

LINUX

clear

It clears the screen

whoami

Shows current username

echo

it will show back your text

pwd

Present Working Directory

cd

Change Directory

- `cd <path>` = Take you to specific path
- `cd ~` or `(cd)` = Take you to home Directory
- `cd ..` = Take you to previous folder (cd ../.. To move two levels up)
- `cd -` = it will take to previous directory

ls

Listing the items

- `-l` list in long format
- `-a` all files including those which begin with dot
- `-F` It is used to classify the directories, executables. It will append indicator (one of */=>@|) to entries
- `-i` list the inode number in the first column
- `-R` recursively list all directories and subdirectories
- `-r` Display in reverse order.
- `-t` sorts files by access time.
- `-d` shows the names of directories and not their contents.
- `-h` Indicates human readable. This mentions file sizes in kilobytes, megabytes, or Gigabytes, instead of just bytes, which is the default setting. Use this option with the
- `-S` Sorts files by file size. This option is useful only when used together with the option

mkdir

Create the DIRECTORY, if they do not already exist.

- `-m` Sets the access mode for the new directory.

- -p If the parent directories don't exist, this command creates them.
- -v Print a message for each created directory

eg: `mkdir <foldername>`

`mkdir -m 777 <FolderName>`

`mkdir -p Test1/Test2/Test3`

rmkdir

Removes an empty directory

rm

Removes (unlinks) files or directories.

- -i interactively asks for confirming the deletion of files. It is useful in avoiding accidental erasure of the file
- -r option provides a convenient way to erase a directory even if it is not empty
- -f option will forcefully remove a file to which we don't have a write permission.

eg: `rm <file/directory>`

`rm -rf /Testing` (Removes directory which has contents.)

`rm *.txt` -----> Removes all the files extension with .txt.

cp

Copy files and directories.

- -i interactively asks for confirmation if file is existed
- -R option behaves recursively to copy an entire directory structure
- -n it doesn't overwrite the file

eg: `cp <sourceFile name> <Destinationfile name>` (it will copy the file with different name)

note: if destination file name existed, it will overwrite without any confirmation)

`cp <file1> <file2> <DestinationPath>` (it will copy file1, file2 to given directory)

mv

Rename SOURCE to DEST, or move SOURCE to DIRECTORY/file.

eg: `mv <filename> /home/folder` (it will move the file to given directory)

`mv file1 file2` (it renames the file1 to file2)

chmod

Change file access permissions.

Numeric:

| # | Sum | rwX | Permission |
|---|----------------------|-----|-------------------------|
| 7 | $4(r) + 2(w) + 1(x)$ | rwX | read, write and execute |
| 6 | $4(r) + 2(w)$ | rw- | read and write |
| 5 | $4(r) + 1(x)$ | r-X | read and execute |
| 4 | $4(r)$ | r-- | read only |
| 3 | $2(w) + 1(x)$ | -wX | write and execute |
| 2 | $2(w)$ | -w- | write only |
| 1 | $1(x)$ | --X | execute only |
| 0 | 0 | --- | none |

(0=no,1=execute,2=write,4=read,7=all)

eg: `chmod 777 <file/DirName>`

- -R is recursive i.e., include objects in subdirectories.

Symbolic Modes:

| | | | |
|---|--------|---|--|
| u | user | | |
| g | group | + | adds the specified modes to the specified classes |
| o | others | - | removes the specified modes from the specified classes |
| a | all | = | the modes specified are to be made the exact modes for the specified classes |

eg:

`chmod g+w shared_dir` (Add write permission (w) to the Group's (g))

`chmod a-w ourBestReferenceFile` (Remove write permissions (w) for all classes (a))

`chmod ug=rx referenceLib` (Set the permissions for the user and the Group (ug) to read and execute (rx))

chown

Changes the owner or group associated with a file or dir.

