OS-UPSKIILL-2023- Basic Commands

1) ls

List information about the FILES (the current directory by default)

SYNTAX : ls [OPTION]... [FILE]...

OPTIONS:

- -l use a long listing format
- -h show as human-readable
- -t sort by modification time, newest first
- -r reverse order while sorting
- -R list subdirectories recursively

Example : ls -lrth sample.txt

2) cat

Concatenate FILE(s), or standard input, to standard output.

SYNTAX : cat [OPTION]... [FILE]...

OPTIONS:

- -n number all output lines
- -T display TAB characters as ^I
- -E display $ at end of each line

Example : cat sample.txt

3) datetime

Display the current time in the given FORMAT, or set the system date

SYNTAX : date [OPTION]... [+FORMAT]

OPTIONS:

- %D – Display date as mm/dd/yy
- %Y – Year (e.g., 2020)
- %m – Month (01-12)
- %d – Day of month (e.g., 01)
- %H – Hour (00-23)
- %I – Hour (01-12)
- %M – Minute (00-59)
- %S – Second (00-60)

Example : `date` && `date --date="yesterday"` && `date --date="4 day"`

4) pwd

Display the present working directory.

SYNTAX : pwd

Example : pwd

5) mkdir

Create the DIRECTORY(ies), if they do not already exist.

SYNTAX : mkdir [OPTION]... DIRECTORY...

EXAMPLE : mkdir sampledir

6) useradd (needed sudo permission or root user)

create a new user account

SYNTAX : sudo useradd [options] [username]

sudo passwd [username] (To set Password)

EXAMPLE:

```
sudo useradd -m username
sudo passwd username
ls -la /home/username/
```

```
sudo su - username  ( to login to that user)
```

7) touch

To create an file in linux.

SYNTAX : touch [filename.ext]

EXAMPLE : touch sample.txt

8) rm

To delete the files.

SYNTAX : rm [filename.ext]

OPTIONS:

- -f ignore nonexistent files and arguments, never prompt
- -r remove directories and their contents recursively

EXAMPLE : rm -rf sample.txt

To know more about RM – type in you terminal command called man rm

9) rmdir

To delete the folders.

SYNTAX : rmdir [directory_name]

EXAMPLE : rmdir sampledir

10) mv

To move or rename the files or folders.

SYNTAX : mv [SOURCE] [DESTINATION]

EXAMPLE : mv sample.txt sample-move.txt

mv sampledir sample-movedir

To know more about MV – type in you terminal command called man MV

11) cp

To copy file or folders to another folders.

SYNTAX : cp [SOURCE] [DESTINATION]

OPTIONS:

- -R, -r copy directories recursively
- -u copy only when the SOURCE file is newer than the destination file or when the destination file is missing
- -v explain what is being done

EXAMPLE : cp sample.txt sample-copy.txt
cp sampledir sample-copydir

To know more about CP – type in you terminal command called man cp

File Permissions

All the three owners (user owner, group, others) in the Linux system have three types of permissions defined. Nine characters denotes the three types of permissions.

1. **Read (r) :** The read permission allows you to open and read the content of a file. But you can't do any editing or modification in the file.
2. **Write (w) :** The write permission allows you to edit, remove or rename a file. For instance, if a file is present in a directory, and write permission is set on the file but not on the directory, then you can edit the content of the file but can't remove, or rename it.
3. **Execute (x):** In Unix type system, you can't run or execute a program unless execute permission is set.But in Windows, there is no such permission available.

Setting Permissions With chmod

You can change the permissions with chmod command accordingly to your need

1. chmod u+x file

   permission to execute is added to the user owner group.

1. chmod g-x file
2. chmod u-w file

   permission to execute is removed from the group and permission to write is removed from the user owner

1. chmod a+w file

   we have given permission to write for all the groups.

PS – Command

Linux provides us a utility called **ps** for viewing information related with the processes on a system which stands as abbreviation for **“Process Status”.** ps

command is used to list the currently running processes and their PIDs along with some other information depends on different options

Linux ps -ef and ps -aux

To display all currently running processes in full format on a system two types of commands are used.

