Introduction to Subversion

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January 5, 2016

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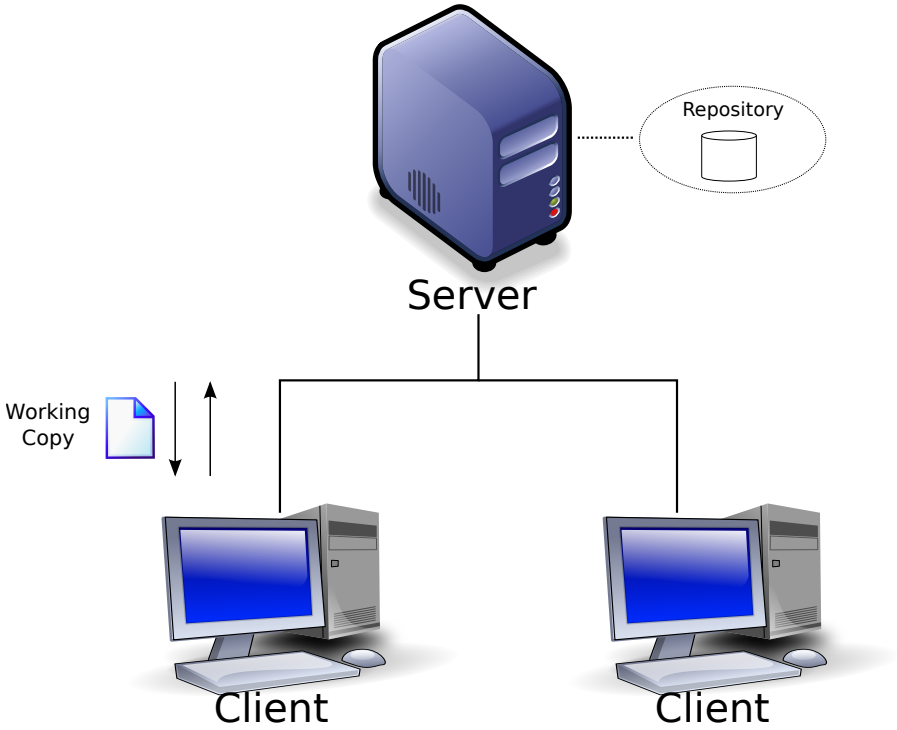
What is version control?

- Version control systems keep track of all changes made to files in a project
- Users can review and undo changes
- Allows several people to work on project:
  - Mutually exclusive changes are automatically merged
  - Changes which clash do not result in someone's changes being automatically

How does Subversion work?

- Subversion stores all changes made to a project on in a database called a *repository*
- A user wanting to work downloads the latest version of the project to their computer - this is called the local *working copy*
- When the user is done making changes to the project, they *commit* their changes to the repository

- The computer which stores and manages this repository is called the *server*
- The computer that downloads a project from a repository, and submits changes is called a *client*
- The server and client may be the same computer



- When changes are commited to the repository, the global *revision number* for the repository is incremented by one.

Creating a repository

- Run the following commands in your home directory:

```
mkdir svn                # Make directory to store repository
svnadmin create svn # Create repository in directory
```

- This creates an empty repository in the directory svn

Importing a project

- Go to your project directory and delete any files that shouldn't be versioned

```
cd my_project
rm -f *.o *~      # Remove binary and backup files
```

- Run the following command to add this project to the repository:

```
svn import file:///home/jamie/svn/my_project/trunk /
          -m 'Initial import'
```

- The prefix `file://` specifies the path of a repository on the local machine
- The `my_project/trunk` specifies the virtual location in the repository where the project resides
- It is conventional to put the working files of a project in a directory called trunk but this is not required
- The `-m` flag specifies a required log for the activity

Checking-out a project

- The project in `my_project` is not under version-control
- To get a version-controlled copy you must check the project out of the repository:

```
mv my_project my_project_temp # rename current copy
svn checkout file:///home/jamie/svn/my_project/trunk
          / my_project # Checkout project
```

- The second argument of `svn checkout` specifies where the project should be checked out to
- Once you have verified that the project has been successfully downloaded from the repository you can delete the old copy:

```
  rm -rf my_project_temp
```

Basic Work Cycle

1. Update working copy
   - svn update
2. Make changes to files
   - svn add
   - svn rm
   - svn cp
   - svn mv
3. Examine your changes
   - svn status
   - svn diff
4. Possibly undo changes
   - svn revert
5. Resolve conflicts
   - svn update
   - svn resolve
6. Commit your changes
   - svn commit

Updating working copy

- If you keep working copies of your project on multiple computers, it is important that you update your working copy before you begin modifying it to avoid conflicts.
- Use the following command to do this:

```
svn update
```

Adding, moving, copying etc.

