Subversion

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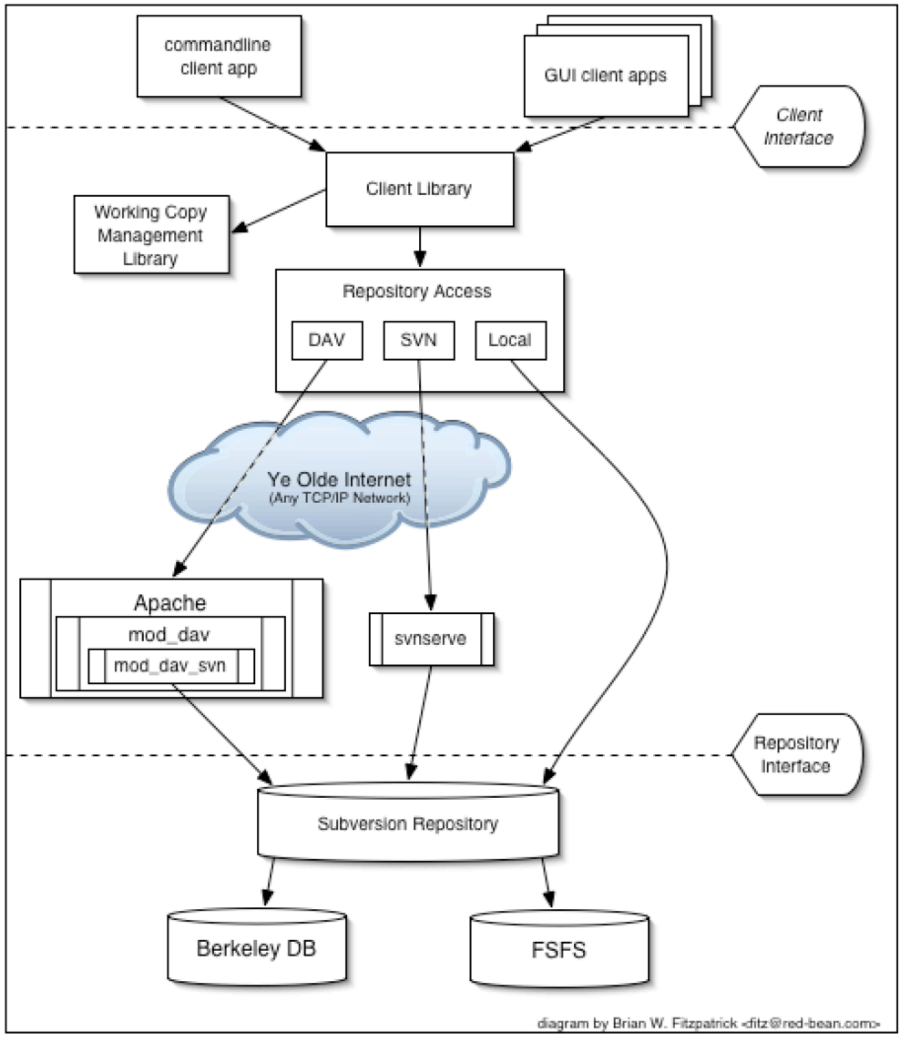
About Subversion

- Subversion
  - A free/open source version control system
  - A typical client-server model
  - Uses the copy-modify-merge strategy
- History
  - Founded in 2000 by CollabNet, Inc. as a successor to CVS
  - Became a top-level Apache project on February 17, 2010
  - http://subversion.apache.org/

Subversion's Architecture

- A layered design
  - Repository Layer
  - Repository Access Layer
  - Client Layer



Subversion' s Architecture

- A modular design
  - Implemented as a collection of libraries written in C
  - Each library has a well-defined purpose and application programming interface (API)
  - SVNKit vs. JavaHL
    - JavaHL is the Java language binding provided by the Subversion project. Based on it, the Subversion libraries can also be used by Java applications.
    - SVNKit is a pure Java implementation of the protocols used by Subversion, and does not use the Subversion libraries.

