1. Linux Introduction

What is Open Source?

- Open source: software and source code available to all
- The Free Software Foundation specifies four freedoms
  - The freedom to run the program for any purpose.
  - The freedom to study and modify the source code
  - The freedom to redistribute the program
  - The freedom to create derivative programs
- Many open-source licenses exist, each with different particulars

Linux Origins

- 1984: The GNU Project and the Free Software Foundation
  - Creates open source version of UNIX utilities
  - Creates the General Public License (GPL)
    - Software license enforcing open source principles
- 1991: Linus Torvalds
  - Creates open source, UNIX-like kernel, released under the GPL
  - Ports some GNU utilities, solicits assistance online
- Today:
  - Linux kernel + GNU utilities = complete, open source, UNIX-like operating system
    - Packaged for targeted audiences as *distributions*

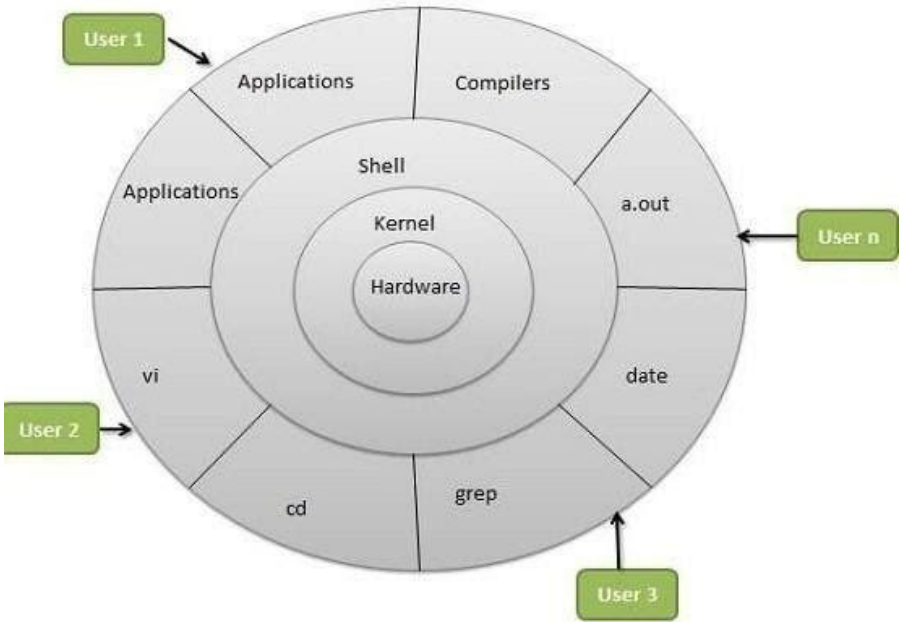
Linux principles

- Everything is a file (including hardware)
- Small, single-purpose programs
- Ability to chain programs together to perform complex tasks
- Avoid captive user interfaces
- Configuration data stored in text

Why Linux?

- OpenSource.
- Community support.
- Heavily customizable.
- Most Servers runs on Linux.
- DevOps most of the tools implements on Linux only.
- Automation
- Secure.

Architecture of Linux



Some Important Directories

- Home Directories: `/root`,`/home/`*`username`*
- User Executable: `/bin`, `/usr/bin`, `/usr/local/bin`
- System Executables: `/sbin`, `/usr/sbin`, `/usr/local/sbin`
- Other Mountpoints: `/media`, `/mnt`
- Configuration: `/etc`
- Temporary Files: `/tmp`
- Kernels and Bootloader: `/boot`
- Server Data: `/var`, `/srv`
- System Information: `/proc`, `/sys`
- Shared Libraries: `/lib`, `/usr/lib`, `/usr/local/lib`

Diffrent Linux distros

➔ Popular Desktop Linux OS

- Ubuntu Linux
- Linux Mint
- Arch Linux
- Fedora
- Debian
- OpenSuse

➔ Popular Server Linux OS

- Red Hat Enterprise Linux
- Ubuntu Server
- Centos
- SUSE Enterprise Linux

Most used Linux distros currently in IT industry.

RPM based:- RHEL & Centos

Debian based :- Ubuntu Server

Diffrence between RPM based and Debian based.

From user's point of view, there isn't much difference in these tools. The RPM and DEB formats are both just archive files, with some metadata attached to them. They are both equally arcane, have hardcoded install paths and only differ in subtle details. DEB files are installation files for Debian based distributions. RPM files are installation files for Red Hat based distributions. Ubuntu is based on Debian's package manage based on APT and DPKG. Red Hat, CentOS and Fedora are based on the old Red Hat Linux package management system, RPM.

DEB or .deb (Debian based softwares)

DEB is the extension of the Debian software package format and the most often used name for such binary packages. DEB was developed by Bedian.

Example: Google chrome software

Package name: google-chrome-stable_current_amd64**.deb**

Installation: dpkg -i google-chrome-stable_current_amd64**.deb**

RPM or .rpm (Red Hat based softwares.)

It is a package management system. The name RPM variously refers to the .rpm file format, files in this format, software packaged in such files, and the package manager itself. RPM was intended primarily for Linux distributions; the file format is the baseline package format of the Linux Standard Base. RPM was developed by Community & **Red Hat**.

Example: Google chrome software

Package Name: google-chrome-stable-57.0.2987.133-1.x86_64.rpm

Installation: rpm -ivh google-chrome-stable-57.0.2987.133-1.x86_64.rpm

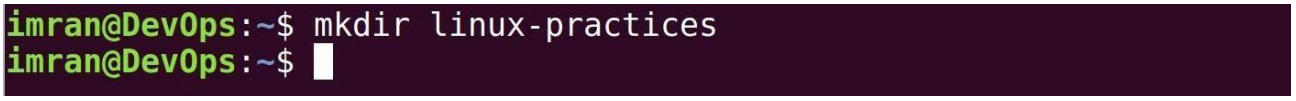
NOTE: You will also encounter diffrent commands, packages and service names while using both kinds of distros.

2. Basic Commands

➔ **Open Terminal**

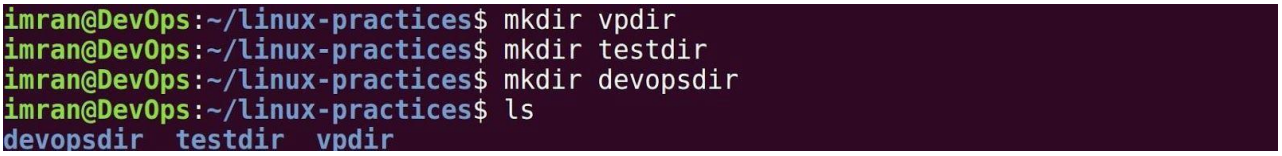
➔ **Know where you are? Present Working Directory**

➔ **Create a directory/folder in your home directory.**



➔ **Change your current working directory to linux-practices(Go to linux-practices folder).**

➔ **Create some more directories and list them with "ls" command.**



➔ **Create some empty files with "touch" command and list them.**

➔ **Reconfirm your location in your system.**

```
imran@DevOps:~/linux-practices$ pwd
/home/imran/linux-practices
imran@DevOps:~/linux-practices$ ls
devopsdir  file1  file2  file3  file4  testdir  vpdir
```

Absolute path and Relative path

What is a path?

A path is a unique location to a file or a folder in a file system of an OS. A path to a file is a combination of / and alpha-numeric characters.

What is an absolute path?

An absolute path is defined as the specifying the location of a file or directory from the root directory(/). In other words we can say absolute path is a complete path from start of actual filesystem from / directory.

Some examples of absolute path:

/home/imran/linux-practices/

/var/ftp/pub

/etc/samba.smb.conf

/boot/grub/grub.conf

If you see all these paths started from / directory which is a root directory for every Linux/Unix machines.

What is the relative path?

Relative path is defined as path related to the present working directory(pwd). Suppose I am located in /home/imran and I want to change directory to /home/imran/linux-practices. I can use relative path concept to change directory to linux-practices and also devopsdir directory.

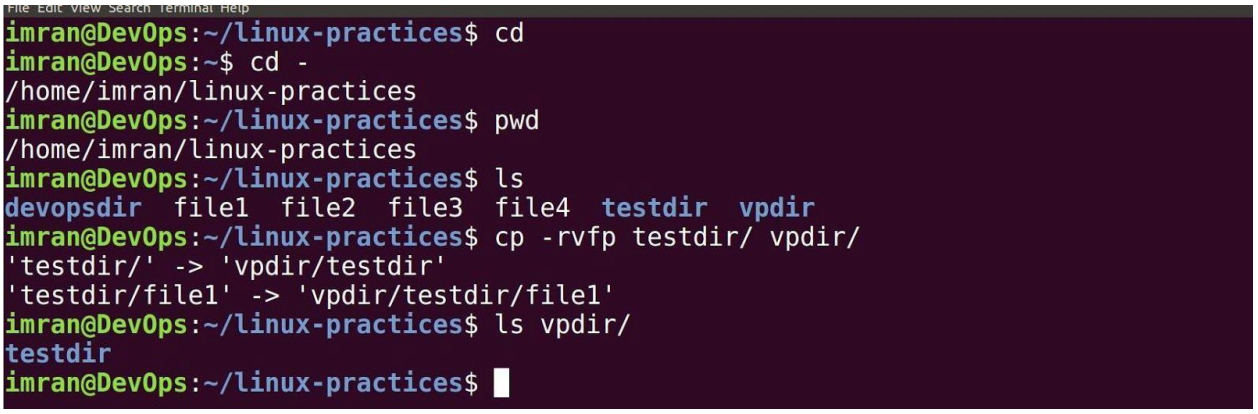
```
File Edit View Search Terminal Help
imran@DevOps:~$ pwd
/home/imran
imran@DevOps:~$ cd linux-practices/
imran@DevOps:~/linux-practices$ ls
devopsdir  file1  file2  file3  file4  testdir  vpdir
imran@DevOps:~/linux-practices$ pwd
/home/imran/linux-practices
imran@DevOps:~/linux-practices$ cd devopsdir/
imran@DevOps:~/.../devopsdir$ pwd
/home/imran/linux-practices/devopsdir
imran@DevOps:~/.../devopsdir$
```

If you see all these paths did not start with / directory.

