Linux Commands

- **pwd :** Present Working Directory.

```
vboxuser@Ubuntu:~$ pwd
/home/vboxuser
```

- **cd**: Change Directory

- **cd /**: Root Directory
- **cd ~**: Home Directory
- **ls**: List of files.

```
vboxuser@Ubuntu:~$ cd /
vboxuser@Ubuntu:/$ ls
bin                  dev    lib64               mnt    run                  srv   var
bin.usr-is-merged    etc    lib.usr-is-merged   opt    sbin                 sys
boot                 home   lost+found          proc   sbin.usr-is-merged   tmp
cdrom                lib    media               root   snap                 usr
vboxuser@Ubuntu:/$ cd ~
vboxuser@Ubuntu:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
```

- **ll**: Long and detailed list of files.

```
vboxuser@Ubuntu:~$ ll
total 80
drwxr-x--- 16 vboxuser vboxuser 4096 Dec  8 08:52 ./
drwxr-xr-x  3 root     root     4096 Dec  4 07:12 ../
-rw-------  1 vboxuser vboxuser 1378 Dec  8 08:51 .bash_history
-rw-r--r--  1 vboxuser vboxuser  220 Mar 31  2024 .bash_logout
-rw-r--r--  1 vboxuser vboxuser 3771 Mar 31  2024 .bashrc
drwx------ 11 vboxuser vboxuser 4096 Dec  4 08:35 .cache/
drwx------ 13 vboxuser vboxuser 4096 Dec  8 06:25 .config/
drwxr-xr-x  2 vboxuser vboxuser 4096 Dec  8 08:51 Desktop/
drwxr-xr-x  2 vboxuser vboxuser 4096 Dec  4 07:17 Documents/
drwxr-xr-x  2 vboxuser vboxuser 4096 Dec  8 08:49 Downloads/
drwx------  2 vboxuser vboxuser 4096 Dec  8 08:52 .gnupg/
drwx------  4 vboxuser vboxuser 4096 Dec  4 07:17 .local/
drwxr-xr-x  2 vboxuser vboxuser 4096 Dec  4 07:17 Music/
drwxr-xr-x  2 vboxuser vboxuser 4096 Dec  4 07:17 Pictures/
-rw-r--r--  1 vboxuser vboxuser  807 Mar 31  2024 .profile
drwxr-xr-x  2 vboxuser vboxuser 4096 Dec  4 07:17 Public/
drwx------  4 vboxuser vboxuser 4096 Dec  8 06:00 snap/
drwx------  2 vboxuser vboxuser 4096 Dec  4 07:12 .ssh/
drwxr-xr-x  2 vboxuser vboxuser 4096 Dec  4 07:17 Templates/
drwxr-xr-x  2 vboxuser vboxuser 4096 Dec  4 07:17 Videos/
```

Linux Commands

- **cd ..** : go back one step in the directory.

- **cd ../..**: go back two steps in the directory.

```
vboxuser@Ubuntu:~/Downloads/Klop$ pwd
/home/vboxuser/Downloads/Klop
vboxuser@Ubuntu:~/Downloads/Klop$ cd ..
vboxuser@Ubuntu:~/Downloads$ cd ../..
vboxuser@Ubuntu:/home$ pwd
/home
vboxuser@Ubuntu:/home$
```

- **ls –ltr**: List of most recently modded files.

```
vboxuser@Ubuntu:~$ ls -ltr
total 36
drwxr-xr-x 2 vboxuser vboxuser 4096 Dec  4 07:17 Videos
drwxr-xr-x 2 vboxuser vboxuser 4096 Dec  4 07:17 Templates
drwxr-xr-x 2 vboxuser vboxuser 4096 Dec  4 07:17 Public
drwxr-xr-x 2 vboxuser vboxuser 4096 Dec  4 07:17 Pictures
drwxr-xr-x 2 vboxuser vboxuser 4096 Dec  4 07:17 Music
drwxr-xr-x 2 vboxuser vboxuser 4096 Dec  4 07:17 Documents
drwx------ 4 vboxuser vboxuser 4096 Dec  8 06:00 snap
drwxr-xr-x 2 vboxuser vboxuser 4096 Dec  8 08:51 Desktop
drwxr-xr-x 3 vboxuser vboxuser 4096 Dec  8 09:18 Downloads
```

- **mkdir** : Make a new directory/folder.

```
vboxuser@Ubuntu:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
vboxuser@Ubuntu:~$ mkdir Klop
vboxuser@Ubuntu:~$ ls
Desktop    Downloads  Music    Public    Templates
Documents  Klop       Pictures  snap      Videos
```

- **ls –a**: List of files along with hidden files.

- **mv**: Move/Rename/hide/unhide file.

```
vboxuser@Ubuntu:~$ mv Klop /home/vboxuser/Desktop
vboxuser@Ubuntu:~$ cd Desktop/
vboxuser@Ubuntu:~/Desktop$ ls
Klop
vboxuser@Ubuntu:~/Desktop$ mv Klop .Klop
vboxuser@Ubuntu:~/Desktop$ ls
vboxuser@Ubuntu:~/Desktop$ ls -a
.  ..  .Klop
```

- **rm** – Remove file.

