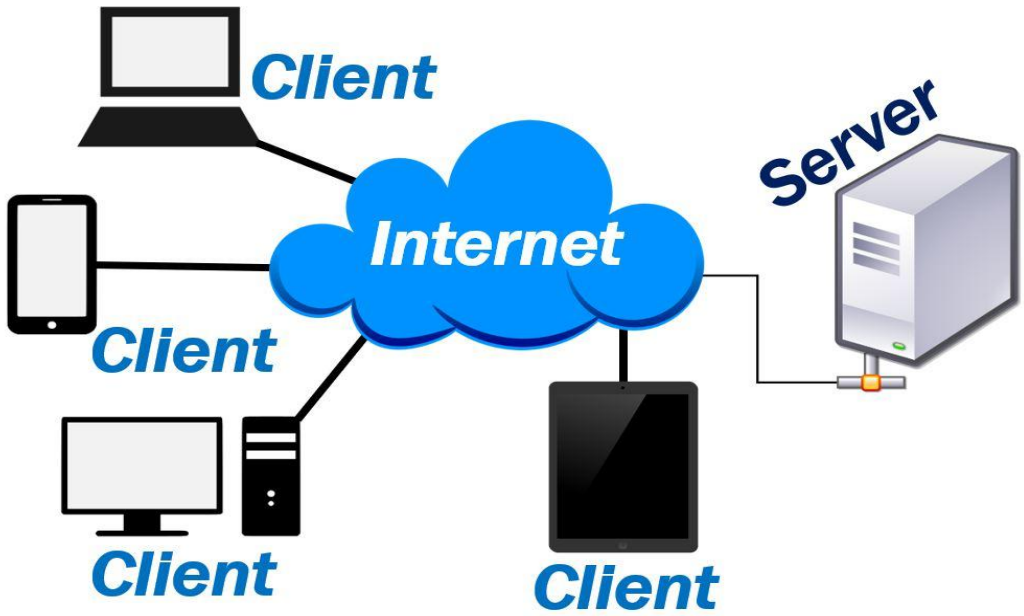
What is server

- In computing, a server is a piece of computer hardware or software (computer program) that provides functionality for other programs or devices, called "clients".
- Typical servers are database servers, file servers, mail servers, print servers, web servers, game servers, and application servers

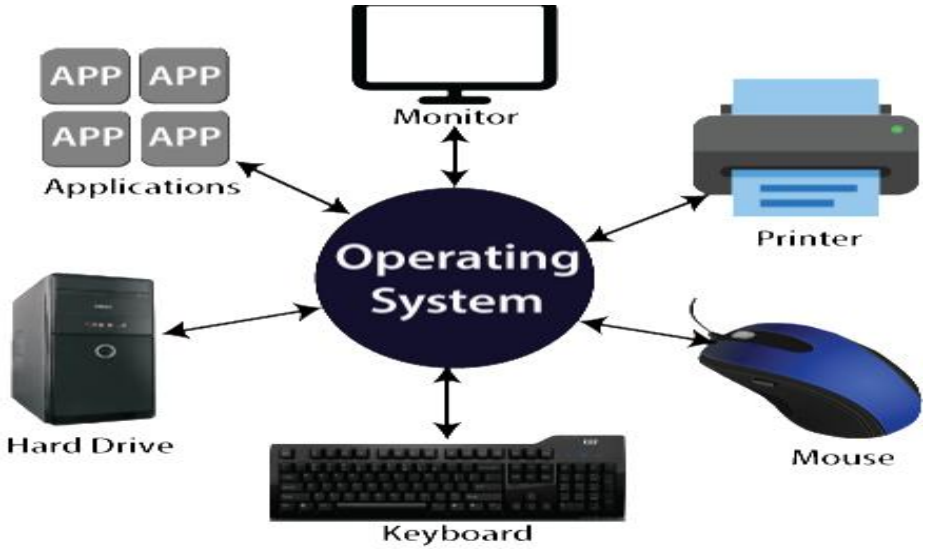


importance of server in software

- Servers not only help your business with data storage, but they will also **improve efficiency and productivity**.
- As employees can access data and information from any workstation it means they can work from home, while travelling or from a different office

What is Operating System

- An operating system is system software that manages computer hardware, software resources, and provides common services for computer programs.
- Operating system is software that is required in order to run application programs and utilities.
- It works as a bridge to perform better interaction between application programs and hardware of the computer.
- Examples of operating system are UNIX, MS-DOS, MS-Windows – 98/XP/Vista, Windows-NT/2000, OS/2 and Mac OS.



