Beginning System Administration DeCal

Week 3

February 22, 2010

What is a shell?

- Just another program
- Allows you to interact with the filesytem
- Allows you to run other programs
- Provides a compact programming environment for task automation

Brief background

- Thompson shell (`sh`), Ken Thompson (1971)
- Bourne shell (Also `sh`), Stephen Bourne (1977)
- Bourne-again shell (`bash`), Brian Fox (1987)
- Other popular ones are `csh` (Improved to `tcsh`), `ksh`, `zsh`.
- Not restricted to command line, can be GUI also!

Basic Navigation

- `cd` - change directory
- `ls` - list directory contents
- `pwd` - print working directory
- `mkdir` - make an emtpy directory
- `rmdir` - remove an empty directory

Review

- Checked where we were in the filesystem with `pwd`
- Created a directory with `mkdir`
- Entered the directory with `cd` and created subdirectories with `mkdir`
- Deleted a subdirectory with `rmdir` or `rm -r`
- Returned to our home directory with `cd` (No arguments).

Moving Things Around

- `touch` - used to create empty file/update file timestamp
- `cp` - copy
- `mv` - move
- `rm` - remove
- `scp` - secure copy
- `rsync` - remote synchronize

Keep it Simple

- Chain small simple programs together to do something bigger
- The shell uses **pipes** ('|') to chain programs together
- Takes the output of one command and use as input to another command
- For instance, `cat foo.txt | wc -l` reports the number of lines in the file `foo.txt`.

Redirection

- Programs have two standard output file descriptors: `stdout` and `stderr`
- As well as one standard input file descriptor: `stdin`.
- You can control where the flow of these descriptors.
- Ex] `ls -l > foo.txt` produces a file named `foo.txt` with detailed information about the contents of the current directory.

Permissions

- UNIX systems use 3 groups of permissions: `user`, `group`, `other`.
- For each group, there are three permissions: `read`, `write`, `execute`
- `read`: 4, `write`: 2, `execute`: 1
- The permission is based on adding up the permission values and the position tells which group the permission is applied to.
- For directories, the execute permission allows for the traversal of the directory.
- Change the permissions of a file with something like `chmod 644 file`.

Links

- Links are like shortcuts to other files or directories.
- Two kinds of links: symbolic/soft links, hard links.
- Symbolic links are references to the original file.
- Hard links are additional links to the original file.

Reminder

- Be sure to read the Notes for more in depth explainations and additional useful commands.
- Questions?