

CVS

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Software Development

- Hack, hack, hack, hack, hack
 - Sorta works

Main.c

2

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Software Development

- Hack, hack, hack, hack, hack
 - Sorta works
- We keep a copy, in case we get stuck later on

Main.c

Main_old.c

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Software Development

- Hack, hack, hack
- It works pretty well, so we keep another copy.

Main.c

Main_old.c

Main_not_as_old.c

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Software Development

- Hack, hack, hack
- Now it works (we think), we decide to release it.

Main.c

Main_old.c

Main_not_as_old.c

Main_rel_1.c

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Software Development

- We keep working to improve our software
- Hack, hack, hack, hack, hack
- New and improved version works (we think), we decide to release it.

Main_rel_2.c

Main.c

Main_old.c

Main_not_as_old.c

Main_rel_1.c

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Software Development

- Oh, no!!! We have a bug in release one.
 - We need to fix it (and not force the to upgrade to rel_2).
- Hack, hack, hack, hack, hack
- Now have a fixed version.

The diagram shows a vertical stack of file names. From top to bottom: Main_rel_2.c (green), Main.c (green), Main_rel_1_fixed.c (green), Main_old.c (green), Main_not_as_old.c (green), and Main_rel_1.c (green). The boxes are slightly offset to the right as they go down.

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Software Development

- Oh, no!!! Another bug in rel_1.
- Hack, hack, hack, hack, hack
- Now have a fixed version.

The diagram shows a vertical stack of file names. From top to bottom: Main_rel_2.c (green), Main.c (green), Main_rel_1_fixed.c (green), Main_old.c (green), Main_rel_1_fixed_2.c (green), Main_not_as_old.c (green), and Main_rel_1.c (green). The boxes are slightly offset to the right as they go down.

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Software Development

- Oh, no!!! A bug in rel_2.
- Hack, hack, hack, hack, hack
- Now have a fixed version.

The diagram shows a vertical stack of file names. From top to bottom: Main_rel_2.c (green), Main.c (green), Main_rel_2_fixed.c (green), Main_rel_1_fixed.c (green), Main_old.c (green), Main_rel_1_fixed_2.c (green), Main_not_as_old.c (green), and Main_rel_1.c (green). The boxes are slightly offset to the right as they go down.

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Software Development

- Now we go back to work on a new release.
- Hack, hack, hack, hack, hack
- Stable version

The diagram shows a vertical stack of file names. From top to bottom: Main_rel_2.c (green), Main.c (green), Main_rel_2_fixed.c (green), Main_rel_1_fixed.c (green), Main_old.c (green), Main_rel_1_fixed_2.c (green), Main_not_as_old.c (green), Main_after_rel_2_but_not_ready_yet.c (green), and Main_rel_1.c (green). The boxes are slightly offset to the right as they go down.

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Software Development

- Suppose we have to deal with a multi-file project

The diagram shows a complex multi-file project with overlapping boxes. The boxes are color-coded: Main_rel_2.c (orange), Main.c (blue), Main_rel_1_fixed.c (blue), Main_rel_2_fixed.c (red), Main_rel_1_fixed_2.c (red), Main_not_as_old.c (green), Main_rel_1.c (red), and Main_after_rel_2_but_not_ready_yet.c (green). The boxes are overlapping and offset to the right.

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We need help!!!

- Welcome to CVS
 - Concurrent Versions System
 - Keeps track of the different versions of your files
 - Keeps track of the relationship between different version files
 - Allows more than one person to work on the files at the same time

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CVS Development Model

Repository
(cvsroot)

- Contains the various versions of your files
- You don't access it directly, only indirectly via cvs commands

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CVS Development Model

Repository
(cvsroot)

↗
 cvs checkout main.c

Main.c

Extracts a working copy of main.c for us to work on

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CVS Development Model

Repository
(cvsroot)

↖
 Hack, hack, hack

Main.c

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CVS Development Model

Repository
(cvsroot)

↙
 cvs commit

Main.c

Main.c

We are at a point where we wish to save a version

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CVS Development Model

Repository
(cvsroot)

↖
 Hack, hack, hack

Main.c

Main.c

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CVS Development Model

Repository
(cvsroot)

↙
 cvs commit

Main.c

Main.c

Main.c

We are at a point where we wish to save another version

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CVS Development Model

- We are keeping a copy of each version of main.c
- The first version forms the root of a tree (only the trunk shown here now)
- Each new main.c grows the tree trunk higher



How can we specify a particular version of a file?