Syntax:

1. ps -ef
2. ps -aux

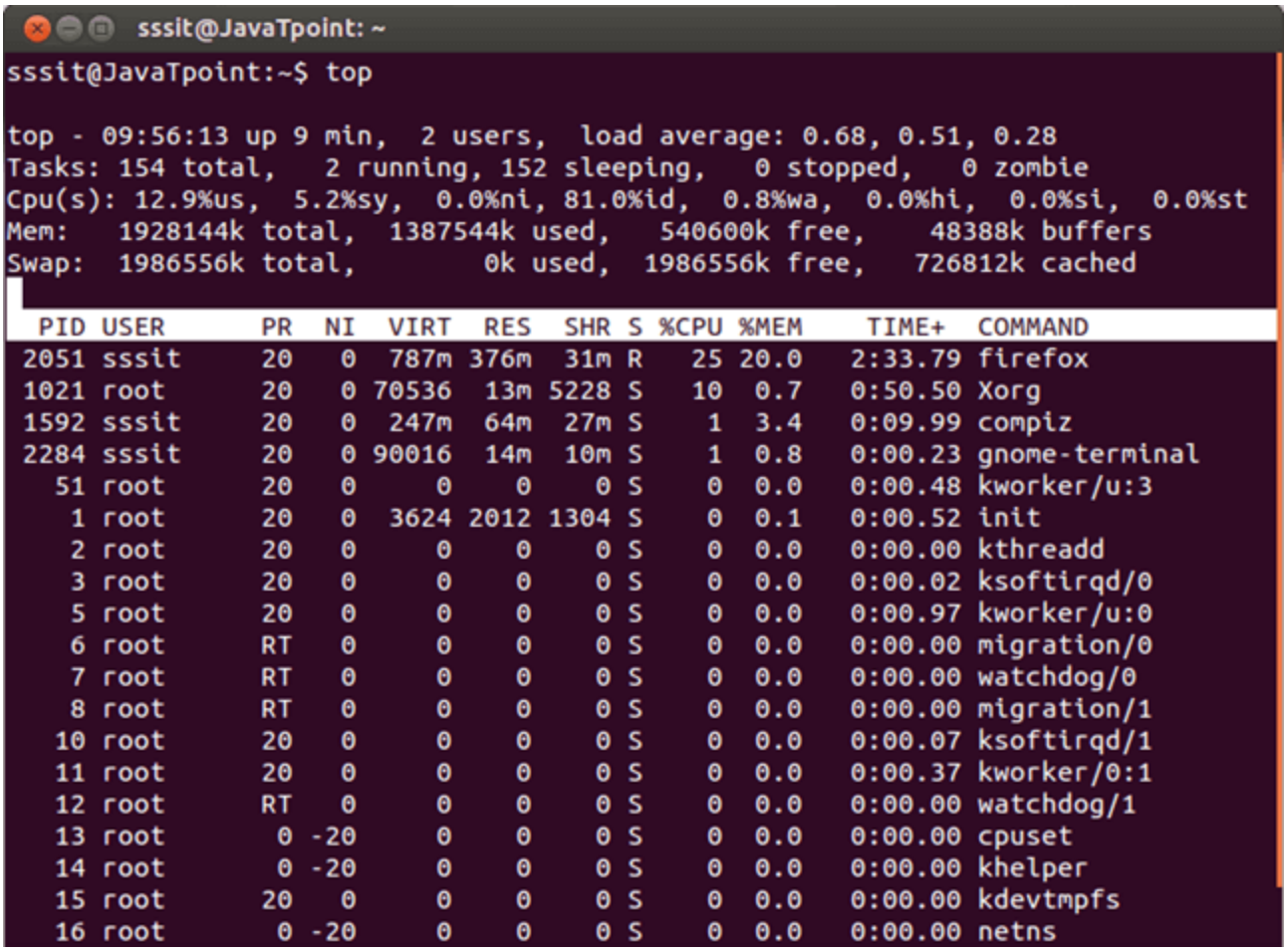
To know more about PS – type in you terminal command called man ps

Top command in Linux with Examples

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 and the list of processes or threads which are currently managed by the Linux Kernel

Syntax:

1. top



Look at the above snapshot, its output is explained here,

Line1

- how long system is running
- how many users are logged in
- and load average

Line2

- Total number of tasks
- number of running tasks
- number of sleeping tasks
- number of stopped tasks
- and number of zombie tasks

Line3

It shows CPU usage in percentage for

- users
- system
- low priority processes
- idle processes
- io wait
- hardware interrupts
- software interrupts
- steal time

Line4

It shows memory usage in kilobytes for

- total memory
- used memory
- free memory
- buffered memory

Line5

It shows swap memory usage in kilobytes for

- total memory
- used memory
- free memory
- cached memory

Table explanation

- proces ID
- user

- priority
- nice user
- virtual memory
- resident memory
- shareable memory
- CPU used percentage
- memory used percentage
- time a process has run
- command

If you want you can **hide/show** these header lines by pressing some keys.