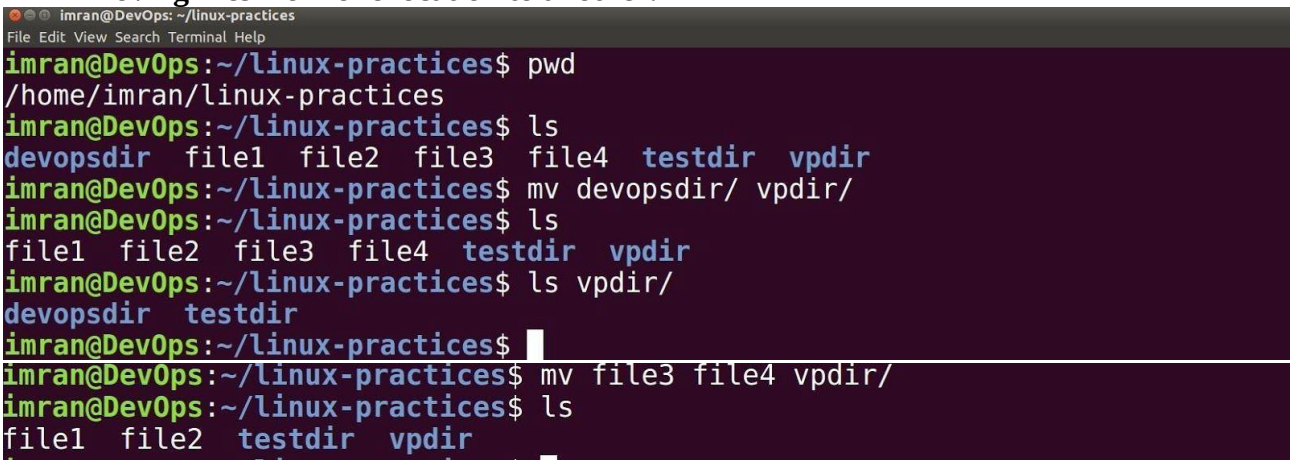
➔ **Creating directories in devopsdir directory with absolute and relative path.**

➔ **Copying files into directory.**

➔ **Copying directories from one location to another.**



➔ **Moving files from one location to another.**



➔ **Removing files and directories.**

VIM EDITOR

➔ **Install vim editor.**

```
imran@DevOps:~/linux-practices$ sudo apt-get install vim
[sudo] password for imran:
Reading package lists... Done
Building dependency tree
Reading state information... Done
```

➔ **Open up a file in vim editor**

```
imran@DevOps:~/linux-practices$ vim firstfile.txt
```

➔ **Hit i to enter into insert mode**

```
imran@DevOps: ~/linux-practices
File  Edit  View  Search  Terminal  Help
~
~
~
~
~
~
~
-- INSERT --                                              0,1           All
```

=> type few lines => hit Esc

```
imran@DevOps: ~/linux-practices
File  Edit  View  Search  Terminal  Help
This is first line in vim editor.
This one's second
So on
and
So forth.
~
                                                         6,0-1         All
```

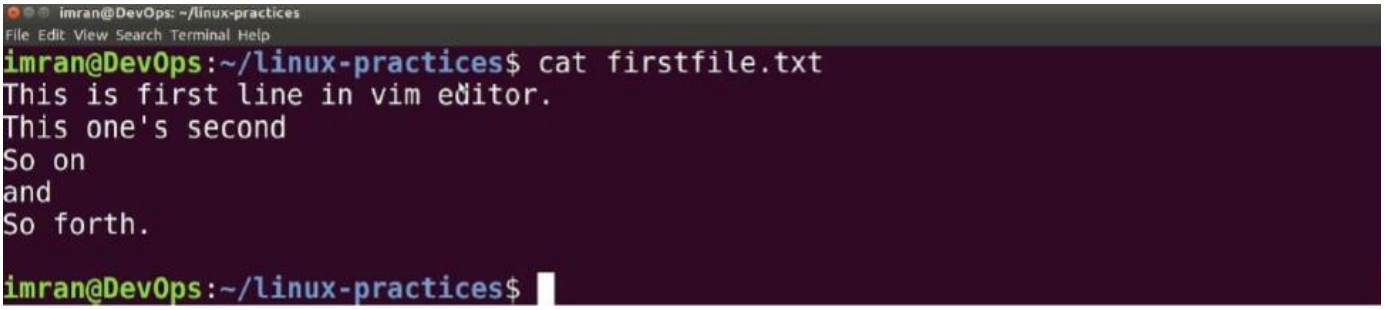
=> type :wq

```
imran@DevOps: ~/linux-practices
File  Edit  View  Search  Terminal  Help
This is first line in vim editor.
This one's second
So on
and
So forth.

~
:wq
```

=> Enter.

➔ **Read file with cat command.**



VIM EDITOR

VI Visual display editor
VIM Visual display editor improved

This is command mode editor for files. Other editors in Linux are emacs, gedit vi editor is most popular

It has 3 modes:
1 Command Mode
2 Insert mode (edit mode)
3 extended command mode

Note: When you open the vim editor, it will be in the command mode by default.

Command Mode:

gg	To go to the beginning of the page
G	To go to end of the page
w	To move the cursor forward, word by word
b	To move the cursor backward, word by word
nw	To move the cursor forward to n words **(SW)**
nb	To move the cursor backward to n words **{SB)**
u	To undo last change (word)

U	To undo the previous changes (entire line)
Ctrl+R	To redo the changes
VY	To copy a line
nyy	To copy n lines (Syy or 4yy)
p	To paste line below the cursor position
p	To paste line above the cursor position
dw	To delete the word letter by letter {like Backspace}
x	To delete the world letter by letter (like DEL Key)
dd	To delete entire line
ndd	To delete n no. of lines from cursor position{Sdd)
I	To search a word in the file

Extended Mode: (Colon Mode)

Extended Mode is used for save and quit or save without quit using "Esc" Key with":"

Esc+:w	To Save the changes
Esc+:q	To quit (Without saving)
Esc+:wq	To save and quit
Esc+:w!	To save forcefully
Esc+wq!	To save and quit forcefully
Esc+:x	To save and quit
Esc+:X	To give password to the file and remove password
Esc+:20(n)	To go to line no 20 or n
Esc+: se nu	To set the line numbers to the file
Esc+:se nonu	To Remove the set line numbers

Is command options

Options	Description
-l	Long listing format of files and directories, one per line
-a	List all hidden files and directories started with '.'
-F	Add a '/' classification at the end of each Directory
-g	List all files and directories with the group name
-i	Print index number of each files and directories
-m	List all file and directories separated by comma ','
-n	List numeric UID and GID of Owner and Groups
-r	List all files and directories in reverse order
-R	Short list all directories
-t	Sorted by modified time, started with the newest file

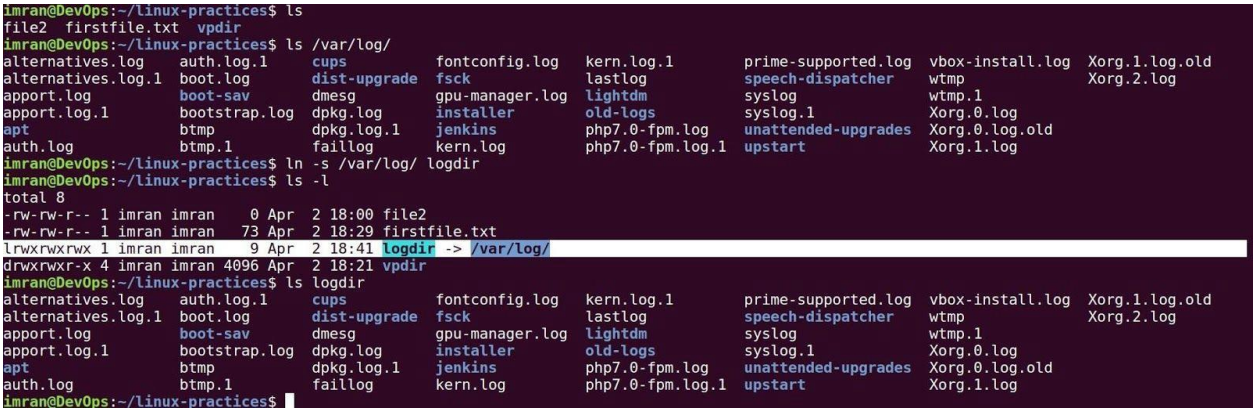
Types of files in linux.