What is Linux

- Linux is a family of open-source Unix-like operating systems based on the Linux kernel, an operating system kernel first released on September 17, 1991, by Linus Torvalds.
- Linux is typically packaged in a Linux distribution.
- Linux® is **an open source operating system (OS)**.
- An operating system is the software that directly manages a system's hardware and resources, like CPU, memory, and storage.
- The OS sits between applications and hardware and makes the connections between all of your software and the physical resources that do the work

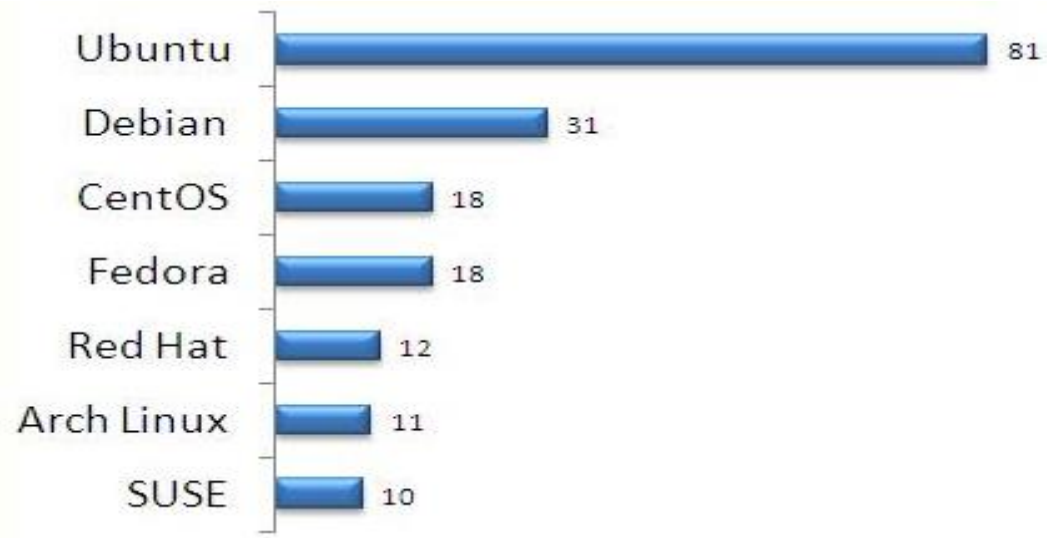
What is Linux mainly used for

- Linux is based on Unix, an operating system developed in the 1970s and which is still used heavily today, especially **to run the Internet**.
- Linux is used both to run parts of the Internet, as well as to run small and large networks in coporations, offices and homes

Why would you use Linux

- Linux makes very efficient use of the system's resources.
- Linux runs on a range of hardware, right from supercomputers to watches.
- we can give new life to your old and slow Windows system by installing a lightweight Linux system, or even run a NAS or media streamer using a particular distribution of Linux.

Linux Flavours:



Advantages of Linux

- pen Source. As it is open-source, its source code is easily available

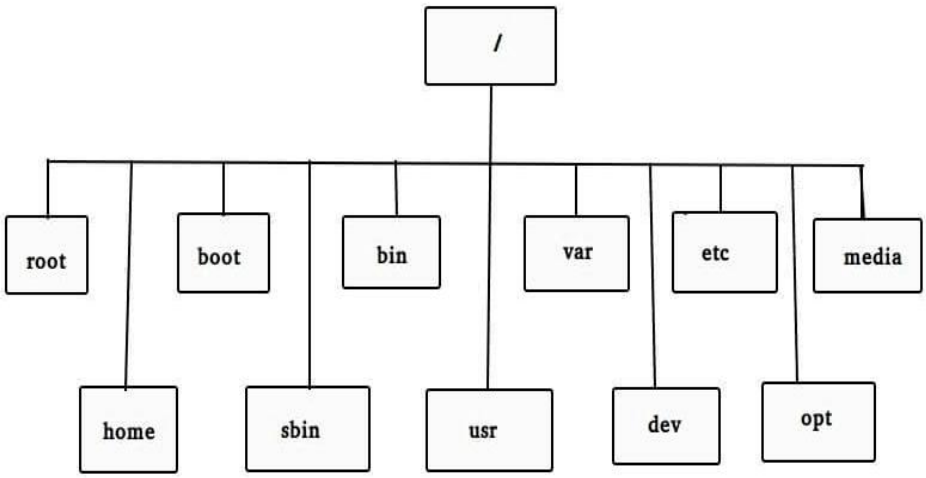
- Security. The Linux security feature is the main reason that it is the most favorable option for developers
- Free
- Lightweight
- Stability
- Performance
- Flexibility
- Software Updates