Using Subversion

- Subversion Repository URLs
- Working Copies
- Revisions
- Repository Administration
- Basic Usage
- Subclipse

Subversion Repository URLs

Schema	Access method
file:///	Direct repository access (on local disk)
http://	Access via WebDAV protocol to Subversion-aware Apache server
https://	Same as http://, but with SSL encryption.
svn://	Access via custom protocol to a svnserve server
svn+ssh://	Same as svn://, but through an SSH tunnel.

- A Subversion URL uses forward slashes on all platforms, including Windows.
  - file:///var/svn/repos
  - file:///C:/var/svn/repos
  - svn://host/svn/repos

Working Copies

- A private copy of the project for you
- Also contains some extra files, created and maintained by Subversion: the .svn folder
  - Which files contain unpublished changes
  - which files are out of date with respect to others' work
  - The .svn folder only exists in the topmost directory of a working copy from Subversion 1.7. In previous versions, it exists in every versioned subdirectory.
- Created by the checkout operation

Revisions

- Each time the repository accepts a commit, this creates a new state of the file system tree, called a *revision.*
- Global Revision Numbers
  - Subversion's revision numbers apply to entire trees, not individual files
  - Revision N represents the state of the repository file system after the Nth commit
- Mixed Revision Working Copies
  - Every commit only increases the revision of the committed file.
  - Your working copy may contain files from several different revisions after several commits.
  - Revisions N and M of a file do not necessarily differ.

Repository Administration

- Choose a Data Store
  - Berkley DB vs. FSFS
  - Prior to Subversion 1.2, the default was Berkeley DB; the default is now FSFS.
- Recommended Repository Layout
  - Three folders: trunk, branches, tags
- Administrator' s Utilities
  - svnadmin
    - We will be using this one in our assignment
  - svnlook
  - svndumfilter
  - svnsync

Repository Administration

- svnadmin Usages
  - svnadmin SUBCOMMAND REPOS_PATH [ARGS & OPTIONS ...]
  - Type 'svnadmin help <subcommand>' for help on a specific subcommand.
- Examples
  - svnadmin create /home/tom/svnrepository
  - svnadmin create --fs-type bdb /home/tom/svnrepository
- Note: svnadmin is a server-side utility.
  - It is used on the machine where the repository resides.
  - The path argument to svnadmin is a regular filesystem path and not a URL.

Basic Usage: svn

- svn: the command-line client program
- General Usages
  - svn <subcommand> <options>
  - The order of the subcommand and the options may vary
  - Subcommands: add, checkout, commit, revert, …
  - Options can have two different forms
    - Long option: two hyphens followed by several letters and hyphens. (E.g. --fs-type, --verbose)
    - Short option: a single hyphen followed by a single letter (E.g. -v).
- Help!
  - svn help <subcommand>
  - Describes the syntax, options, and behavior of subcommand

Basic Usage: please note that

- svn subcommands presented in the following slides are some most popular ones.
- It is not an exhaustive list.
- The sequence of presentation follows a basic work cycle of Subversion usage.
- Refer to the svn manual (link is provided in the last slide) if you have question about how to use these subcommands.
- You should be able to use these commands after this class.

Basic Usage

- Getting data into your repository
- Getting a working copy
- Basic work cycle
  - Update your working copy
  - Make your changes
  - Review your changes
  - Fix your mistakes
  - Resolve any conflicts
  - Commit your changes

Getting data into your repository

- Command: svn import
  - Copy an unversioned tree of files into a repository and create intermediate directories as necessary.
  - Recursively **commit** a copy of PATH to URL.
  - Usage: svn import [PATH] URL
  - Example: svn import myproj http://svn.com/repos
  - To start working, you still need to svn checkout a fresh working copy of the tree.