File Type	First Character in File Listing	Description
Regular file	-	Normal files such as text, data, or executable files
Directory	d	Files that are lists of other files
Link	l	A shortcut that points to the location of the actual file
Special file	c	Mechanism used for input and output, such as files in /dev
Socket	s	A special file that provides inter-process networking protected by the file system's access control
Pipe	p	A special file that allows processes to communicate with each other without using network socket semantics

Symbolic links

Symbolic links are like desktop shortcuts we use in windows.

Create a soft link for /var/log directory in our current working directory.



4. Filter & IO redirectioncommand.

Grep

grep command is used to find texts from any text input.

Passwd file: stores information about all the users in the

system

```
imran@DevOps:~/linux-practices$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
```

➔ Finding line which contains word as “root” from /etc/passwd file.

```
imran@DevOps:~/linux-practices$ grep root /etc/passwd
root:x:0:0:root:/root:/bin/bash
imran@DevOps:~/linux-practices$
```

➔ Linux is case sensetive, Root is diffrent that root. Ignoring case in grep with -i option.

```
imran@DevOps:~/linux-practices$ grep Root /etc/passwd
imran@DevOps:~/linux-practices$ grep -i Root /etc/passwd
root:x:0:0:root:/root:/bin/bash
```

➔ To display things except the given word use -v option

Filter Commands

- **less: Displays file content page wise or line wise. Ex: less /etc/passwd**

Note: -press **Enter** key to scroll down line by line (or)
Use **d** to go to next page
Use **b** to go to previous page
Use **/** to search for a word in the file
Use **v** to go vi mode where you can edit the file and once you save it you will back to less command

- **more**

more is exactly same like **less**
Ex: #more /etc/passwd
Note: -press **Enter** key to scroll down line by line (or)
Use **d** to go to next page
Use **/** to search for a word in the file
Use **v** to go vi mode where you can edit the file and once you save it you will back to more command

- **head**

It is used to display the top **10 lines** of the file.
Ex:# head /etc/passwd

```
[root@ktlinux ~]# head /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
uucp:x:10:14:uucp:/var/spool/uucp:/sbin/nologin
```

- **tail**

It is used to display the **last 10** lines of the file
#tail /etc/passwd

```
[root@ktlinux ~]# tail /etc/passwd
apache:x:48:48:Apache:/var/www:/sbin/nologin
nslcd:x:65:55:LDAP Client User:/:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
ntp:x:38:38::/etc/ntp:/sbin/nologin
pulse:x:496:494:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
tcpdump:x:72:72::/:/sbin/nologin
visitor:x:500:500:visitor:/home/visitor:/bin/bash
ktuser:x:501:501::/home/ktuser:/bin/bash
```

- **cut**

 # cut -d -f filename (where d stands for delimiter ex. : , " " etc and f stands for field)

```
[root@ktlinux ~]# cut -d: -f1 /etc/passwd
root
bin
daemon
adm
lp
sync
shutdown
halt
mail
uucp
```

To delimit spaces and print the field
#cut –d " " –f1 filename

- **sed**

sed stands for **stream editor**, which is used to search a word in the file and replace it with the word required to be in the output

Note: it will only modify the output, but there will be no change in the original file.

#sed 's/searchfor/replacewith/g' filename

```
[root@ktlinux ~]# cat ktfile
Welcome to Kernel Tech
[root@ktlinux ~]# sed 's/Tech/Technologies/g' ktfile
Welcome to Kernel Technologies
[root@ktlinux ~]# cat ktfile
Welcome to Kernel Tech
```

I/O redirection

Redirection is a process where we can copy the output of any command(s), file(s) into a new file. There are two ways of redirecting the output into a file.
Using **>** or **>>** **filename** after the command, and

➔ **Create a file named devopstools with below content.**

```
imran@DevOps:~/linux-practices$ cat devopstools
chef tech
ansible tech
git tech
docker tech
aws tech
```

➔ **Search for text “tech” replace it with “tools” and redirect output to a new file.**

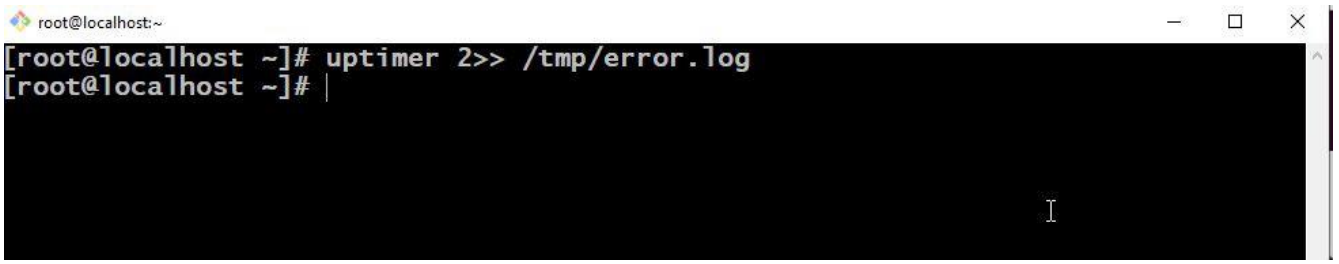
```
imran@DevOps:~/linux-practices$ sed 's/tech/tools/g' devopstools
chef tools
ansible tools
git tools
docker tools
aws tools
imran@DevOps:~/linux-practices$ sed 's/tech/tools/g' devopstools > newtools.txt
imran@DevOps:~/linux-practices$ cat newtools.txt
chef tools
ansible tools
git tools
docker tools
aws tools
```

Note: if the given name of the file is not available a new file will be created automatically. If the file already exists then it will overwrite contents of that file.

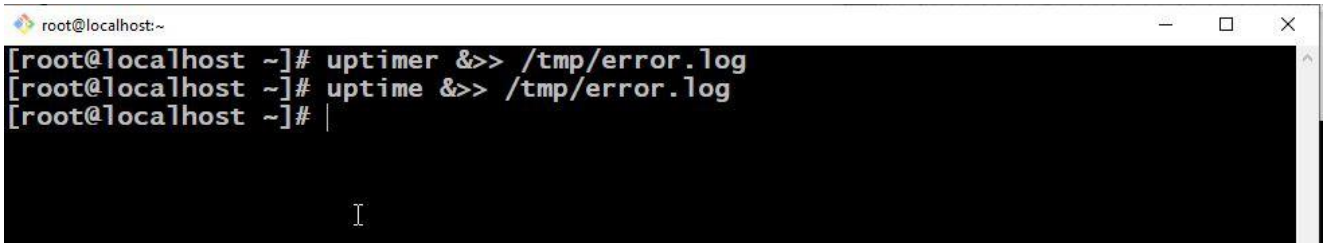
➔ **Appending another output in same file with “>>” .**

```
imran@DevOps:~/linux-practices$ tail /etc/passwd >> newtools.txt
imran@DevOps:~/linux-practices$ cat newtools.txt
chef tools
ansible tools
git tools
docker tools
aws tools
pulse:x:117:124:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:118:126:RealtimeKit,,,:/proc:/bin/false
saned:x:119:127::/var/lib/saned:/bin/false
usbmux:x:120:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
imran:x:1000:1000:Imran,,,:/home/imran:/bin/bash
jenkins:x:121:131:Jenkins,,,:/var/lib/jenkins:/bin/bash
guest-lx1wni:x:999:999:Guest:/tmp/guest-lx1wni:/bin/bash
guests:x:1001:1001:,,,:/home/guests:/bin/bash
nvidia-persistenced:x:122:132:NVIDIA Persistence Daemon,,,:/:/sbin/nologin
guest-yjz1gk:x:998:998:Guest:/tmp/guest-yjz1gk:/bin/bash
imran@DevOps:~/linux-practices$
```

➔ **Redirecting only error to a file “2>>”.**



➔ **Redirecting all the output to a file “&>>”.**



Piping

So far we've dealt with sending data to and from files. Now we'll take a look at a mechanism for sending data from one program to another. It's called piping and the operator we use is (|). What this operator does is feed the output from the program on the left as input to the program on the right.

```
imran@DevOps:~$ cd linux-practices/
imran@DevOps:~/linux-practices$ ls
chefdk_1.2.22-1_amd64.deb  file2          logdir        tree_1.7.0-3_amd64.deb
devopstools                firstfile.txt  newtools.txt  vpdir
imran@DevOps:~/linux-practices$ ls | head -3
chefdk_1.2.22-1_amd64.deb
devopstools
file2
imran@DevOps:~/linux-practices$ ls | grep logdir
logdir
imran@DevOps:~/linux-practices$ cat /etc/passwd | grep root
root:x:0:0:root:/root:/bin/bash
imran@DevOps:~/linux-practices$
```

Find

find command is used to find the files or directory's path, it is exactly like the find option in windows where you can search for a file.

```
imran@DevOps:~/linux-practices$ find /home/imran/ -name newtools.txt
/home/imran/linux-practices/newtools.txt
```

Options that can be used with find command:

Option	Usage
-name	For searching a file with its name
-inum	For searching a file with particular inode number
-type	For searching a particular type of file
-user	For files whose owner is a particular user
-group	For files belonging to particular group

5. Users & Groups.

USERS

Some Important Points related to Users:

- Users and groups are used to control access to files and resources
- Users login to the system by supplying their username and password
- Every file on the system is owned by a user and associated with a group
- Every process has an owner and group affiliation, and can only access the resources its owner or group can access.