Windows VS Linux

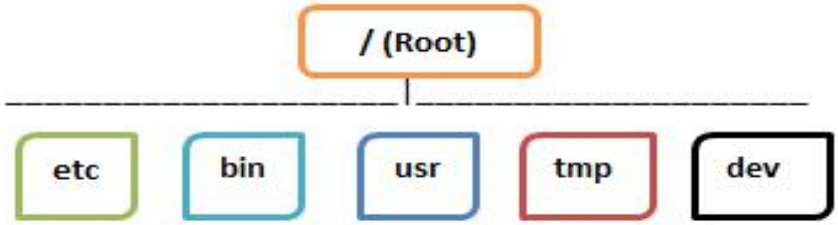
S.NO	Linux	Windows
1	Linux is a open source operating system.	While windows are the not the open source operating system.
2	Linux is free of cost.	While it is costly.
3	It's file name case-sensitive.	While it's file name is case-insensitive.
4	In linux, monolithic kernel is used.	While in this, micro kernel is used.
5	Linux is more efficient in comparison of windows.	While windows are less efficient.
6	There is forward slash is used for Separating the directories.	While there is back slash is used for Separating the directories.
7	Linux provides more security than windows.	While it provides less security than linux.
8	Linux is widely used in hacking purpose based systems.	While windows does not provide much efficiency in hacking.

what is file system in linux

- A Linux file system is a structured collection of files on a disk drive or a partition.
- **A** partition is a segment of memory and contains some specific data. In our machine, there can be various partitions of the memory. ... It stores the data on hard disks (HDD) or some equivalent storage type

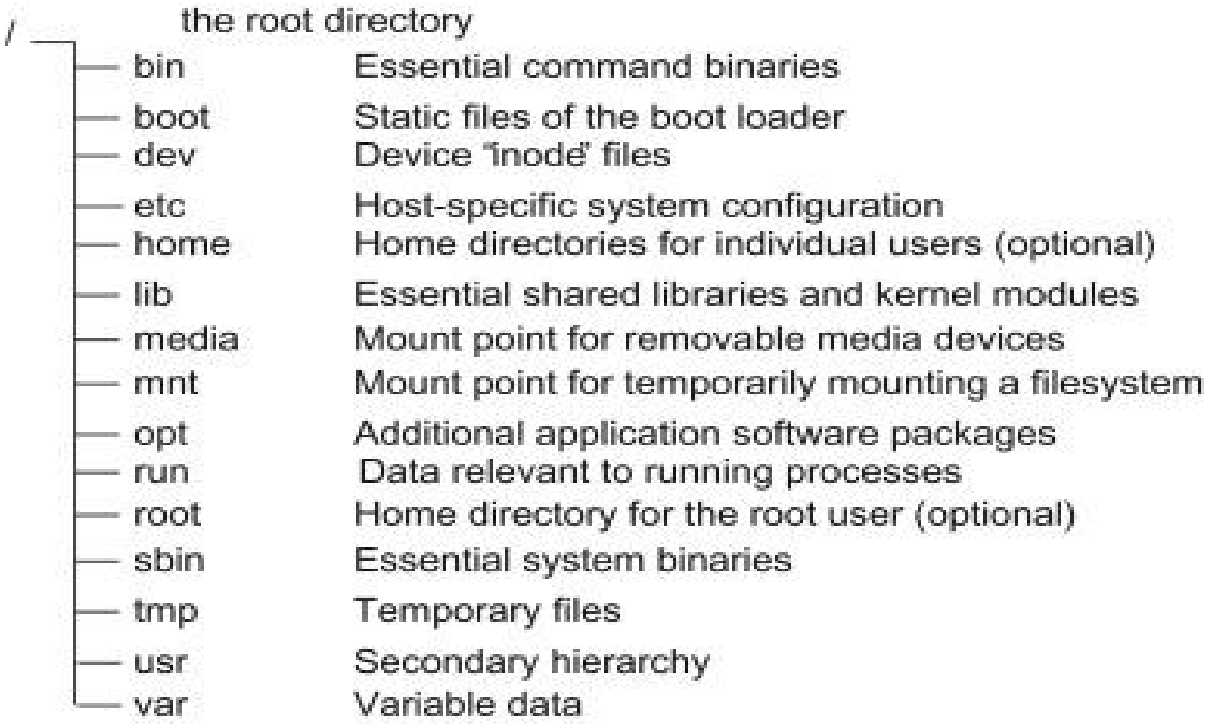


This root directory can be considered as the start of the file system, and it further branches out various other subdirectories. The root is denoted with a forward slash '/'.



