CPSC 4240/6240 Fall 2019

Lab 1 Activity/Quiz Review

This lab is a review of your prior knowledge of Linux system commands. You will also review the new material that we have covered so far: booting, daemons, systemd, and using root privileges. All the hands-on tasks should be done in the command line.

1. **Intro and History**
   a. Who is Richard Stallman and what is GNU and GPL?
      Richard Stallman launched the GNU Project, founded the Free Software Foundation, developed the GNU Compiler Collection, and wrote the GNU GPL.
      GNU is “gnu is not unix”.
      GPL is general public license.
   b. What company (and CEO) is behind UBUNTU?
      Company: Canonical, Ltd.
      CEO: Mark Shuttleworth.
   c. What does UBUNTU word mean and in which language?
      Ubuntu is a Nguni Bantu term meaning "humanity."
   d. What is a Linux distribution?
      Kernel + packages
   e. How does Ubuntu number their distros?
      Year and mouth of release
   f. What is the name of the 18.04 distro? 19.04?
      Bionic Beaver, Disco Dingo.

2. **Finding your way around Linux.**
   In this part you will login into your Linux installation on the Virtual Box. You will review and demonstrate your knowledge of several commands.

   <u>Directory</u>
   a. Display the current directory.
      pwd
   b. What is your home directory?
      /home/username
   c. Change to your home directory.
      Cd ~
   d. Navigate one level up.
      Cd ..
   e. Navigate two levels up.
      Cd ../..
   f. Create a new directory named cpsc6240 or cpsc4240
      Mkdir cpsc6240 mkdir cpsc4240

g. Change to that directory.
   Cd directory
h. Now change to root directory.
   Cd /
i. Create directory lab1, then delete it.
   Mkdir lab1 rm –r lab1
j. Now change to your home directory without typing the path.
   Cd ~

Manage Files

a. List files in current directory.
   ls
b. List files in long format.
   Ls -l
c. List all files, including hidden files, in long format.
   Ls -la
d. What does option F do in **ls –Fl** ?
   -F, --classify append indicator (one of */=>@|) to entries
e. How do you use wild card * to list all files with filenames that start with T?
   Ls T*
f. List all files in the root directory without changing to that directory.
   Ls /
g. Copy file1.c into file2.c
   Cp file1.c file2.c
h. Copy file1 into directory cpsc6240.
   Cp file1 cpsc6240
i. Delete file1 without changing to cpsc6240.
   Rm cpsc6240/file1
j. Delete directory cpsc6240.
   Rm –r cpsc6240
k. Rename file1 to file5.
   Mv file1 file5
l. Preview files on the screen using cat or head.
   Cat filename head filename
m. Show how to use **| more** or **| less**.
   Cat filename | more
   Ls directory | less

Manual

a. Find manual entry for command **grep**
   Man grep It displays the whole manual of the command
   Man –w grep This option returns the location in which the manual page of a given command is present.
b. Show manual entry for command **sudo**
   Man sudo
   Man –w sudo
c. What does command **man man** do?
   It displays the whole manual of the man.

3. Managing packages with apt, using sudo, etc.

Packet Management

a. What is apt?
   Advance package tool
b. Check what packages are installed on your machine.
   Apt list --installed
c. Check if gcc and tcpdump are installed.
   Apt list installed gcc / tcpdump
d. Install gcc.
   Sudo apt-get install gcc
e. Remove gcc.
   Sudo apt-get --purge remove gcc<version>
f. Reinstall gcc.
   sudo apt-get install --reinstall gcc-<version>
g. Update your system.
   Sudo apt-get update
   Sudo apt-get upgrade
h. What is the difference between apt update and apt upgrade?
   apt-get update updates the list of available packages and their versions, but it does not install or upgrade any packages.
   apt-get upgrade actually installs newer versions of the packages you have.
   After updating the lists, the package manager knows about available updates for the software you have installed.
i. Why do you run apt with sudo?
   Manage package requires superuser privileges

Boot Process

a. What is GRUB?
   Grand unified bootloader

b. Where is GRUB config file located?
   Lives in a text file in /boot/grub/grub.conf
c. Open that file and look at the code. What do you see?
   Config that can Id and load the OS kernel.
   which is used to create the list of operating systems to boot in GRUB's menu interface, essentially allows the user to select a pre-set group of commands to execute.