- Every user of the system is assigned a unique user ID number (the UID)
- Users name and UID are stored in **/etc/passwd**
- User's password is stored in **/etc/shadow** in encrypted form.
- Users are assigned a **home directory** and a program that is run when they login (**Usually a shell**)
- Users cannot read, write or execute each other's files without permission.

Types of user

TYPE	EXAMPLE	USER ID (ID)	GROUP ID (GID)	HOME DIR	SHELL
ROOT	root	0	0	/root	/bin/bash
REGULAR	imran, vagrant	1000 to 60000	1000 to 60000	/home/username	/bin/bash
SERVICE	ftp, ssh, apache	1 to 999	1 to 999	/var/ftp etc	/sbin/nologin

In Linux there are three types of users.

1. Super user or root user
Super user or the root user is the most powerful user. He is the administrator user.

2. System user
System users are the users created by the softwares or applications. For example if we install Apache it will create a user apache. These kinds of users are known as system users.

3. Normal user
Normal users are the users created by root user. They are normal users like Rahul, Musab etc. Only the root user has the permission to create or remove a user.

Whenever a user is created in Linux things created by default:-

- A home directory is created(/home/username)
- A mail box is created(/var/spool/mail)
- unique UID & GID are given to user

Passwd file

1. /etc/passwd

```
[root@ktlinux ~]# head /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
```

The above fields are

- **root** =name
- **x**= link to password file i.e. /etc/shadow
- **0** or **1**= UID (user id)
- **0** or **1**=GID (group id)
- **root** or **bin** = comment (brief information about the user)
- **/root** or **/bin** = home directory of the user
- **/bin/bash** or **/sbin/nologin** = shell

Group file

2. /etc/group

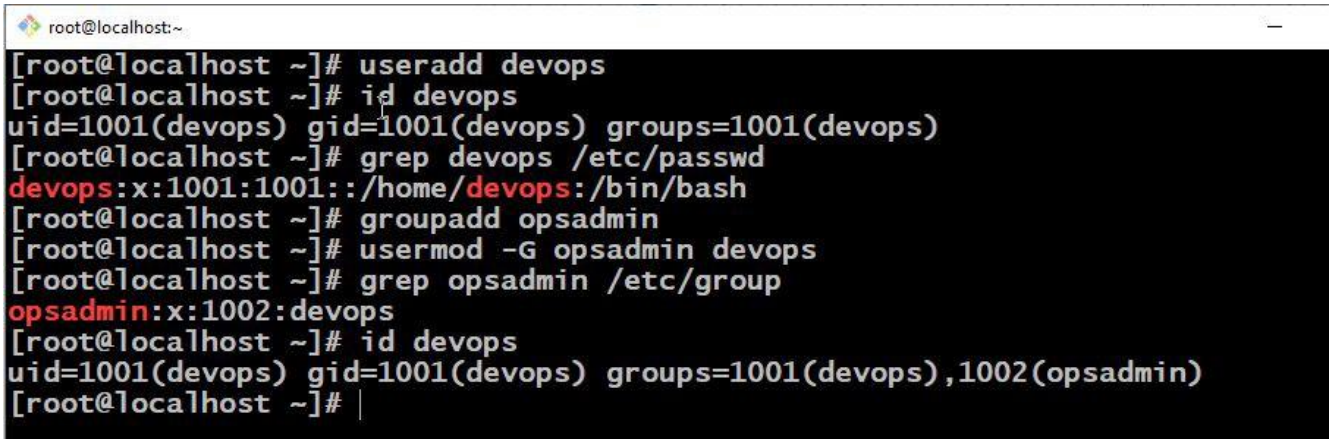
The file /etc/group stores group information. Each line in this file stores one group entry.

```
Group name, group password, GID, group members
```

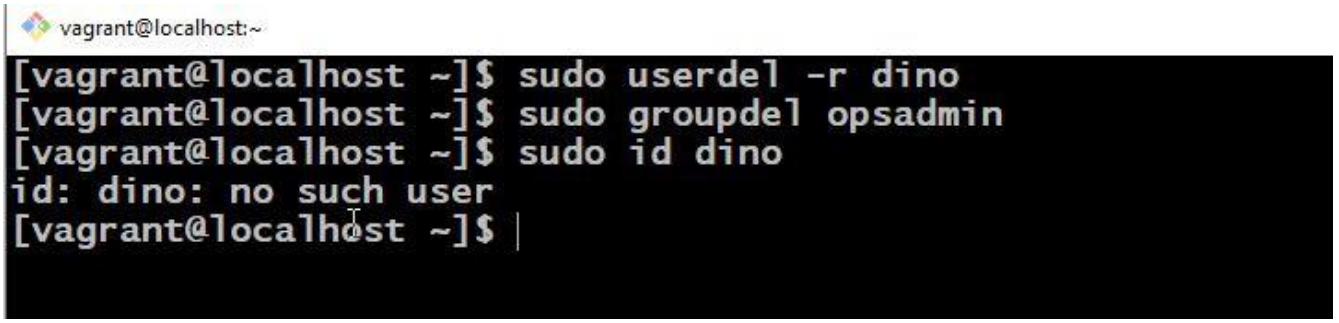
```
[root@localhost ~]# head /etc/group
root:x:0:
bin:x:1:
daemon:x:2:
```

ADD USER, SET PASSWORD & SWITCH TO USER

ADD USER, GROUP & USER INTO GROUP



DELETE USER & GROUP

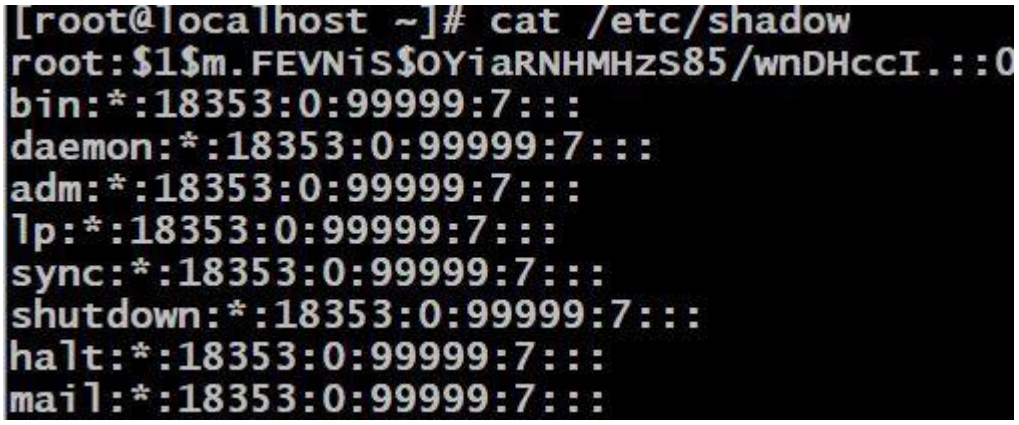


3. The /etc/shadow file

This file stores users' password and password related information. Just like */etc/passwd* file, this file also uses an individual line for each entry.

1. Username
2. Encrypted password
3. Number of days when password was last changed
4. Number of days before password can be changed
5. Number of days after password must be changed
6. Number of days before password expiry date to display the warning message

7. Number of days to disable the account after the password expiry
8. Number of days since the account is disabled
9. Reserved field



USER & GROUP cheatsheet

COMMANDS	DESCRIPTION
useradd	Creates user in RedHat
adduser	Creates user in ubuntu
id	Shows user info
groupadd	Creates group
usermod -G grpnam usrname	Adds user to group
passwd	set/reset password
userdel -r	removes user with home dir
groupdel	removes group
last	shows last login in system
who	who is logged into system
whoami	username
`lsof -u user`	`List files opened by user`

