

Linux Commands

Linux:

Linux is a family of open-source, Unix-like operating systems based on the Linux kernel, created by **Linus Torvalds in 1991**, and used in various devices and applications, including smartphones, servers, and supercomputers.

The **Linux Kernel** communicates directly with hardware and handles system processes. **Linux Distributions** are versions of Linux that include the kernel and additional software.

Popular Linux distributions:

- Ubuntu
- Debian
- Fedora
- Linux Mint
- Arch Linux
- Android (based on the Linux kernel)

Key Features and Characteristics:

- **Open-Source:** The code is freely available for anyone to use, modify, and distribute.
- **Unix-like:** Linux follows the Unix philosophy, which emphasizes modularity, simplicity, and user control.
- **Kernel:** The Linux kernel is the core of the operating system, responsible for managing hardware resources and interacting with software.
- **Distributions:** Linux is not a single operating system, but rather a family of distributions (distros) that build upon the Linux kernel and include a user interface, utilities, and other software.
- **Versatility:** Linux is used in a wide range of applications, including:
 - **Servers:** Hosting websites, databases, and other applications.
 - **Desktops:** Providing a powerful and customizable user experience.
 - **Embedded Systems and Super Computers.**
- **Security:** Linux is known for its strong security features, making it a popular choice for servers and other critical systems.
- **Community:** The Linux community is large and active, providing extensive documentation, support, and resources.

Commands:

File/Directory system Management:

1. **pwd**: Prints the current working directory.
2. **ls**: Lists contents of the current directory.
3. **ls -al**: Lists the information about files and directories including file permissions.

```
sri@sri-VirtualBox:~$ pwd
/home/sri
sri@sri-VirtualBox:~$ ls
argsnparams.sh Desktop Downloads Music Pictures
askinput.sh Documents moveFileContent.sh newfile1.txt predefined.sh
sri@sri-VirtualBox:~$ ls -al
total 136
drwxr-x--- 17 sri sri 4096 Mar 13 12:53 .
drwxr-xr-x  3 root root 4096 Jan  9  2024 ..
-rw-rw-r--  1 sri sri   99 Mar 12 18:46 argsnparams.sh
-rw-rw-r--  1 sri sri   82 Mar 12 18:43 askinput.sh
-rw-----  1 sri sri 4529 Mar 13 12:54 .bash_history
-rw-r--r--  1 sri sri  220 Jan  9  2024 .bash_logout
-rw-r--r--  1 sri sri 3771 Jan  9  2024 .bashrc
drwx----- 11 sri sri 4096 Dec 27 22:21 .cache
drwx----- 13 sri sri 4096 Dec 30 22:03 .config
drwxr-xr-x  2 sri sri 4096 Jan  9  2024 Desktop
drwxr-xr-x  2 sri sri 4096 Mar  2  2024 Documents
drwxr-xr-x  2 sri sri 4096 Jan  9  2024 Downloads
-rw-----  1 sri sri 12288 Mar  9  2024 .exp6a.sh.swp
drwx-----  2 sri sri 4096 Mar 11 16:01 .gnupg
-rw-----  1 sri sri   20 Mar 12 18:20 .lessht
drwx-----  3 sri sri 4096 Jan  9  2024 .local
-rw-rw-r--  1 sri sri  113 Mar 12 19:03 moveFileContent.sh
drwxr-xr-x  2 sri sri 4096 Jan  9  2024 Music
-rw-rw-r--  1 sri sri   72 Mar 12 19:04 newfile1.txt
drwxr-xr-x  2 sri sri 4096 Jan  9  2024 Pictures
-rw-rw-r--  1 sri sri  152 Mar 12 18:50 predefined.sh
drwxrwxr-x  2 sri sri 4096 Mar 11 14:45 priya
-rw-r--r--  1 sri sri  807 Jan  9  2024 .profile
drwxr-xr-x  2 sri sri 4096 Jan  9  2024 Public
-rw-rw-r--  1 sri sri   88 Mar 13 12:52 removeFiles.sh
-rw-rw-r--  1 sri sri  111 Mar 12 18:36 script.sh
drwx-----  5 sri sri 4096 Dec 30 22:02 snap
drwx-----  2 sri sri 4096 Mar  2  2024 .ssh
-rw-r--r--  1 sri sri    0 Mar 11 16:56 .sudo_as_admin_successful
drwxr-xr-x  2 sri sri 4096 Jan  9  2024 Templates
-rw-rw-r--  1 sri sri   50 Mar 12 18:38 variable.sh
drwxr-xr-x  2 sri sri 4096 Jan  9  2024 Videos
```

