G52GRP 2012–2013: Lecture 3

Project Site and Version Control with Subversion

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This Lecture

- Indefero project site
- Why use version control systems?
- Subversion
- Using Subversion

Sharing Code and Documents (1)

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  - Who’s got the latest version?
  - Who’s got the right to edit?
  - How to ensure that everyone sees up-to-date versions of everything?
  - . . .

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  - Provides additional project management features beyond a shared repository.
  - The designated `gp12-XXX` Indefero project should (in most cases) be your central repository for code and documentation.
- Additionally, a Unix group has been created for each group on the School's Linux servers.

Indefero Features (1)

- Project Management:
  - Project description (using Markdown syntax).
  - Access rights (who can access and change what: defaults should work for most groups).
  - Detailed configuration of many of the other features (e.g. “tags”, notification e-mails).

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  - Access rights (who can access and change what: defaults should work for most groups).
  - Detailed configuration of many of the other features (e.g. “tags”, notification e-mails).
- Source code repository:
  - Version control using Subversion.
  - Not just for code, but can also be used for reports, design documents, and more.

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- Downloads
  - Various releases
  - Source, binaries for various platforms, . . .

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- Due 2 November
- Designed to get your project site off the ground and ensure everyone understands the basics of Indefero and Subversion
- Nominate a Project Site Master ASAP!
- See the Group Project Handbook for further details.

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- All documents and code ***must*** be backed up on School servers!
  Temporary unavailability of external hosting, or external host going out of business (or your own, private machines dying, getting stolen, . . .), are ***not*** valid extenuating circumstances.
- You may have to copy certain data across to the project site for submission purposes.

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- Social networking sites like Facebook were designed for . . . social networking, not software development.
- Consequently, lack key features like version control and issue tracking.
- Grops that ***did*** use Facebook reported that the social aspects were a constant source of distraction.

Other Ways To Share & Coordinate (4)

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- If a team of people involved, how to coordinate the work on the shared source code and documentation?
- As the source and documentation evolves, how to
  - keep track of changes
  - keep track of consistent configurations
  - insulate against “work in progress”
  - . . .