For example,

press **l** - to show/hide Line1. Top line

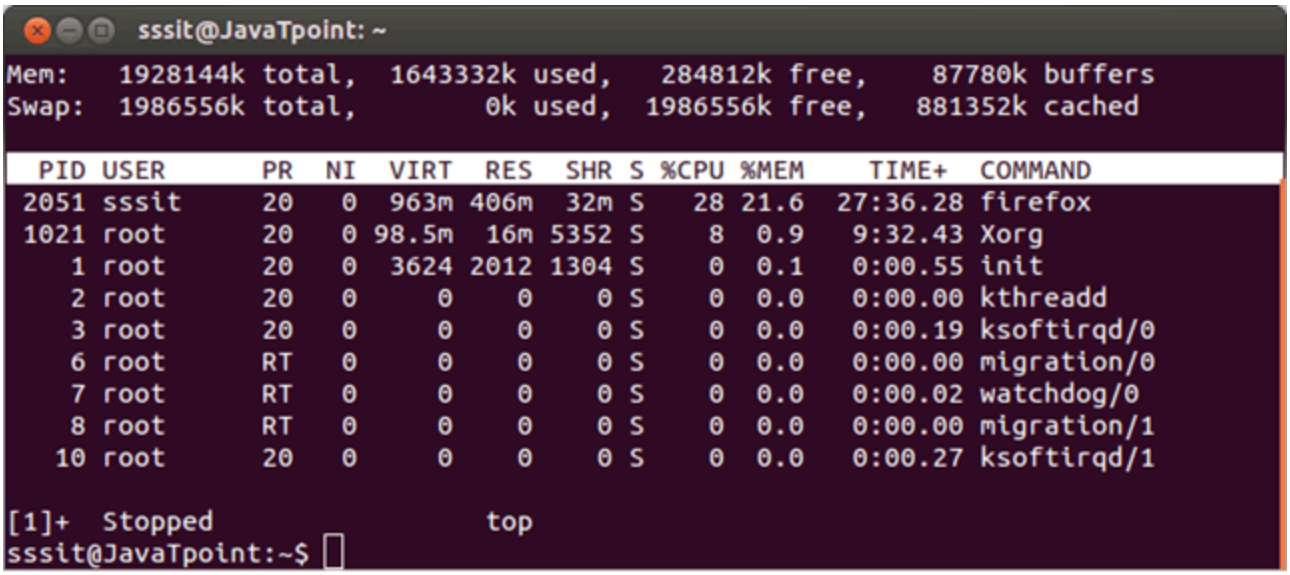
press **t** - to show/hide Line3. CPU information

press **m** - to show/hide Line4 and 5. Memory information

Keeping top command running in background

You can keep top command running in the background continuously without typing top in terminal every time.

Use **ctrl+z** keys to get back your terminal.



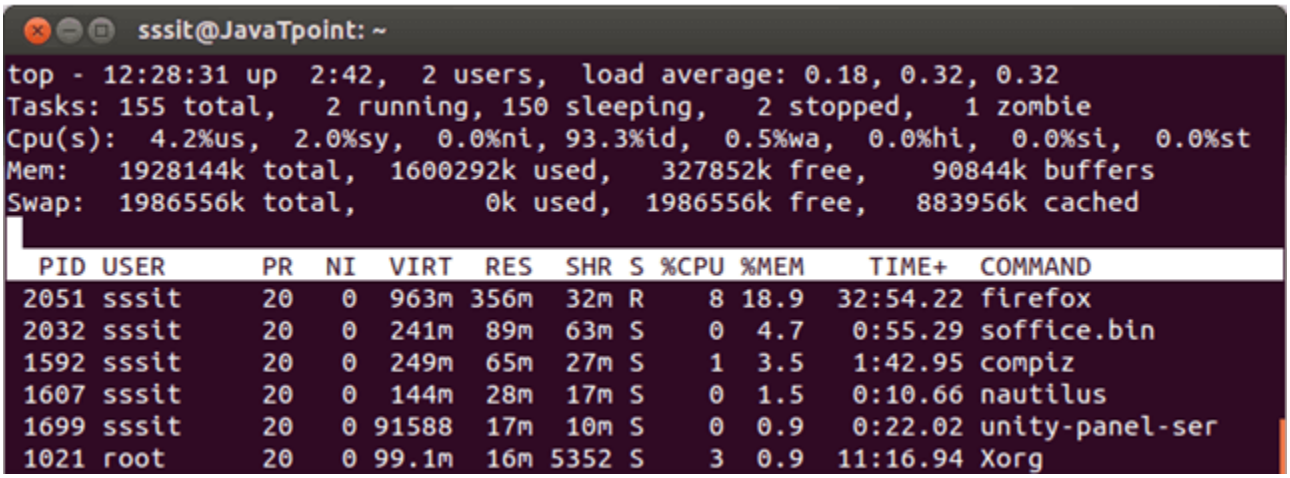
Look at the above snapshot, after pressing ctrl+z keys top command has stopped and we got our terminal back.

