

LINUX

Linux is an free and Open-source operating system with high security. Linux is multi user based OS.

OPERATING SYSTEM:

- An Operating System (OS) is a software that acts as an interface between computer hardware components and the user.
- Every computer system must have at least one operating system to run other programs. Applications like Browsers, MS Office, Notepad Games, etc., need some environment to run and perform its tasks.
- The OS helps you to communicate with the computer without knowing how to speak the computer's language. It is not possible

KERNEL: manages the Hardware Components. CPU, memory, and peripheral devices.

The kernel is the lowest level of the OS.

DAEMONS: Manages are background services (printing, sound, scheduling, etc.) that either start up during boot or after you log into the desktop.

SHELL: is an environment in which we can run our commands, programs, and shell scripts. It gathers input from you and executes programs based on that input. When a program finish executing, it displays that program's output.

A shell is a program that serves as an interface between the user and the operating system. It provides a way for users to interact with the computer by accepting commands and then executing them.

Shells can be graphical (GUI-based), where users interact with the computer through windows, icons, and buttons, or they can be command-line-based, where users type text commands into a terminal.

COMMAND: A command is a specific instruction or request given to a computer's operating system or shell. It tells the computer to perform a particular action or task.

TERMINAL: A terminal, also known as a command-line interface (CLI), shell, or console, is a text-based interface for interacting with a computer's operating system. It provides a way for users to enter commands and receive text-based output.

Terminals are commonly used in Unix-based and Linux operating systems, but they also exist in Windows (Command Prompt or PowerShell) and macOS.

LINUX OS DISTRIBUTIONS: Many of the users taken the linux OS and modified according to their requirements and released into the market with different names called Linux distribution.

- RedHat
- Ubuntu
- Debian
- Centos
- Fedora
- Opensuse
- Kali Linux
- Amazon Linux
- Rocky Linux

LINUX HISTORY:

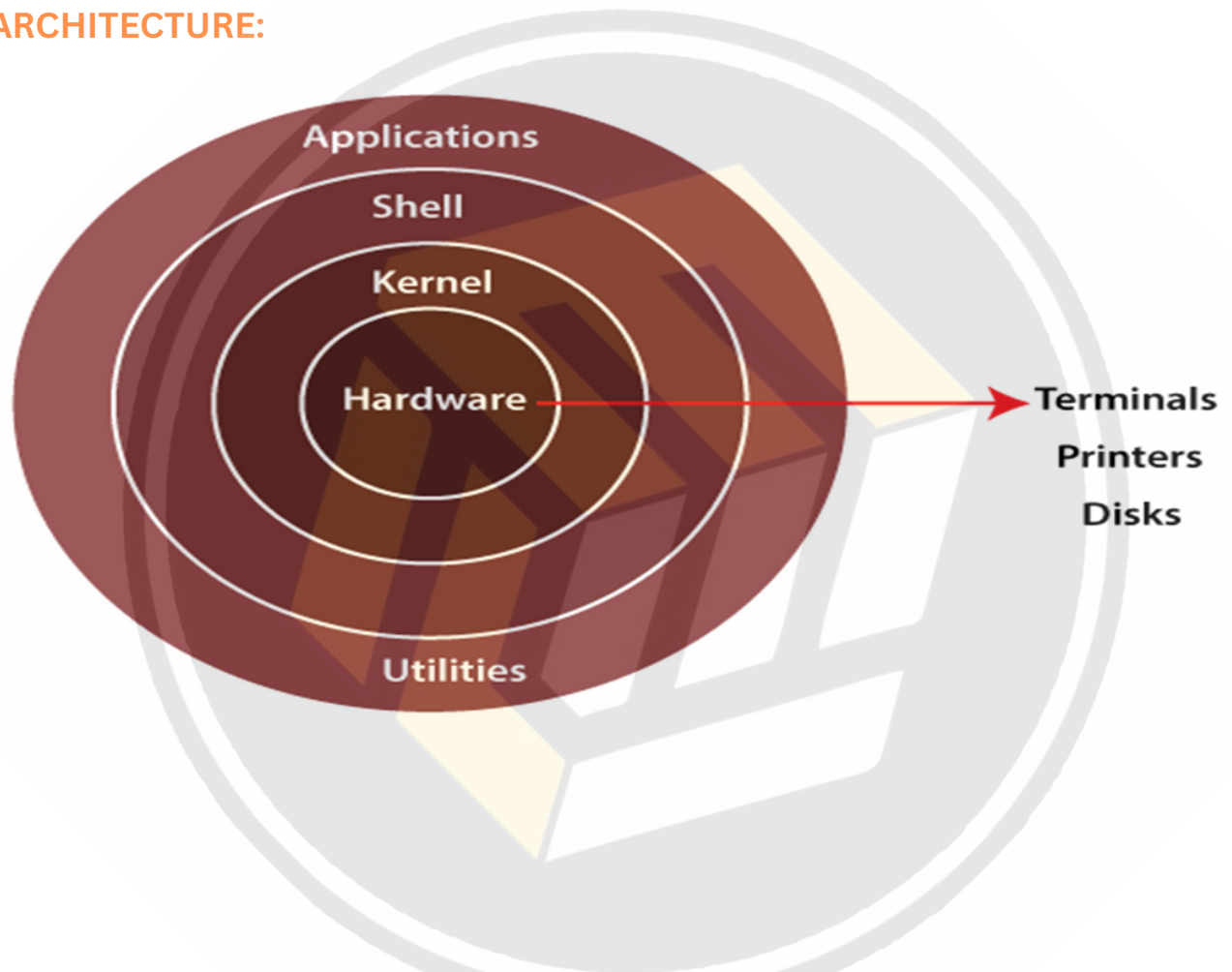
- In 1991, Linus Torvalds a student at the university of Helsinki, Finland, thought to have a freely available academic version of Unix started writing its own code.
- After this project became the Linux kernel.
- The Linux kernel is written in C language.
- He wrote this program specially for his own PC
- Firstly he wanted to name it as 'Freax' but later it became 'Linux'.
- In 1992, he released the kernel under GNU General Public License.
- Today, supercomputers, smart phones, desktop, web servers, tablet, laptops and home appliances like washing machines, DVD players, routers, modems, cars, refrigerators, etc use Linux OS.

OPEN SOURCE:

Linux is also distributed under an open-source license. Open source follows these key tenants:

- It is made freely available to the public, allowing anyone to view, use, modify, and distribute the code as they see fit.
- The freedom to run the program, for any purpose.
- The freedom to study how the program works, and change it to make it do what you wish.
- The freedom to redistribute copies so you can help your neighbour.
- The freedom to distribute copies of your modified versions to others.

ARCHITECTURE:



LINUX COMMANDS

COMMANDS	DESCRIPTION
SYSTEM COMMANDS	
uname	used to get OS
uname -r	Displays Linux kerner version
uname -a	Displays all information about Linux system information
uptime	Displays since how system has been running
uptime -p	Shows uptime in pretty format
uptime -s	Shows uptime in pretty format
hostname	Displays the Hostname
hostname -i	Displays IP addresses for the host name
hostname -l	Displays IP addresses for the host name
last reboot	Shows system reboot history
ip addr	Shows addresses assigned to all network interfaces
ip route	Show table routes
ifconfig	Displays the IP address of the system
date	Shows system date and timestamp
date +"%d"	Prints day of the month (01-31)
date +"%m"	Prints the month of the year 01-12
date +"%y"	Prints only the last two digits of Year
date +"%H"	Prints the hour 00-23

date +"%M"	Prints the Minute of the hour 00-59
date +"%S"	Prints the current seconds count in the minute (00-60)
date +"%D"	Prints Date in MM/DD/YY
date +"%F"	Prints only the Full date as YYYY-MM-DD
date +"%A"	Prints the Day of the Week Saturday-Sunday
date +"%B"	Prints the month between January-December
who	Prints information about default user in our server
whoami	Prints information about all users who are currently logged in
top	List out the running processors in our system
ps	Displays information about a selection of the active processes
HARDWARE COMMANDS	
lscpu	Displays information about the CPU architecture
lsblk -a	Lists the information about all the block devices attached to the system
free	Displays system memory(RAM) details in KB
free -m	Displays system memory(RAM) details in MB