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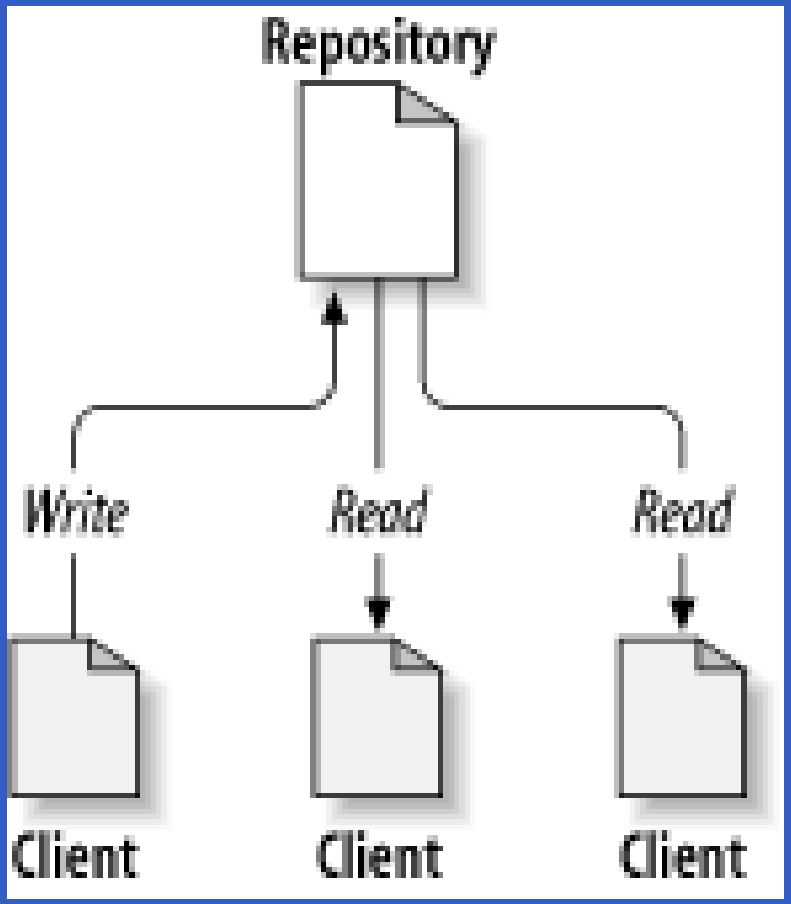
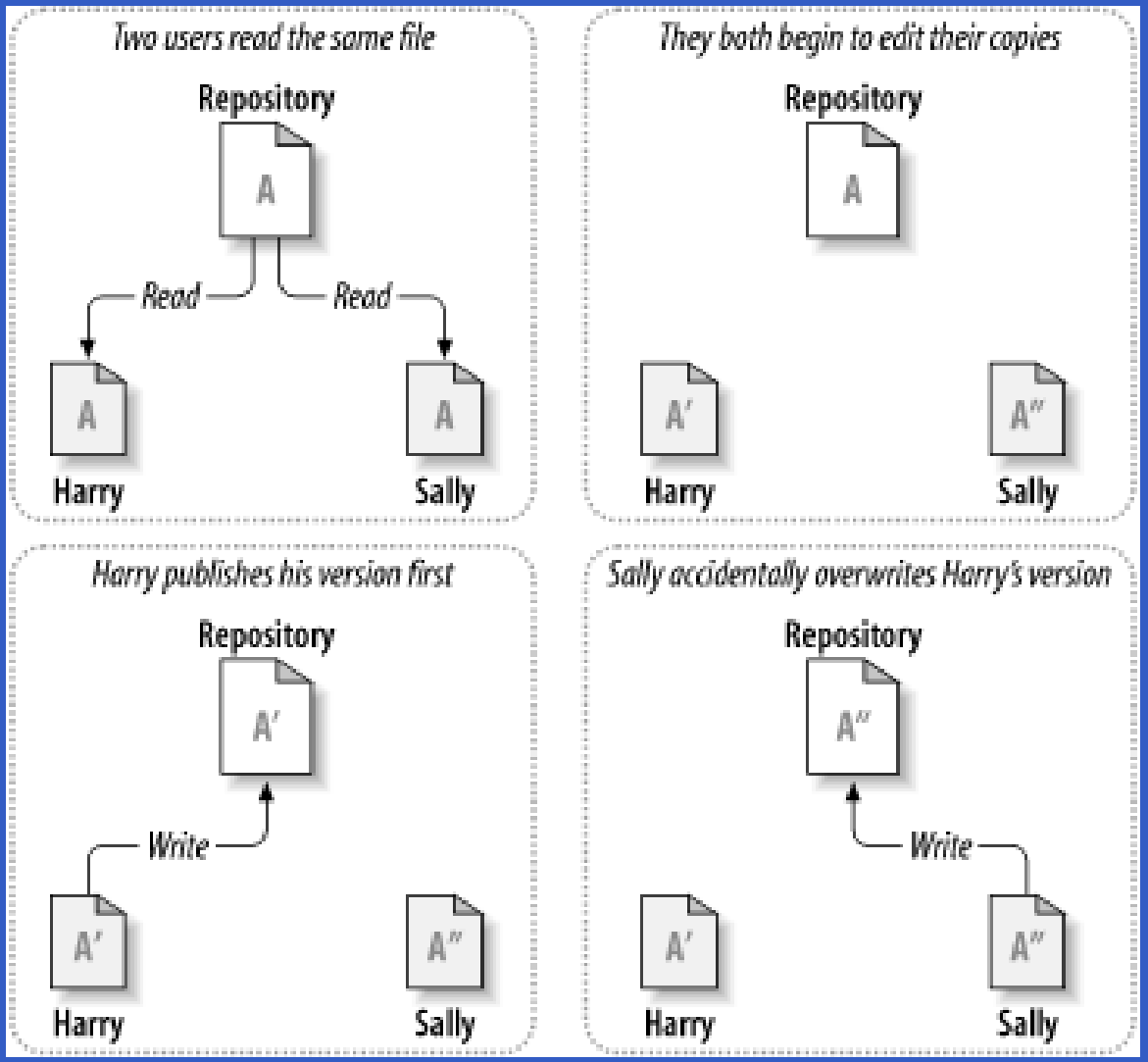
- but modern ones also provide very sophisticated support for
  - teams of programmers working on shared source and documentation
  - distributed teams of programmers (over the Internet)