4. **cd <directory>**: Changes the current directory.
5. **cd ..**: Moves back to the previous directory.
6. **mkdir <directory>**: Creates a new directory.
7. **touch <filename>**: Creates a new file.
8. **cat <filename>**: Displays the content of a file.
9. **cat > <filename>**: Edits the content of a file. It also creates file if the file doesn't exist.
10. **cat >> <filename>**: Appends the content to a file.
11. **vi <filename>**: Edits a file using vi editor. Also creates if file doesn't exist.
 - Press i to start editing, then press Esc, followed by :wq! to save and exit, or :q! to exit without saving.
12. **rm <filename>**: deletes a file.
13. **rm -rf <directory>**: Deletes a directory and its contents recursively.
14. **rmdir <directory>**: Removes an empty directory.

15. **find <directoryPath> -name <filename>**: Searches for a file or directory in the specified path.
16. **clear**: To clear the screen.

```
sri@sri-VirtualBox:~$ mkdir linuxCommands
sri@sri-VirtualBox:~$ ls
argsnparams.sh  Desktop  Downloads  moveFileContent.sh  newfile1.t
askinput.sh     Documents linuxCommands  Music               Pictures
sri@sri-VirtualBox:~$ cd linuxCommands
sri@sri-VirtualBox:~/linuxCommands$ ls
sri@sri-VirtualBox:~/linuxCommands$ touch file1.txt
sri@sri-VirtualBox:~/linuxCommands$ ls
file1.txt
sri@sri-VirtualBox:~/linuxCommands$ cd ..
sri@sri-VirtualBox:~$ vi file2.txt
sri@sri-VirtualBox:~$ cat file2.txt
hi this is file1
1
2
3
sri@sri-VirtualBox:~$ cat >> file2.txt
hi we are using cat >> <filename>
^Z
[4]+  Stopped                  cat >> file2.txt
sri@sri-VirtualBox:~$ cat file2.txt
hi this is file1
1
2
3
hi we are using cat >> <filename>
sri@sri-VirtualBox:~$ cat > file3.txt
hi this is file3
^Z
[5]+  Stopped                  cat > file3.txt
sri@sri-VirtualBox:~$ cat file3.txt
hi this is file3
sri@sri-VirtualBox:~$ rm file3.txt
sri@sri-VirtualBox:~$ rm -rf linuxCommands
sri@sri-VirtualBox:~$ ls
argsnparams.sh  Desktop  Downloads  moveFileContent.sh  newfile1.txt
askinput.sh     Documents file2.txt   Music               Pictures
sri@sri-VirtualBox:~$
```

File Content:

1. **cp <filename> <path>**: Copies the content of a file to a specific location.
2. **cp <file1> <file2>**: Copies the first file content to second file.
3. **mv <oldfile> <newfile>**: Moves the content from old file to new file or renames a file.
4. **cat <filename>**: Displays file content.
5. **head -n 3 <filename>**: Displays the first 3 lines of a file.
6. **tail -n 3 <filename>**: Displays the last 3 lines of a file.
7. **sed -n 3,6p <filename>**: Prints the lines from 3 to 6 from a file.

```

sri@sri-VirtualBox:~$ cp file1.txt file2.txt
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1      file1.txt      Music
askinput.sh     Documents file2.txt      newfile1.txt
Desktop         Downloads moveFileContent.sh Pictures
sri@sri-VirtualBox:~$ cat file2.txt
hi,this is file1.
sri@sri-VirtualBox:~$ cp file1.txt /home/sri/dir1/file2.txt
sri@sri-VirtualBox:~$ cat /home/sri/dir1/file2.txt
hi,this is file1.
sri@sri-VirtualBox:~$ mv file2.txt file3.txt
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1      file1.txt      Music
askinput.sh     Documents file3.txt      newfile1.txt
Desktop         Downloads moveFileContent.sh Pictures
sri@sri-VirtualBox:~$ cat file3.txt
hi,this is file1.

sri@sri-VirtualBox:~$ cat file1.txt
hi,this is file1.
1
2
3
4
5
6
7
sri@sri-VirtualBox:~$ head -n 3 file1.txt
hi,this is file1.
1
2
sri@sri-VirtualBox:~$ tail -n 4 file1.txt
4
5
6
7
sri@sri-VirtualBox:~$ sed -n 3,6p file1.txt
2
3
4
5

```

Multiple files/folders:

1. **mkdir -p <dir1/dir2/dir3>**: Creates nested directories.
2. **rmdir -p <dir1/dir2/dir3>**: Deletes nested directories if they are empty.
3. **mkdir <directory>{1..10}**: Creates multiple directories {eg: dir1,dir2,dir3,...dir10}
4. **rmdir <directory>{1..10}**: Removes multiple directories.
5. **touch file{1..10}**: Creates multiple files like file1,file2,...file10.
6. **rm file{1..10}**: Deletes multiple files.

```

sri@sri-VirtualBox:~$ mkdir -p /home/sri/folder1/folder2/folder3
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1      file1.txt      moveFileContent.sh  Pictures
askinput.sh     Documents file3.txt      Music               predefined.sh
Desktop         Downloads folder1      newfile1.txt        Public
sri@sri-VirtualBox:~$ cd folder1
sri@sri-VirtualBox:~/folder1$ ls
folder2
sri@sri-VirtualBox:~/folder1$ cd folder2
sri@sri-VirtualBox:~/folder1/folder2$ ls
folder3
sri@sri-VirtualBox:~/folder1/folder2$ cd ..
sri@sri-VirtualBox:~/folder1$ cd ..
sri@sri-VirtualBox:~$ rmdir -p /home/sri/folder1/folder2/folder3
rmdir: failed to remove directory '/home/sri': Permission denied
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1      file1.txt      Music               predefined.sh
askinput.sh     Documents file3.txt      newfile1.txt        Public
Desktop         Downloads moveFileContent.sh Pictures             removeFiles.sh

```

```

sri@sri-VirtualBox:~$ mkdir folder{1..10}
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1          file1.txt  folder10  folder4  folder7
askinput.sh     Documents    file3.txt  folder2   folder5  folder8
Desktop         Downloads    folder1    folder3   folder6  folder9
sri@sri-VirtualBox:~$ rmdir folder{1..10}
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1          file1.txt  Music      prec
askinput.sh     Documents    file3.txt  newfile1.txt Publi
Desktop         Downloads    moveFileContent.sh Pictures    remc
sri@sri-VirtualBox:~$ touch file{1..5}
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1          file1      file3      file5
askinput.sh     Documents    file1.txt  file3.txt  moveFileContent.
Desktop         Downloads    file2      file4      Music
sri@sri-VirtualBox:~$ rm file{1..5}
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1          file1.txt  Music      prec
askinput.sh     Documents    file3.txt  newfile1.txt Publi
Desktop         Downloads    moveFileContent.sh Pictures    remc

```

System Management:

1. **whoami**: Displays the current user.
2. **hostname**: Displays the system's hostname.
3. **uname -a**: Displays detailed information about the system.
4. **date**: Shows the current date and time.
5. **top**: Displays real-time information about system processes.
6. **df -h**: Shows available disk space in human readable format.
7. **du -h**: Displays disk usage in human readable format.
8. **man <command>**: Displays the manual page for a command.
9. **cal <year>**: Displays the calendar for a specified year.
10. **cal <mon> <year>**: Displays the Calendar for a specified month in a specific year.

```

sri@sri-VirtualBox:~$ whoami
sri
sri@sri-VirtualBox:~$ hostname
sri-VirtualBox
sri@sri-VirtualBox:~$ uname -a
Linux sri-VirtualBox 6.2.0-26-generic #26~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Thu
Jul 13 16:27:29 UTC 2 x86_64 x86_64 x86_64 GNU/Linux
sri@sri-VirtualBox:~$ date
Thursday 13 March 2025 08:38:45 PM IST
sri@sri-VirtualBox:~$

```

```

Azureuser@Adhitya-ubuntu-vm:~$ cal mar 2025
      March 2025
Su Mo Tu We Th Fr Sa
                1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31