df	Report file system disk space usage
df -h	Report file system disk space usage in human readable languages
du filename	Summarize disk usage of each FILE, recursively for directories
du -sh filename	Summarize disk usage in human readable format
cat /proc/cpuinfo	Displays information about the CPU architecture
cat /proc/meminfo	Displays system memory(RAM) details
fdisk -l	List the partition tables for the specified devices
fdisk -s <partition>	Displays partition size(s) in blocks (to convert block into MB : $\text{blocksize} \times 1024 / 1000000$)
FILE COMMANDS	
touch file-name	used to crete a single file
touch f1 f2 f3	used to create multiple files
touch file{1..5}	create 5 files at a time
rm file	used to remove single file
rm f1 f2 f3	used to remove multiple files
rm file{1..5}	used to remove 5 files
rm -f filename	used to remove a file without our permission
rm -f *	used to remove all files at a time

mkdir folder1	used to create a single folder
mkdir f1 f2 f3	used to create multiple folders
mkdir folder{1..7}	used to create 7 folders
touch foldername/filename	used to create a file inside the folder
mkdir foldername/foldername	used to create a folder inside a folder
mkdir -p foldername/foldername/foldername	used to create folders inside a folder
cd foldername	used to change the directory
cd ..	used to back to one step back
cd -	used to go back to the previous directory
cd	used to go to root directory at a time
cd /	To change the pwd to root directory which is the topmost/outermost parent directory
pwd	present working directory
rmdir folder	used to remove empty directory
rmdir *	used to remove all empty directories
rm -rf *	used to remove all files and folders at a time
ll	used to see all the files along with the data
ls	used to see only file names
ls folder1	used to see the list of files present in folder1
ll -a	used to see hidden files

ll -r	used to see the files in reverse order
ll -t	used to see the latest files in top
ll -ltr	To list the files in long listing format with sort by modification time, newest first and then in reverse order
cat>filename	used to overwrite the data in a file
cat>>filename	used to append the data into a file
cat filename	used to read the data into a file
cat -n filename	used to read the data along the line numbers
tac filename	Displays the file1 content in reverse ie last line first
rev filename	used to reverse the content in a file
cat f1 f2 f3	used to see all the files data at a time
more f1 f2 f3	used to see all the files data at a time with percentages
head filename	used to print first 10 lines of a file
tail filename	used to print last 10 lines of a file
sed -n '5,9p' filename	used to print the lines between 5 to 9
sed -n '7p' filename	used to print the 7th line
head -n 8 filename	prints 8 lines in a file
tail -n 4 filename	used to print last 4 lines in a file
wc filename	used to get the no of lines, words, letters in a file
wc -l filename	used to get only line numbers of a file

<code>wc -w filename</code>	used to get no of words in a file
<code>wc -c filename</code>	used to get no of characters in a file
<code>cp file1 file2</code>	used to copy the data from file1 file2
<code>cat file1 >> file2</code>	used to append the data from file1 file2
<code>cat file1 tee file2 file3 file4</code>	used to copy the data from file1 to file2 file3 file4
<code>cat file1 tee -a file2 file3 file4</code>	used to append the data from file1 to file2 file3 file4
<code>cp file1 folder1</code>	used to copy file1 to folder1
<code>mv file1 file2</code>	used to move the data from file1 to file2
<code>mv file1 folder1</code>	used to move file1 to folder1
<code>echo folder{2..7} xargs -n 1 cp -v folder1/*</code>	copy files from folder1 to folder2 to folder7 at a time
<code>cmp file1 file2</code>	used to compare the 2 files
<code>diff file1 file2</code>	used to get the differences of a file b/w 2 files
SEARCH COMMANDS	
<code>find . -name file</code>	used to find a file in current directory
<code>find /proc/ -name filename</code>	used to find a file in proc directory
<code>find . -type d -name folder</code>	used to find a folder in current directory
<code>find . -type f -name <file1.txt></code>	used to find a file in current directory
<code>find . -type f -perm 777</code>	Finds all the files whose permissions are