Basic Model

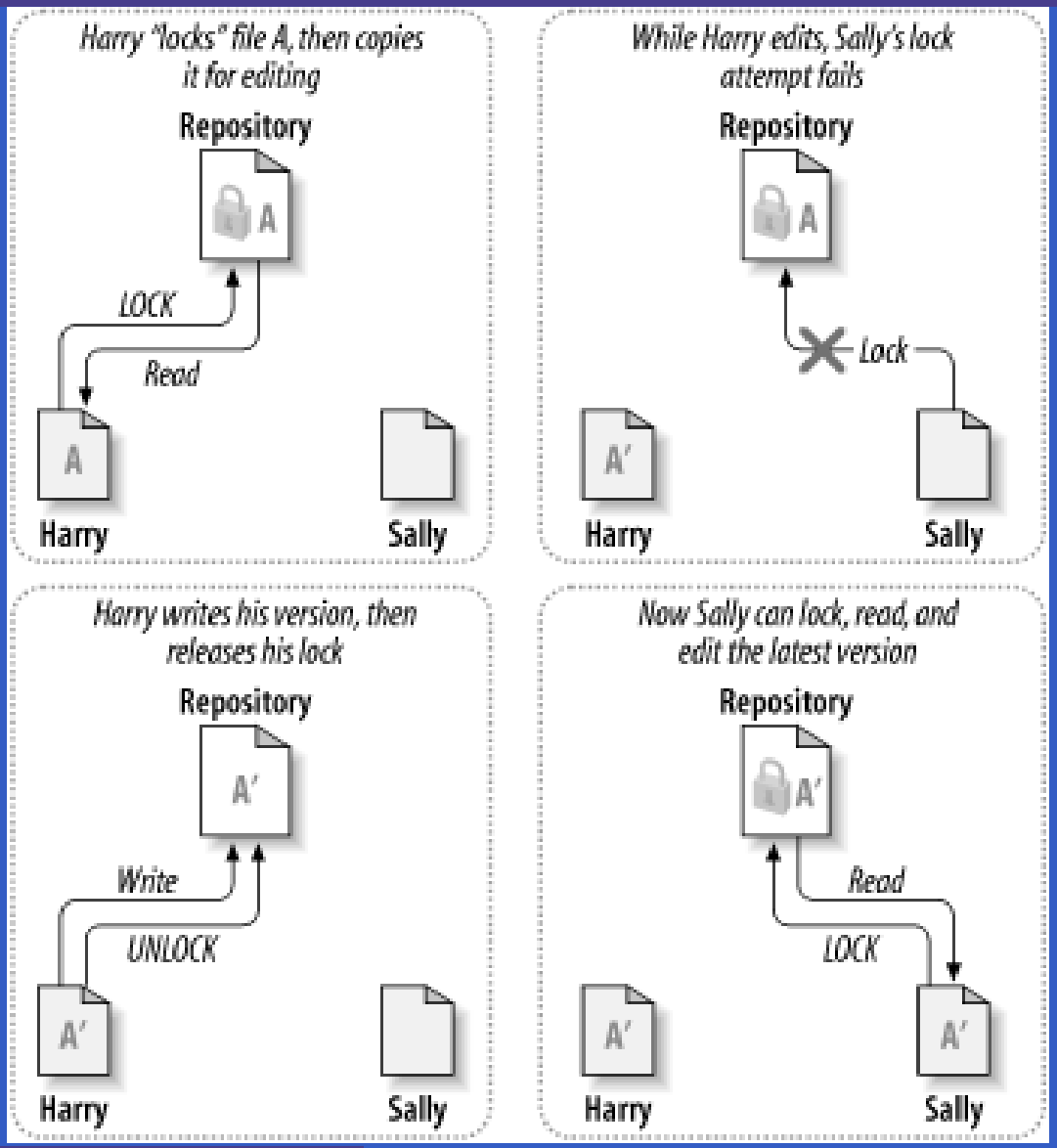


(Pictures from Collins-Sussman, Fitzpatrick, Pilato: Version Control with Subversion.)