```



```
sri@sri-VirtualBox:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
tmpfs            391M  1.4M  390M   1% /run
/dev/sda3        24G   11G   12G  48% /
tmpfs            2.0G   0 2.0G   0% /dev/shm
tmpfs            5.0M  4.0K  5.0M   1% /run/lock
/dev/sda2       512M  6.1M  506M   2% /boot/efi
tmpfs            391M  108K  391M   1% /run/user/1000

sri@sri-VirtualBox:~$ du -h
4.0K  ./Desktop
4.0K  ./ssh
12K   ./gnupg
8.0K  ./Documents
12K   ./config/ibus/bus
16K   ./config/ibus
16K   ./config/evolution/sources
20K   ./config/evolution
8.0K  ./config/gtk-3.0
4.0K  ./config/enchant
84K   ./config/pulse
4.0K  ./config/procps
4.0K  ./config/update-notifier
8.0K  ./config/gedit
4.0K  ./config/goa-1.0
4.0K  ./config/nautilus
4.0K  ./config/gnome-session/saved-session
8.0K  ./config/gnome-session
8.0K  ./config/dconf
188K  ./config
4.0K  ./Templates
4.0K  ./Videos
192K  ./cache/ibus/bus
196K  ./cache/ibus
4.0K  ./cache/evolution/mail/trash
8.0K  ./cache/evolution/mail
4.0K  ./cache/evolution/sources/trash
8.0K  ./cache/evolution/sources
4.0K  ./cache/evolution/calendar/trash
8.0K  ./cache/evolution/calendar
```

```
Azureuser@xhitya-ubuntu-vm:~$ cal 2025
                2025

January          February          March
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
1 2 3 4          1 2 3 4          1 2 3 4 5 6 7 8
5 6 7 8 9 10 11 2 3 4 5 6 7 8 2 3 4 5 6 7 8
12 13 14 15 16 17 18 9 10 11 12 13 14 15 9 10 11 12 13 14 15
19 20 21 22 23 24 25 16 17 18 19 20 21 22 16 17 18 19 20 21 22
26 27 28 29 30 31 23 24 25 26 27 28 23 24 25 26 27 28 29
30 31

April            May              June
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
1 2 3 4 5          1 2 3 4 5          1 2 3 4 5 6 7
6 7 8 9 10 11 12 4 5 6 7 8 9 10 8 9 10 11 12 13 14
13 14 15 16 17 18 19 11 12 13 14 15 16 17 15 16 17 18 19 20 21
20 21 22 23 24 25 26 18 19 20 21 22 23 24 22 23 24 25 26 27 28
27 28 29 30        25 26 27 28 29 30 31 29 30

July             August           September
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
1 2 3 4 5          1 2 3 4 5          1 2 3 4 5 6
6 7 8 9 10 11 12 3 4 5 6 7 8 9 7 8 9 10 11 12 13
13 14 15 16 17 18 19 10 11 12 13 14 15 16 14 15 16 17 18 19 20
20 21 22 23 24 25 26 17 18 19 20 21 22 23 21 22 23 24 25 26 27
27 28 29 30 31    24 25 26 27 28 29 30 28 29 30

October          November         December
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
1 2 3 4          1 2 3 4          1 2 3 4 5 6
5 6 7 8 9 10 11 2 3 4 5 6 7 8 7 8 9 10 11 12 13
12 13 14 15 16 17 18 9 10 11 12 13 14 15 14 15 16 17 18 19 20
19 20 21 22 23 24 25 16 17 18 19 20 21 22 21 22 23 24 25 26 27
26 27 28 29 30 31 23 24 25 26 27 28 29 28 29 30 31
30
```

File permissions:

- ❖ There are 3 file permissions –
 - Read - r-4
 - Write - w-2
 - Execute - x-1
 - ❖ There are three levels for a file.
 - User level – u
 - Group level – g
 - Other level – o
1. **chmod u+r <filename>**: Grants read permissions to the specified file in user level.
 2. **chmod u-r <filename>**: revokes read permissions to a file in user level.
 3. **chmod 777 <filename>**: Grants all permissions to a file.

```
sri@sri-VirtualBox:~$ ls -al file1.txt
-rw-rw-r-- 1 sri sri 32 Mar 13 19:57 file1.txt
sri@sri-VirtualBox:~$ chmod o-r file1.txt
sri@sri-VirtualBox:~$ ls -al file1.txt
-rw-rw---- 1 sri sri 32 Mar 13 19:57 file1.txt
sri@sri-VirtualBox:~$ chmod o+r file1.txt
sri@sri-VirtualBox:~$ ls -al file1.txt
-rw-rw-r-- 1 sri sri 32 Mar 13 19:57 file1.txt
sri@sri-VirtualBox:~$ chmod 777 file1.txt
sri@sri-VirtualBox:~$ ls -al file1.txt
-rwxrwxrwx 1 sri sri 32 Mar 13 19:57 file1.txt
sri@sri-VirtualBox:~$ chmod 747 file1.txt
sri@sri-VirtualBox:~$ ls -al file1.txt
-rwxr--rwx 1 sri sri 32 Mar 13 19:57 file1.txt
sri@sri-VirtualBox:~$ chmod 737 file1.txt
sri@sri-VirtualBox:~$ ls -al file1.txt
-rwx-wxrw- 1 sri sri 32 Mar 13 19:57 file1.txt
sri@sri-VirtualBox:~$ chmod 333 file1.txt
sri@sri-VirtualBox:~$ ls -al file1.txt
--wx-wx-wx 1 sri sri 32 Mar 13 19:57 file1.txt
sri@sri-VirtualBox:~$ chmod 444 file1.txt
sri@sri-VirtualBox:~$ ls -al file1.txt
-r--r--r-- 1 sri sri 32 Mar 13 19:57 file1.txt
```