	777 in the current directory
<code>find . -type f ! -perm 777</code>	Finds all the files whose permissions are NOT 777 in the current directory
<code>find . -perm /u=r</code>	Finds all Read-Only files in the current directory
<code>find . -perm /a=x</code>	Finds all executables files in the current directory
<code>find . -perm /a=w</code>	Finds all writable files in the current directory
<code>find . -type f -empty</code>	Find all Empty Files in the current directory
<code>find . -type d -empty</code>	Find all Empty directories in the current directory
<code>find / -user <username></code>	Finds all the files specific user owned in / directory
<code>find / -group groupname</code>	Finds all the files specific group owned in / directory
<code>find . -mtime 10</code>	Finds all the files which are modified 10 days back in current folder
<code>find / -atime 100</code>	Finds all the files which are accessed 10 days back in current folder
<code>find . -cmin -60</code>	Finds all the files which are changed in the last 1 hour in current directory
<code>find . -mmin -60</code>	Finds all the files which are modified in the last 1 hour in current directory
<code>find . -amin -60</code>	Finds all the files which are accessed in the last 1 hour in current directory
<code>find . -size 1k</code>	Finds all 1KB files in current directory

find / -size +50M -size -100M	Finds all the files which are greater than 50MB and less than 100MB in / directory
locate filename	Used to locate a word in linux (by default it will not locate, we need update db every time)
sudo updatedb	used to update linux db
locate -i filename	used to search for a file in case sensitive
locate -n 5 "*.txt"	used to search top 5 text files
locate -c aws*	used to count no of aws files present in server
grep "word" file	Used to search for a word in a file
grep "word" file1 file2 file3	Used to search for a word in multiple files
grep -l "word" file1 file2 file3	Prints the filename which contains the word
grep -n "word" file	Used to search for a word in a file with line number
grep -i "word" file	Searches the word in file with case-insensitive
grep -c "word" file	Gives the count of words in a file
grep -e <pattern1> -e <pattern2> <file1>	To search multiple patterns in file1
USER COMMANDS	
useradd	To add the user
useradd -e 2024-01-31 username	Set Expiration date of the user. After the

	date the user will be no longer available
useradd -U username	Create a group with the same name as the user and added the user into the group
useradd -M username	Created username without hoem directory
useradd -D	Prints the default home directory, default shell, default expiration date, and other settings.
userdel	To delete the user
userdel -f username	Forcefully deleted
userdel -r username	Deletes the user along with the directory
chage -l userName	Used to get user expiry details
su - useradd	Login into the user
passwd username	Used to set a password
groupadd	Used to add a group
groups	Displays the group where current user belongs to
groupmod -n newgroup oldgroup	used to change the group name
groupdel	Used to delete the group
groupdel -f	Used to delete the group forcefully
PERMISSION COMMANDS	
chown username file/foldername	To change the user of a file/folder
chown -R username foldername	To change the user of folder along with files

chown username foldername/*	To change the user of all files that are present in folder
chgrp groupname file/foldername	To change the group of a file/folder
chgrp -R groupname foldername	To change the group of folder along with files
chgrp username foldername/*	To change the group of all files that are present in folder
chown username:groupname file/foldername	To change the user and group of a file/folder
chown -R username:groupname foldername	To change the user group of folder along with files
chown username:groupname foldername/*	To change the user group of all files that are present in folder
chmod 777 file/foldername	To change the permissions of a file/folder
chmod -R 777 foldername	To change the permissions of folder along with files
chmod 567 foldername/*	To change the permissions of all files that are present in folder
sudo gpasswd -d username groupname	To delete a user from group