6. File permissions

Viewing Permissions from the Command-Line

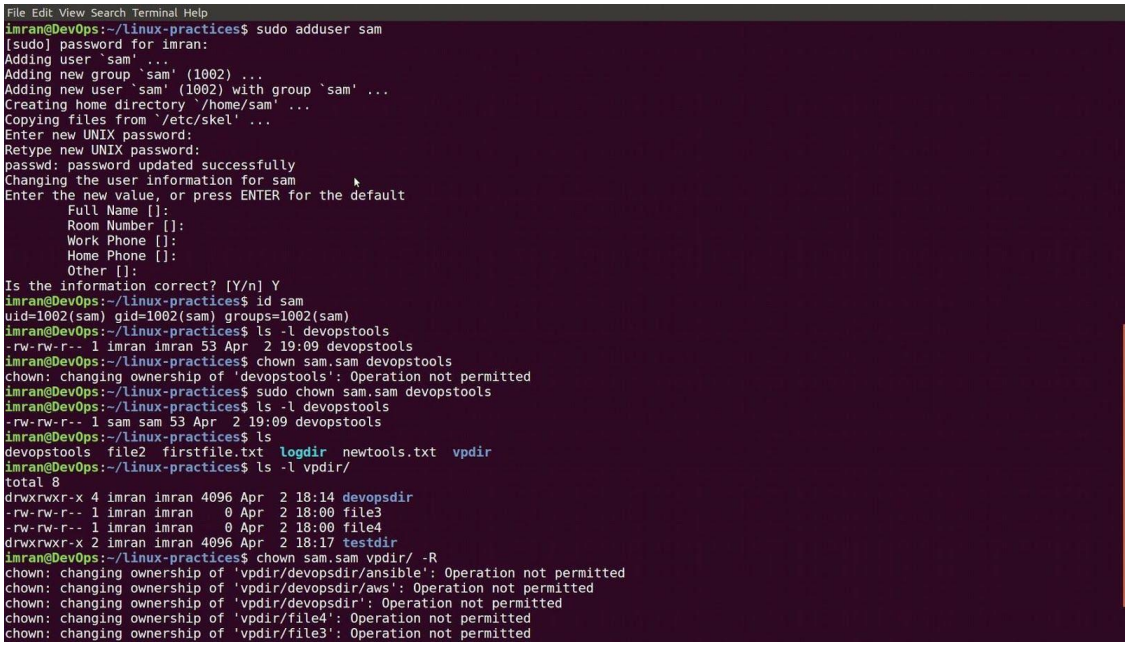
- File permissions may be viewed using **ls -l**

```
$ ls -l /bin/login
-rwxr-xr-x 1 root root 19080 Apr 1 18:26 /bin/login
```

- Four symbols are used when displaying permissions:
  - `r`: permission to read a file or list a directory's contents
  - `w`: permission to write to a file or create and remove files from a directory
  - `x`: permission to execute a program or change into a directory and do a long listing of the directory
  - `-`: no permission (in place of the `r`, `w`, or `x`)

Changing File Ownership

- Only root can change a file's owner
- Only root or the owner can change a file's group
- Ownership is changed with **chown**:
  - **chown [-R]** ***user_name file|directory*** **...**
- Group-Ownership is changed with **chgrp**:
  - **chgrp [-R]** ***group_name file|directory*** **...**



Changing Permissions - Symbolic Method

- To change access modes:
  - **chmod [-OPTION]... mode[,mode]** ***filel directory ...***
- *mode* includes:
  - **u,g** or **o** for user, group and other
  - **+ -** or **=** for grant, deny or set
  - **r**, **w** or **x** for read, write and execute
- Options include:
  - **-R** Recursive
  - **-v** Verbose
  - **--reference** Reference another file for its mode
- Examples:
  - **chmod ugo+r *file:*** Grant read access to all for ***file***
  - **chmod o-wx *dir:*** Deny write and execute to others for *dir*

Changing Permissions - Numeric Method

- Uses a three-digit mode number
  - first digit specifies owner 's permissions
  - second digit specifies group permissions
  - third digit represents others' permissions
- Permissions are calculated by adding:
  - 4 (for read)
  - 2 (for write)
  - 1 (for execute)
- Example:
  - **chmod 640 myfile**

7. Sudo

sudo gives power to a normal user to execute commands which is owned by root user.

Example shown below:

If a user has already full sudoers privilege, it can become a root user anytime.

➔ sudo -i changes from normal user to root user

```
imran@DevOps:~/linux-practices$ id
uid=1000(imran) gid=1000(imran) groups=1000(imran),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),113(lpadmin
),128(sambashare),130(docker),1006(dev_dock_gr)
imran@DevOps:~/linux-practices$ sudo -i
[sudo] password for imran:
root@DevOps:~# id
uid=0(root) gid=0(root) groups=0(root)
root@DevOps:~#
```

Note: User imran was already a sudo user with full privilege.

➔ Adding user sam in sudoers list.

```
imran@DevOps:~/linux-practices$ sudo -i
root@DevOps:~# export EDITOR=vim
root@DevOps:~# visudo
```

```
File  Edit  View  Search  Terminal  Help
#
# This file MUST be edited with the 'visudo' command as root.
#
# Please consider adding local content in /etc/sudoers.d/ instead of
# directly modifying this file.
#
# See the man page for details on how to write a sudoers file.
#
Defaults        env_reset
Defaults        mail_badpass
Defaults        secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/snap/bin"

# Host alias specification

# User alias specification

# Cmnd alias specification

# User privilege specification
root    ALL=(ALL:ALL) ALL
sam     ALL=(ALL:ALL) ALL


# Members of the admin group may gain root privileges
%admin ALL=(ALL) ALL

# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL
%dev_dock       ALL=(ALL:ALL) ALL
                                                              21,3          Top
```

➔ Like a user a group can also be added into sudoers list.

```
# Members of the admin group may gain root privileges
%admin ALL=(ALL) ALL
```

➔ **Every time you enter sudo command it asks your own password. To turn that off use NOPASSWD in sudoers file.**

```
# User privilege specification
root    ALL=(ALL:ALL) ALL
sam     ALL=(ALL:ALL) NOPASSWD: ALL
```

➔ **Changing to any other user with "su -" command.**

```
imran@DevOps:~/linux-practices$ su - sam
Password:
sam@DevOps:~$
```

➔ **Become a root user from sam user login.**

```
sam@DevOps:~$ sudo -i
root@DevOps:~#
```

8. Software Management.

➔ **Download package from internet.**

For CentOS

`To install Tree`

curl https://rpmfind.net/linux/centos/7.9.2009/os/x86_64/Packages/tree-1.6.0-10.el7.x86_64.rpm -o tree-1.6.0-10.el7.x86_64.rpm

rpm -ivh tree-1.6.0-10.el7.x86_64.rpm

```
[root@Imran ~]# curl https://rpmfind.net/linux/centos/7.9.2009/os/x86_64/Packages/tree-1.6.0-10.el7.x86_64.rpm -o tree-1.6.0-10.el7.x86_64.rpm
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 47508  100 47508    0     0  57226      0 --:--:-- --:--:-- --:--:-- 57238
[root@Imran ~]# ls
anaconda-ks.cfg  httpd-2.4.6-95.el7.centos.x86_64.rpm  original-ks.cfg  tree-1.6.0-10.el7.x86_64.rpm
[root@Imran ~]# rpm -ivh tree-1.6.0-10.el7.x86_64.rpm
Preparing...                          ################################# [100%]
Updating / installing...
   1:tree-1.6.0-10.el7                ################################# [100%]
[root@Imran ~]# tree /var/log/
/var/log/
├── anaconda
│   ├── anaconda.log
│   ├── ifcfg.log
│   ├── journal.log
│   ├── ks-script-898Bxq.log
│   ├── ks-script-dyarrY.log
│   ├── ks-script-kPd16m.log
│   ├── ks-script-Wnz4e2.log
│   ├── packaging.log
│   ├── program.log
│   ├── storage.log
│   └── syslog
├── audit
│   └── audit.log
├── boot.log
├── btmp
├── chrony
├── cloud-init.log
├── cron
├── dmesg
├── grubby_prune_debug
├── lastlog
├── maillog
├── messages
├── qemu-ga
├── rhsm
├── secure
├── spooler
```

To install httpd

curl https://rpmfind.net/linux/centos/7.9.2009/os/x86_64/Packages/httpd-2.4.6-95.el7.centos.x86_64.rpm -o httpd-2.4.6-95.el7.centos.x86_64.rpm

rpm -ivh httpd-2.4.6-95.el7.centos.x86_64.rpm

```
[root@Imran ~]# curl https://rpmfind.net/linux/centos/7.9.2009/os/x86_64/Packages/httpd-2.4.6-95.el7.centos.x86_64.rpm -o httpd-2.4.6-95.el7.centos.x
86_64.rpm
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 2779k  100 2779k    0     0  1943k      0  0:00:01  0:00:01 --:--:-- 1945k
[root@Imran ~]# ls
anaconda-ks.cfg  httpd-2.4.6-95.el7.centos.x86_64.rpm  original-ks.cfg
[root@Imran ~]# rpm -ivh httpd-2.4.6-95.el7.centos.x86_64.rpm
warning: httpd-2.4.6-95.el7.centos.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID f4a80eb5: NOKEY
error: Failed dependencies:
        /etc/mime.types is needed by httpd-2.4.6-95.el7.centos.x86_64
        system-logos >= 7.92.1-1 is needed by httpd-2.4.6-95.el7.centos.x86_64
        httpd-tools = 2.4.6-95.el7.centos is needed by httpd-2.4.6-95.el7.centos.x86_64
        libapr-1.so.0()(64bit) is needed by httpd-2.4.6-95.el7.centos.x86_64
        libaprutil-1.so.0()(64bit) is needed by httpd-2.4.6-95.el7.centos.x86_64
[root@Imran ~]#
```