Linux Commands

- **touch** – Create a new file with 0 size.

```
vboxuser@Ubuntu:~/Desktop/Klop$ touch why
vboxuser@Ubuntu:~/Desktop/Klop$ ls
why
vboxuser@Ubuntu:~/Desktop/Klop$ rm why
vboxuser@Ubuntu:~/Desktop/Klop$ ls
```

- **rm –rf**: delete entire directory. (irreversible)

```
vboxuser@Ubuntu:~/Desktop$ ls
Klop
vboxuser@Ubuntu:~/Desktop$ rm -rf Klop
vboxuser@Ubuntu:~/Desktop$ ls
```

- **cp –r**: copy the selected directory.

```
vboxuser@Ubuntu:~$ ls
Desktop     Downloads  Music       Public   Templates
Documents   Klop       Pictures    snap     Videos
vboxuser@Ubuntu:~$ cp -r Klop /home/vboxuser/Desktop
vboxuser@Ubuntu:~$ cd Desktop/
vboxuser@Ubuntu:~/Desktop$ ls
Klop
vboxuser@Ubuntu:~/Desktop$ cd ~
vboxuser@Ubuntu:~$ ls
Desktop     Downloads  Music       Public   Templates
Documents   Klop       Pictures    snap     Videos
```

- **cat** – view the file content.
- **wc** – word count. 2 is number of lines, 4 is number of characters, 27 is size of the file in the below screenshot.
- **:wq!**: save and exit from the editor.
- **vi** – add content to a file.
- **vi filename** – If there is no created file, it will create file and launch the editor.

```
vboxuser@Ubuntu:~/Klop$ vi World
vboxuser@Ubuntu:~/Klop$ cat World
Hello World
Enough Already
vboxuser@Ubuntu:~/Klop$ wc World
 2  4 27 World
```

Linux Commands

- chmod – used to change permissions of a file/directory.

```
vboxuser@Ubuntu:~/Klop$ ls
Mecha
vboxuser@Ubuntu:~/Klop$ ll
total 12
drwxrwxr-x  2 vboxuser vboxuser 4096 Dec  9 08:47 ./
drwxr-x--- 17 vboxuser vboxuser 4096 Dec  9 07:11 ../
-rw-rw-r--  1 vboxuser vboxuser   34 Dec  9 08:47 Mecha
vboxuser@Ubuntu:~/Klop$ chmod 766 Mecha
vboxuser@Ubuntu:~/Klop$ ll
total 12
drwxrwxr-x  2 vboxuser vboxuser 4096 Dec  9 08:47 ./
drwxr-x--- 17 vboxuser vboxuser 4096 Dec  9 07:11 ../
-rwxrw-rw-  1 vboxuser vboxuser   34 Dec  9 08:47 Mecha*
```

- cat /etc/passwd - get a complete list of users.

```
vboxuser@Ubuntu:~$ 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
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
_apt:x:42:65534::/nonexistent:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:998:998:systemd Network Management:/:/usr/sbin/nologin
systemd-timesync:x:996:996:systemd Time Synchronization:/:/usr/sbin/nol
dhcpcd:x:100:65534:DHCP Client Daemon,,,:/usr/lib/dhcpcd:/bin/false
```

- chown – used to change ownership of the file.
- Id – used to check the current user.
- sudo - means super user do. It gives extra privileges to the user that is in sudoers files only.

```
vboxuser@Ubuntu:~/Klop$ ll
total 12
drwxrwxr-x  2 vboxuser vboxuser 4096 Dec  9 08:47 ./
drwxr-x--- 17 vboxuser vboxuser 4096 Dec  9 07:11 ../
-rwxrw-rw-  1 vboxuser vboxuser   34 Dec  9 08:47 Mecha*
vboxuser@Ubuntu:~/Klop$ chown Jack Mecha
chown: changing ownership of 'Mecha': Operation not permitted
vboxuser@Ubuntu:~/Klop$ sudo chown Jack Mecha
[sudo] password for vboxuser:
vboxuser@Ubuntu:~/Klop$ ll
total 12
drwxrwxr-x  2 vboxuser vboxuser 4096 Dec  9 08:47 ./
drwxr-x--- 17 vboxuser vboxuser 4096 Dec  9 07:11 ../
-rwxrw-rw-  1 Jack     vboxuser   34 Dec  9 08:47 Mecha*
```

Linux Commands

- useradd – used to add user.
- passwd – used to add password to the new user.
- exit – used to exit from shell

```
vboxuser@Ubuntu:~/Klop$ sudo su root
root@Ubuntu:/home/vboxuser/Klop# useradd Wolf
root@Ubuntu:/home/vboxuser/Klop# passwd Wolf
New password:
Retype new password:
passwd: password updated successfully
root@Ubuntu:/home/vboxuser/Klop# su Wolf
$ id
uid=1002(Wolf) gid=1002(Wolf) groups=1002(Wolf)
$
```

- find – used to find any file/directory.
- find / -name filename – used to find the file.
- find / -name *.extension - used to find files with a specific extension.

```
root@Ubuntu:/home/vboxuser# find / -name sudoers
find: '/run/user/1000/gvfs': Permission denied
find: '/run/user/1000/doc': Permission denied
/usr/share/doc/sudo/examples/sudoers
/snap/core22/2163/etc/sudoers
/snap/core22/2045/etc/sudoers
/etc/sudoers
root@Ubuntu:/home/vboxuser# vi /etc/sudoers
root@Ubuntu:/home/vboxuser# find / -name *.txt
find: '/run/user/1000/gvfs': Permission denied
find: '/run/user/1000/doc': Permission denied
/usr/lib/xorg/protocol.txt
/usr/lib/python3.12/LICENSE.txt
/usr/lib/python3/dist-packages/click-8.1.6.egg-info/top_level.txt
```

- echo text > filename - add the provided text to a file. It will also delete or overwrite the existing content.

