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 Omce, 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

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| 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 -I | 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 |

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| 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 |
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| 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 |

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| 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 :  blocksize\*1024/1000000) |
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| 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 |

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| 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 |
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| 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 |

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

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|  | 777 in the current directory |
| find . -type f ! -perm 777 | Finds all the files whose permissions are NOT 777 in the current directory |
| find . -perm /u=r | Finds all Read-Only files in the current directory |
| find . -perm /a=x | Finds all executables files in the current directory |
| find . -perm /a=w | Finds all writable files in the current directory |
| find . -type f -empty | Find all Empty Files in the current directory |
| find . -type d -empty | Find all Empty directories in the current directory |
| find / -user <username> | Finds all the files specific user owned in / directory |
| find / -group groupname | Finds all the files specific group owned in / directory |
| find . -mtime 10 | Finds all the files which are modified 10 days back in current folder |
| find / -atime 100 | Finds all the files which are accessed 10 days back in current folder |
| find . -cmin -60 | Finds all the files which are changed in the last 1 hour in current directory |
| find . -mmin -60 | Finds all the files which are modified in the last 1 hour in current directory |
| find . -amin -60 | Finds all the files which are accessed in the last 1 hour in current directory |
| find . -size 1k | Finds all 1KB files in current directory |
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| 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 |
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| USER COMMANDS |  |
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| useradd | To add the user |
| useradd -e 2024-01-31 username | Set Expiration date of the user. After the |

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|  | 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 |
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| 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 |
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| 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 wiht 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 wiht 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 wiht 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 |