Advantages of Linux

- Linux is an open source operating system so user can change source code as per requirement whereas Windows OS is a commercial operating system so user doesn't have access to source code.
- Linux is very well secure as it is easy to detect bugs and fix whereas Windows has a huge user base, so it becomes a target of hackers to attack windows system.
- Comparing Windows file system vs Linux file system, Linux runs faster even with older hardware whereas Windows are slower compared to Linux.
- Linux peripherals like hard drives, CD-ROMs, printers are considered files whereas Windows, hard drives, CD-ROMs, printers are considered as devices
- Linux files are ordered in a tree structure starting with the root directory whereas in Windows, files are stored in folders on different data drives like C: D: E:
- In Linux you can have 2 files with the same name in the same directory while in Windows, you cannot have 2 files with the same name in the same folder.
- In Linux you would find the system and program files in different directories whereas in Windows, system and program files are usually saved in C: drive.



what is cpu in linux

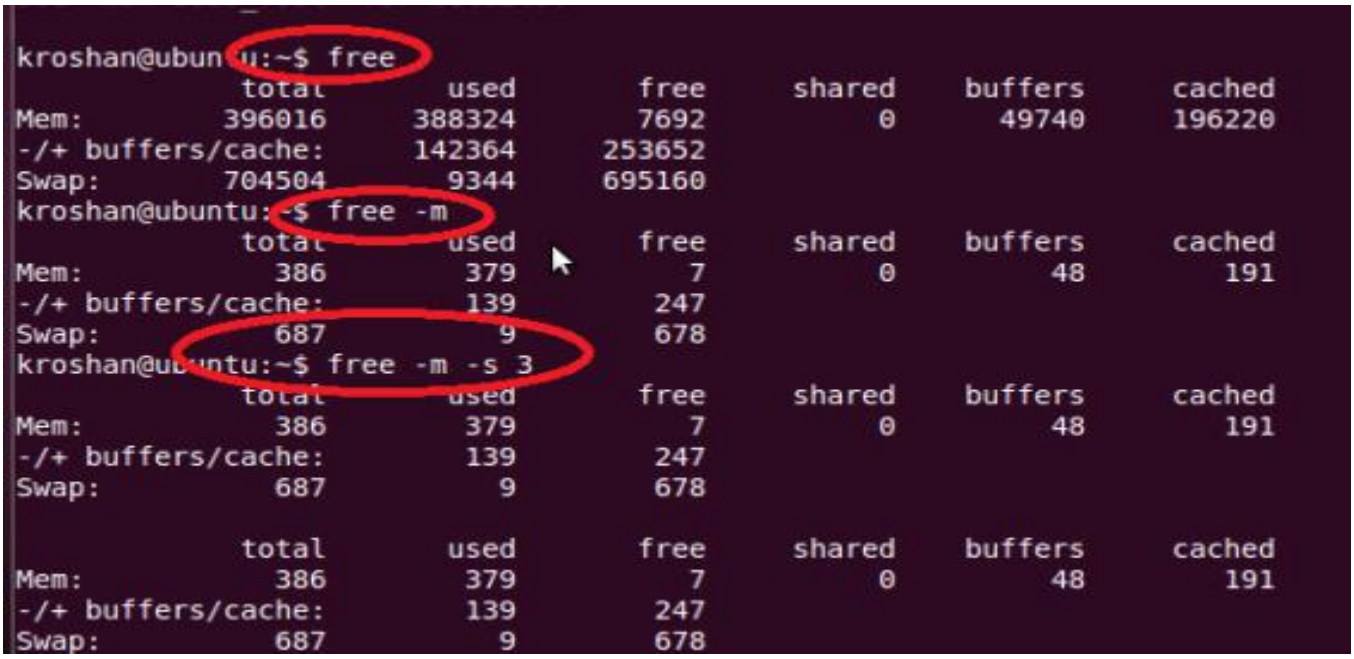
- The CPU information includes **details about** the processor, like the architecture, vendor name, model, number of cores, a speed of each core etc.
- There are quite a few commands on Linux to get those details about the CPU hardware, and here is about some of the commands. /proc/cpuinfo. Lscpu

```
top - 11:05:29 up 10:17,  3 users,  load average: 1.38, 1.15, 0.93
Tasks: 256 total,   3 running, 253 sleeping,   0 stopped,   0 zombie
%Cpu(s): 13.8 us, 18.8 sy,  0.0 ni, 67.2 id,  0.3 wa,  0.0 hi,  0.0 si,  0.0 st
KiB Mem :  3742792 total,   146592 free,  2919320 used,   676880 buff/cache
KiB Swap:        0 total,        0 free,        0 used.   455704 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU %MEM     TIME+ COMMAND
17918 aaronki+  20   0    7336    712    640 R 100.0  0.0   5:06.58 dd
14418 aaronki+  20   0 2816472 1.284g  59720 R  18.6 36.0  58:36.00 firefox
18030 aaronki+  20   0  479616  35208  26260 S   4.7  0.9   0:00.41 gnome-scre+
 2672 aaronki+  20   0 1870444 369932  36952 S   3.0  9.9  16:05.01 cinnamon
 1697 root      20   0  710828 161916 143344 S   2.7  4.3   5:15.83 Xorg
 1726 shinken   20   0 1585496  27960    420 S   0.3  0.7   4:38.01 shinken-sc+
 1863 shinken   20   0 1659248  29496   1988 S   0.3  0.8   2:51.35 shinken-re+
 1942 shinken   20   0 1660204  30624   1912 S   0.3  0.8   3:52.23 shinken-br+
 2026 shinken   20   0 1584700  26492   1776 S   0.3  0.7   2:06.98 shinken-re+
 2110 root      20   0 1661356  29624   2092 S   0.3  0.8   2:45.38 shinken-ar+
 2545 aaronki+  20   0  206868   2140   1500 S   0.3  0.1   0:02.05 at-spi2-re+
18025 aaronki+  20   0   41924   3836   3112 R   0.3  0.1   0:00.03 top
    1 root      20   0  119848   4168   2128 S   0.0  0.1   0:03.00 systemd
    2 root      20   0       0      0      0 S   0.0  0.0   0:00.01 kthreadd
    3 root      20   0       0      0      0 S   0.0  0.0   0:00.27 ksoftirqd/0
    5 root       0 -20       0      0      0 S   0.0  0.0   0:00.00 kworker/0:+
    7 root      20   0       0      0      0 S   0.0  0.0   0:28.19 rcu_sched
```