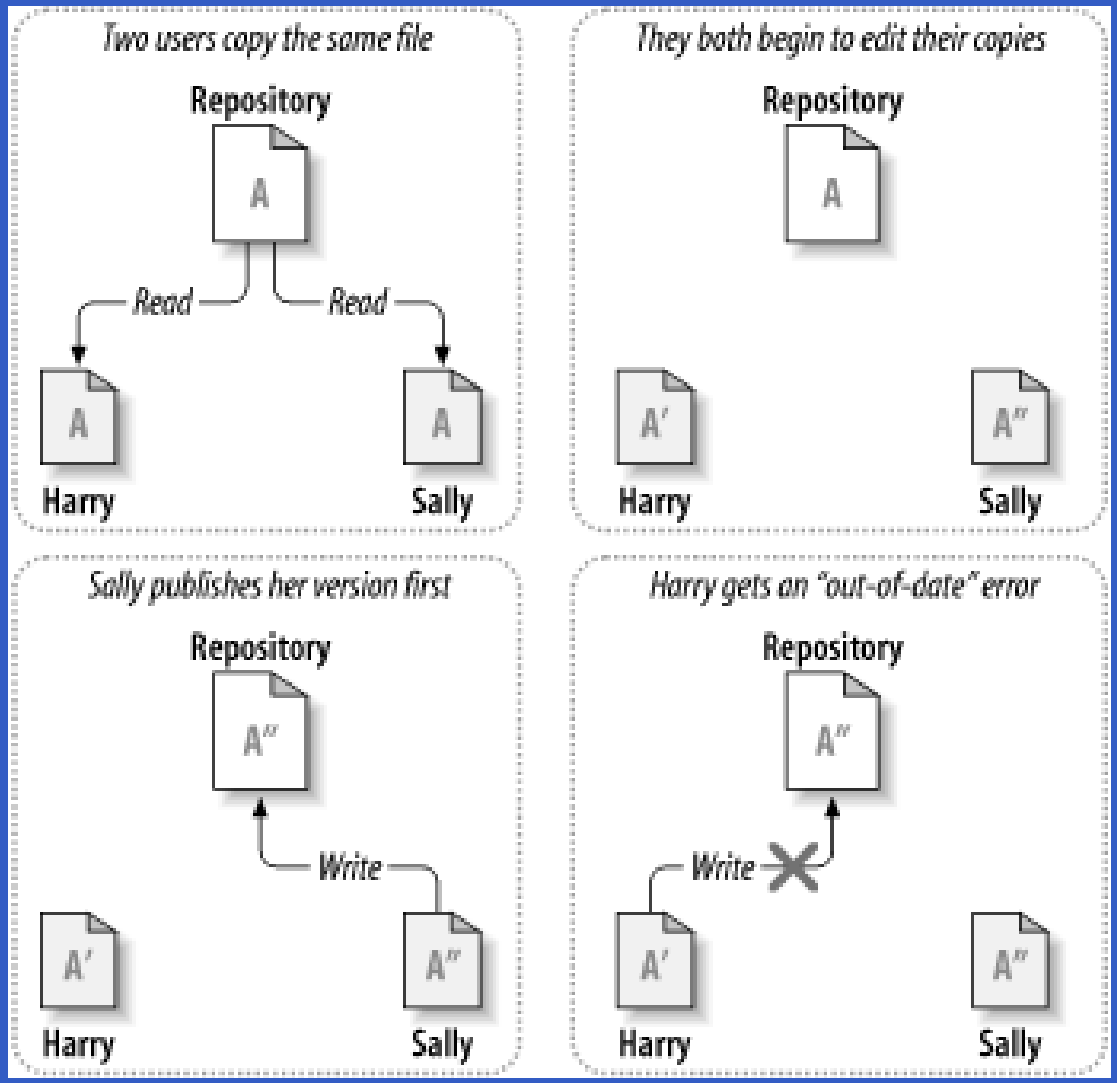
The Problem to Avoid



The Lock, Modify, Unlock Model