Linux Commands

- echo text >> filename - add the text to a file without overwriting the existing content.

```
vboxuser@Ubuntu:~$ cd Klop/
vboxuser@Ubuntu:~/Klop$ ls
Mecha
vboxuser@Ubuntu:~/Klop$ vi GOT
vboxuser@Ubuntu:~/Klop$ cat GOT
Winter is
coming
vboxuser@Ubuntu:~/Klop$ echo Power is  Power > GOT
vboxuser@Ubuntu:~/Klop$ cat GOT
Power is Power
vboxuser@Ubuntu:~/Klop$ echo Winter is Coming >> GOT
vboxuser@Ubuntu:~/Klop$ cat GOT
Power is Power
Winter is Coming
```

- head -3 filename - read the top three lines of a file.
- tail -3 filename - read the bottom three lines of a file.
- tail - f filename - It is to continuously monitor a given file.

```
vboxuser@Ubuntu:~/Klop$ head -3 Mecha
a
a
a
vboxuser@Ubuntu:~/Klop$ tail -2 Mecha
asd
a
vboxuser@Ubuntu:~/Klop$ tail -f Mecha
s
f
e
q
w
eq
wr
s
asd
a
^C
```

- grep -i keyword alphabet - shows whether the given keyword exists in the given file irrespective of its case, upper or lower.
- grep keyword alphabet - shows whether the given keyword exists in the given file.

```
vboxuser@Ubuntu:~/Klop$ grep s Mecha
s
s
s
asd
vboxuser@Ubuntu:~/Klop$ grep S Mecha
vboxuser@Ubuntu:~/Klop$ grep -i S Mecha
s
s
s
asd
```

Linux Commands

- chgrp – change group ownership.

```
vboxuser@Ubuntu:~$ sudo chgrp Jack Klop
vboxuser@Ubuntu:~$ ll
total 84
drwxr-x--- 17 vboxuser vboxuser 4096 Dec  9 07:11 ./
drwxr-xr-x  3 root     root     4096 Dec  4 07:12 ../
-rw-------  1 vboxuser vboxuser 2893 Dec  9 09:02 .bash_history
-rw-r--r--  1 vboxuser vboxuser  220 Mar 31  2024 .bash_logout
-rw-r--r--  1 vboxuser vboxuser 3771 Mar 31  2024 .bashrc
drwx------ 12 vboxuser vboxuser 4096 Dec  9 05:35 .cache/
drwx------ 14 vboxuser vboxuser 4096 Dec  9 05:33 .config/
drwxr-xr-x  2 vboxuser vboxuser 4096 Dec  9 05:46 Desktop/
drwxr-xr-x  2 vboxuser vboxuser 4096 Dec  4 07:17 Documents/
drwxr-xr-x  2 vboxuser vboxuser 4096 Dec  9 06:02 Downloads/
drwx------  2 vboxuser vboxuser 4096 Dec  8 08:52 .gnupg/
drwxrwxr-x  2 vboxuser Jack     4096 Dec  9 09:11 Klop/
```

- stat – used to display stats of file/directory.

```
vboxuser@Ubuntu:~$ stat Klop
  File: Klop
  Size: 4096            Blocks: 8          IO Block: 4096   directory
Device: 8,2     Inode: 1576301    Links: 2
Access: (0775/drwxrwxr-x)  Uid: ( 1000/vboxuser)   Gid: ( 1001/    Jack)
Access: 2025-12-09 08:47:15.007437878 +0000
Modify: 2025-12-09 09:11:46.101302109 +0000
Change: 2025-12-09 09:18:43.097645775 +0000
 Birth: 2025-12-09 06:45:53.236532765 +0000
```

- Create user with name Techie and provide sudo access to user.

```
root@Ubuntu:/home/vboxuser# useradd Techie
root@Ubuntu:/home/vboxuser# passwd Techie
New password:
```

```
Ubuntu% sudo apt install git
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
git is already the newest version (1:2.43.0-1ubuntu7.3).
The following package was automatically installed and is no longer required:
  libllvm19
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 11 not upgraded.
Ubuntu% id
uid=1002(Techie) gid=1002(Techie) groups=1002(Techie)
```

-
- Navigate to the home directory.

```
vboxuser@Ubuntu:/$ cd ~
vboxuser@Ubuntu:~$ ls
Desktop  Documents  Downloads  Klop  Music  Pictures  Public  snap  Templates  Videos
```

- Create a new directory.

Linux Commands

- Copy a file to another location.