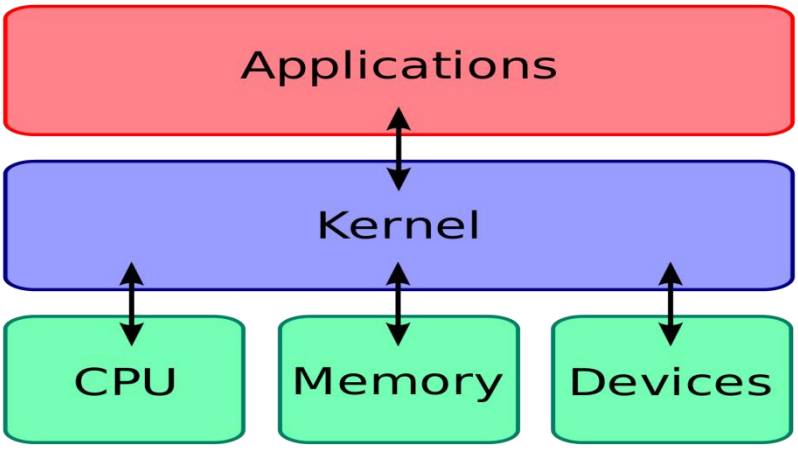
what is memory in linux

Linux by default tries to use **RAM** in order to speed up disk operations by making use of available memory for creating buffers (file system metadata) and cache (pages with actual contents of files or block devices), helping the system to run faster because disk information is already in memory which saves I/O operations



