it had run **update**, but to not really update anything.

What if I want to see what changes I’ve made to my local files?

Run **cave diff**.

Appendix F: Cave Command Summary

add [-R] [-k *kflag*] [-m *message*] [-F *list*] *file* ...

checkout [*cvs_checkout_opts*] [-res] [-F *list*] [*path* ...]

commit [-lnR] [-m *msg* | -f *file*] [-r *revision*] [-t *tag*] [-T] [-unres] [-F *list*] [*path* ...]

diff [-l] [-q] [-cefh] [-biwt] [[-r *rev1* | -D *date1*] [-r *rev2* | -D *date2*]] [-F *list*] [*file* ...]

export [-fnQq] -r *tag* | -D *date* [-F *list*] [*module* ...]

header [-q] [-c *chars*] [-k *keyword* [-k *keyword* ...]] [-F *list*] *file* [...]

help [*command*]

history [-d *root_dir*] [-report] [-flags] [-options] [-F *list*] [*file*...]

lock [-m *message*] *lock_type*

log [-l] [*rlog-options*] [-F *list*] [*file* ...]

pack [*co_opts*] [-c] [-d *dir*] [-w *from*] [-T | -Z] [-i *distrib*] [-F *list*] [[-x *other*] ...] [*path* ...]

print [*co_opts*] [-w *from*] [-l] [-c] [-p "*lpr_line*"] [...] [-F *list*] [*path* ...]

release [-dQq] [-F *list*] *module* ...

remove [-R] [-F *list*] [*file* ...]

reserve [-m *message*] [-F *list*] *path* [...]

rtag [-aflnQqR] [-b] [-d] [-r *tag* | -D *date*] [-F *list*] *symbolic_tag module* ...

status [-lR] [-v] [-F *list*] [*file* ...]

tag [-lQqR] [-b] [-d] [-F *list*] *symbolic_tag [file...]*

unlock *lock_type* | -n *lock_name*

unreserve [-F *list*] *path* [...]

update [-AdnPpQq] [-j *branch*] [-r *tag* | -D *date*] [-I *name* [-I *name*...]] [-F *list*] [*file* ...]

Appendix F: Cave Command Summary

verify

version

what [is | are] *key* [*args*]

Glossary

branch Each revision of an rcs file is considered to be a node in a tree structure. All nodes which have revision numbers containing two fields (e.g. 1.2, 6.3, etc.) are on the **trunk** or main branch. Occasionally, a developer will want to create a branch off of the trunk, which is generally done using `rtag -b` or `tag -b`. From that point on, all commit changes made within these working sources will be automatically added to a branch revision, thereby not perturbing main-line development in any way. The revision numbers on the branch will have four fields. For example, revision 2.3.1.4 is on branch number 1 started at revision 2.3 from the trunk.

cvs This stands for "Concurrent Versions System". It is a freeware program that runs on most UNIX stations. It acts as a front end to the rcs revision control system.

CVS Whenever a cvs controlled source is checked out into a local workspace, it is place in a directory created by cvs. This directory also contains a subdirectory called **CVS** which contains several files used by cvs for administrative purposes. This subdirectory should not be touched as long as the user plans to return the local files to the source repository.

CVSROOT This is used in two places The first is an environment variable which gives the absolute pathname of the currently active cvs root directory. The second is the name of a subdirectory of the root directory which contains several files used by cvs for administrative purposes.

head The most recent revision of a file on the **trunk**. Generally, the head revision is the default for most cvs commands.

loginfo file A special file used by cvs for administrative purposes. It can use any sort of filter program, such as `cat`, to automatically send output to a log file whenever source files are committed. The **loginfo** file is contained in the directory **CVSROOT**, located in the root directory.

module A name or key assigned in the **modules** file to reference subdirectories and files in a source repository. For example, you could define "my.pkg" to mean all the files in the directory "foo/my.pkg". The key may be different than the real name of the subdirectory or file in the source repository.

modules file A special file used by cvs for administrative purposes. It is used define alias's, and to define keys or pointers to the source repository, its subdirectories, and its source files. The **modules** file is contained in the directory **CVSROOT**, located in the root directory.

project The complete set of files and directories under **cave** control which are used to make an executable or collection of executables. This may include source files, object files, make files, scripts, etc.

project directory The directory in your local workspace where sources checked out by cvs are placed. It is named after the project, as determined from the project description file. The sources are placed so that the directory structure under the project directory echoes that of the root directory.

project description file A project description file is a text file which describes the root directories, source repositories, subdirectories used by a project. It contains the information needed to customize the operation of the **cave** tool.

repository A repository is a directory inside a root directory. It contains the cvs controlled file(s)

revision A file has a revision number which indicates what branch it is from, and how many times it has been changed. This number is (generally) changed automatically. For example, if a file is assigned an initial revision number of 1.1, the next time it is checked in the revision will be 1.2. If the revision number has more than two fields (such as 1.2.1.1), it indicates that the version of the file is from a branch, rather than the main trunk.

root directory A root directory is a directory that contains one or more repositories and a CVSROOT directory.

source repository See *repository*.

symbolic tag See *tag*.

tag A symbolic name or marker assigned by a user to one or more files in a repository. It can be thought of as a version number for a group of files. The tag must start with a letter, and must not contain a semicolon, colon, dollar sign, at sign, comma or period (;:\$@.,). See also: *revision*

tail The tail of a pathname is the last file or directory in that pathname. For example, if the pathname is `/home/people/me/foo`, the tail of the pathname is `foo`.

trunk See *branch*.

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