- Move a file to another location.

```
vboxuser@Ubuntu:~$ cd Klop/
vboxuser@Ubuntu:~/Klop$ cp -r Look /home/vboxuser/Downloads
vboxuser@Ubuntu:~/Klop$ ls
GOT  Look
vboxuser@Ubuntu:~/Klop$ cd ..
vboxuser@Ubuntu:~$ cd Downloads/
vboxuser@Ubuntu:~/Downloads$ ls
hello-world-pixel-3840x2160-15168.png  Look  wc1782992-berserk-2017-wallpaper.jpg
vboxuser@Ubuntu:~/Downloads$ mv Look /home/vboxuser/
vboxuser@Ubuntu:~/Downloads$ cd ..
vboxuser@Ubuntu:~$ ls
Desktop  Documents  Downloads  Klop  Look  Music  Pictures  Public  snap  Templates  Videos
```

- Rename a file.

- Delete a file.

```
vboxuser@Ubuntu:~$ mv Look Night
vboxuser@Ubuntu:~$ ls
Desktop  Documents  Downloads  Klop  Music  Night  Pictures  Public  snap  Templates  Videos
vboxuser@Ubuntu:~$ cat Night
World is here
sure?
yep
vboxuser@Ubuntu:~$ rm Night
vboxuser@Ubuntu:~$ ls
Desktop  Documents  Downloads  Klop  Music  Pictures  Public  snap  Templates  Videos
```

- Grant or revoke permissions on a file or directory.

```
vboxuser@Ubuntu:~/Klop$ ll
total 16
drwxrwxr-x  2 vboxuser Jack     4096 Dec 10 09:43 ./
drwxr-x--- 18 vboxuser vboxuser 4096 Dec 10 09:49 ../
-rw-rw-r--  1 vboxuser vboxuser   38 Dec  9 11:12 GOT
-rw-rw-r--  1 vboxuser vboxuser   24 Dec 10 09:43 Look
vboxuser@Ubuntu:~/Klop$ chmod 777 GOT
vboxuser@Ubuntu:~/Klop$ ll
total 16
drwxrwxr-x  2 vboxuser Jack     4096 Dec 10 09:43 ./
drwxr-x--- 18 vboxuser vboxuser 4096 Dec 10 09:49 ../
-rwxrwxrwx  1 vboxuser vboxuser   38 Dec  9 11:12 GOT*
-rw-rw-r--  1 vboxuser vboxuser   24 Dec 10 09:43 Look
vboxuser@Ubuntu:~/Klop$ chmod 621 GOT
vboxuser@Ubuntu:~/Klop$ ll
total 16
drwxrwxr-x  2 vboxuser Jack     4096 Dec 10 09:43 ./
drwxr-x--- 18 vboxuser vboxuser 4096 Dec 10 09:49 ../
-rw--w---x  1 vboxuser vboxuser   38 Dec  9 11:12 GOT*
-rw-rw-r--  1 vboxuser vboxuser   24 Dec 10 09:43 Look
```

Linux Commands

- View the current date and time.

- Check the system uptime.

```
vboxuser@Ubuntu:~$ date
Wed Dec 10 09:53:52 AM UTC 2025
vboxuser@Ubuntu:~$ uptime
 09:55:07 up  5:13,  1 user,  load average: 0.00, 0.00, 0.00
```

- View the running processes.

```
vboxuser@Ubuntu:~$ ps -ef
UID          PID    PPID  C STIME TTY          TIME CMD
root           1       0  0 04:41 ?        00:00:02 /sbin/init splash
root           2       0  0 04:41 ?        00:00:00 [kthreadd]
root           3       2  0 04:41 ?        00:00:00 [pool_workqueue_release]
root           4       2  0 04:41 ?        00:00:00 [kworker/R-rcu_gp]
root           5       2  0 04:41 ?        00:00:00 [kworker/R-sync_wq]
```

- Kill a running process.

```
vboxuser@Ubuntu:~$ pkill -9 apache2
vboxuser@Ubuntu:~$ systemctl status apache2
○ apache2.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset:
     Active: inactive (dead) since Thu 2025-12-11 05:09:38 UTC; 43min ago
   Duration: 41min 29.186s
       Docs: https://httpd.apache.org/docs/2.4/
    Process: 1179 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SU
    Process: 3244 ExecStop=/usr/sbin/apachectl graceful-stop (code=exited, stat
```

- Install a package using the package manager (e.g., apt or yum).

```
vboxuser@Ubuntu:~$ sudo apt install cmatrix
[sudo] password for vboxuser:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
  libllvm19
Use 'sudo apt autoremove' to remove it.
Suggested packages:
  cmatrix-xfont
The following NEW packages will be installed:
  cmatrix
0 upgraded, 1 newly installed, 0 to remove and 11 not upgraded.
Need to get 33.7 kB of archives.
After this operation, 75.8 kB of additional disk space will be used.
```

Linux Commands

- Update the system packages.

```
vboxuser@Ubuntu:~$ sudo apt update
Hit:1 http://in.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://in.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1,646 kB]
Get:6 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [21.6 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [212 B
Get:8 http://in.archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:9 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [71.4 kB
Get:10 http://in.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212
Get:11 http://in.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1,501 k
Get:12 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [212
Get:13 http://in.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [377 k
Get:14 http://in.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940
Get:15 http://in.archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [7,124 B
Get:16 http://in.archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [2
Get:17 http://in.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [11.
```

- Create a symbolic link.

```
vboxuser@Ubuntu:~$ ln -s /home/vboxuser/Klop/GOT got_link
vboxuser@Ubuntu:~$ ls
Desktop  Documents  Downloads  got_link  Klop  Music  Pictures  Public  snap  Templates  Videos
vboxuser@Ubuntu:~$ cat got_link
Power is Power
Winter is Coming
Lions
```

