CVS
Concurrent Versions System

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Outline of the talk

- What is and what is not CVS?
- Basics of CVS
- Sample session
- Managing projects with CVS

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What is CVS?

- Concurrent Versions System
- Record history of files in a clever way
- Group developing

What is NOT CVS?

- Not a build system
- Not a substitute for managment
- Not a substitute for developers comunication
- Not a do-it-all utility

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Basics of CVS

- Repository
- Modules
- Revision numbers / Branches
- Versions, revisions, releases
- Tags to release

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Repository

- CVS Repository → complete copy of all the files and directories with under version control.
- Use CVS commands to access the files:
  1. Check-out module
  2. Modify, update, create new files
  3. Check-in back (commit) module
- Can be either local or remote
- Repository = CVSROOT + modules

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Modules

- Modules : Groups of files close-related each other.
  - A library
  - An application
  - A small utility
  - A sub-program for a big application
- CVS is module-oriented (projects)
- Modules allow several developers working in different section of the same application, at the same time, without critical conflicts.

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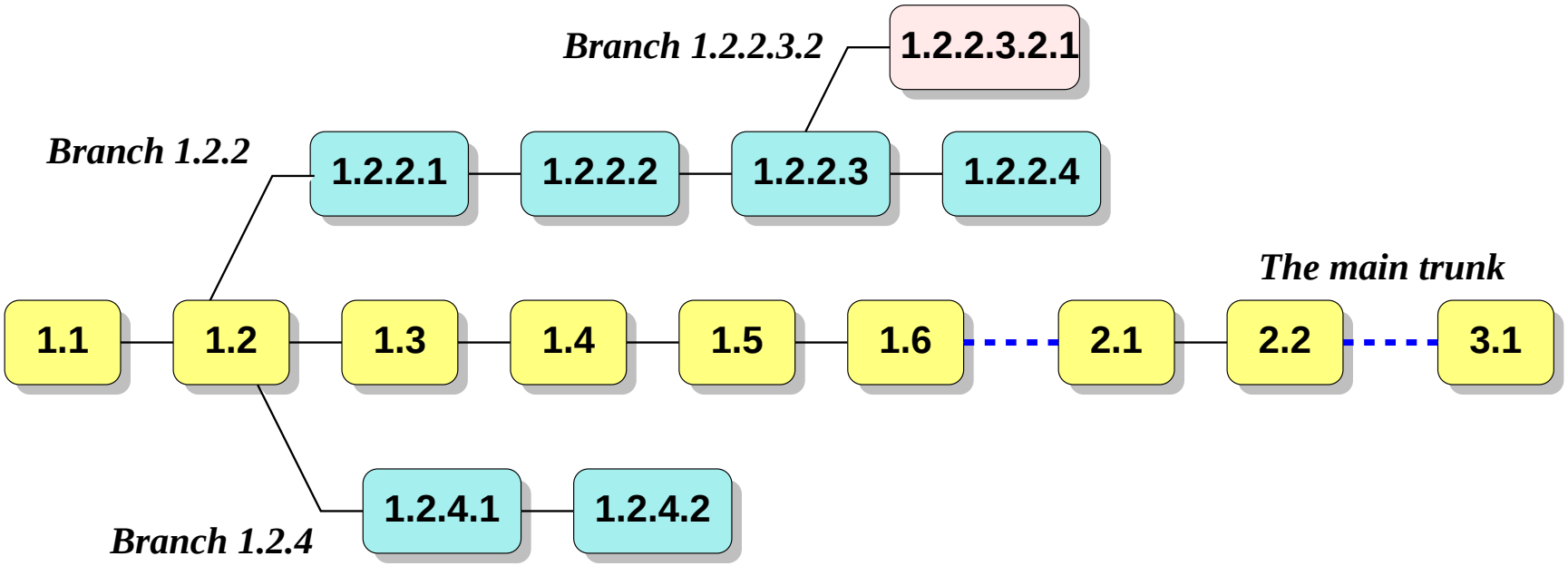
Revision numbers and Branches