1) To change the Owner of the file

eg: `chown <owner_name> <file_name>`

2) To change the group of the file

eg: `chown:group1 file1.txt` (or) `chgrp group1 file1.txt`

3) To change both owner and group of the file

eg: `chown master:group1 file1.txt`

file

file command is used to determine the type of a file according to content of file

eg: `file <FileName>`

WC

Word count, It will show how many lines and words and bytes in the specific file

eg: `wc <Filename>`

- -l it will display only lines
- -w it will display only words
- -c it will display only bytes
- -m it will display only character
- -L it will display the length of the longest line

ln

Make links between files. and provide a copy of file to any user

Types of links

I. Hardlink

It will create copy a file with the same properties of original file and same size
and if the original file is deleted the new file will not be affected
inode number will be same

eg: `ln <source_file_path> <New_filename>`

II. Softlink (Shortcut)

A soft link will point to the original file on your system, if the original file is deleted the new file
will be effected

only shortcut will be created,
inode number will be different

eg: `ln -s <source_file_path> <New_filename>`

touch

create empty file

vi/vim

Vim is a text editor that is an upgraded version of the Vi editor

Opening file

after opening file, we need to press I for insert mode

Editing

we can edit the text

Quit

- press esc and :wq (Save and quit)
- press esc and :q! (quit without Saving)

cat

It will display the content of the file directly in the terminal

- -n will display line numbers with the content

head

Print the first lines of each FILE to standard output

eg: `head <filename>` (by Default it will show first 10 lines)

`head -n 15 <filename>` (it will display first 15 lines)

Tail

Print the last lines of each FILE to standard output

- -f : output appended data as the file grows.
- -n : output the last N lines, instead of the last 10.

sed

SED is a powerful text stream editor. Can do insertion, deletion, search and replace(substitution)
Here it will not make a change but it shows the changes in command line
if we need to overwrite the file we need to add -i flag to sed cmd

- view/print files
 - Viewing a file from x to y range
eg: `sed -n '2,5p' a.txt`
 - View the entire file except the given range
eg: `sed '2,4d' a.txt`
 - Print nth line of the file
eg: `sed -n '4'p a.txt`
 - Print only the last line
eg: `sed -n '$'p filename`
 - Print from nth line to end of file
eg: `sed -n '3,$'p a.txt`
 - Print the line only which matches the pattern
eg: `sed -n '/<word>/p a.txt`
- Replacement with the sed command
 - Change the first occurrence of the pattern
eg: `sed 's/life/leaves/' a.txt`
 - Replacing all the occurrence of the pattern in a line
eg: `sed 's/life/learn/g' a.txt`
eg: `sed -n 's/life/learn/g' a.txt` (-n flag to display only the replaced lines)
 - Replace pattern from nth occurrence to all occurrences in a line.
eg: `sed 's/to/TWO/2g' a.txt`
 - Replacing pattern on a specific line number
eg: `sed '3 s/every/each/' a.txt`
 - Replace string on a defined range of lines
eg: `sed '2,5 s/to/TWO/' a.txt`
- Deleting lines
 - Delete a particular line
eg: `sed '5d' a.txt`
 - Delete the last line
eg: `sed '$d' filename`
 - Delete line from range x to y
eg: `sed '3,5d' a.txt`
 - Delete from nth to last line
eg: `sed '2,$d' a.txt`
 - Delete the pattern matching line
eg: `sed '/life/d' a.txt`

sort

SORT command is used to sort a file, arranging the records in a particular order
eg: `sort <filename>`

- -r for sorting reverse order(descending)
- -n for sorting number (-nr for number descending order)
- -u to sort and remove duplicates lines
- -M to sort by month pass

| (pipe symbol)

It is used in Linux and other Unix-like operating systems to send the output of one command/program/process to another command/program/process for further processing
eg: `cat file.txt | sort`

tr

It supports a range of transformations including uppercase to lowercase, squeezing repeating characters, deleting specific characters, and basic find and replace

eg: `cat <filename> | tr [a-z] [A-Z]`
`cat <filename> | tr [:lower:] [:upper:]` { - ... }
`echo "Welcome To GeeksforGeeks" | tr [:space:] "\t"` (translates all the space characters to tabs)

grep (global regular expression print)

grep command searches the given file for lines containing a match to the given strings or words.

eg: `grep <flagName> "<wordName>" <file>`
`grep -i "UNix" geekfile.txt`

- -c : This prints only a count of the lines that match a pattern
- -h : Display the matched lines, but do not display the filenames.
- -i : Ignores, case for matching
- -l : Displays list of a filenames only.
- -n : Display the matched lines and their line numbers.
- -v : This prints out all the lines that do not matches the pattern
- -e exp : Specifies expression with this option. Can use multiple times.
- -f file : Takes patterns from file, one per line.
- -E : Treats pattern as an extended regular expression (ERE)
- -w : Match whole word
- -o : Print only the matched parts of a matching line,
with each such part on a separate output line.

who

command lets you display the users currently logged in to your Linux operating system.