The Copy, Modify, Merge Model (1)



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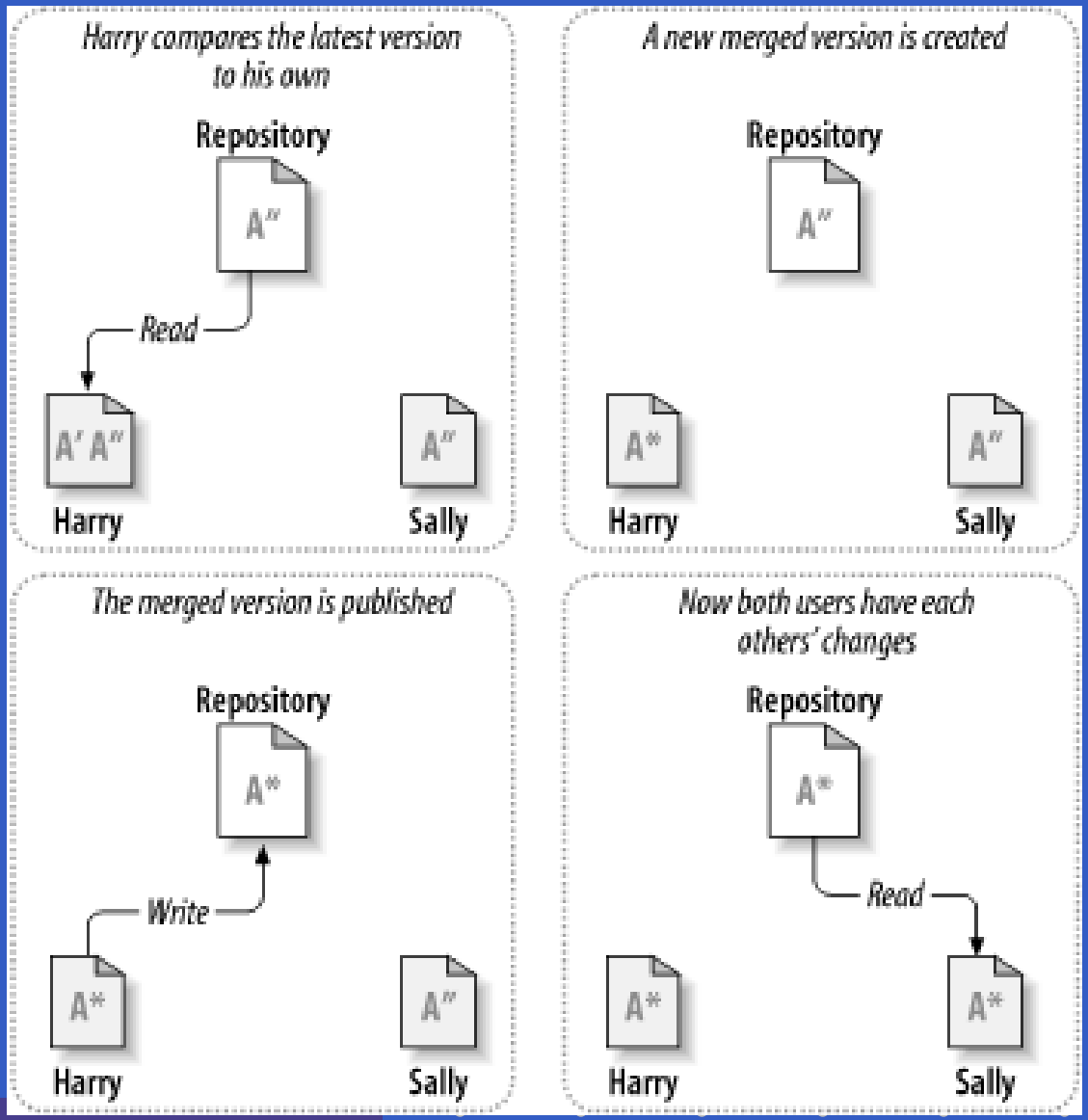