- To add a new file to the repository use `svn add`:

```
svn add wavelet.cpp    # add wavelet.cpp to repository
```

- To delete a file use `svn rm`

```
svn rm gibbs_sampler.R # delete gibbs_sampler.R
                       # and remove from repository
```

- To move a file or change its name use `svn mv`
- To add a new directory to repository use `svn mkdir`

```
svn mkdir include/ # create new directory include
                   # and add to repository
```

- Note that the svn `rm`, `mv` and `mkdir` subcommands work just like the corresponding unix commands.

- In the preceding examples, the svn commands act immediately on local working copy but are not propagated to the repository until the next commit.
- Some svn subcommands (including the four above) can be used with URLs to the repository, rather than local paths.

```
svn mkdir svn://193.113.58.233/wsd_calc/branches
          -m 'Created branches directory'
svn cp svn://193.113.58.233/wsd_calc/trunk
       svn://193.113.58.233/wsd_calc/branches/my_branch
       -m 'Copied trunk to a new branch'
```

- In this case, the changes are made directly on the repository.

Examining changes

- The exact differences between two versions of a file can examined using the `svn diff` command:

```
svn diff Makefile   # Compare working copy of
                    # Makefile to base version
svn diff filter.py -r 205:225 # Compare version 225
                               # with version 205
                               # of plotter.py
```

- To see a list of files which have changed since the last commit use `svn status`
- The output uses the following code:

M	File has been modified
A	File has been added
R	File has been removed
C	File in state of conflict
?	Unknown file

Viewing logs

- Logs from commits can be viewed using the `svn log` command:

```
svn log changepoints.M # View all logs for changepoints.
svn log changepoints.M -r 13:PREV
        # View log from revision 13 to previous commit
```

Undoing working changes

- To undo changes made to your local working copy use `svn revert`

```
svn revert bandits.h  # undo changes to bandits.h
```

- Note that this command only changes files in your working copy and not the repository

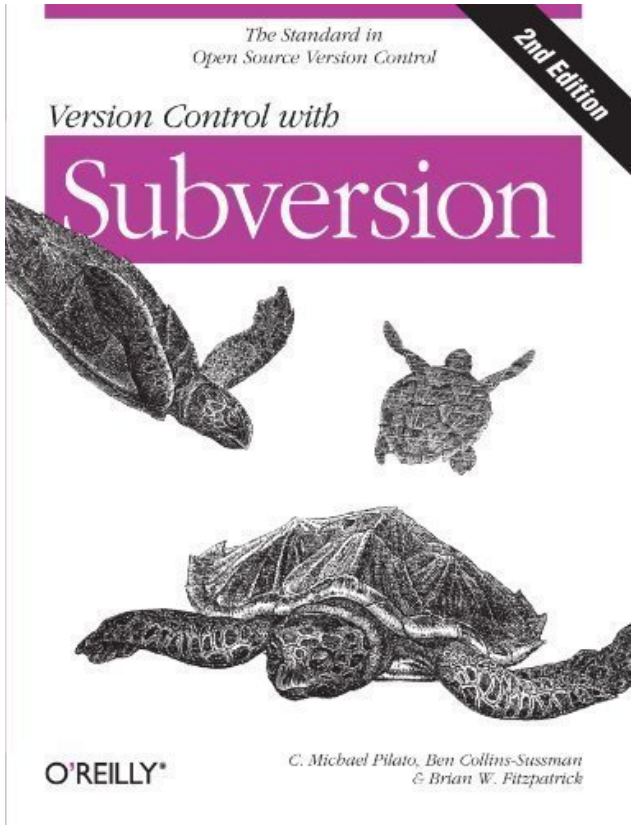
Commiting changes to repository

- When you are done making changes to your local copy, you should commit them to the repository:

```
svn commit  # Commit all changed files in working copy
svn commit file1 file2 # Commit only file1 and file2
```

- Any conflicts with the repository will be flagged up at this point

Getting help

- For a list of all available subcommands run `svn help`
- For usage information on a particular subcommand run `svn help subcommand`

- The book "Version Control with Subversion" published by O'reilly is recommended
- This is freely available online at `http://svnbook.red-bean.com/`