To bring back top command in terminal type **fg** in terminal.

Sorting top output

By default, top command always display output in the order of CPU usage.

Press M - To display in order of memory usage.



Netstat command in Linux

Netstat command displays various network related information such as network connections, routing tables, interface statistics, masquerade connections, multicast memberships etc.,

The netstat command supports various command-line options. The basic syntax of the netstat command is as follows:

1. netstat

Options:

It supports multiple command-line options to print information about the Linux networking subsystem. The output is controlled by the first argument. Let's see the list of the first arguments:

(none): If no option is specified, it will execute the default command that displays a list of open sockets of all configured address families.**-interfaces, -i:** It is used to display all network interfaces.

--masquerade, -M: It displays masqueraded connections.

--statistics, -s: This option displays the summary statistics for each protocol.

Other options:

--verbose, -v: It is used to display the detailed output. It is a handy tool for displaying the details about unconfigured address families.

--wide, -W: It is used as an output not to reduce the IP address as necessary. It is still optional not to break existing scripts.

--numeric, -n: It is used to display numeric addresses alternatively defining symbolic hosts, ports, or usernames.

--numeric-hosts: It is used to display numerical host addresses; it does not affect the resolution of port or user names.

--numeric-ports: It is used to display numerical port numbers, it does not affect the properties and objects of host or user names.

--numeric-users: It is used to display numeric user Ids, it does not affect the resolution of host or port names.

--protocol=family, -A: It is used to specify the address families for which connections are to be displayed. The address families are a comma (',') separated like Inet, inet6, Unix, ax25, Netrom, Econet, Ipx, DDP, and Bluetooth.

-c, --continuous: It is used to display the selected information continuously for every second.

-e, --extend: It is used for extended output. This option can be used twice for maximum detail.

-o, --timers: It is used to include networking timers related information.

-p, --program: It is used to display the PID and name of the process to the corresponding sockets.

-l, --listening: It is used to display only listening sockets.

-a, --all: It is used to display both sockets (i.e., listening and non-listening). By specifying the '--interfaces' option, we can list the interfaces that are not up.

-F: It is used to display the routing information from the FIB.

-C: It is used to display the routing information from the route cache.

Installation of the netstat command

If the netstat command is not installed on your machine, it will display the traditional Linux installation error message "Command 'netstat' not found."

To install it, execute the below command:

1. sudo apt install net-tools

The above command will ask for the administration password to install the command. If it is successfully installed, it will produce the output as follows:

```
javatpoint@javatpoint-Inspiron-3542:~$ sudo apt install net-tools
[sudo] password for javatpoint:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libclang1-5.0 libllvm5.0 libpango1.0-0 libpangox-1.0-0 libpython-stdlib
  libwxsqlite3-3.0-0 linux-headers-5.3.0-28 linux-headers-5.3.0-28-generic
  linux-image-5.3.0-28-generic linux-modules-5.3.0-28-generic
  linux-modules-extra-5.3.0-28-generic python python-minimal python2.7
  python2.7-minimal wx-common
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  net-tools
```

Examples of the netstat command

Let' see the following examples of the netstat command:

- Display All Connections
- Display only TCP or UDP connections
- Disable reverse DNS lookup for faster output
- Display only listening connections
- Display Pid and Uid
- Display Statistics
- Display kernel routing information
- Display network interfaces
- Display netstat output continuously
- Display multicast group information