d. What is a daemon?
   Kernel background processes that start automatically after booting.
e. What daemons live in your system? (Find 5 examples)
   Systemd , Manages network connections (networkd), kernel log entires (journald), logins (logind) , amd - Auto Mount Daemon ,sshd Secure Shell Server Daemon
f. What is the function of systemd?
   1. Advanced process management.
   2. A collection of programs, daemons, libraries and kernel components.
   3. Defines a dependency model
   4. Manages processes in parallel
g. What is the PID of systemd?
   PID 1
h. What are the systemd units?
   The unit files on your system determine how systemd will start and run. Each corresponds to a single activity or component — or unit in systemd terms. Each unit file is a simple text file describing a unit, what it does, what needs to run before or afterward, and other details.
i. What command can be used to check all loaded and running units?
   systemctl
j. How do you start a bluetooth service?
   Systemctl start bluetooth
k. How do you stop a bluetooth service?
   Systemctl stop bluetooth
l. How do you list units of type “service”?
   systemctl list-units –type=service
m. Do you need to use sudo before using the systemctl command?
   no
n. What is the system journal?
   Includes ALL service and kernel messages from boot to shutdown.
o. What entity manages journal?
   journald
p. Is it a daemon or not? How can you tell?
   journald is a daemon, in order to record all messages from boot to shutdown, it has to be a daemon run on background.

q. How do you display all messages from the current boot?
   Journalctl
r. Where is journald's configuration file located?
   /etc/systemd/journald.conf
s. Open the file. What do you see?
   These files configure various parameters of the systemd journal service
t. Can I log all boot messages? How? Where?
   Can make it retain all messages from all boots. Edit /etc/systemd/journald.conf:

   [Journal]
   Storage=persistent
u. There is a way to see error messages in **/var/log/syslog**.
   How do you do it? What do you see there?
   tail -5 /var/log/messages
   Contains global system messages, including the messages that are logged during system startup

sudo/su commands

a. Who is root?
   The user which has full authority to all directories and all files.
b. What is the UID of root?
   UID 0
c. You just installed your Ubuntu Linux, are you root?
   NO
d. What does **su** stand for?
   The substitute user. This command is used for becoming another user. Without giving a username, su will change account to root.
e. What is the difference between **su** and **sudo**?
   Password difference:
   su needs current user to input password of the target user.
   sudo needs current user to input its own password to run commands as target user.
   Default behavior difference:
   su will create a terminal environment for the target user, it should be exited manually.
   sudo will exit after all commands have been excuted.
   Log difference:
   You cannot track command logs after login with su. You can track command logs of sudo: sudo grep sudo /var/log/auth.log
f. What are the benefits and disadvantages of using **sudo** vs. **su**?
   1. Accountability: command logging.

2. Users can do specific chores without unlimited root privileges.

3. No need to give out root password.

4. Using sudo is faster – used on command line, no need to su or login as root.

5. No root password needed to get privileges.

6. Have a list of all users with privileges.

7. Reducing the chance of root shell being left unattended.

8. A single fie can control access for an entire network.

Disadvantages:

1. Breaching in a sudoer's account is breaching root itself.

2. Command logging can be subverted.

g. In some new Ubuntu installations root password is disabled by default. How can you tell?
   There is no procedure to set root password during installation. Ubuntu will automatically lock the password for root, that's why a user is always fails to login as root with su. In file /etc/shadow, there is a "!" sign in the root line which indicates the root password has been locked.
h. Imagine you need to login as root, but your passwd is disabled. How can you fix this?
   Reset a password for root: sudo passwd -u root
i. What is in **/etc/passwd** file?
   The list file of every registered user that has access to a system.
j. What is in **/etc/shadow** file?
   The list file of encrypted password for each account user.
k. Who are **sudoers**?
   Those accounts which has privilege to use sudo.
l. Where is the file that defines who **sudoers** are?
   /etc/sudoers
m. What group are they in?
   group sudo, wheel
n. What is group **%wheel**? Does your system have one?
   The wheel group is a group of users allowed to access root user. NO
o. Where can you find the list of all groups?
   /etc/group
p. Create a new user named **bob**.
   sudo adduser bob

q. Set bob's **passwd**

   sudo passwd bob

r. What is bob's UID? Where can you find it?

   id -u bob, /etc/passwd

s. What program do you use to edit the sudoers file?

   sudo visudo

t. Why should you use that specific program?

   It validates the syntax of the file upon saving.

u. Is it possible to change the default editor? If so, how?

   sudo update-alternatives --config editor

   https://www.digitalocean.com/community/tutorials/how-to-edit-the-sudoers-file-on-ubuntu-and-centos

v. Add bob to the group of sudoers.

   sudo usermod -aG sudo bob -G 加入副群組 -g 加入主群組

w. Delete user bob and remove him from the list of sudoers.

   sudo userdel -r bob 如果加參數-r，表示在刪除用戶的同時，一併把使用者的家目錄及本地郵件存儲的目錄或檔也一同刪除

   gpasswd -d userName groupName

   gpasswd -d bob sudoers

x. How do you shutdown the system? What does "now" mean?

   shutdown now, now means shutdown immediately

y. How to you reboot the system?

   reboot or systemctl reboot

If you are here, you have survived the lab. Congratulations! You are one step closer to being a sysadmin!