- Use dates and times
 - Awkward to use (hard to remember when something happens)
- Use CVS internal numbering
 - They end up being meaningless quickly
 - Multi-file projects end up with many version numbers that don't relate to each other
- We need something more useful

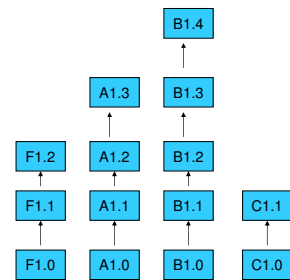


CVS tags

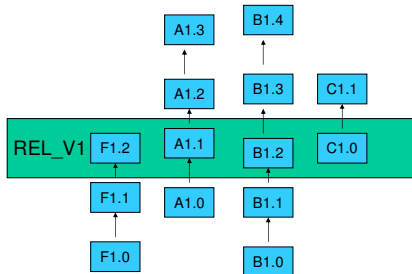
`cvs tag symbolic_name`

- Allows us to give symbolic names to particular versions of files
 - E.g. `cvs tag ass1-start`

Multiple File and Tags

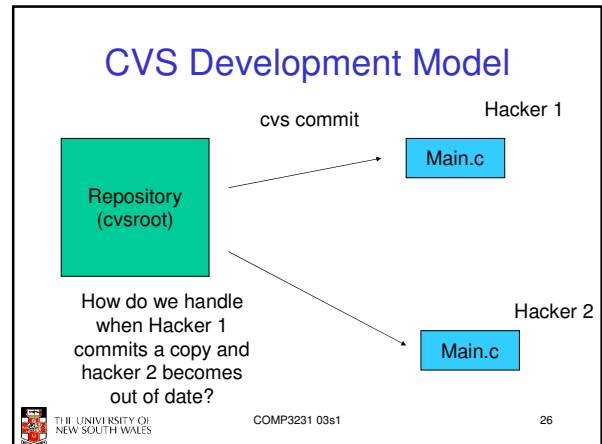
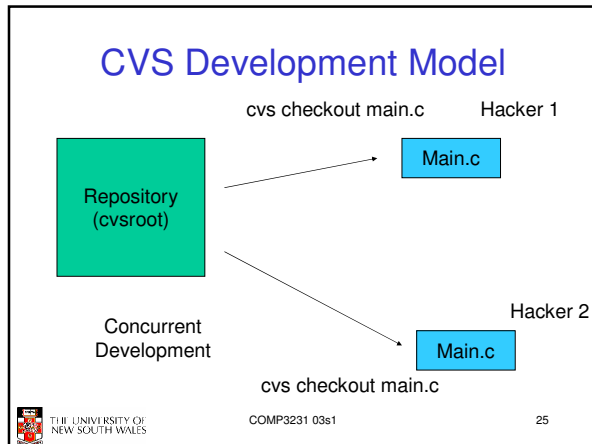


Tagging A Coherent Version



Tagging

- You can do the following on tags
 - Add
 - Delete
 - Move
 - Change the version a tag refers to
 - Rename
- Can tag the repository directly
 - `cvs rtag`
- See www.cvshome.org for details



CVS status & update

- CVS status provide the “status” of your files

```
-----
File: errmsg.h            Status: Up-to-date
Working revision: 1.1.1.1 Fri Mar 14 03:47:13 2003
Repository revision: 1.1.1.1 /home/kovine/cv3231/cvsroot/src/kern/include/kern/errmsg.h,v
Sticky Tag:            asst1-spec3 (revision: 1.1.1.1)
Sticky Date:           (none)
Sticky Options:        (none)
```

- CVS `-q -n update`
 - Perform an “update”
 - -q “quietly”
 - -n “no action”

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CVS update

- Brings the file (directory, or directory tree) up-to-date with a specified version
 - When no version is specified, it brings it up-to-date with the latest release
- cvs update
 - Update to latest release
- cvs update `-r os161-base main.c`
 - Update to version that was tagged os161-base

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cvs update output

- *U file*
 - The file was brought up to date with respect to the repository.
- *P file*
 - Like ‘U’, but the CVS server sends a patch instead of an entire file.
- *A file*
 - The file has been added to your private copy of the sources
- *R file*
 - The file has been removed from your private copy of the sources
- *M file*
 - The file is modified in your working directory.
- *C file*
 - A conflict was detected while trying to merge your changes to *file* with changes from the source repository.
- *? file*
 - *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 CVS to ignore