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- facilities for supporting parallel, non-interfering development, e.g. through what ***looks*** like separate copies, . . .
- . . . while ***maximizing sharing*** and ***facilitating reintegration*** of lines of development.

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- Handles ***both*** text and binary data (like Word documents, images)
- Supports concurrent development (the Copy, Modify, Merge model), both locally and remotely (over a network).

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- Other helpful features like
  - file portability (e.g. transparent conversion between CR/LF and LF line ending conventions)
  - automation through hooks (e.g. sending e-mail after changes committed)

What Is Subversion? (3)

Main reference (freely available on-line):

Collins-Sussman, Fitzpatrick, Pilato:
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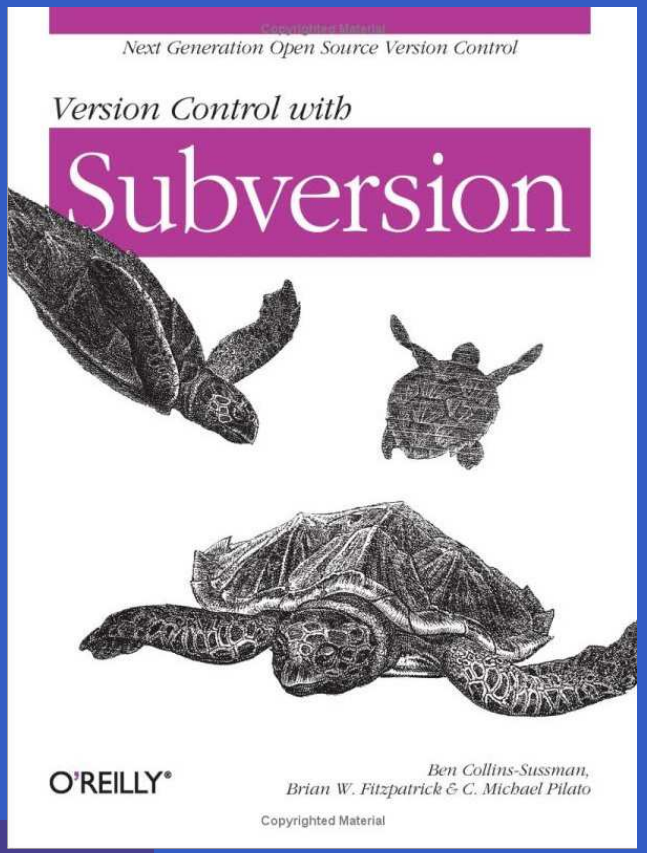
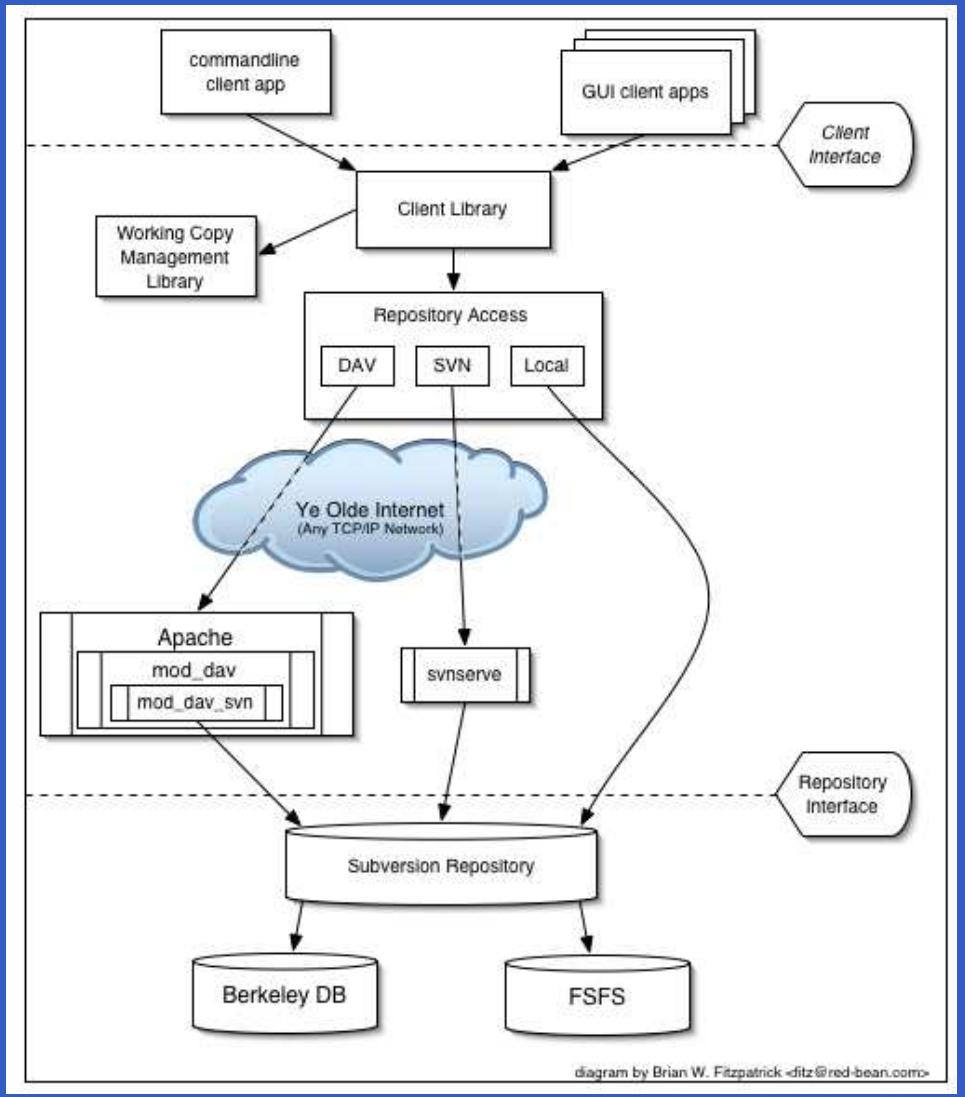


Architecture of Subversion



Getting Started

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- Check out a copy of the repository, e.g.:

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svn checkout \
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- Change directory: `cd gp12-nhn`.

Accessing the Repository

The command-line Subversion client is called `svn`. It has many subcommands, e.g.:

- `svn list`
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It is always possible to get help, including on specific subcommands:

- `svn help`
- `svn help copy`

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Branches and Tags are created by copying: `svn copy`

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- ***src***: for source code
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- ***src***: for source code
- ***doc***: for documentation

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AND! It is easy to change the structure later by simply moving around files and directories.