- Time of last system boot
- Current run level of the system
- List of logged-in users and more

w

It gives us important information about who is currently using the computer, how much the computer is being used, and what programs are running. It's a handy tool for people who take care of computer systems

whereis

whereis command is used to find the location of source/binary file of a command and manuals sections for a specified file in Linux system

eg: `whereis <commandName>`

date

date command is used to display the system date and time.

df

The df command displays information about file system disk space usage on the mounted file system (external devices Disk space can be identified)

du

du command is used for estimating file and directory space usage. The name `du` stands for “disk usage”. It provides information about the storage consumption of files and directories.

eg: `du <path/file>`

`du -sh <path/file>` (here flag ‘h’ is human readable, ‘s’ is summary)

hostname

it will display hostname (Private DNS)

ifconfig

to display IP address (can use -i flag)

man

It is used to display the user manual of any command that we can run on the terminal

systemctl

The systemctl command manages both system and service configurations, enabling administrators to manage the OS and control the status of services

- list all the services
eg: `systemctl list-unit-files`
- Starting and Stopping Services
eg: `systemctl start <ServiceName>`
`systemctl stop <ServiceName>`
- Enabling and Disabling Service
eg: `systemctl enable <ServiceName>`
`systemctl disable <ServiceName>`
- Restarting and Reloading Services
eg: `systemctl restart <ServiceName>`
`systemctl reload <ServiceName>`
- Viewing the Status of Services
eg: `systemctl status <ServiceName>`

uptime

It is used to find out how long the system is active (running).

last

it is used to display the list of all the users logged in (user logged in and logged out)

ps

The ps command is a widely used utility in Linux that provides a snapshot of current processes and their status. It helps monitor running processes, identify process ID (PID), terminal type (TTY), CPU time usage, command name, user ID and other information.

- ps -ef or ps -aux – List currently running processes in full format
- ps -ax – List currently running processes
- ps -u <username> – List processes for a specific user
- ps -C <command> – List processes for a given command
- ps -p <PID> – List processes with a given PID
- ps -ppid <PPID> – List processes with a given parent process ID (PPID)
- pstree – Show processes in a hierarchy
- ps -L – List all threads for a particular process
- ps --sort pmem – Find memory leaks
- ps -eo – Show security information
- ps -U root -u root u – Show processes running by root

kill

It is used to terminate processes manually. kill command sends a signal to a process that terminates the process

top

top command is used to show the Linux processes. It provides a dynamic real-time view of the running system. Usually, this command shows the summary information of the system

- PID: Shows task's unique process id.
- PR: The process's priority. The lower the number, the higher the priority.
- VIRT: Total virtual memory used by the task.
- USER: User name of owner of task.
- %CPU: Represents the CPU usage.

zip

Zip is used to compress files to reduce file size and is also used as a file package utility

eg: `zip myfile.zip filename.txt`

- -d : This option removes any file through the zip archive.
eg: `zip -d filename.zip file.txt`
- -u : This option can update the file inside the zip archive. It could be used for updating the described list of files or adding new files to an existing zip file.

- -m : After zipping, this option deletes the real files. Transfer the particular files into a zip archive as it deletes the target files/directories after creating the specified zip archive.
- -r : To recursively zip a directory, use the zip command with this -r option and it will zip specified files inside the directory recursively. This option supports us to zip every file that existed inside the specified directory
- -x Option: This option can exclude the specified files in making the zip
- -v Option: Print diagnostic or verbose mode version info

unzip

unzip will list, test, or extract files from a ZIP archive

eg: `unzip [file_name.zip]`

tar

It is used to create Archive and extract the Archive files

eg: `tar -cvf home.tar /home/james` (Creating an archive file)

`tar xvf file.tar` (Extracting files from Archive)

‘-c’: Creates a new archive.

‘-x’: Extracts files from an archive.

‘-v’: Displays verbose output during the extraction process.