- Search for files using the find command.

```
vboxuser@Ubuntu:~/Klop$ sudo find / -name GOT
[sudo] password for vboxuser:
find: '/run/user/1000/gvfs': Permission denied
find: '/run/user/1000/doc': Permission denied
find: '/proc/8192/task/8192/net': Invalid argument
find: '/proc/8192/net': Invalid argument
/home/vboxuser/Klop/GOT
```

- Compress and decompress files using tar.

```
vboxuser@Ubuntu:~/Downloads$ ls
Fun.tar  hello-world-pixel-3840x2160-15168.png  wc1782992-berserk-2017-wallpaper.jpg
vboxuser@Ubuntu:~/Downloads$ tar -xf Fun.tar
vboxuser@Ubuntu:~/Downloads$ ls
Fun.tar  hello-world-pixel-3840x2160-15168.png  Klop  wc1782992-berserk-2017-wallpaper.jpg
```

Linux Commands

- Monitor system resources with top or htop.

```
top - 10:26:12 up  5:45,  1 user,  load average: 0.00, 0.01, 0.00
Tasks: 241 total,   1 running, 239 sleeping,   0 stopped,   1 zombie
%Cpu(s):  0.8 us,  0.2 sy,  0.0 ni, 99.0 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :  11961.8 total,   8701.1 free,   1202.1 used,   2408.3 buff/cache
MiB Swap:      0.0 total,      0.0 free,      0.0 used.  10759.8 avail Mem

   PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
  1968 vboxuser  20   0 5022400 394004 150276 S   3.3   3.2   8:18.89 gnome-shell
  6023 vboxuser  20   0  562444  59428  45112 S   0.7   0.5   0:16.53 gnome-terminal-
    18 root      20   0       0      0      0 I   0.3   0.0   0:03.04 rcu_preempt
   458 systemd+  20   0   17560   7660   6748 S   0.3   0.1   0:03.10 systemd-oomd
 11631 root      20   0       0      0      0 I   0.3   0.0   0:03.28 kworker/u18:3-events_unbound
     1 root      20   0   23376  14476   9532 S   0.0   0.1   0:02.85 systemd
     2 root      20   0       0      0      0 S   0.0   0.0   0:00.00 kthreadd
     3 root      20   0       0      0      0 S   0.0   0.0   0:00.00 pool_workqueue_release
```

- Create and manage user groups.

```
vboxuser@Ubuntu:~$ groups
vboxuser sudo
vboxuser@Ubuntu:~$ sudo groupadd Wolves
vboxuser@Ubuntu:~$ groups
vboxuser sudo
vboxuser@Ubuntu:~$ sudo usermod -aG Wolves Jack
```

- Set up SSH password less authentication.

```
Viqaas@LAPTOP-VG025G9U MINGW64 ~/Downloads
$ ssh ec2-user@44.221.43.88

   ,     #_
   ~\_   ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___    https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
Last login: Thu Dec 11 07:22:42 2025 from 103.203.172.230
[ec2-user@ip-172-31-65-118 ~]$
```

- Monitor log files using tail or grep.

```
vboxuser@Ubuntu:~$ sudo tail -f /var/log/syslog
[sudo] password for vboxuser:
2025-12-11T05:46:23.469490+00:00 Ubuntu gnome-shell[2143]: Window manager warnin
g: Overwriting existing binding of keysym 37 with keysym 37 (keycode 10).
2025-12-11T05:46:23.469545+00:00 Ubuntu gnome-shell[2143]: Window manager warnin
g: Overwriting existing binding of keysym 35 with keysym 35 (keycode e).
2025-12-11T05:46:23.475903+00:00 Ubuntu gnome-shell[2143]: DING: DBus interface
for Switcheroo control (net.hadess.SwitcherooControl) is now available.
2025-12-11T05:46:23.501657+00:00 Ubuntu gnome-shell[2143]: DING: DBus interface
for Gvfs daemon (org.gtk.vfs.Metadata) is now available.
2025-12-11T05:46:23.503451+00:00 Ubuntu gnome-shell[2143]: DING: DBus interface
```

Linux Commands

- Set up a web server (e.g., Apache or Nginx).

```
vboxuser@Ubuntu:~$ systemctl status apache2
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset
     Active: active (running) since Wed 2025-12-10 11:20:23 UTC; 4s ago
       Docs: https://httpd.apache.org/docs/2.4/
    Process: 6790 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/
   Main PID: 6796 (apache2)
      Tasks: 55 (limit: 14256)
     Memory: 5.4M (peak: 6.0M)
        CPU: 22ms
```

- Configure and secure a MySQL Database.

```
vboxuser@Ubuntu:~$ systemctl status mysql
● mysql.service - MySQL Community Server
     Loaded: loaded (/usr/lib/systemd/system/mysql.service; enabled; preset: en>
     Active: active (running) since Wed 2025-12-10 11:23:56 UTC; 10s ago
    Process: 8899 ExecStartPre=/usr/share/mysql/mysql-systemd-start pre (code=e>
   Main PID: 8908 (mysqld)
     Status: "Server is operational"
```

- Set up an Application Server (e.g: Apache Tomcat)