Display All Connections

The '-a' option is used to display all the existing connections. Execute the netstat command as follows:

1. netstat- a

The above command will list all the existing connections. Consider the below output:

```
javatpoint@javatpoint-Inspiron-3542:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:ssh             0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:telnet          0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp6       0      0 [::]:http               [::]:*                  LISTEN
tcp6       0      0 [::]:ssh                [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
tcp6       0      0 javatpoint-Inspir:44138 2a04:fa87:fffe::c:https ESTABLISHED
tcp6       0      0 javatpoint-Inspir:37262 2404:6800:4003:c0:https ESTABLISHED
udp        0      0 localhost:domain        0.0.0.0:*
udp        0      0 0.0.0.0:bootpc          0.0.0.0:*
udp        0      0 0.0.0.0:45320           0.0.0.0:*
udp        0      0 0.0.0.0:ipp             0.0.0.0:*
udp        0      0 javatpoint-Inspir:53951 0.0.0.0:*
udp        0      0 224.0.0.251:mdns        0.0.0.0:*
udp        0      0 224.0.0.251:mdns        0.0.0.0:*
udp        0      0 0.0.0.0:mdns            0.0.0.0:*
```

Display only TCP or UDP Connections

We can list only the TCP or UDP connections. To display only the TCP connection, execute the command with the 't' option as follows:

1. netstat -at

The above command will list all the TCP connections. Consider the below output:

```
javatpoint@javatpoint-Inspiron-3542:~$ netstat -at
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:ssh             0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:telnet          0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp       78      0 javatpoint-Inspir:55488 ec2-52-72-231-90.:https CLOSE_WAIT
tcp        0      0 javatpoint-Inspir:55486 ec2-52-72-231-90.:https TIME_WAIT
tcp6       0      0 [::]:http               [::]:*                  LISTEN
tcp6       0      0 [::]:ssh                [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
tcp6       0      0 javatpoint-Inspir:58926 del11s06-in-x03.1:https ESTABLISHED
tcp6       0      0 javatpoint-Inspir:37262 2404:6800:4003:c0:https ESTABLISHED
tcp6       0      0 javatpoint-Inspir:47580 2600:9000:2172:96:https ESTABLISHED
tcp6       0      0 javatpoint-Inspir:45920 del03s05-in-x0e.1:https ESTABLISHED
```

To display only UDP connection, execute it with 'u' option as follows:

1. netstat -au

The above command will list all the UDP connections. Consider the below output:

```
javatpoint@javatpoint-Inspiron-3542:~$ netstat -au
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 localhost:domain        0.0.0.0:*
udp        0      0 0.0.0.0:bootpc          0.0.0.0:*
udp        0      0 0.0.0.0:45320           0.0.0.0:*
udp        0      0 0.0.0.0:ipp             0.0.0.0:*
udp        0      0 224.0.0.251:mdns        0.0.0.0:*
udp        0      0 224.0.0.251:mdns        0.0.0.0:*
udp        0      0 0.0.0.0:mdns            0.0.0.0:*
udp6       0      0 [::]:33276              [::]:*
udp6       0      0 [::]:mdns               [::]:*
```

DF – COMMAND

The df command **displays the amount of disk space available on the filesystem with each file name's argumen**

Syntax:

1. df [OPTION]... [FILE]...

Options:

-a, --all: It is used to include pseudo, duplicate, remote file systems.

-B, --block-size=SIZE: It is used to scale sizes by SIZE before printing them, for example, the '-BM' option prints sizes in units of 1,048,576 bytes.

-h, --human-readable: It is used to display sizes in powers of 1024 (e.g., 1023M).

-H, --si: It is used to show sizes in powers of 1000 (e.g., 1.1G)

-i, --inodes: It is used to list inode information instead of block usage

-l, --local: It is used to limit the listing to local file systems.

--no-sync: It is used for not invoking sync before getting usage info (default).

--output[=FIELD_LIST]: This option used if we want to use the output format defined by FIELD_LIST or print all fields if FIELD_LIST is omitted.

-P, --portability: It is used to use the POSIX output format.

--total: It is used to exclude all entries insignificant to available space, and produce a total.

-t, --type=TYPE: It is used to limit the listing to file systems of type TYPE.

-T, --print-type: It is used to display the file system type.

-x, --exclude-type=TYPE: It is used to limit the listing to file systems, not of type TYPE.