Getting a working copy

- svn checkout
  - Check out a working copy from a repository.
  - Usage: svn checkout URL[@REV]... [PATH]
  - E.g. svn checkout file:///var/svn/repos/test mine
  - If "PATH" information is not provided, svn checkout will create a working copy in a directory named for the final component of the checkout URL ("test" in the above example).
  - If the local directory you specify does not yet exist, svn checkout will create it for you.

Basic work cycle

- Update your working copy
  - Involved command: **svn update**.
- Make your changes
  - Involved commands: **svn add**, **svn delete**, **svn mkdir**.
- Review your changes
  - Involved commands: **svn status**, **svn diff**.
- Fix your mistakes
  - Involved command: **svn revert**.
- Resolve any conflicts (merge others' changes)
  - Involved commands: **svn update**, **svn resolve**.
- Commit your changes: **svn commit**.

Update your working copy

- It is a good practice to keep in touch with the repository (update often).
- Command: svn update
  - Bring your working copy into sync with the latest version in the repository.
  - Resolves mixed revision working copies.
  - Usage: svn update [PATH...]
  - E.g. svn update

Making your changes

- Two kinds of changes: file changes and directory changes.
- You must tell Subversion about every directory change that you do by using the provided commands.
- Command: svn add
  - Schedule the file or directory to be added to the repository.
  - Will be reflected to the repository in next commit.
  - Usage: svn add PATH... (e.g. svn add testdir)
- Command: svn delete (E.g. svn delete testdir)
- Command: svn copy (E.g. svn copy testdir testdirCopy)
- Command: svn move (E.g. svn move testdir newdir)
- Command: svn mkdir (E.g. svn mkdir testdir)
  - Same as: mkdir testdir; svn add testdir

Review your changes

- See an overview of your changes: svn status – one of most popular svn commands
  - svn status –verbose (-v): shows the status of every item in your working copy
    - One column shows the working revision of the item.
    - Another column shows the revision in which the item last changed.
- Examine the details of your local modifications: svn diff
  - The svn diff command displays differences in file content, with each line of text pre-fixed with a single-character code.
    - A space: unchanged.
    - A minus sign: how the line looked **before** the modifications.
    - A plus: how the line looked **after** the modifications..

Fix your mistakes

- svn revert
  - Undo all local edits, and revert the file to its pre-modified state by overwriting it with the *pristine* version of the file.
    - The pristine version is the version that the user checked out from the repository without making any changes.
  - Usage: svn revert PATH...
  - E.g. svn revert foo.c

Resolve any conflicts

- When you run svn update, you may see conflict information displayed.
  - "Conflict discovered in xxx …"
- If conflict exists, you will be given several options to resolve the conflict. Overall, they can be classified as
  - Viewing conflicts
    - Display all changes or all conflicts (df or dc)
  - Resolving conflicts
    - Edit merged file in an editor (e)
    - Accept my version for all conflicts or entire file. (mc or mf)
    - Accept their version for all conflicts or entire file. (tc or tf)
  - Postponing conflicts resolution
    - Mark the conflict to be resolved later (p)

Resolve any conflicts

- When postponing conflict resolution, three things will happen.
  - Subversion prints a C during the update
  - Subversion places conflict markers into the file to highlight the overlapping areas.
  - For every conflicted file, Subversion creates three temporary files for it
    - Filename.mine, filename.rOLDREV, filename.rNEWREV
- Revolve by hand
- After the conflicts are resolved
  - svn resolve –accept working filename
  - As a result, the temporary files will be removed and the file becomes commit-able.

Commit your changes

- It is a good practice to explain your commits completely.
- Command: svn commit
  - Send changes from your working copy to the repository.
  - Usage: svn commit [PATH...]
  - E.g. svn commit -m "added howto section."
  - If you did not specify the message, Subversion will automatically launch your editor for composing a log message.