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Example: cvs -q -n update

```
% cvs -q -n update
A kern/asst1/bar.c
A kern/asst1/bar.h
A kern/asst1/bar_driver.c
R kern/asst1/catlock.c
R kern/asst1/catsem.c
R kern/asst1/stoplight.c
A kern/asst1/test.h
M kern/conf/conf.kern
M kern/include/synch.h
M kern/include/test.h
M kern/include/version.h
M kern/main/menu.c
M kern/thread/synch.c
M kern/thread/thread.c
M lib/hostcompat/time.c
M lib/libc/exit.c
%
```

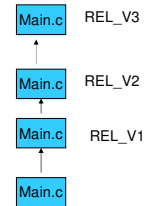
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Example: Reverting to a different version of a file

```
% rm main.c
% cvs update -r tag_you_want main.c
%
```

How do we handle the "go back and bugfix an old release" problem?

- We would like to go to the version released and make changes
- We can't insert in the middle of the trunk, and the head of the trunk is being using for REL_V3



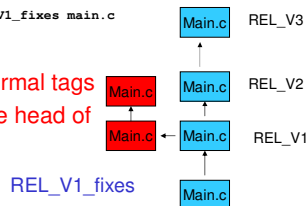
How do we handle the "go back and bugfix an old release" problem?

- We can use a *branch*

```
% cvs rtag -r REL_V1 -b REL_V1_fixes main.c
```

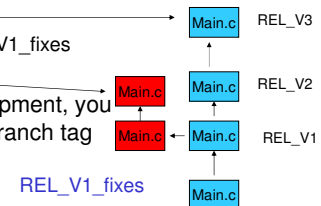
- Note *branch tags*

- are different to normal tags
- always refer to the head of the branch



Checking out branches

- cvs checkout main.c
 - Checks out →
- cvs checkout -r REL_V1_fixes
 - Checks out →
- To continue development, you must check out a branch tag or the main trunk



Adding and removing files


- cvs add file.c
- cvs remove file.c
 - Note: Like always, you must *commit* to make the changes visible

View tags and commit logs

- cvs log

```
$ cvs log synch.c

RCS file: /home/kevine/cs3231/cvsroot/src/kern/thread/synch.c,v
Working file: synch.c
head: 1.1
branch: 1.1.1
locks: strict
access list:
symbolic names:
  ass1-v3-start: 1.1.1.1.12.1
  ass1-v3-test: 1.1.1.1.0.12
  ass1-v3-rel2: 1.1.1.1.2.2
  ass1-v3-rel1: 1.1.1.1.2.2
  ass1-v3-pre2: 1.1.1.1.2.2
  ass1-v3-pre1: 1.1.1.1.2.2.0.4
  ass1-v2-pre1: 1.1.1.1.0.10
  ass1_v1-start: 1.1.1.1.8.1
  ass1_v1: 1.1.1.1.0.8
  ass1: 1.1.1.1
  ass1: 1.1.1.1
  ass1-test-base: 1.1.1.1.6.1.0.2
  ass1-test-pre: 1.1.1.1.6.1
  ass1-test1: 1.1.1.1.0.6
  ass1-rel3: 1.1.1.1.2.2
  ass1-rel2: 1.1.1.1.2.2.0.2
```




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```
keyword substitution: kv
total revisions: 8; selected revisions: 8
description:
-----
revision 1.1
date: 2003/03/14 03:47:33; author: kevine; state: Exp;
branches: 1.1.1;
Initial revision
-----
revision 1.1.1.1
date: 2003/03/14 03:47:33; author: kevine; state: Exp; lines: +0 -0
branches: 1.1.1.1.2; 1.1.1.1.4; 1.1.1.1.6; 1.1.1.1.8; 1.1.1.1.12;
Initial import of os161
-----
revision 1.1.1.12.1
date: 2003/03/27 01:46:22; author: kevine; state: Exp; lines: +87 -27
test start
-----
revision 1.1.1.1.8.1
date: 2003/03/19 08:34:15; author: kevine; state: Exp; lines: +87 -27
Start of assignment 1
-----
revision 1.1.1.1.6.1
date: 2003/03/17 23:30:03; author: kevine; state: Exp; lines: +87 -27
patched to bring up to date
```



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