

Basic Linux/Unix Commands in Using HPC Cluster

1. Login and manage your account

- Remote login: ssh, SGD portal or through MobileVisLab
- Check your disk quota: `hpc s`
- `~` is equivalent to HPC home directory `/home/svu/<UID>`
- Common workspace directory: `/hptctmp2`
- Grace period for files in the common workspace directory
 - `/home/svu/<UID>`: permanent (snapshots for last 7 days)
 - `/hptctmp2`: 60 days (no backup/snapshots)
- file system in the hosts: `df -h`
- Disk usage for certain directory: `du -ms` (reporting in MB)

2. On line reference manual:

- `man -k <KEYWORDS>`
- `apropos <KEYWORDS>`
- `man <COMMAND>`
- `whatis`: describe what a command is.

3. ls: list contents of directory

- l List in long format
- a List all entries
- t Sort by time stamp instead of by name.
- F Put a slash (/) asterisk (*) an equal sign (=) (@)
- i list the inode number

* you can have several options at the same time. E.g. `ls -ltr`

4. Display the content of file

- `more`: browse a text file in the command line terminal
- `less`: the opposite of `more` and with search a pattern or forward or backward

using /pattern or ?pattern.

- cat: concatenate and print file onto the terminal.
- vi(-R), view: screen oriented display editor.
- nano: simple text editor like a notepad in Windows.
- tail: tail -n (from the end) +n (from the beginning) (only one file)
- head: head -n (with more than 3 files here)

5. Directory management

- mkdir: make a new directory
- rmdir: remove directory
- rm -r: recursively remove directory and the files inside
- cd <Enter>: to user's home directory
- cd .. : to one directory-level higher in the directory tree
- cd / : to root directory
- cd DIR1: to directory DIR1
- cd /hpctmp2/ccev711: to the "ccev711" directory under working space /hpctmp2
- pwd: show path of the current directory

6. Copy, move, remove files or directories

- mv -i file1 file2
- rm file (wildcat)
 - i turn interactive promoting (applicable to cp and mv)
 - f force to remove files
- cp file1 file2
 - i interactive
 - f force
 - r copy directories recursively
 - R recursively
 - p keep the date of the file

7. Change the attribute of files and directories

- chmod ugo+rwx filename

- `chmod ugo-rwx filename`
- `chown user:group filename`
- `chgrp group filename`
- Recursively change permission: `chmod -R u+rwx dir`

8. Meta-characters & Special Characters

- ? one character except back and tab
- * zero or more character
- [] a range of characters
- \$ used to print the value of a variables
- ~ abbreviation for a user's home directory

9. Redirect your output

- < > redirection operator
- | pipe operator
- >> to append
- >& redirect the error message into the standard output
- >! to overwrite the output file

10. Process monitor and session control

- `Ctrl Z` (suspend the current jobs)
- `fg pid`: run a job in foreground
- `bg pid`: run a job in background
- `top`: most CPU-intensive processes currently running
- `ps -ef |grep <STRING>`: to check the status of a process
- `kill -9 <PID>`: kill a process
- `time <COMMAND>`: time a command execution

11. Link files and directory

- hard link: `ln file1 (path)file2` (have the same inode, in same file system)
- soft link: `ln -s file1 (path)file2`
- list link information: `ls -il`

- first character is l for softlink
- link count for hard link is 2, soft link is 1

12. Find file in a directory

- find path-name-list options expression
 - name: True if file matches the current filename
 - user username: True if the file belongs to the user uname.
 - print: always true; causes the current pathname to be printed.
 - depth: always true; causes descent of the directory hierarchy to be done so that all entries in a directory are acted on before the directory itself.
 - local: true if the file physically resides on the local system; causes the search not to descend into remotely mounted filesystems.
 - mount: always true; restricts the search to the filesystem containing the current element of the path-name-list.

13. Repeat command and history

- The history will be stored in .history
- history [n]: to list last n pieces of command history
- !comm: to repeat the last "commandx"
- !! : to repeat the very last command
- !-4 (offset) : to repeat the last but 4 command
- !m: repeat command with number m as show in the history list

14. Identify

- who: check who is login now.
- w: who is on and what they are doing.
- id: print the user name and ID, and group name and ID
- whoami: display the effective current username
- hostname: print name of current host system
- which: locate a program file including aliases and path (csh only)

15. Diff compare two files and display a list of the difference.

- `diff file1 file2`

16. Compress and uncompress files

- `compress, uncompress: tar, gzip, gunzip, zcat, gzcat`
 - `tar -cvf` (create a tar file)
 - `tar -czvf` (create a tar zipped file)
 - `tar -tvf` (table)list the tarred files in the tar file
 - `tar -xvf` (extract) files
- * don't specify the absolute directory, and use `.` to represent the current directory.

17. Linux utilities

- `date:` show date and time
- `cal:` calendar

18. Search a pattern

- `grep 'this pattern' filename (directory)`
 - l print only the name of the file with matching lines once, rated by new line.
 - n precedes each line by its line number in the file.
 - s supresses error message. work silently., display nothing
 - c output only the count of the lines with the pattern.
 - v output the lines that don't contain the pattern.
 - i ignore uppercase/lowercase distinction during comparison.