- Revision Numbers: "Versions" of the files.
  - Example: 1.1, 1.2, 1.3.2.5, 1.3.2.5.1.2
  - Updated when you "check-in" (commit)
  - Sequential, with possible steps into a mayor revision number: 1.3 - 1.4 - 2.1 - ...
- CVS is not limited to "linear development"
  Revision Numbers → Revision Tree → Branches


Branch 1.2.2.3.2
1.2.2.3.2.1
Branch 1.2.2
1.2.2.1
1.2.2.2
1.2.2.3
1.2.2.4
The main trunk
1.1
1.2
1.3
1.4
1.5
1.6
2.1
2.2
3.1
1.2.4.1
1.2.4.2
Branch 1.2.4

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Revision numbers and Branches (II)

- Each branch → a self-maintained line of development
- Modifications in branches → easily transported back to the main trunk
- What are branches good for?
  - Develope new algorithms to substitute old ones.
  - Expand performance without disturbing main development (adding new options, . . .)
  - Correct bugs in earlier versions

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Versions

- Versions[files] $\neq$ Versions[applications]
- Notation:

Revision $\equiv$ Versions[files]

Release $\equiv$ Versions[applications]

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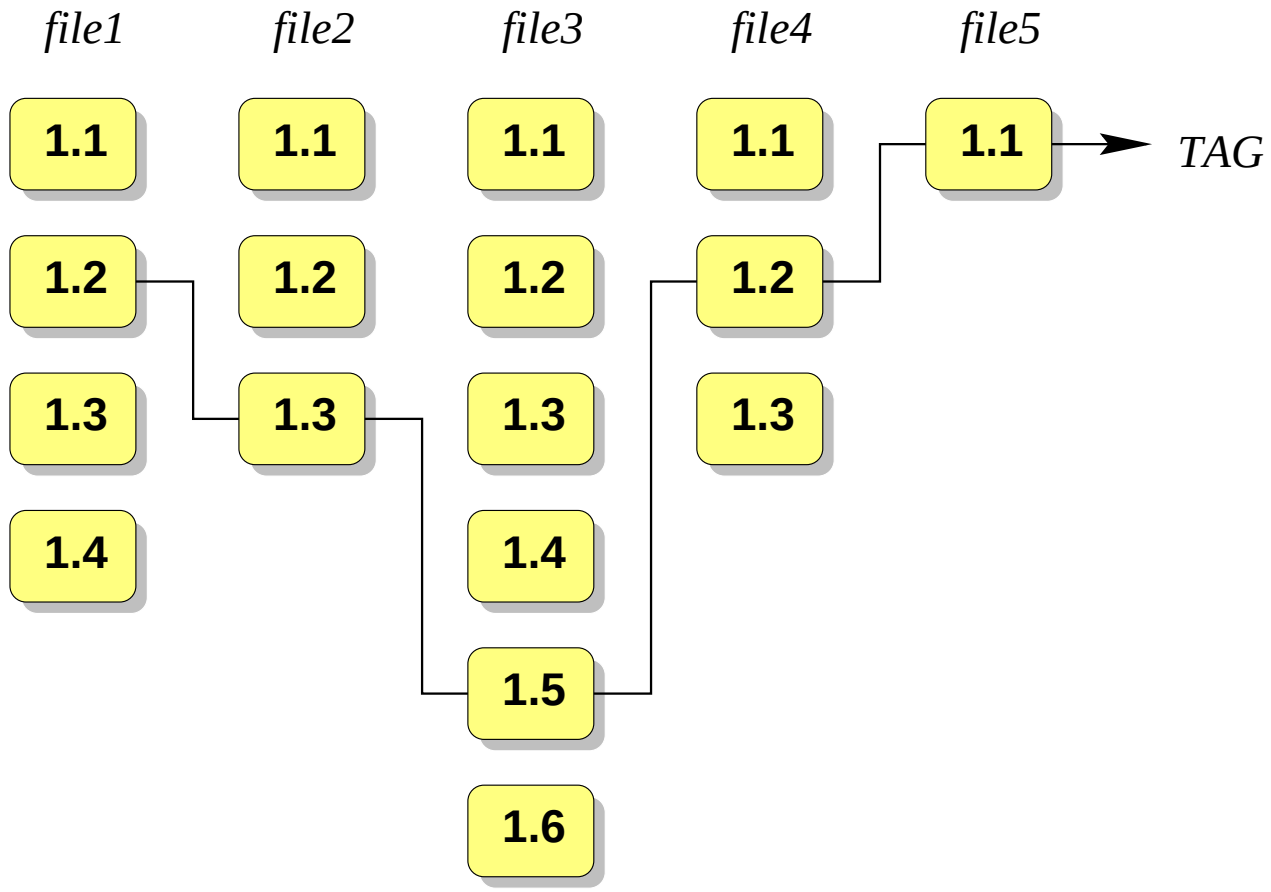
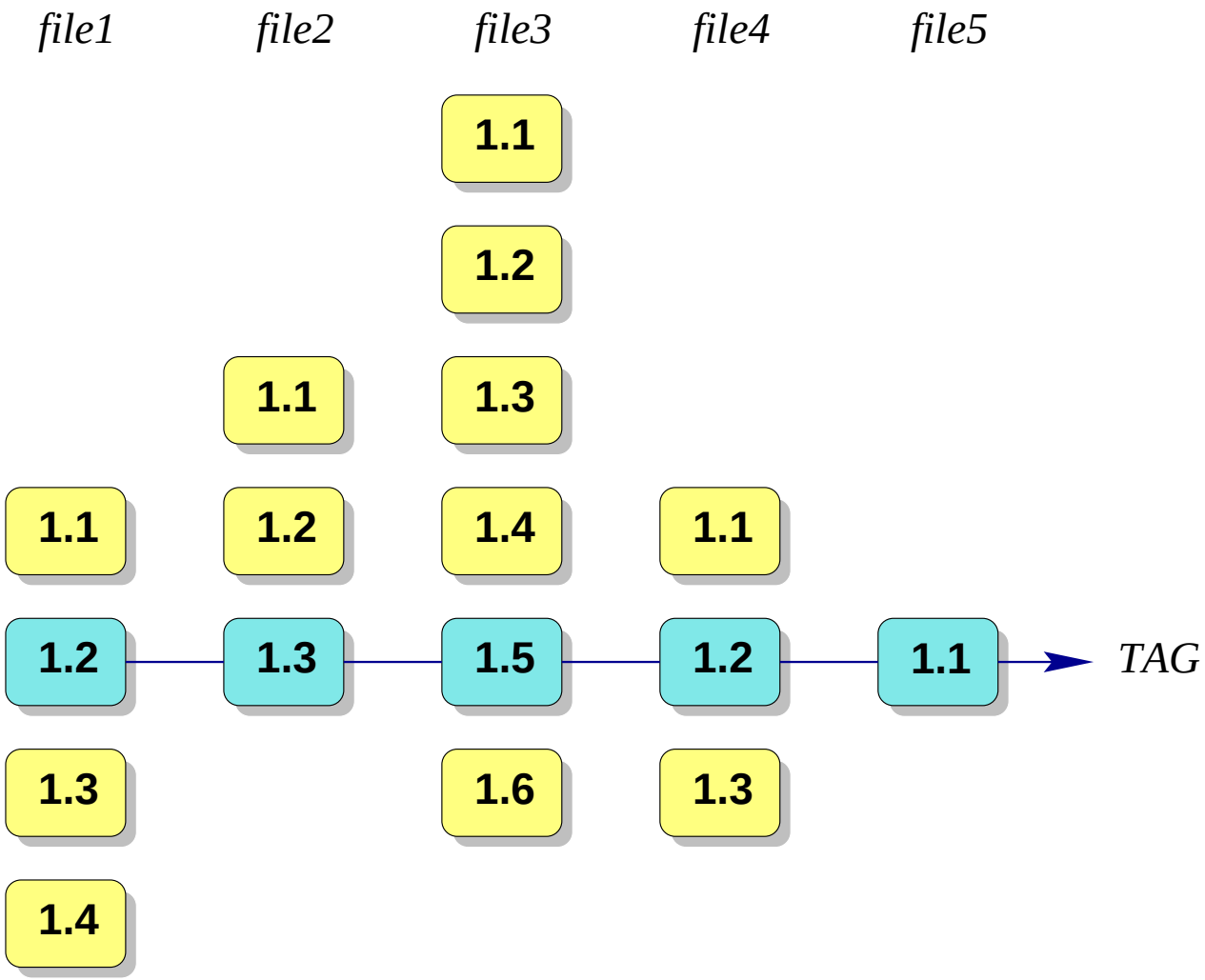
Tags to release

