Introduction to Version Control

Ralf Hemmecke

Research Institute for Symbolic Computation
Johannes Kepler University Linz, Austria

Outline

1. General Remarks about Version Control
2. Central Development with Subversion
3. Collaboration Using Subversion

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Old Style

- Files are in a directory
- lots of backup files
- ordered by manual version number or manual date or ???

```
/home/hemmecke/myproject/
               myproject/myproject-1.0/
               myproject/myproject-1.2/
               myproject/myproject-20061014.tar.gz
               myproject/myproject-20061117.tar.gz
               myproject/myproject-20061122.tar.gz
```

- generated files like .dvi, .ps etc. are also stored
- HD space is cheap, but manual administration costs time

New Style

Source Code Management systems

Use an SCM system to store versioned files and history in a (central) repository and have one or several working copies.

Common use cases for SCM systems

Source Code Management can be beneficial for

- single user
  - keep history and evolution of files
  - doing work on different machines
  - develop a program with several releases
- multiple user
  - writing a joint article with other authors
  - develop a program in a group

Free Source Code Management Systems

- for central development
  - RCS (Revision Control System)
  - CVS (Concurrent Versions System
  - Subversion (SVN)
- for distributed development
  - SVK (uses SVN as backend)
  - GNU Arch, Bazaar-NG (used for Ubuntu)
  - Git (used for Linux kernel)
  - Mercurial (used for Sage)
  - Darcs

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Subversion Repository

The Repository can be considered as a collection of snapshots of the file system together with dates and log information.

Central Development with Subversion

Create Working Copy from Repository

svn checkout file:///home/hemmecke/SVNREPOSITORY/HOME myhome

Update the Working Copy from Repository

svn update

Put Modified Data Back into Repository

svn commit

File System Commands

Introduce a new File or Directory

```
svn add myfile.tex
svn mkdir mydir
```

Remove Files

```
svn delete foo.c
```

Move Files Around

```
svn cp SOURCE TARGET
svn mv SOURCE TARGET
```

Undo Local Modifications

```
svn revert
```

Getting Information

Help

svn help

Location Information

svn info

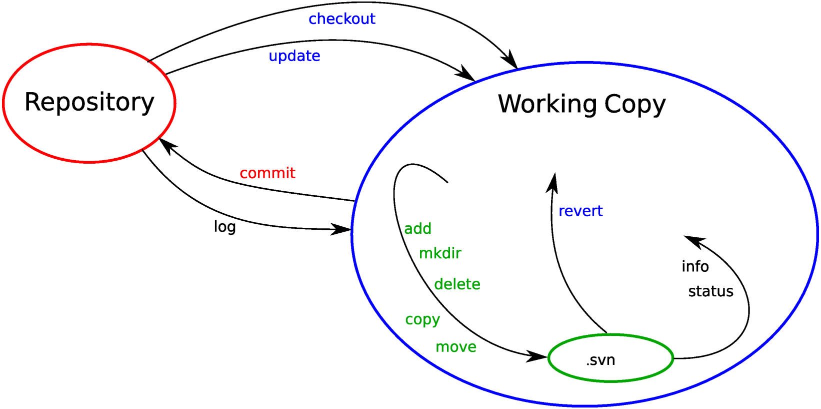
History

svn log -v

What is the Current Situation

svn status

Summary


checkout
update
Repository
Working Copy
commit
log
add
mkdir
delete
copy
move
revert
info
status
.svn

Creation of Subversion Repository

- On svn.risc.uni-linz.ac.at invoke:

```
cd /home_local/svn/hemmecke
svnadmin create --fs-type fsfs REPOSITORYDIR
```

- On your local computer invoke:

```
cd
svnadmin create --fs-type fsfs MyRepo
```

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Initial Situation

- Three people intend to jointly write an article about magic rings.
- They decide to use LaTeX.
- They want to use a central SVN repository to keep track of the changes.

Example Workflow (Hemmecke)

Provide a frame for the article together with an initial abstract and a Makefile to compile the file.

```
cd scratch
mkdir MR
emacs Makefile magicrings.tex
cd
umask 007
svnadmin create --fs-type fsfs MyRepo
svn import scratch/MR file:///home/hemmecke/MyRepo/MagicRings
```

Example Workflow (Baggins)

Explain what magic rings are.

```
svn co file:///home/hemmecke/MyRepo/MagicRings MagicRings
cd MagicRings
emacs magicrings.tex
svn status
```

Forgot to checkin before going to an important meeting.

Example Workflow (Potter)

Write a section about how to forge magic rings.

```
svn co file:///home/hemmecke/MyRepo/MagicRings MagicRings
cd MagicRings
emacs magicrings.tex
svn status
svn commit
```

Harry likes emacs more, so he sets a variable for the next commit.

```
export SVN_EDITOR=emacs
```

Example Workflow (Baggins)

Comes back from the meeting and wants to commit the definition of magic rings.
BTW, Bilbo also likes emacs.

```
export SVN_EDITOR=emacs
svn commit # fails
svn status
svn update
svn diff
svn info
svn diff -r1:2
svn commit
```

Example Workflow (Hemmecke)

Each article should have an introduction.

```
svn log file:///home/hemmecke/MyRepo/
svn co file:///home/hemmecke/MyRepo/MagicRings MagicRings
cd MagicRings
emacs magicrings.tex
svn status
svn commit
```

Of course, magic rings must have a multiplication.

```
emacs magicrings.tex
svn commit
svn blame
```

Example Workflow (Hemmecke)

Find out who did the latest changes.

```
svn blame
svn log -v
```

Subversion Documentation

- The official book

  `http://svnbook.red-bean.com/`
- Subversion Homepage

  `http://subversion.tigris.org`