Introduction to Unix/Linux:

Linux and Unix are one of the most popular operating system. These are the operating systems that act as an interface between computer and user.

- Unix was originally developed in 1969 by a group of AT&T Lab employees.
- There are various variants for Unix such as Solaris, AIX and HP Unix.
- Unix and Linux are multi-user and multi-tasking systems.
- Linux was developed by Linus Torvalds and is an open-source software.
- Once you logged in to these systems you will see a system prompt where you can type Unix/Linux commands.
- Here commands are case-sensitive.
- Once you log in system places you in your home directory.
- The full home directory path has a subdirectory listed with a letter and number followed with subdirectory named after your login/user name. For example, /home/a010/sacwal.

Quick Reference to Commands

File/Directory Commands:

cd dir: changes the working directory

pwd: present working directory

ls -F lists all the files and sub-directories

ls -af: Lists all the files and sub-directories along with the hidden files

rmdir dir: deletes an empty directory

mkdir dir: makes a new directory

cd: change to home

rm file: delete file

rm -r dir: Removes directory recursively

rm -f file: Removes file forcefully

cp file1 file2: copies contents of file1 to file2

mv file1 file2: moves file1 onto file2

ln -s file: creates symbolic link to file

touch file: create or update file

cat > file: writes the contents (inputs) to file.

more file: Outputs the content of file on your screen

head | tail file: Outputs the first 10 lines | last 10 lines of file to your screen

System Info Commands:

Date: shows the current date and time of your system

Cal: displays current month calendar

whoami: displays who you are logged in as.

uname -a: shows kernel information

man command: shows manual for command. For example, man date

df: shows disk usage

du: shows disk usage

free: show memory and swap usage

cat /proc/cpuinfo: shows cpu information

cat /proc/meminfo: shows memory information

Process Management Commands:

ps - shows currently active processes

top – shows all running processes

kill pid - kill the process id <pid>

bg – lists stopped or background jobs

fg – brings most recent job to foreground

File Permissions Commands:

chmod: changes file permissions for users, group and others

4- read(r), 2- write(w), 1-execute(x)

chown/chgrp: Changes ownership of the file

Installation Commands:

Install from source:

./configure

make install

dpkg -I packagename.deb – Install a package (Debian)

rpm -Uvh packagename.rpm – Install a package (RPM)

Other Useful Commands:

Compress - Reduces the size of file. Example: compress <filename>

Uncompress – To restore a compressed file. Example: uncompress <filename.Z>

Diff – Compares two file and displays the difference. Example: diff file1 file2

ftp – Helpful to transfer the file to a remote computer. Example: ftp <ipaddress>/<hostname>

grep – Useful to find the matching pattern in a file. Example: grep -icvn [pattern] ab*

-i - ignores case

-c – lists count of lines for the specified pattern

-v – lists all the lines except those with the specified pattern

-n – lists the line number for each pattern

history – displays list of most recent commands

logout – ends your session

vi – starts text vi editor to edit or write to a file

wc – counts line, characters or words in a file

ping – useful to check if the other host is sending response or not. Example: ping 127.0.0.1

gzip file – compresses file and renames it to file.gz

gzip -d file.gz – decompresses file.gz back to file

Advanced Commands:

pvck – check physical volume metadata

pvremove – remove a physical volume

vgs - Reports information about volume groups

ivs – reports information about logical volumes

init – it is the execution of first process (PID = 1) and system executes it in following order:

/sbin/init

/etc/init

/bin/init

/bin/sh

[**start**] | [**stop**] | [**restart**] **service –** Helps to start/stop/restart any service

/**var/log/auth.log –** it is a logfile containing list of user logins and authentication mechanisms

/**var/log/pwdfail -** it is a logfile contains number of failed authentication attempts

Shutdown – shutdown the system in secure way. Can only be run by root user.

-a – non-root users listed in /etc/shutdown.allow can use this command to shutdown the system.

