Version Control

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1.   Version Control Systems

- CVS
- BitKeeper
- Arch
- Subversion
- SVK

2. CVS

2.1. History

- started in 1986 as a bunch of shell scripts for RCS
- algorithms remain as a basis for the C program

2.2. Features

- Concurrent editing
- Directory tree storage
- Source code stored in a centralized repository
- Branches and tags
- Plain text repository format

2.3. Disadvantages

- Bad support for binaries or symlinks.
- Can't move, copy, or delete files in the repository
- No atomic commits.

3.   BitKeeper

3.1.   Features

- Distributed source code management.
- Concept of changesets that is bigger than commits.
- Some GUI features built in.

3.2.   Disadvantages

- Not free as in speech.
- Free as in beer to anyone willing to use Open Logging.

Linus uses this for kernel development.

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4.   Arch

4.1.   Features

- Changesets
- Distributed source code management.
- No particular preference for a given filesystem or protocol.

4.2.   Disadvantages

- Very rigid repository structure.
- I think it's really difficult to learn
- Many more commands needed to do things that Subversion does automatically.

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5.   Subversion

- Learn from the net's experience of 10 years with CVS.
- Works a lot like CVS, with most obvious deficiencies gone.
- Most flexible.
- Also called by its command-name `svn`.

5.1.   Features

- Centralized repository.
- Move, copy, delete files.
- Constant space and time copies
- Binary files
- Symlinks in client 1.1 or later
- No explicit branching and tagging features.

6.   SVN Repository Layout

- project-name
  - trunk
  - branches
    * branch-1
    * branch-2
  - tags
    * tag-1
    * tag-2

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7.   SVK

- Originally called SubversionKeeper.

- Decentralized features of arch and BitKeeper.

- Simpler repository structure than arch.

- Use with Subversion, CVS, Perforce servers without special server-side support

- Horrible documentation.

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8.   Using Subversion

8.1.   Subversion commands

Creating a repository: `svnadmin create <path>`
Importing files: `svn import <path> <URL>`
Checking out a directory: `svn checkout <URL>`
Adding a file   `svn add <path>`
Committing changes   `svn commit`
Updating working directory   `svn update`
Merge from one branch into another   `svn merge`
Make branches and tags, copy files   `svn cp`
Use for backups: `svnadmin dump`

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8.2. svk commands

Most of the Subversion commands are svk commands too!

Mirror of a remote repository `svk mirror <URL> <depotpath>`

Synchronize that mirror `svk sync <depotpath>`

Merge specific commits `svk cmerge -c <revisions> \`
`<srcpath> <destpath>`

Star-merge knows what's been merged already `svk smerge`

Generate a patch file by adding the **-p** option to `smerge` or `cmerge`.

9.   Backing up

This script is called from part of a larger script that generates a backup.iso and then actually burns it.

```bash
#!/bin/bash
export R=/home/bloom_svn
LAST=$(svnlook youngest $R)
if [ -e /cdrom/subversion_latest ]; then
    FIRST=$( cat /cdrom/subversion_latest )
    FIRST=$(($FIRST + 1))
else
   FIRST=0
fi
svnadmin dump $R --deltas --incremental \
   -r${FIRST}:${LAST} > $1
echo $LAST > $2
```

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10.   At $HOME in Subversion

I keep my whole home directory (except for mail) in Subversion.

10.1.   Reasons for my setup

- Keep computers in sync
- Easy incremental backups of my documents
- Version history
- Joey Hess says: distributed backups

10.2.   Features of my setup

- Three (nonoverlapping) sets of dotfiles: `.hide`, `.home-plus`, `home-base`.
- Partial Checkouts

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10.3.   Tools (and kludges) for my setup

- `~/bin/recursive`

- `.svnfix`

- jpilot-backup

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10.3.1.   /bin/recursive

```
#!/bin/sh
echo =======
echo '* '~
cd $HOME
svn $1
for x in * .home-plus .hide; do
   if [ -e $x ] ; then
       echo =======
       echo '* '$x
       cd $x && svn $1
       cd $HOME
   fi
done
```

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10.3.2. .svnfix

Lives in `.home-plus` and `.hide`

- Links things into their appropriate places

- fixes some permissions.

  - .ssh/authorized_keys
  - ssh secret keys
  - .fetchmailrc

- Copied from Joey Hess' svn repository at `http://svn.kitenet.net/trunk/`

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11. Where do things live in my home directory

11.1. The root

- **bin/** – I absolutely need this otherwise some things just don't work
- **hide/** – rename this to .hide after checking it out
- **hide-insecure/** – contains an SSH private key with a password
- **home-base/** – move everything here into the root of the home directory after checking out
- **home-plus/**
- **parts/**
- **research/** – this has been here since before I moved everything to Subversion.

12.   Resources

- http://subversion.tigris.org/ – Subversion

- http://svnbook.red-bean.com/ – Subversion Book

- http://svk.elixus.org/ – SVK

- http://www.kitenet.net/~joey/cvshome.html
  – The original article "At $HOME in CVS"

- http://www.kitenet.net/~joey/svnhome.html
  – Joey's new article posted after I agreed to do this talk.

- http://better-scm.berlios.de/comparison/comparison.html
  – A comparison of source code management systems