
Lab 0 – Introduction to CMC Cloud VCAD, Linux and TCL

Lab 0 – COMPENG 4DV4

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Part B: Linux Fundamentals for ASIC Workflows

Experiment 1: Basic Listing Options

Lab Question 1:

- `ls -l` displays a long listing – this includes user permissions (read r, write w, execute x), link count, file owner, group, size in bytes, time of last modification and filename.
- `ls -a` shows hidden files – files starting with `.`
- `ls -t` orders files by time of last modification – most recently modified first
- `ls -r` reverses the current sort order

Experiment 2: Combining Options

Lab Question 2:

- The options in the command `ls -ltr` do the following
 - `l`: display files in long format
 - `t`: order files by time of last modification
 - `r`: reverse time ordering – display least recently modified first

Experiment 3: Basic Pattern Search

Lab Question 3:

- The command **grep ASIC** displays all lines which contain a match for the pattern `ASIC`, while the command **grep ASIC** displays all lines which contain a match for the pattern `ASIC` along with lines numbers
- The option `-i` makes the pattern match case insensitive
- The option `-n` is useful when users want to quickly find a specific output in a large log file

Experiment 4: Recursive Search

Lab Question 4:

- The `-r` option performs a recursive search. This means that all files in the current directory are searched to see if there is a match of the desired pattern.
- Recursive search is important for large directories containing many subdirectories, log files, and scripts. Searching recursively for many files saves time compared to manually searching many subdirectories and files.

Experiment 5: Counting Lines and Words

Lab Question 5:

- The command **wc hello.txt** outputs 3 columns representing lines, words, and bytes/characters in the file hello.txt respectively.
- The options **-l -w** and **-c** display only lines, words and characters in a file respectively
- Counting lines in an ASIC report file could be useful as an indication of the number of errors, violations or warnings in a report, and an indication of how these are changing between iterations.

Experiment 6: Combining Commands

Lab Question 6:

- The pipe symbol | is used to send the output from the command on the left hand side of the | symbol as input to the command on the right hand side of the | symbol.
- The command **grep ASIC hello.txt | wc -l** finds all occurrences of the pattern ASIC in hello.txt, then sends all occurrences to **wc -l** which counts the number of occurrences
- A similar command which would be useful in the ASIC flow is searching for patterns matching error, and passing it to wc -l to count the number of errors in a log file.

Experiment 7: Finding Files by Name

Lab Question 7:

- Searching for files using **type -f** retrieves files only, while **type -d** retrieves directories only
- It is important to distinguish between files and directories because many Linux commands are file only, and will have improper or unexpected behaviour if operating on directories.

Experiment 8: Searching by Extension

Lab Question 8:

- * is a wildcard, which matches any string. In this case **find . -name “*.txt”** searches for all text files in the current directory
- In the ASIC design flow, * is useful for finding all files of a certain type that exist, for example, finding all TCL scripts or log files that exist in a project directory.

Experiment 9: Advanced Find Usage

Lab Question 9:

- The option **-mtime -1** selects filters for files modified in the last 24 hours.
- This option could be useful when a tool fails suddenly due to recent changes. The option **-mtime -1** can be used to narrow down the source of the problem by listing files that have been recently changed.