Due to Dependencies its failing and it will be installed one we install all the dependencies. But what if we have Hundreds of dependencies, And that can be solved easily by other package managers like YUM .

repos. d/ directory. It reads each YUM Repository **configuration file to get the information required to**

download and install new software, resolves software dependencies and installs the required RPM package files. YUM Repository configuration files must: be located in /etc/yum.repos.d

ls /etc/yum.repos.d/

```
[root@Imran ~]#
[root@Imran ~]# ls /etc/yum.repos.d/
CentOS-Base.repo  CentOS-CR.repo  CentOS-Debuginfo.repo  CentOS-fasttrack.repo  CentOS-Media.repo  CentOS-Sources.repo  CentOS-Vault.repo
```

Shows the usage of YUM Command with options

yum –help

```
[root@Imran ~]#
[root@Imran ~]# yum --help
Loaded plugins: fastestmirror
Usage: yum [options] COMMAND

List of Commands:

check          Check for problems in the rpmdb
check-update   Check for available package updates
clean          Remove cached data
deplist        List a package's dependencies
distribution-synchronization Synchronize installed packages to the latest available versions
downgrade      downgrade a package
erase          Remove a package or packages from your system
fs             Acts on the filesystem data of the host, mainly for removing docs/lanuages for minimal hosts.
fssnapshot     Creates filesystem snapshots, or lists/deletes current snapshots.
groups         Display, or use, the groups information
help           Display a helpful usage message
history        Display, or use, the transaction history
info           Display details about a package or group of packages
install        Install a package or packages on your system
list           List a package or groups of packages
load-transaction load a saved transaction from filename
makecache      Generate the metadata cache
provides       Find what package provides the given value
reinstall      reinstall a package
repo-pkgs      Treat a repo. as a group of packages, so we can install/remove all of them
repolist       Display the configured software repositories
search         Search package details for the given string
shell          Run an interactive yum shell
swap           Simple way to swap packages, instead of using shell
update         Update a package or packages on your system
update-minimal Works like upgrade, but goes to the 'newest' package match which fixes a problem that affects your system
updateinfo     Acts on repository update information
upgrade        Update packages taking obsoletes into account
version        Display a version for the machine and/or available repos.


Options:
  -h, --help            show this help message and exit
  -t, --tolerant        be tolerant of errors
```

To Update all your packages

yum update

```
[root@Imran ~]# yum update
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: download.cf.centos.org
 * extras: download.cf.centos.org
 * updates: download.cf.centos.org
Resolving Dependencies
--> Running transaction check
---> Package acl.x86_64 0:2.2.51-14.el7 will be updated
---> Package acl.x86_64 0:2.2.51-15.el7 will be an update
---> Package bash.x86_64 0:4.2.46-33.el7 will be updated
---> Package bash.x86_64 0:4.2.46-34.el7 will be an update
---> Package bind-export-libs.x86_64 32:9.11.4-9.P2.el7 will be updated
---> Package bind-export-libs.x86_64 32:9.11.4-26.P2.el7_9.7 will be an update
---> Package binutils.x86_64 0:2.27-41.base.el7_7.2 will be updated
---> Package binutils.x86_64 0:2.27-44.base.el7 will be an update
---> Package ca-certificates.noarch 0:2019.2.32-76.el7_7 will be updated
---> Package ca-certificates.noarch 0:2021.2.50-72.el7_9 will be an update
---> Package centos-release.x86_64 0:7-7.1908.0.el7.centos will be updated
---> Package centos-release.x86_64 0:7-9.2009.1.el7.centos will be an update
---> Package chkconfig.x86_64 0:1.7.4-1.el7 will be updated
---> Package chkconfig.x86_64 0:1.7.6-1.el7 will be an update
---> Package cloud-init.x86_64 0:18.5-3.el7.centos will be updated
```

To install httpd

yum install httpd -y

```
[root@Imran ~]#
[root@Imran ~]# yum install httpd -y
Loaded plugins: fastestmirror
Determining fastest mirrors
 * base: download.cf.centos.org
 * extras: download.cf.centos.org
 * updates: download.cf.centos.org
base                                                                                                | 3.6 kB  00:00:00
extras                                                                                              | 2.9 kB  00:00:00
updates                                                                                             | 2.9 kB  00:00:00
(1/4): base/7/x86_64/group_gz                                                                       | 153 kB  00:00:00
(2/4): extras/7/x86_64/primary_db                                                                   | 243 kB  00:00:00
(3/4): base/7/x86_64/primary_db                                                                     | 6.1 MB  00:00:00
(4/4): updates/7/x86_64/primary_db                                                                  |  11 MB  00:00:00
Resolving Dependencies
--> Running transaction check
Total                                                                                    22 MB/s |  24 MB  00:00:01
Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Importing GPG key 0xF4A80EB5:
 Userid     : "CentOS-7 Key (CentOS 7 Official Signing Key) <security@centos.org>"
 Fingerprint: 6341 ab27 53d7 8a78 a7c2 7bb1 24c6 a8a7 f4a8 0eb5
 Package    : centos-release-7-7.1908.0.el7.centos.x86_64 (installed)
 From       : /etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : apr-1.4.8-7.el7.x86_64                                                                                1/6
  Installing : apr-util-1.5.2-6.el7.x86_64                                                                           2/6
  Installing : httpd-tools-2.4.6-97.el7.centos.x86_64                                                                3/6
  Installing : centos-logos-70.0.6-3.el7.centos.noarch                                                               4/6
  Installing : mailcap-2.1.41-2.el7.noarch                                                                           5/6
  Installing : httpd-2.4.6-97.el7.centos.x86_64                                                                      6/6
  Verifying  : mailcap-2.1.41-2.el7.noarch                                                                           1/6
  Verifying  : apr-1.4.8-7.el7.x86_64                                                                                2/6
  Verifying  : apr-util-1.5.2-6.el7.x86_64                                                                           3/6
  Verifying  : httpd-2.4.6-97.el7.centos.x86_64                                                                      4/6
  Verifying  : httpd-tools-2.4.6-97.el7.centos.x86_64                                                                5/6
  Verifying  : centos-logos-70.0.6-3.el7.centos.noarch                                                               6/6

Installed:
  httpd.x86_64 0:2.4.6-97.el7.centos

Dependency Installed:
  apr.x86_64 0:1.4.8-7.el7       apr-util.x86_64 0:1.5.2-6.el7  centos-logos.noarch 0:70.0.6-3.el7.centos  httpd-tools.x86_64 0:2.4.6-97.el7.centos
  mailcap.noarch 0:2.1.41-2.el7

Complete!
```

To remove httpd

yum remove httpd -y

```
[root@Imran ~]# yum remove httpd -y
Loaded plugins: fastestmirror
Resolving Dependencies
--> Running transaction check
---> Package httpd.x86_64 0:2.4.6-97.el7.centos will be erased
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================================================================================
 Package                       Arch                          Version                                 Repository                          Size
================================================================================================================================================
Removing:
 httpd                         x86_64                        2.4.6-97.el7.centos                     @updates                           9.4 M

Transaction Summary
================================================================================================================================================
Remove  1 Package

Installed size: 9.4 M
Downloading packages:
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Erasing    : httpd-2.4.6-97.el7.centos.x86_64                                                                                          1/1
  Verifying  : httpd-2.4.6-97.el7.centos.x86_64                                                                                          1/1

Removed:
  httpd.x86_64 0:2.4.6-97.el7.centos

Complete!
```

For Ubuntu

wget http://archive.ubuntu.com/ubuntu/pool/universe/t/tree/tree_1.7.0-3_amd64.deb -o tree_1.7.0-3_amd64.deb

dpkg -i tree_1.7.0-3_amd64.deb

```
root@Imran:~#
root@Imran:~# wget http://archive.ubuntu.com/ubuntu/pool/universe/t/tree/tree_1.7.0-3_amd64.deb
--2021-09-27 04:30:17--  http://archive.ubuntu.com/ubuntu/pool/universe/t/tree/tree_1.7.0-3_amd64.deb
Resolving archive.ubuntu.com (archive.ubuntu.com)... 91.189.88.142, 91.189.88.152, 2001:67c:1360:8001::24, ...
Connecting to archive.ubuntu.com (archive.ubuntu.com)|91.189.88.142|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 40572 (40K) [application/x-debian-package]
Saving to: 'tree_1.7.0-3_amd64.deb'

tree_1.7.0-3_amd64.deb               100%[=====================================================================>]  39.62K  --.-KB/s    in 0.07s

2021-09-27 04:30:17 (551 KB/s) - 'tree_1.7.0-3_amd64.deb' saved [40572/40572]

root@Imran:~# dpkg -i tree_1.7.0-3_amd64.deb
Selecting previously unselected package tree.
(Reading database ... 63739 files and directories currently installed.)
Preparing to unpack tree_1.7.0-3_amd64.deb ...
Unpacking tree (1.7.0-3) ...
Setting up tree (1.7.0-3) ...
Processing triggers for man-db (2.9.1-1) ...
root@Imran:~# tree /var/log/
/var/log/
├── amazon
│   └── ssm
│       ├── amazon-ssm-agent.log
│       ├── audits
│       │   └── amazon-ssm-agent-audit-2021-09-27
│       └── hibernate.log
├── apt
│   ├── eipp.log.xz
│   ├── history.log
│   └── term.log
├── auth.log
├── btmp
├── cloud-init-output.log
├── cloud-init.log
├── dist-upgrade
├── dmesg
```

We have seen YUM Like that for Ubuntu we have a package manager '**apt**'.