Random Number:

1. `echo $RANDOM`: Prints a random number.
2. `echo $((RANDOM%10))`: Generates a random number between 0-9.
3. `echo $((10+RANDOM%10))`: Generates random number between 10-19.

```
sri@sri-VirtualBox:~$ echo $RANDOM
10897
sri@sri-VirtualBox:~$ echo $((RANDOM%10))
9
sri@sri-VirtualBox:~$ echo $((RANDOM%10))
4
sri@sri-VirtualBox:~$ echo $((10+RANDOM%10))
18
sri@sri-VirtualBox:~$ echo $((10+RANDOM%10))
16
```

Shell Scripting:

- ✓ In Linux, the shell scripting will be done by using “bash script”.
- ✓ In Windows, it is “Power Shell scripting”.
- ✓ Bash extension is “.sh”
- ✓ Every script must start with “#!”(shebang) followed by “/bin/bash”.

Commands:

- **touch script.sh**: To create a bash script.
- **vi script.sh**: To edit bash script.
- **cat script.sh**: To print the script code.
- **bash script.sh**: To run the script.

Examples:

❖ Greetings bash script:

```
#!/bin/bash
echo "Good Morning team"
sleep 2
echo "How are you?"
sleep 3
echo "Hope you guys are doing good"
```

```
sri@sri-VirtualBox:~$ vi script.sh
sri@sri-VirtualBox:~$ cat script.sh
#!/bin/bash
echo "Good Morning team"
sleep 2
echo "How are you?"
sleep 3
echo "Hope you guys are doing good"

sri@sri-VirtualBox:~$ bash script.sh
Good Morning team
How are you?
Hope you guys are doing good
```

❖ Script to print User login information

```
#!/bin/bash
user=$(whoami)
date=$(date)
```

```
whereami=$(pwd)
echo "you are currently logged in as $user
and you are in $whereami directory.Today
is: $date"
```

```
sri@sri-VirtualBox:~$ vi moveFileContent.sh
sri@sri-VirtualBox:~$ cat moveFileContent.sh
#!/bin/bash
oldfile=$1
newfile=$2
mv $oldfile $newfile
echo "The file content of $oldfile is moved to $newfile"
sri@sri-VirtualBox:~$ bash moveFileContent.sh file2.txt file3.txt
The file content of file2.txt is moved to file3.txt
sri@sri-VirtualBox:~$ cat file3.txt
hi,this is file1.
1
2
3
4
```

❖ Move File Content using bash Script

```
#!/bin/bash
oldfile=$1
newfile=$2
mv $oldfile $newfile
echo "The file content of $oldfile is moved to
$newfile"
```

```
sri@sri-VirtualBox:~$ vi variable.sh
sri@sri-VirtualBox:~$ vi predefined.sh
sri@sri-VirtualBox:~$ cat predefined.sh
#!/bin/bash
user=$(whoami)
date=$(date)
whereami=$(pwd)
echo "you are currently logged in as $user and you are in $whereami directory.To
day is :$date"
sri@sri-VirtualBox:~$ bash predefined.sh
you are currently logged in as sri and you are in /home/sri directory.Today is :
Friday 14 March 2025 11:25:48 AM IST
```

❖ Remove files using bash script

```
#!/bin/bash
echo "Enter file to be removed."
read File
rm $File
echo "$File is removed"
```

```
sri@sri-VirtualBox:~$ vi removeFiles.sh
sri@sri-VirtualBox:~$ cat removeFiles.sh
#!/bin/bash
echo "Enter file to be removed"
read File
rm $File
echo "$File is removed"
sri@sri-VirtualBox:~$ bash removeFiles.sh
Enter file to be removed
file3.txt
rm: remove write-protected regular file 'file3.txt'? yes
file3.txt is removed
sri@sri-VirtualBox:~$ ls
argsnparams.sh  Documents  newfile1.txt  removeFiles.sh  variable.sh
askinput.sh     Downloads  Pictures      script.sh       Videos
Desktop         moveFileContent.sh  predefined.sh  snap
dir1            Music      Public       Templates
```