- Create a service file for Apache Tomcat. (Should execute by using systemtctl command)

```
vboxuser@Ubuntu:/tmp$ systemctl status tomcat
● tomcat.service - Apache Tomcat Application Server
     Loaded: loaded (/etc/systemd/system/tomcat.service; enabled; preset: enabl
     Active: active (running) since Thu 2025-12-11 07:52:01 UTC; 3min 16s ago
    Process: 6919 ExecStart=/opt/tomcat/bin/startup.sh (code=exited, status=0/S
   Main PID: 6926 (java)
      Tasks: 38 (limit: 14256)
     Memory: 112.4M (peak: 170.1M)
        CPU: 6.311s
     CGroup: /system.slice/tomcat.service
```

- Print specific columns from a delimited file.

```
vboxuser@Ubuntu:~/Klop$ cat Look
age,height,country,city
12,50,India,Hy
vboxuser@Ubuntu:~/Klop$ awk -F ','  '{print $2, $4}' Look
height city
50 Hy
```

Linux Commands

- Filter and print lines based on a specific pattern or condition.

```
vboxuser@Ubuntu:~/Klop$ grep IT Look
Bob,32,IT,55000
David,35,IT,60000
vboxuser@Ubuntu:~/Klop$ awk -F ',' '$4 < 50000' Look
Alice,25,HR,40000
Charlie,29,Finance,48000
Eve,22,HR,35000
vboxuser@Ubuntu:~/Klop$ cat Look
name,age,department,salary
Alice,25,HR,40000
Bob,32,IT,55000
Charlie,29,Finance,48000
David,35,IT,60000
Eve,22,HR,35000
```

- Calculate and print the average, sum, or other statistics of a column.

```
vboxuser@Ubuntu:~/Klop$ awk -F ',' 'NR>1 {sum = sum +$4} END {print sum}' Look
238000
vboxuser@Ubuntu:~/Klop$ awk -F ',' 'NR>1 {sum = sum + $4; count++} END {print sum/count}' Look
47600
vboxuser@Ubuntu:~/Klop$ awk -F ',' 'NR>1 {print $1, $4 - $2}' Look
Alice 39975
Bob 54968
Charlie 47971
David 59965
Eve 34978
```

- Perform string manipulation, such as extracting substrings or changing cases.

```
vboxuser@Ubuntu:~/Klop$ echo "Hello World"
Hello World
vboxuser@Ubuntu:~/Klop$ echo "Hello World" | tr 'a-z' 'A-Z'
HELLO WORLD
vboxuser@Ubuntu:~/Klop$ echo "Hello World" | tr ' ' ','
Hello,World
vboxuser@Ubuntu:~/Klop$ echo "Winter is coming" | cut -c4-7
ter
vboxuser@Ubuntu:~/Klop$ echo "Winter is coming" | awk '{print toupper ($0)}'
WINTER IS COMING
```

- Count the occurrences of a specific pattern in a file.

```
vboxuser@Ubuntu:~/Klop$ cat Look
name,age,department,salary
Alice,25,HR,40000
Bob,32,IT,55000
Charlie,29,Finance,48000
David,35,IT,60000
Eve,22,HR,35000
vboxuser@Ubuntu:~/Klop$ grep -c IT Look
2
vboxuser@Ubuntu:~/Klop$ grep -o IT Look | wc -l
2
```

Linux Commands

- Sort lines based on a specific field or column.

```
vboxuser@Ubuntu:~/Klop$ cat Look
name,age,department,salary
Alice,25,HR,40000
Bob,32,IT,55000
Charlie,29,Finance,48000
David,35,IT,60000
Eve,22,HR,35000
vboxuser@Ubuntu:~/Klop$ ( head -n 1  Look; tail -n +2 Look | sort -t',' -k4,4n )
name,age,department,salary
Eve,22,HR,35000
Alice,25,HR,40000
Charlie,29,Finance,48000
Bob,32,IT,55000
David,35,IT,60000
```

- Merge multiple files based on a common field or column.

```
vboxuser@Ubuntu:~/Klop$ cat employees.txt
1 Alice 10
2 Bob 20
3 Charlie 30
4 David 40
vboxuser@Ubuntu:~/Klop$ cat departments.csv
10,HR
20,IT
30,Finance
40,Marketing
vboxuser@Ubuntu:~/Klop$ awk 'NR==FNR { split($0,a,","); dept[a[1]]=a[2]; next } { print $0, dept[$3] }' departments
.csv employees.txt
1 Alice 10 HR
2 Bob 20 IT
3 Charlie 30 Finance
4 David 40 Marketing
```

- Substitute text in a file using search and replace.

```
vboxuser@Ubuntu:~/Klop$ echo  "i love apples and oranges">> fruitx.txt
vboxuser@Ubuntu:~/Klop$ ls
departments.csv  employees.txt  fruitx.txt  GOT  Look  test  test.zip
vboxuser@Ubuntu:~/Klop$ mv fruitx.txt fruits.txt
vboxuser@Ubuntu:~/Klop$ sed -i 's/apples/mangoes/g' fruits.txt
vboxuser@Ubuntu:~/Klop$ cat fruits.txt
i love mangoes and oranges
```