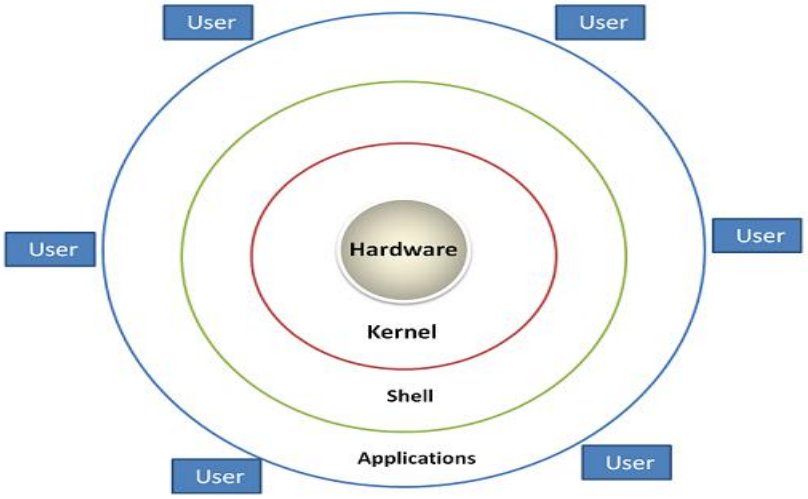
what kernel in linux

The Linux® kernel is **the main component of a Linux operating system** (OS) and is the core interface between a computer's hardware and its processes. It communicates between the 2, managing resources as efficiently as possible



What are basic elements or components of Linux

Linux generally consists of five basic elements or components as given below



- **Kernel:** It is considered a core or main part of Linux and is generally responsible for all major activities of OS such as process management, device management, etc.
- **System Library:** These are special functions or programs with the help of which application programs or system utilities can access features of the kernel without any requirement of code. It is simply used to implement the functionality of the OS.
- **System Utility:** These are utility programs that are responsible to perform specialized and individual-level tasks. They are considered more liable and allow users to manage the computer.
- **Hardware:** It is physical hardware that includes items such as a mouse, keyboard, display, CPU, etc.
- **Shell:** It is an environment in which we can run our commands, shell scripts, and programs. It is an interface between user and kernel that hides all complexities of functions of the kernel from the user. It is used to execute commands.

Kernel main function

- Memory Management
- Process Management
- Device Management
- Storage Management
- Manage access, and use of various peripherals that are connected to the computer.

What is load average in Linux

- Load average, as the name suggests, is the average system load on Linux servers being calculated over a given period of time.
- The load average of Linux servers can be found using “top” and “uptime” commands.
- It is simply used to keep track of system resources.
- It is represented by a decimal number starting at 0.00.
- It tells you the load that the system has been under.

What is Shell Script

- Shell Script, as name suggests, is a script especially written for shell. Here, script means programming language that is being used to control applications.
- It simply allows the execution of different commands that are entered in the shell.
- It generally helps you to create complex programs containing conditional statements, loops, and functions.
- It is very easy to debug, can simplify everyday automation processes, and is much quicker as compared to writing big programs

What is the advantage of open source

- Open source allows you to distribute your software, including source codes freely to anyone who is interested.
- People would then be able to add features and even debug and correct errors that are in the source code. They can even make it run better and then redistribute these enhanced source code freely again.
- This eventually benefits everyone in the community

what is reboot in linux

- reboot command is used restart or reboot the system.
- In a Linux system administration, there comes a need to restart the server after the completion of some network and other major updates.
- The reboot is needed so that the changes that the user have done can be affected on the server.

how to check linux version

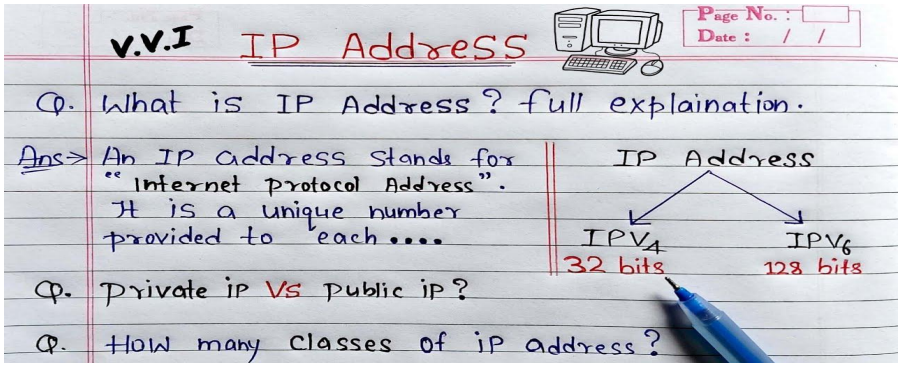
- Type any one of the following command to find os name and version in Linux: cat /etc/os-release. lsb_release -a. hostnamectl.
- Type the following command to find Linux kernel version: uname -r.

Mention some Linux file content commands

- **head:** Display the top lines of the file.
- **tail:** Display the last lines of the file.
- **cat:** Concatenate more than two files.
- **more:** Display the content in pager form to view in the terminal.

What is in IP address

- IP stands for "Internet Protocol," which is the set of rules governing the format of data sent via the internet or local network.
- IP addresses are the identifier that allows information to be sent between devices on a network: they contain location information and make devices accessible for communication.