-h 14:00 message – schedule shutdown with a warning message

-f – skip fsck on reboot

-F – force fsck on reboot

-c – cancels already initiated shutdown

fdisk /dev/sda – disk partitioning interactive tool

mount – displays currently mounted filesystems

apt-get install package – installs a package in Debian

yum install package – installs a package in Red Hat.

apt-get upgrade (Debian)/yum update – Updates an installed package

apt-get update (Debian) – updates the information on all packages

cut -d: -f3 file – cuts the line of file, considering : as a delimiter and prints only 3rd column (field)

sed -n '7,13p' file: prints line 7 to 13 of a text file

awk – useful for text processing and data extraction

lsof – lists all open files

vmstat – displays report about virtual memory statistics

iostat – displays report about cpu, device utilization and network filesystem.

mpstat – displays report about processor activities.

uptime – displays how long the system has been up and running, number of users connected, system load averages for past 1, 5 and 15 minutes

find path -name "abc*" – find all files and dir in the specified path, where name starts with abc

find / -size +128M – find all files larger than 128 Mb.

Find – type f -ctime +10 – find all the files last changed more than 10 days ago

find . \! -name "*.gz" -type f -exec gzip {} \ - find all the files in current directory, which do not have gz extension and compress them.

find / -name "dat*" -exec chmod 700 {} \ - find all files and directories, whose name start with dat and provide 700 permissions to all of them.

Set – display all variables

Env – display all environment variables

/etc/user – contains list of users who have access to the server.

Useradd -m sacagarwal – creates a user account along with homedir

Usermod -L sacagarwal - lock a user account

Usermod -U sacagarwal – unlock a user account

Passwd sacagarwal – changes the password for user

Groupadd being_datum – create a group

Su user – run a shell as user

Su /su root – run a shell as root

Sudo command/sudo -u user command - runs a command as root/user.

Nohup <PPID> - prevents a process from terminating when its parent process dies.

Stty – changes or displays terminal settings

Echo "Hi, Welcome" – prints the message to your screen

/etc/crontab – displays crontab file

Crontab -e – edit your crontab file

Crontab -l – lists the contents of your crontab file

#minutes #hours #day of month #month #day of week # user as whom it will be executed #command

25 6 * * 1 root /opt/file1.sh

Ntpd – ntp daemon, keeps the clock in sync with internet time servers

Netstat - displays network commands

Netstat -a – displays all listening and non-listening sockets

Tcpdump -ni eth0 – sniff all network traffic on interface eth0

Nslookup – perform a dns lookup for specific domain or hostname.

Traceroute host – print route hop by hop or traces packet of remote host.

telnet host port – establishes a telnet connection to specific host and port.

Nmap host – scan for open TCP ports.

scp /path1/file user@host:/path2 – copies the file from one computer to another securely

ssh user@host – connects to remote host via ssh and login as a user

ssh user@host /path/to/command – executes a command on remote host

sftp user@host – securely transfer the file similar like FTP

sshpass -p password ssh user@host – connects to a remote host using the specified password

ssh-keygen -t rsa -b 2048 – generates a 2048 RSA-Key pair

ssh-add - adds private key to ssh-cache

/etc/ssh/sshd_config – enable ssh authentication in this file

CA.pl -newca – creates a certificate authority hierarchy

CA.pl -signreq – sign a certificate signing request

/home – home directories for users

/bin – essential command binaries

/boot – bootloader files

/dev – virtual filesystem containing device nodes to devices and partitions

/etc – system configuration files and scripts

/lost+found – storage directory for recovered files in this partition

/opt – most of the software packages are installed in this.

/root – home directory for root users

Vi commands:

ESC: go to command mode

i – insert text before cursor

I – insert text after line

a -append text after cursor

A – append text after line

w – move to next word

:q – quits the program

:wq – save changes and quits

b: move to start of word

e – move to end of word

Special commands and characters:

< - Routes input to command from file

[>] – Routes output from command to file

>> - Appends the output to existing file

| - Route output between commands

Wildcards used in filenames:

[*] – matches any number of characters

[?] – matches one character