Additional useful commands

- Command: svn log
  - Shows information about the history of a working copy.
  - You can also examine the history of a single file or directory.
  - svn log foo.c
  - svn log http://foo.com/svn/trunk/code/foo.c
- Command: svn list
  - Shows what files are in a repository directory without actually downloading the files to your local machine.
  - svn list http://svn.example.com/repo/project
  - svn list –v http://svn.example.com/repo/project

Subclipse

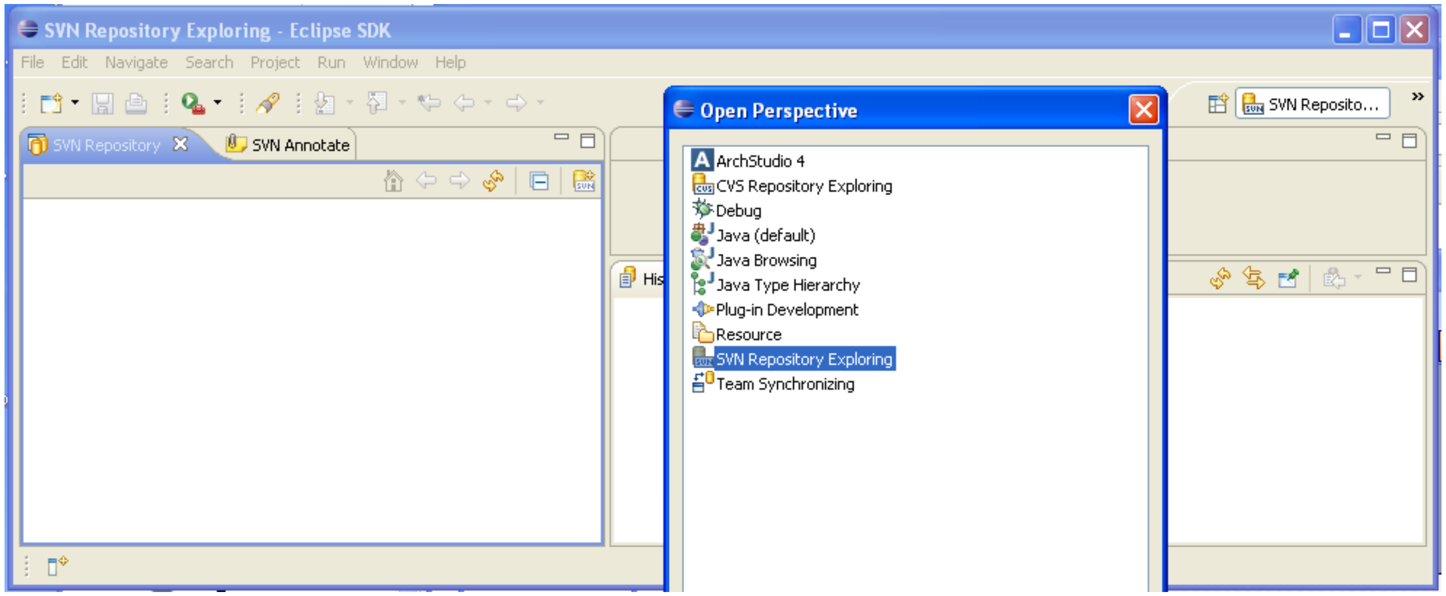
- It is an Eclipse plug-in
- It aims to provide all Subversion functionality to the Eclipse development environment.
- It is an open source project: http://subclipse.tigris.org/

Install Subclipse

- Follow the instructions here: http://subclipse.tigris.org/servlets/ProjectProcess?pageID=p4wYuA
- Installation Considerations
  - Update site
    - http://subclipse.tigris.org/update_1.6.x
  - Please, select all the components during the installation:

Install Subclipse - Verification

- To see the Subeclipse Perspective: go to Window->Open Perspective->Others->SVN Repository Exploring



Reference

- Please read Chapter 2 of the book "Version Control with Subversion".