‘-f’: Specifies the filename of the archive.

useradd

Creates a new user account

eg: `useradd <UserName>`

{Background process done while creating a user:

- creating directory in home
- it going to create an entry for a user in /etc/ passwd, shadow, group}

userdel

Removes a user account

eg: `sudo userdel -r <UserName>`

passwd

Changes a user's password.

eg: `passwd`

password will be saved in /etc/shadow (encrypted)

chage

It is used to see user related “threshold details” such as user disable time etc.

eg: `chage <username>`

groupadd

Create a new group

eg: `groupadd <GroupName>`

groupdel

Delete group

eg: `groupdel <GroupName>`

usermod

Changes user attributes (adding user to group)

eg: `usermod -g <Group Name> <User Name>`

id /groups

It is used to find user and group names, along with the UID and GID of any user in Linux

eg: `id <username>`

`group <username>`

lid

It is used to find the users in the specific group

eg: `lid -g <GroupName>`

su

Switches the user between users and root.

eg: `su - <UserName>`

sudo

Sudo is a command in Linux that allows users to run commands with privileges that only root user have

In Linux we can give or take `sudo` access by adding or removing the username from the file called `sudoers`. To add username to the sudoers we need to run `sudo visudo` command and edit the file and add the line that will give access to user. For example: "username ALL=(ALL:ALL) ALL" gives the user complete access to the sudo command.

ssh

ssh stands for "Secure Shell". It is a protocol used to securely connect to a remote server/system.

ssh runs at TCP/IP port 22.

eg: `ssh user_name@host(IP/Domain_name)`

How to Enable Password Authentication in AWS ec2 Instances

- 1) Log in to the server using ssh client of your choice using the private key.
`ssh -i your-key.pem username@ip_address`
- 2) Setup a password for the user using passwd command along with the username.
`sudo passwd ec2-user`
- 3) Open the sshd_config file.
`sudo vi /etc/ssh/sshd_config`
- 4) Find the Line containing "PasswordAuthentication" parameter and change its value from "no" to "yes"; If you want to set up "root" login, find "PermitRootLogin" parameter and change its value from "prohibit-password" to "yes"
- 5) Now, restart the "sshd" service using the following command
`sudo service sshd restart`
- 6) Now you can log out and log in using the password you set for the user.
`ssh ec2-user@ip_address`

scp

It is used to copy file(s) between servers in a secure way.

- If we want to copy a file from a local machine to a remote machine.
`scp [file_name] remoteuser@remotehost:/remote/directory`
- If we want to copy a file from remote machine to our local machine.
`scp user@remotehost:/home/user/file_name`
 - -P Specifies the port to connect on the remote host
 - -r Recursively copy entire directories.

free

To displays the total amount of free space available along with the amount of memory used and swap memory in the system, and also the buffers used by the kernel.

- -h: To view the memory information in human-readable format
- -k: To get the memory information in kilobytes
- -m: To view the memory information in megabytes
- -g: To view the memory information in gigabytes

dmidecode

It Give the RAM information like Type of RAM(SD RAM, DRAM or DDR2/3), Speed, Manufacture etc

eg: `dmidecode -t 17`

vmstat

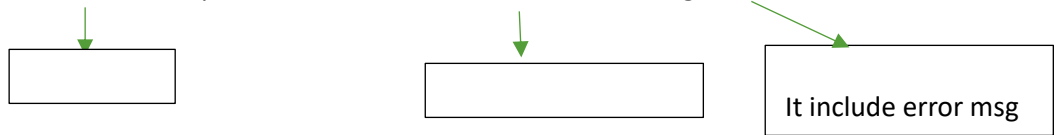
I will give the virtual memory statistics

Crontab

The crontab is a list of commands that you want to run on a regular schedule, and also the name of the command used to manage that list. Crontab stands for “cron table,”

here we need to edit crontab by ‘crontab -e’ cmd and provide the schedules in the editor

`*/1 * * * * /home/bhaskar/devops/lscmd.sh >> /home/bhaskar/lscmd.log 2>&1`



Crontab format:

| Minute | Hour | Day of Month | Month | Day of week | Command |
|--------|--------|--------------|-------------------|------------------|----------------|
| (0-59) | (0-23) | (1-31) | (1-12 or Jan-Dec) | (1-6 or Sun-Sat) | /user/bin/find |

```
* * * * * Command_to_execute

| | | | |
| | | | Day of the Week ( 0 - 6 ) ( Sunday = 0 )
| | | |
| | | Month ( 1 - 12 )
| | |
| | Day of Month ( 1 - 31 )
| |
| Hour ( 0 - 23 )
|
Min ( 0 - 59 )
```