What are the kinds of permissions under Linux

- There are 3 kinds of permissions under Linux:- Read: users may read the files or list the directory- Write: users may write to the file of new files to the directory- Execute: users may run the file or lookup a specific file within a directory

Features of Linux

- **Multitasking:** Supports more than one function simultaneously by dividing the CPU time.
- **Multiuser capability:** Allows multiple users to access the same system resource using different terminals for operation.
- **Portable:** Linux Kernel and application programs can be installed on any kind of hardware platform.
- **Application support:** Has its own software repository to download and install applications.
- **Security:** Provides security in three ways namely, authentication, authorization, and encryption.
- **Hierarchical File System:** Provides a standard file structure in which system files and user files are arranged.
- **Open Source:** Code is freely available to all.
- **Live CD/USB:** Provide a live CD/USB so that users can run it without installing it.

Why is Linux better than Windows

- Linux offers more security and great speed compared to Windows.
- Windows offers great ease of use, enabling even non-technical people to work on it easily. But it is less secure compared to Linux as viruses and malware affect windows more quickly.

- Linux is preferred by many corporate organizations as a server and operating system for security.

What are the different process states in Linux

Linux has the following process states:

- **Ready:** The process has been created and is ready to run.
- **Running:** The process is being executed and using the CPU at a particular moment.
- **Waiting:** Process is waiting for an event to occur or for a system resource.
- **Terminated/Stopped:** A process has been stopped, usually by receiving a signal.
- **Zombie:** The process is terminated, but still has an entry in the process table.

How can you check the memory status

- free -m to display output in MB
- free -g to display output in GB

Which command is used to check the memory status

- **"cat" command:** It can be used to show or display Linux memory information. (cat/proc/meminfo)
- **"vmstat" command:** It can be used to report statistics of virtual memory.
- **"top" command:** It can be used to check the usage of memory.
- **"htop" command:** It can be used to find the memory load of each proces

root account

- The root account is like a systems administrator account and allows you full control of the system. Here you can create and maintain user accounts, assigning different permissions for each account. It is the default account every time you install Linux.

What is CLI

- The Command Line Interface (CLI), is a non-graphical, text-based interface to the computer system, where the user types in a command and the computer then successfully executes it.
- The Terminal is the platform or the IDE that provides the command line interface (CLI) environment to the user

what is gui in linux

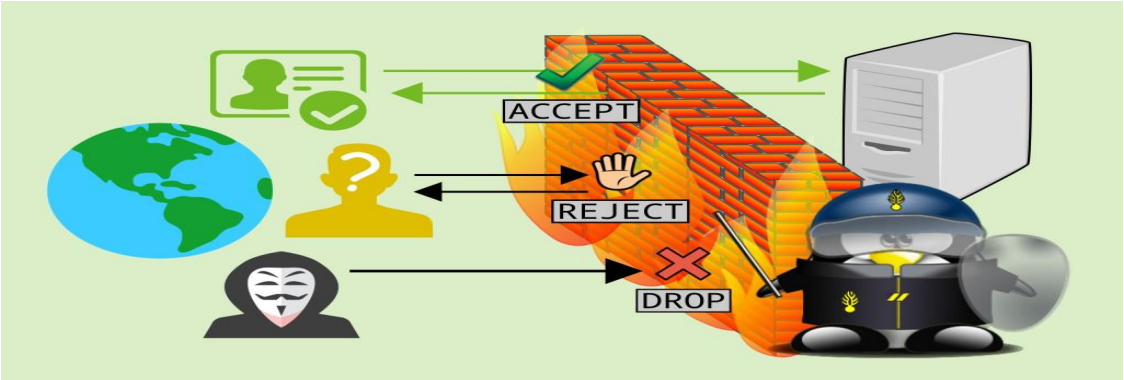
- An interface that allows users to interact with the system visually through icons, windows, or graphics is a GUI.
- While the kernel is the heart of Linux, the face of the operating system is the graphical environment provided by the X Window System or X

How to fix network issues in linux

- Check your network configuration
- Check the network configuration file
- Check the servers DNS records
- Test the connection both ways
- Find out where the connection fails
- Firewall settings
- Host status information

what is firewall in linux

- A Linux firewall is **a device that inspects Network traffic (Inbound /Outbound connections) and makes a decision to pass or filter out the traffic**.
- Iptables is a CLI tool for managing firewall rules on a Linux machine.
- Network Security evolved with different types of Linux firewall in the era



Iptables

- **iptables** is a user-space utility program that allows a system administrator to configure the IP packet filter rules of the Linux kernel firewall, implemented as different Netfilter modules.
- The filters are organized in different tables, which contain chains of rules for how to treat network traffic packets.
- Different kernel modules and programs are currently used for different protocols; *iptables* applies to IPv4, *ip6tables* to IPv6

What is the use of iptables in Linux

- Simply put, iptables is a firewall program for Linux.
- It **will monitor traffic from and to your server using tables**.
- These tables contain sets of rules, called chains, that will filter incoming and outgoing data packets.