Linux Commands

- Delete specific lines based on a pattern or line number.

```
vboxuser@Ubuntu:~/Klop$ cat >sample.txt <<EOF
> line one
> error found
> line three
> another error here
> line five
> EOF
vboxuser@Ubuntu:~/Klop$ cat sample.txt
line one
error found
line three
another error here
line five
```

```
vboxuser@Ubuntu:~/Klop$ cat sample.txt
line one
error found
line three
another error here
line five
vboxuser@Ubuntu:~/Klop$ sed -i '/error/d' sample.txt
vboxuser@Ubuntu:~/Klop$ cat sample.txt
line one
line three
line five
vboxuser@Ubuntu:~/Klop$ sed -i '/three/!d' sample.txt
vboxuser@Ubuntu:~/Klop$ cat sample.txt
line three
```

- Append or insert text before or after a specific pattern or line.

```
vboxuser@Ubuntu:~/Klop$ cat file.txt
fruits : apples
fruits : oranges
fruits : mangoes
fruits : melons
vboxuser@Ubuntu:~/Klop$ sed -i '/mangoes/i strawberries' file.txt
vboxuser@Ubuntu:~/Klop$ cat file.txt
fruits : apples
fruits : oranges
strawberries
fruits : mangoes
fruits : melons
vboxuser@Ubuntu:~/Klop$ sed -i '/strawberries/a lemons' file.txt
vboxuser@Ubuntu:~/Klop$ cat file.txt
fruits : apples
fruits : oranges
strawberries
lemons
fruits : mangoes
fruits : melons
```

Linux Commands

- Print only specific lines from a file.

- Copy file from linux to windows machine.

- 5 use cases for AWK and 5 use cases for sed.
- awk -F ',' 'NR>1 {sum = sum + $n} END {print sum}' filename – for adding content in a file
- ps -ef | awk '{print $2}' - gives pid column in processes,
- awk -F ',' 'NR>1 {sum = sum + $4; count++} END {print sum/count}' filename - an example for taking a average in a file.
- awk -F ',' 'NR>1 {print $1, $4 - $2}' filename - an example for subtracting (NR>1 means to ignore the first line, use it if the file contains header)
- sed -i '/keyword/d' filename - to delete lines with the specific keyword.
- sed -i '/keyword/!d' filename - to delete every line except the ones with the specific keyword.
- sed -n '3p' filename - to print the third line.
- sed -n '2,4p' filename - to print 2-4 line.
- sed -n '/keyword/p' filename - print lines that match a pattern.

Linux Commands

```
vboxuser@Ubuntu:~/Klop$ cat file.txt
fruits : apples
fruits : oranges
strawberries
lemons
fruits : mangoes
fruits : melons
vboxuser@Ubuntu:~/Klop$ sed -n '3p' file.txt
strawberries
vboxuser@Ubuntu:~/Klop$ sed -n '3,6p' file.txt
strawberries
lemons
fruits : mangoes
fruits : melons
vboxuser@Ubuntu:~/Klop$ sed -n '3p;6p' file.txt
strawberries
fruits : melons
```

```
vboxuser@Ubuntu:~/Klop$ cat sample.txt
line one
error found
line three
another error here
line five
vboxuser@Ubuntu:~/Klop$ sed -i '/error/d' sample.txt
vboxuser@Ubuntu:~/Klop$ cat sample.txt
line one
line three
line five
vboxuser@Ubuntu:~/Klop$ sed -i '/three/!d' sample.txt
vboxuser@Ubuntu:~/Klop$ cat sample.txt
line three
```

```
vboxuser@Ubuntu:~/Klop$ grep IT Look
Bob,32,IT,55000
David,35,IT,60000
vboxuser@Ubuntu:~/Klop$ awk -F ',' '$4 < 50000' Look
Alice,25,HR,40000
Charlie,29,Finance,48000
Eve,22,HR,35000
vboxuser@Ubuntu:~/Klop$ cat Look
name,age,department,salary
Alice,25,HR,40000
Bob,32,IT,55000
Charlie,29,Finance,48000
David,35,IT,60000
Eve,22,HR,35000
```

- whoami – displays the current user.
- who – displays all active users.
- man – displays manual of a command
- which – shows the absolute path of a service.

Linux Commands

- tac – views the contents of the file backwards.

```
vboxuser@Ubuntu:~/Klop$ whoami
vboxuser
vboxuser@Ubuntu:~/Klop$ who
vboxuser seat0        2025-12-23 11:07 (login screen)
vboxuser tty2         2025-12-23 11:07 (tty2)
vboxuser@Ubuntu:~/Klop$ man ls
vboxuser@Ubuntu:~/Klop$ which nginx
/usr/sbin/nginx
vboxuser@Ubuntu:~/Klop$ cat file.txt
fruits : apples
fruits : oranges
strawberries
lemons
fruits : mangoes
fruits : melons
vboxuser@Ubuntu:~/Klop$ tac file.txt
fruits : melons
fruits : mangoes
lemons
strawberries
fruits : oranges
fruits : apples
```

- getent foldername content – gets information from the adminintrative database.