<https://crontab-generator.org>

- To Install or update job in crontab, use -e option:
`crontab -e`
- To List Crontab entries, use -l option:
`crontab -l`
- To Delete job from crontab, use -r option:
`crontab -r`
- To edit other user crontab, user -u option and specify username:
`crontab -u username -e`
- To List other user crontab entries:
`crontab -u username -l`

How to Limit crontab Command Access to Specified Users

- Become the root role.
 - Create the `/etc/cron.d/cron.allow` file.
 - Add the root user name to the cron.allow file.
- If you do not add root to the file, superuser access to crontab commands will be denied.

```
root
username1
username2
username3
```

mail

It allows a user to send emails via a command-line interface.

To take advantage of this command, we need to install a package named 'mailutils'

`sudo apt install mailutils`

```
mail -s "<Subject>" -A <PATH>/<FILENAME> -c "<receiver@domain>" -b "<receiver@domain>"  
<receiver@domain> <<< "<Mail body>"
```

- -s: is used to denote the "Subject" of the mail.
- -A: '-A' or '--attach' options are used to attach files
- -c: option for cc
- -b option for Bcc.

cal

Displays a calendar

wget

The non-interactive network downloader

```
wget <Link>
```

curl

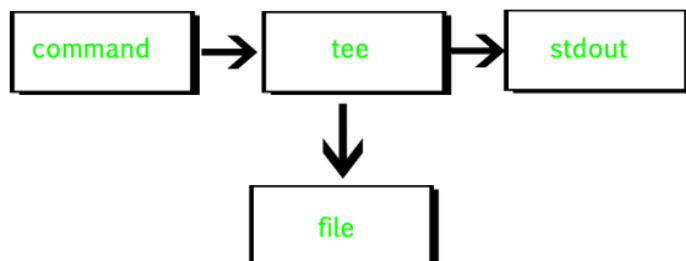
curl is a command-line tool to transfer data to or from a server, using any of the supported protocols (HTTP, FTP, IMAP, POP3, SCP, SFTP, SMTP, TFTP, TELNET, LDAP, or FILE). curl is powered by Libcurl. This tool is preferred for automation since it is designed to work without user interaction.

eg: `curl [options] [URL...]`

`curl -o [file_name] [URL...]` (-o: saves the downloaded file on the local machine with the name provided in the parameters.)

tee

tee command reads the standard input and writes it to both the standard output and one or more files.



eg: `echo " add text" | tee file1.txt file2.txt file3.txt`

```
javatpoint@javatpoint-Inspiron-3542:~$ echo " add text" | tee file1.txt file2.tx
t file3.txt
add text
javatpoint@javatpoint-Inspiron-3542:~$ cat file1.txt
add text
javatpoint@javatpoint-Inspiron-3542:~$ cat file2.txt
add text
javatpoint@javatpoint-Inspiron-3542:~$ cat file3.txt
add text
```

script

This command records your login session in a typescript in the current directory.

ping

PING (Packet Internet Groper) command is used to check the network connectivity between host and server/host

telnet

It is used to create a remote connection with a system over a TCP/IP network. It allows us to administrate other systems by the terminal. We can run a program to conduct administration.

eg: `telnet hostname/IP address`

`telnet server-IP port`

Install Telnet

- `sudo apt install telnetd -y`
- `ufw allow 23/tcp`
- `ufw reload`
- `telnet (Start Telnet)`

history

Displays the recently executed commands

uname

The uname command in Linux is a simple yet powerful tool that offers information about a Linux machine's operating system and hardware platform

netstat -tulap

For finding out which ports of the machine are being opening by which services

watch

watch command in Linux is used to execute a program periodically, showing output in fullscreen

eg: `watch [options] command`

shutdown

The shutdown command in Linux is used to shutdown the system in a safe way

restart

reboot command is used to restart or reboot the system

exit (Ctrl+d or logout)

It is used to exit the shell where it is currently running