- Diferent files have different revisions history
- Tags: Symbolic revisions → Releases


file1
file2
file3
file4
file5
1.1
1.2
1.3
1.4
1.1
1.2
1.3
1.1
1.2
1.3
1.4
1.5
1.6
1.1
1.2
1.3
TAG


file1
file2
file3
file4
file5
1.1
1.2
1.3
1.4
1.5
1.6
TAG

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Sample session

Context

We are working on a new algorithm to be implemented in the software trigger layer for MAGIC. The source code consists of some C files and a Makefile. The program is called “ta” (trigger algorithm) and this is also the name of your module in the repository.

Getting the code

```
HAL10M:~> cvs checkout ta
HAL10M:~> cd ta
HAL10M:~/ta> ls
CVS         Makefile    algor.c     main.c      param.c
HAL10M:~/ta> _
```

Modifications + hacking away

```
HAL10M:~/ta> emacs algor.c
 ...
HAL10M:~/ta> ls
CVS         Makefile    algor.c     algor.c~    main.c
param.c
HAL10M:~/ta> _
```

Did it work?

```
HAL10M:~/ta> make
 compiling algor.c ...
 compiling main.c ...
 compiling param.c ...
 linking...
 done.
HAL10M:~/ta> ls
CVS         Makefile    algor.c     algor.c~    algor.o
main.c      main.o      param.c     param.o     ta*
HAL10M:~/ta> _
```

Committing your changes

```
HAL10M:~/ta> cvs commit -m "Added search of local islands" algor.c
Checking in algor.c;
/usr/local/cvsroot/ta/algor.c,v  <--  algor.c
new revision: 1.5; previous revision: 1.4
done
HAL10M:~/ta> _
```

Cleaning up

```
HAL10M:~/ta> cd ..
HAL10M:~/> cvs release -d ta
M param.c
? ta
You have [1] altered files in this repository.
Are you sure you want to release (and delete) module ‘ta’: n
** ‘release’ aborted by user choice.
HAL10M:~/> cd ta
HAL10M:~/ta> cvs diff param.c
 ...
HAL10M:~/ta> cvs commit -m "Added search of local islands" param.c
Checking in param.c;
/usr/local/cvsroot/ta/param.c,v  <--  param.c
new revision: 1.3; previous revision: 1.2
done
HAL10M:~/ta> cd ..
HAL10M:~/> cvs release -d ta
? ta
You have [0] altered files in this repository.
Are you sure you want to release (and delete) module ‘ta’: y
HAL10M:~/> _
```

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Managing projects with CVS

- Defining projects
- History
- Revision management
- Release management
- Multiple developers

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Defining projects

- Creation of projects using old files
- Creation of projects from scratch
- Definition of the module in the repository
- CVS $\rightarrow$ recursive behaviour

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History

- Log messages (`cvs log`)
- History database (log of CVS actions — `cvs history`)
- User-defined logging: customization for logging commits, check-outs, check-ins, tags, ...
- Annotate command: what revision modified each line of a file?

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Revision management

- Decide which policy to use regarding commits
- Several policies are possible
  - Too quickly → files may not even compile
  - Too slowly → improvements are not available
- Common policy: only to commit files when they compile
- Another policy: Force to pass a test suite
- Too controlled ⇒ too regimented ⇒
  ⇒ counter-productive → get the software written

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Release management

- Decide which policy to use regarding releases
- Suggestion: Frequent releases with a test suite and a test phase

Multiple developers

- CVS model: unreserved checkouts *rightarrow* developers have their own "working copy"
- When committing *rightarrow* possible conflicts. BUT with CVS one can bring his working copy up to date with the repository revision
- Several states for the files: Up-to-date, Locally Modified, Locally Added, Unresolved Conflict, ...
- Informing others
- Watching files / Getting notified