The **sources. list** file is a key factor in adding or upgrading applications to your Ubuntu installation. This is also used by your system for system updates. The file is basically the roadmap for your system to know where it may download programs for installation or upgrade.

cat /etc/apt/sources.list

```
root@Imran:~#
root@Imran:~# cd /etc/apt/
root@Imran:/etc/apt# ls
apt.conf.d  auth.conf.d  preferences.d  sources.list  sources.list.d  trusted.gpg.d
root@Imran:/etc/apt# cat /etc/apt/sources.list
## Note, this file is written by cloud-init on first boot of an instance
## modifications made here will not survive a re-bundle.
## if you wish to make changes you can:
## a.) add 'apt_preserve_sources_list: true' to /etc/cloud/cloud.cfg
##     or do the same in user-data
## b.) add sources in /etc/apt/sources.list.d
## c.) make changes to template file /etc/cloud/templates/sources.list.tmpl

# See http://help.ubuntu.com/community/UpgradeNotes for how to upgrade to
# newer versions of the distribution.
deb http://us-east-1.ec2.archive.ubuntu.com/ubuntu/ focal main restricted
# deb-src http://us-east-1.ec2.archive.ubuntu.com/ubuntu/ focal main restricted

## Major bug fix updates produced after the final release of the
## distribution.
deb http://us-east-1.ec2.archive.ubuntu.com/ubuntu/ focal-updates main restricted
# deb-src http://us-east-1.ec2.archive.ubuntu.com/ubuntu/ focal-updates main restricted

## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu
## team. Also, please note that software in universe WILL NOT receive any
## review or updates from the Ubuntu security team.
deb http://us-east-1.ec2.archive.ubuntu.com/ubuntu/ focal universe
# deb-src http://us-east-1.ec2.archive.ubuntu.com/ubuntu/ focal universe
deb http://us-east-1.ec2.archive.ubuntu.com/ubuntu/ focal-updates universe
# deb-src http://us-east-1.ec2.archive.ubuntu.com/ubuntu/ focal-updates universe

## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu
## team, and may not be under a free licence. Please satisfy yourself as to
## your rights to use the software. Also, please note that software in
## multiverse WILL NOT receive any review or updates from the Ubuntu
## security team.
deb http://us-east-1.ec2.archive.ubuntu.com/ubuntu/ focal multiverse
# deb-src http://us-east-1.ec2.archive.ubuntu.com/ubuntu/ focal multiverse
deb http://us-east-1.ec2.archive.ubuntu.com/ubuntu/ focal-updates multiverse
# deb-src http://us-east-1.ec2.archive.ubuntu.com/ubuntu/ focal-updates multiverse
```

Shows the usage of apt Command with options

apt --help

```
root@Imran:~# apt --help
apt 2.0.6 (amd64)
Usage: apt [options] command

apt is a commandline package manager and provides commands for
searching and managing as well as querying information about packages.
It provides the same functionality as the specialized APT tools,
like apt-get and apt-cache, but enables options more suitable for
interactive use by default.

Most used commands:
  list - list packages based on package names
  search - search in package descriptions
  show - show package details
  install - install packages
  reinstall - reinstall packages
  remove - remove packages
  autoremove - Remove automatically all unused packages
  update - update list of available packages
  upgrade - upgrade the system by installing/upgrading packages
  full-upgrade - upgrade the system by removing/installing/upgrading packages
  edit-sources - edit the source information file
  satisfy - satisfy dependency strings

See apt(8) for more information about the available commands.
Configuration options and syntax is detailed in apt.conf(5).
Information about how to configure sources can be found in sources.list(5).
Package and version choices can be expressed via apt_preferences(5).
Security details are available in apt-secure(8).
                                        This APT has Super Cow Powers.
```

To update all your package lists

#apt update

```
root@Imran:~# apt update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu focal-security InRelease
Reading package lists... Done
Building dependency tree
Reading state information... Done
27 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

TO search for a <package> apache2

apt search apache2

```
root@Imran:~# apt search apache2
Sorting... Done
Full Text Search... Done
apache2/focal-updates,now 2.4.41-4ubuntu3.4 amd64 [installed]
  Apache HTTP Server

apache2-bin/focal-updates,now 2.4.41-4ubuntu3.4 amd64 [installed,automatic]
  Apache HTTP Server (modules and other binary files)

apache2-data/focal-updates,now 2.4.41-4ubuntu3.4 all [installed,automatic]
  Apache HTTP Server (common files)

apache2-dev/focal-updates 2.4.41-4ubuntu3.4 amd64
  Apache HTTP Server (development headers)

apache2-doc/focal-updates 2.4.41-4ubuntu3.4 all
  Apache HTTP Server (on-site documentation)

apache2-ssl-dev/focal-updates 2.4.41-4ubuntu3.4 amd64
  Apache HTTP Server (mod_ssl development headers)

apache2-suexec-custom/focal-updates 2.4.41-4ubuntu3.4 amd64
  Apache HTTP Server configurable suexec program for mod_suexec

apache2-suexec-pristine/focal-updates 2.4.41-4ubuntu3.4 amd64
  Apache HTTP Server standard suexec program for mod_suexec

apache2-utils/focal-updates,now 2.4.41-4ubuntu3.4 amd64 [installed,automatic]
  Apache HTTP Server (utility programs for web servers)
```

To install apache2

apt install apache2 -y

```
root@Imran:~# apt install apache2 -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser
The following NEW packages will be installed:
  apache2
0 upgraded, 1 newly installed, 0 to remove and 27 not upgraded.
Need to get 95.5 kB of archives.
After this operation, 542 kB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/main amd64 apache2 amd64 2.4.41-4ubuntu3.4 [95.5 kB]
Fetched 95.5 kB in 0s (5456 kB/s)
Selecting previously unselected package apache2.
(Reading database ... 64421 files and directories currently installed.)
Preparing to unpack .../apache2_2.4.41-4ubuntu3.4_amd64.deb ...
Unpacking apache2 (2.4.41-4ubuntu3.4) ...
Setting up apache2 (2.4.41-4ubuntu3.4) ...
Processing triggers for systemd (245.4-4ubuntu3.11) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for ufw (0.36-6) ...
root@Imran:~#
```

To remove apache2

apt remove apache2 -y

```
root@Imran:~# apt remove apache2 -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap libjansson4 liblua5.2-0 ssl-cert
Use 'apt autoremove' to remove them.
The following packages will be REMOVED:
  apache2
0 upgraded, 0 newly installed, 1 to remove and 27 not upgraded.
After this operation, 542 kB disk space will be freed.
(Reading database ... 64471 files and directories currently installed.)
Removing apache2 (2.4.41-4ubuntu3.4) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for ufw (0.36-6) ...
root@Imran:~#
```

Commands	Description	
wget link	to download file from link	
curl link	access file from link	
curl link -o outputfile	access file and store o/p to a file	
REDHAT RPM commands		
rpm -ivh {rpm-file}	Install the package	rpm -ivh mozilla-mail-1.7.5-17 .i586.rpm rpm -ivh --test mozilla-mail-1.7.5-17 .i586.rpm
rpm -Uvh {rpm-file}	Upgrade package	rpm -Uvh mozilla-mail-1.7.6-12 .i586.rpm rpm -Uvh --test mozilla-mail-1.7.6-12 .i586.rpm

rpm -ev {package}	Erase/remove/ an installed package	rpm -ev mozilla-mail
rpm -ev --nodeps {package}	Erase/remove/ an installed package without checking for dependencies	rpm -ev --nodeps mozilla-mail
rpm -qa	Display list all installed packages	rpm -qa rpm -qa | less
rpm -qi {package}	Display installed information along with package version and short description	rpm -qi mozilla-mail
rpm -qf {/path/to/file}	Find out what package a file belongs to i.e. find what package owns the file	rpm -qf /etc/passwd rpm -qf /bin/bash
rpm -qc {pacakge-name}	Display list of configuration file(s) for a package	rpm -qc httpd
rpm -qcf {/path/to/file}	Display list of configuration files for a command	rpm -qcf /usr/X11R6/bin/xeyes
rpm -qa --last	Display list of all recently installed RPMs	rpm -qa --last rpm -qa --last | less
rpm -qpR {.rpm-file} rpm -qR {package}	Find out what dependencies a rpm file has	rpm -qpR mediawiki-1.4rc1-4.i586.rpm rpm -qR bash
CentOS_8 Commands		
DNF commands cheatsheet	https://www.linuxtechi.com/dnf-command-examples-rpm-management-fedora-linux/	
dnf --help	Show the help	

dnf search PACKAGE	search from available repositories	
dnf install PACKAGE -y	To install the package	
dnf install httpd -y	To Install httpd package	
dnf install vim -y	Installing VIM Editor	
dnf reinstall PACKAGE	To reinstall PACKAGE	
dnf remove PACKAGE	To remove PACKAGE	
dnf update	update all packages	
dnf update PACKAGE	update only a package	

dnf grouplist	List all available Group Packages	
dnf groupinstall "GROUPNAME"	Installs all the packages in a group	
dnf repolist	List Enabled dnf Repositories	
dnf clean all	Clean dnf Cache	
dnf install epel-release	Additional package repository that provides easy access to install packages for commonly used software.	

dnf history	View History of dnf	
dnf info package name	Shows the information of package like version, size, source, repository etc	
YUM Commands Cheatsheet	https://access.redhat.com/sites/default/files/attachments/rh_yum_cheatsheet_1214_jcs_print-1.pdf	

yum –help	Shows the help	
yum search PACKAGE	Search from available repositories	
yum install PACKAGE -y	To install the package	
yum install httpd -y	To install httpd package	
yum install vim -y	To install VIM Editor	
yum reinstall PACKAGE	To reinstall the PACKAGE	
Yum remove PACKAGE	To Remove PACKAGE	
yum update	Update all packages	
yum update PACKAGE	To Update specific package	
yum grouplist	List all available Group packages	
yum groupinstall “Group Name”	Install all the packages in a group	

Yum repolist	List Enabled YUM repositories	
yum install epel-release	Additional package repository that provides easy access to install packages for commonly used software.	
yum clean all	Clean yum cache	
yum history	View history of yum	
Yum info PACKAGE NAME	Shows the information of package like version, size, source, repository etc.	
Ubuntu20 Commands		
apt commands cheatsheet	https://itsfoss.com/apt-command-guide/	
apt search PACKAGE	search from available repositories	
apt install PACKAGE -y	To Install Packages	
apt install apache2 -y	To Install apache2	
apt reinstall PACKAGE	To reinstall PACKAGE	
apt remove PACKAGE	To remove PACKAGE	
apt update	update all packages	
apt update PACKAGE	update only a package	

apt grouplist	List all available Group Packages	
apt groupinstall "GROUPNAME"	Installs all the packages in a group.	
apt repolist	List Enabled apt Repositories	
apt clean all	Clean apt Cache	
apt history	View History of apt	
apt show package name	Shows the information of package like version, size, source, repository etc	

9. SEARCH