--help: It is used to display the help manual having brief information about the supported options.

--version: It is used to display the version information of the df command.

Examples of the df command

Let's see the following examples of the df command:

- Display the disk space usage
- Display the disk space usage in a human-readable form
- Display the file system type
- Display specific file system types
- Exclude the particular file system types
- Display available space and mount point for a folder

Display the Disk Space Usage

To display the disk space usage, execute the df command without any argument. It will show the disk space usage in a tabular form. The df command is useful for discovering the available free space on a system or file system. Execute the below command:

1. df

The above command will produce the output as follows:

```
javatpoint@javatpoint-Inspiron-3542:~$ df
Filesystem     1K-blocks     Used Available Use% Mounted on
udev             1931652        0   1931652   0% /dev
tmpfs             393260     1760    391500   1% /run
/dev/sda1      479668904 29005756 426227540   7% /
tmpfs            1966284   304388   1661896  16% /dev/shm
tmpfs               5120        4      5116   1% /run/lock
tmpfs            1966284        0   1966284   0% /sys/fs/cgroup
/dev/loop1          1024     1024         0 100% /snap/gnome-logs/93
/dev/loop3          2560     2560         0 100% /snap/gnome-calculator/748
/dev/loop4          2560     2560         0 100% /snap/gnome-calculator/730
/dev/loop0          2304     2304         0 100% /snap/gnome-system-monitor/148
/dev/loop5           384      384         0 100% /snap/gnome-characters/550
/dev/loop8          1024     1024         0 100% /snap/gnome-logs/100
/dev/loop7        178048   178048         0 100% /snap/gimp/252
/dev/loop2        261760   261760         0 100% /snap/gnome-3-34-1804/33
/dev/loop9         56320    56320         0 100% /snap/core18/1705
/dev/loop6         99456    99456         0 100% /snap/core/9289
/dev/loop15       220160   220160         0 100% /snap/wine-platform-5-stable/5
/dev/loop13        96256    96256         0 100% /snap/core/9066
/dev/loop11        56192    56192         0 100% /snap/gtk-common-themes/1502
/dev/loop10       261760   261760         0 100% /snap/gnome-3-34-1804/36
/dev/loop12       180096   180096         0 100% /snap/gimp/273
```

From the above output, we can see the file system, the size of the file system in 1k block, used space, available space, the percentage applied by the file system, and mount point, respectively.

Display the disk space usage in a human-readable form

The '-h' option is used to display the disk space in a human-readable form. It will display the size in powers of 1024 and will append G for GBs, M for MBs, and B for Bytes. Execute the below command:

1. df -h

The above command will produce the output as follows:

```
javatpoint@javatpoint-Inspiron-3542:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            1.9G     0  1.9G   0% /dev
tmpfs           385M  1.8M  383M   1% /run
/dev/sda1       458G   28G  407G   7% /
tmpfs           1.9G  302M  1.6G  16% /dev/shm
tmpfs           5.0M  4.0K  5.0M   1% /run/lock
tmpfs           1.9G     0  1.9G   0% /sys/fs/cgroup
/dev/loop1      1.0M  1.0M     0 100% /snap/gnome-logs/93
/dev/loop3      2.5M  2.5M     0 100% /snap/gnome-calculator/748
/dev/loop4      2.5M  2.5M     0 100% /snap/gnome-calculator/730
/dev/loop0      2.3M  2.3M     0 100% /snap/gnome-system-monitor/148
/dev/loop5      384K  384K     0 100% /snap/gnome-characters/550
/dev/loop8      1.0M  1.0M     0 100% /snap/gnome-logs/100
/dev/loop7      174M  174M     0 100% /snap/gimp/252
/dev/loop2      256M  256M     0 100% /snap/gnome-3-34-1804/33
/dev/loop9       55M   55M     0 100% /snap/core18/1705
/dev/loop6       98M   98M     0 100% /snap/core/9289
/dev/loop15     215M  215M     0 100% /snap/wine-platform-5-stable/5
/dev/loop13      94M   94M     0 100% /snap/core/9066
/dev/loop11      55M   55M     0 100% /snap/gtk-common-themes/1502
/dev/loop10     256M  256M     0 100% /snap/gnome-3-34-1804/36
/dev/loop12     176M  176M     0 100% /snap/gimp/273
/dev/loop14     141M  141M     0 100% /snap/gnome-3-26-1604/100
```