How do I find iptables in Linux

How to list all iptables rules on Linux

- Open the terminal app or login using ssh: ssh user@server-name.
- To list all IPv4 rules : sudo iptables -S.
- To list all IPv6 rules : sudo ip6tables -S.
- To list all tables rules : sudo iptables -L -v -n | more.
- To list all rules for INPUT tables : sudo iptables -L INPUT -v -n

```
computer@computer:~$ sudo iptables -t filter -A OUTPUT -d 192.168.1.123 -j DROP
computer@computer:~$ sudo iptables --list
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
DROP       udp  --  anywhere             anywhere
ACCEPT     all  --  192.168.1.230        anywhere

Chain FORWARD (policy DROP)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
DROP       all  --  anywhere             192.168.1.123
computer@computer:~$
```

What is difference between iptables and Firewalld

- The essential differences between firewalld and the iptables service are: The iptables service stores configuration in /etc/sysconfig/iptables while firewalld stores it in various XML files in /usr/lib/firewalld/ and /etc/firewalld/

What layer is iptables

- Application Layer
- The Iptables firewall is realized as Application Layer Firewall that can filter the packets based on its contents

How do I know if iptables is running

- You can, however, easily check the status of iptables with the command systemctl status iptables.
- service or maybe just the service iptables status command -- depending on your Linux distribution.
- we can also query iptables with the command iptables -L that will list the active rules.

How many types of firewall are there in Linux

- There are **four types** of firewalls, which are all available on Linux platforms.
- These are, in order of complexity and features, **packet filtering, application proxies, stateful inspection, and hybrid**

File Commands		
1.	ls	Directory listing
2.	ls -al	Formatted listing with hidden files
3.	ls -lt	Sorting the Formatted listing by time modification
4.	cd dir	Change directory to dir
5.	cd	Change to home directory
6.	pwd	Show current working directory
7.	mkdir dir	Creating a directory dir
8.	cat >file	Places the standard input into the file
9.	more file	Output the contents of the file
10.	head file	Output the first 10 lines of the file
11.	tail file	Output the last 10 lines of the file
12.	tail -f file	Output the contents of file as it grows,starting with the last10 lines
13.	touch file	Create or update file
14.	rm file	Deleting the file
15.	rm -r dir	Deleting the directory
16.	rm -f file	Force to remove the file
17.	rm -rf dir	Force to remove the directory dir
18.	cp file1 file2	Copy the contents of file1 to file2
19.	cp -r dir1 dir2	Copy dir1 to dir2;create dir2 if not present

20.	mv file1 file2	Rename or move file1 to file2,if file2 is an existingdirectory
21.	ln -s file link	Create symbolic link link to file
Process management		
1.	ps	To display the currently working processes
2.	top	Display all running process
6.	finger user	Display information about user
7.	uname -a	Show kernel information
8.	cat /proc/cpuinfo	Cpu information
9.	cat proc/meminfo	Memory information
10.	man command	Show the manual for command
11.	df	Show the disk usage
12.	du	Show directory space usage
13.	free	Show memory and swap usage
14.	whereis app	Show possible locations of app
15.	which app	Show which applications will be run by default
Compression		
1.	tar cf file.tar file	Create tar named file.tar containing file
2.	tar xf file.tar	Extract the files from file.tar
3.	tar czf file.tar.gz files	Create a tar with Gzip compression
4.	tar xzf file.tar.gz	Extract a tar using Gzip
5.	tar cjf file.tar.bz2	Create tar with Bzip2 compression
6.	tar xjf file.tar.bz2	Extract a tar using Bzip2
7.	gzip file	Compresses file and renames it to file.gz
8.	gzip -d file.gz	Decompresses file.gz back to file
Network		
1.	ping host	Ping host and output results
2.	whois domain	Get whois information for domains
3.	dig domain	Get DNS information for domain
4.	dig -x host	Reverse lookup host
5.	wget file	Download file
6.	wget -c file	Continue a stopped download

RT - Technologies

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