```
$ grep pattern files                    # Search for pattern in
(you will this command                  files
often)
$ grep-r pattern dir                     # Search recursively
pattern in dir                           for

$ locate                                # Find all instances of
file                                    file
$ find /home/tom -name                  # Find files names that
'index*' with "index"(10 find           start
examples)
$ find /home -size                      # Find files larger
+10000k 10000k in /home                 than
```

10. LOGIN (SSH AND TELNET)

```
$ ssh user@host                         # Connect to host as
(secure data communication              user
command)
$ ssh -p port                           # Connect to host
user@host specific                      using
port
$ telnet host                           # Connect to the
using telnet                            system
port
```

11. FILE TRANSFER

scp

```
$ scp file.txt                          # Secure
file.txt to remote host  /tmp folder

$ scp nixsavy@server2:/www/*.html    /www/tmp    # Copy *.html
files from remote host to current system /www/tmp folder

$ scp -r nixsavy@server2:/www  /www/tmp          # Copy all
and folders recursively from remote server to the current
system
/www/tmp folder
```

rsync

```
$ rsync -a /home/apps                   #
/backup/ source to                      Synchronize
destination
$ rsync -avz /home/apps                          #
Synchronize files/directories between the local and remote
system with compression enabled
```

12. DISK USAGE

```
$ df                                    # Show free space on
filesystems(commonly used               mounted
command)
$ df -i                                 # Show free inodes on
filesyste                               mounted
ms
$ fdisk -l                              # Show disks partitions sizes
types(fdisk command                     and
output)
$ du                                    # Display disk usage in
readable form (command                  human
variations)
$ du -sh                                # Display total disk usage on
current                                 the
directory
$                                       # Displays target mount point
all filesystem (refer type,list,evaluate output)

$ mount device-path mount-point      # Mount a
device
```

13. DIRECTORY TRAVERSE

```
$ cd ..     # To go up one level of the directory tree(simple &
most needed)

$                                       # Go to $HOME
c                                       directory
$ cd                                    # Change to /test
/test                                   directory
```

14. SERVICES

Centos8

$ sudo systemctl start httpd	***# Starts httpd on centos***
$ sudo systemctl stop httpd	***# Stops httpd on centos***
$ sudo systemctl restart httpd	***# Restart services***
$ sudo systemctl status httpd	***# shows the current status***
$ sudo systemctl reload httpd	***# Reload conf***
$ sudo systemctl enable httpd	***# starts httpd at boot time***
$ sudo systemctl disable httpd	***# stops httpd at boot time***

$ sudo systemctl is-active httpd	*# shows whether the service is active or not*
$ sudo systemctl is-enabled httpd	*# shows whether the service is enabled or not*

Ubuntu20

$ sudo systemctl start apache2	*# Starts apache2 on ubuntu*
$ sudo systemctl stop apache2	*# Stops apache2 on ubuntu*
$ sudo systemctl restart apache2	*# Restart service*
$ sudo systemctl reload apache2	*# Reload conf*
$ sudo systemctl enable apache2	*# starts apache2 at boot time*
$ sudo systemctl disable apache2	*# stops apache2 at boot time*
$ sudo systemctl is-active apache2	*# Shows whether the service is active or not*
$ sudo systemctl is-enabled apache2	*# Shows whether the service is enabled or not*

15. COMPRESSION / ARCHIVES

```
$ tar cf home.tar home  # Create tar named home.tar containing
home/ (ll tar examples)

$ tar xf
file.tar                        # Extract the files
file.tar                        from
$ tar czf                   fi  # Create a tar with
file.tar.gz                 le  gzip
compression                 s
$ gzip file                     # Compress file and renames
to file.gz (untar gzip          it
file)
```

16. PROCESS RELATED

```
$                               # Display your currently
processes (many parameters to   active
learn)
$ ps aux | grep                 # Find all process id related
'telnet' telnet                 to
process
$ pmap                          # Memory map of
(kernel,user memory             process
etc)
$ top                           # Display all running
(30                             processes
examples)
$ kill pid                      # Kill process with
pid id (types of                mentioned
signals)
$ killall                       # Kill all processes named
proc                            proc
$ pkill                         # Send signal to a process
processname its                 with
name
$                               # Resumes suspended jobs
bringing them to foreground (bg and fg
command)
$ fg                            # Brings the most recent job
foregrou                        to
nd
$ fg                            # Brings job n to the
n                               foreground
```

17. SYSTEM

```
$ uname -a                          => Display linux system informati
$ uname                             => Display kernel
information (refer uname command in release detail)
$ cat /etc/redhat_release           => Show which version of redhat installed
$ uptime                            => Show how long system running +
load (learn uptime command)
$ hostname                          => Show system host name
$ hostname -i                       => Display the IP address of the
host (all options hostname)
$ last reboot                       => Show system reboot history
(more examples last command)
$ date                              => Show the current date and time
(options of date command)
$ cal                               => Show this month calendar (what
more in cal)
$ w                                 => Display who is online (learn
more about w command)
$ whoami                            => Who you are logged in as
(example + sreenshots)
$ finger user      => Display information about user (many options of finger command)
```

18. HARDWARE

```
$ messages (dmesg many more options)   => Detected hardware and boot
$ cat /proc/cpuinfo                    => CPU model
$ cat /proc/meminfo                    => Hardware memory
$ cat /proc/interrupts per CPU per I/O device   => Lists the number of interrupts
$ hardware configuration of the system          => Displays information on
$ information in Linux (sudo yum install util-linux-ng)   => Displays block device
$ free -m                              => Used and free memory (-m for
MB) (free command in detail)
```

```
$ lspci -tv                    => Show PCI devices (very useful
to find vendor ids)
$ lsusb -tv                    => Show USB devices (read more
lsusb options)
$ lshal                        => Show a list of all devices with
their properties
$ dmidecode                    => Show hardware info from the
BIOS (vendor details)
$ hdparm -i /dev/sda           # Show info about disk sda
$ hdparm -tT /dev/sda          # Do a read speed test on disk sda
$ badblocks -s /dev/sda        # Test for unreadable blocks on
disk sda
```

19. STATISTICS

```
$ top => Display and update the top cpu processes (30 example options)

$ mpstat 1  => Display processors related statistics (learn mpstat command)

$ vmstat                       => Display virtual memory
statistics (very useful performance tool)
$ iostat 2                     => Display I/O statistics (2sec
Intervals) (more examples)
$ tail -n 500                  => Last 10 kernel/syslog
messages, (everyday use tail options)
$ tcpdump -i                   => Capture all packets flows
interface eth1 (useful to sort network issue)
$ tcpdump -i eth0 'port 80'    => Monitor all traffic on port
80 ( HTTP )
$                              => List all open files
to all active processes.(sysadmin favorite
command)
$ lsof -u                      => List files opened by
testuser user specific

$ free -m                      => Show amount of RAM
usage (daily
command)
```

$ watch df -h => Watch changeable data continuously(interesting linux command)