Initial Repository Structure (3)

Let's create this directory structure:

```
marian$ mkdir trunk
marian$ mkdir branches
marian$ mkdir tags
marian$ mkdir trunk/src
marian$ mkdir trunk/doc
```

Initial Repository Structure (4)

Let's tell subversion all these directories have been added:

```
marian$ svn add trunk
marian$ svn add branches
marian$ svn add tags
marian$ svn add trunk/src
marian$ svn add trunk/doc
```

Then, let's commit to the central repository:

```
marian$ svn commit
```

Checking Out a Working Copy

Now ***other*** people can check out a working copy of the relevant part of the repository:

```
svn checkout \
https://code.cs.nott.ac.uk/svn/gp12-nhn/trunk
A    trunk/doc
A    trunk/src
Checked out revision 1.
```

Adding a File (1)

Let's add a document:

```
isis-19% cd trunk/doc
isis-20% ooffice
isis-21% ls -l
-rw-r--r-- 1 henrik henrik 8192 Oct 23 01:45
    design.doc
```

The location of the repository is stored with the working copy, so Subversion commands can now be given without giving the repository URL:

```
isis-49% svn status
?      design.doc
```

Adding a File (2)

The status “?” indicates something which is unknown to Subversion. We need to tell Subversion about it:

```
isis-50% svn add design.doc
A  (bin)  design.doc
```

Important! The new document is now added to the ***local working copy***. But it (and other changes) will not be propagated to the central repository until we explicitly perform a ***commit***.

```
isis-51% svn status
A       design.doc
```

Adding a File (3)

Subversion correctly determined that our document is a ***binary*** file. (Could have been configured otherwise.)

```
isis-52% svn proplist design.doc
Properties on 'design.doc':
  svn:mime-type
isis-53% svn propget svn:mime-type \
  design.doc
application/octet-stream
```

Adding a Directory

It is equally easy to add directories:

```
isis-54% mkdir Meeting-2012-10-23
isis-55% svn add Meeting-2012-10-23
A         Meeting-2012-10-23
isis-56% emacs Meeting-2012-10-23/ideas.txt
isis-57% svn add Meeting-2012-10-23/ideas.txt
A         Meeting-2012-10-23/ideas.txt
isis-58% svn status
A       design.doc
A       Meeting-2012-10-23
A       Meeting-2012-10-23/ideas.txt
```

Or use `svn mkdir`.

Committing

Time to propagate the changes to the central repository:

```
isis-59% svn commit \
   -m "System design and ideas from meeting 23 Oct"
Adding          doc/design.doc
Adding          doc/Meeting-2012-10-23
Adding          doc/Meeting-2012-10-23/ideas.txt
Transmitting file data .
Committed revision 2.
```

Making Changes

Let's assume a few typos in the design are fixed:

```
isis-65% svn status
M       design.doc
isis-66% svn commit -m "Fixed typos"
Sending        doc/design.doc
Transmitting file data .
Committed revision 3.
```

Propagating Changes (1)

Assume someone else makes changes and commits. We can check the status against the repository and get log entries

```
isis-70% svn status -u
       *         2   design.doc
Status against revision:      3
isis-70% svn log -r 3 design.doc
------------------------------------------------------------------------
r3 | nhn | 2012-10-24 09:51:00 +0100 (Wed, 24 Oct 201

Fixed typos
------------------------------------------------------------------------
```

Propagating Changes (2)

Let’s bring our working copy up-to-date:

```
isis-71% svn update
U    design.doc
Updated to revision 3.
```

In general, it is good practice to to bring everything up-to-date before starting to make any changes. Minimizes the risk of conflicts.

Conflicts (1)

What if someone else has commited changes before I commit?

Conflict! Text files can, however, be merged.

```
isis-92% svn commit
Sending        Meeting-2012-10-23/ideas.txt
Transmitting file data .svn: Commit failed (details f
isis-83% svn update
C    ideas.txt
Updated to revision 7.
```

Conflicts (2)

The differences are marked in the file. Edit as necessary. Then:

```
isis-93% svn resolved idead.txt
Resolved conflicted state of 'ideas.txt'
isis-94% svn commit
```

(Newer versions has a more sophisticated `svn resolve` command.)

Other useful Subversion commands

Some other commands:

- `svn delete`
- `svn copy`
- `svn diff`
- `svn revert`
- `svn lock`
- `svn unlock`

Be sure to read at least the introductory chapters of the Subversion book (very accessible) and do use `svn help`!