- lsblk – lists all blocked devices.N

```
vboxuser@Ubuntu:~/Klop$ getent passwd Jack
Jack:x:1001:1001::/home/Jack:/bin/zsh
vboxuser@Ubuntu:~/Klop$ lsblk
NAME    MAJ:MIN RM    SIZE RO TYPE MOUNTPOINTS
loop0     7:0    0      4K  1 loop /snap/bare/5
loop1     7:1    0   73.9M  1 loop /snap/core22/2045
loop2     7:2    0     74M  1 loop /snap/core22/2163
loop3     7:3    0  250.4M  1 loop /snap/firefox/7477
loop4     7:4    0    516M  1 loop /snap/gnome-42-2204/202
loop5     7:5    0   18.5M  1 loop /snap/firmware-updater/210
loop6     7:6    0   11.1M  1 loop /snap/firmware-updater/167
loop7     7:7    0   49.3M  1 loop /snap/snapd/24792
loop8     7:8    0   91.7M  1 loop /snap/gtk-common-themes/1535
loop9     7:9    0  516.2M  1 loop /snap/gnome-42-2204/226
loop10    7:10   0   10.8M  1 loop /snap/snap-store/1270
loop12    7:12   0   50.9M  1 loop /snap/snapd/25577
loop13    7:13   0    576K  1 loop /snap/snapd-desktop-integration/315
loop14    7:14   0  250.8M  1 loop /snap/firefox/7559
sda       8:0    0   40.5G  0 disk
├─sda1    8:1    0      1M  0 part
└─sda2    8:2    0   40.5G  0 part /
sr0      11:0    1   1024M  0 rom
```

Linux Commands

- asciiquarium – displays a live aquarium.

- cmatrix – view matrix console.
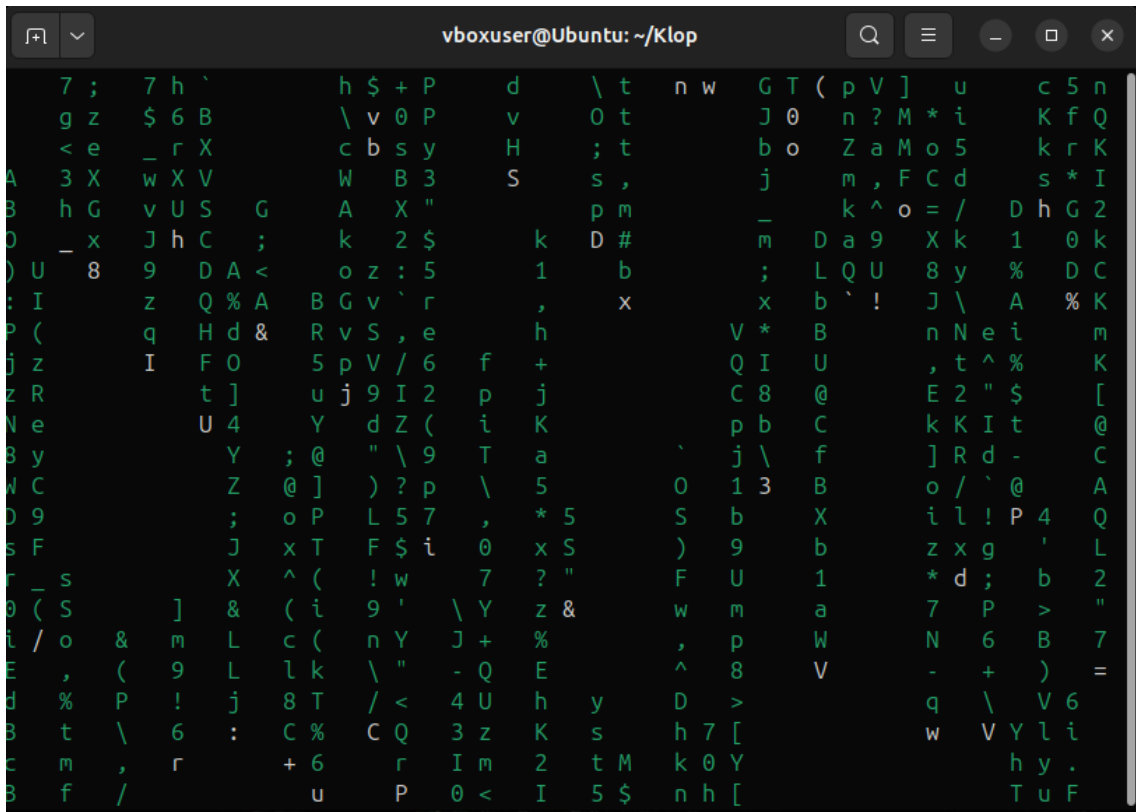
Linux Commands

- ip route show – Displays the routing table.
- ping – check the connectivity to a given hostname.

```
vboxuser@Ubuntu:~/Klop$ ip route show
default via 10.0.2.2 dev enp0s3 proto dhcp src 10.0.2.15 metric 100
10.0.2.0/24 dev enp0s3 proto kernel scope link src 10.0.2.15 metric
vboxuser@Ubuntu:~/Klop$ ping google.com
PING google.com (142.251.221.206) 56(84) bytes of data.
64 bytes from pnmaaa-ba-in-f14.1e100.net (142.251.221.206): icmp_se
ime=27.5 ms
64 bytes from pnmaaa-ba-in-f14.1e100.net (142.251.221.206): icmp_se
ime=32.2 ms
64 bytes from pnmaaa-ba-in-f14.1e100.net (142.251.221.206): icmp_se
ime=30.4 ms
^C
--- google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/mdev = 27.525/30.030/32.166/1.912 ms
```