CHAPTER - LINUX

History of linux

● Year - 1960 - US Defence developed a powerful system in terms of security for internal use, for that matter under the project name of Advanced Research Projects Agency Network (ARPANET) few developers were hired from Bell Labs.

● Mr. Dennis Ritchie and Mr. Ken Thomson were Project leads

● Year 1969 - Bell lab's used the code of Mr. Ken Thomson and developed a new system called UNIX. (using DOS)

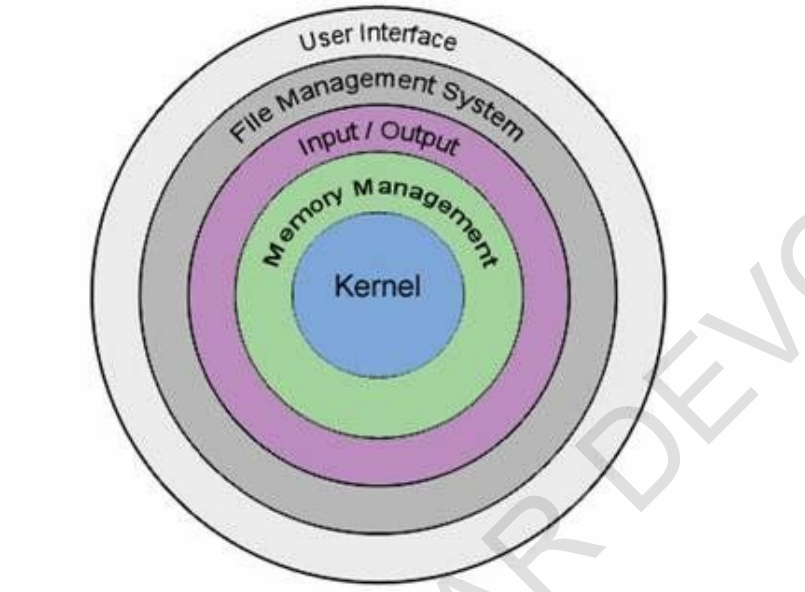
● Unix was Re-developed using DOS and C, Unix licensed to universities only.

● Year 1984, Richard Stallman started " GNU" ,-- General Not Unix, goal - create free unix like software., movement started across globe to create free open source unix like OS

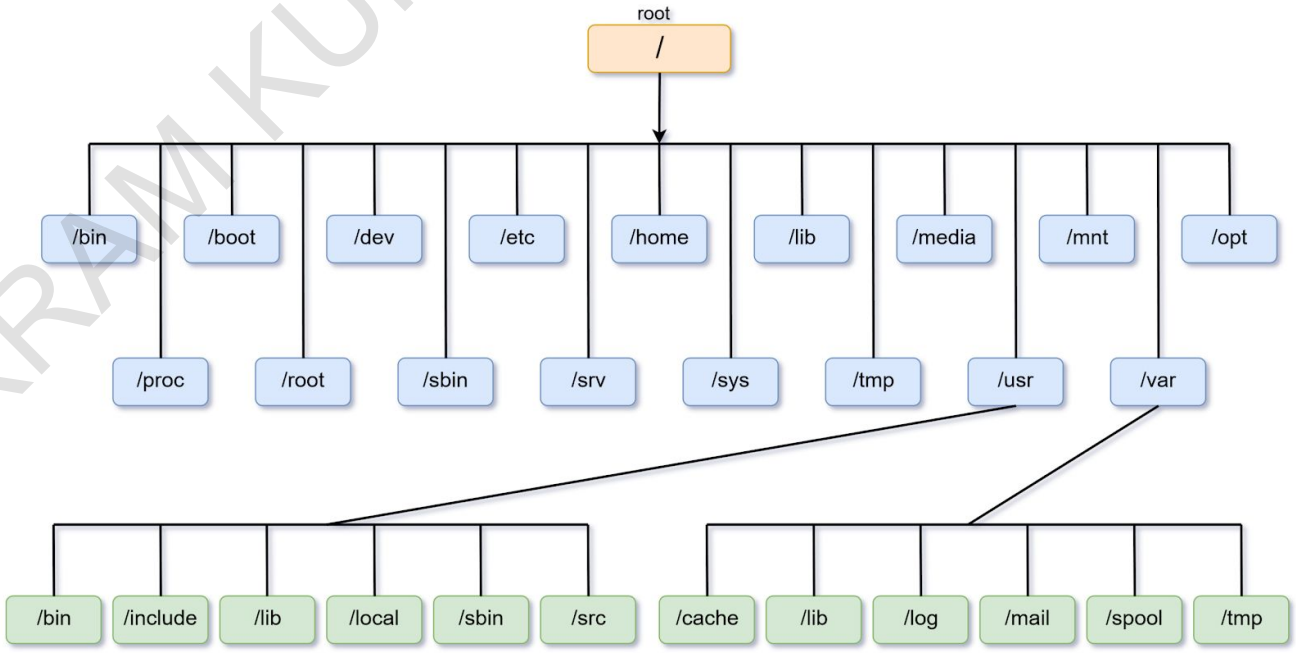
Linux Flavours

- Solaris
- AIX
- Ubuntu
- HP-UX
- Kali Linux
- RHEL
- Ubuntu ..etc

OS Structure



File System Hierarchy



The Linux FileSystem

Linux Commands

1. LOGOUT

- Usage - to logout of system
- Ctrl + D an alternative method to logout .

Syntax :

logout

2. Shutdown

- Used to shutdown the system

Syntax : shutdown [options] [time] message

Example -

shutdown -h +10 "system will shutdown after 10 minutes”

shutdown -c

shutdown -r

shutdown now

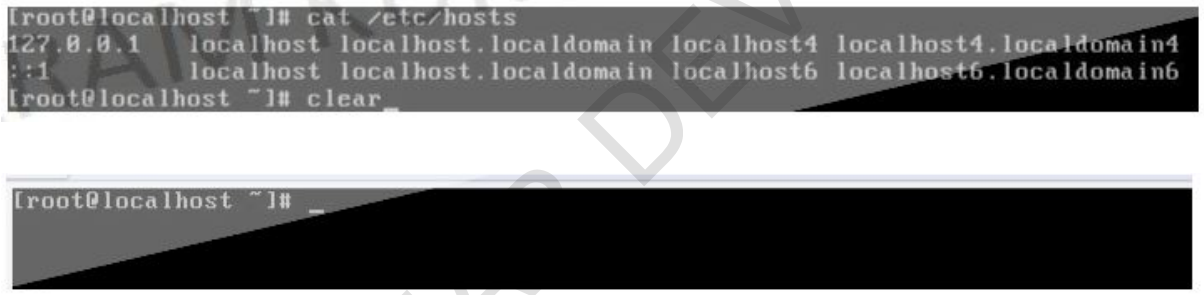
3. Clear

● Used to clear the terminal screen

Syntax

clear

Example:



4. Logname

● Shows current user login information

Syntax

logname

5. Man

● Helps to display the help information of any command

● It provides all reference information of commands

Syntax - # man <command>

Examples :

man shutdown

Alternate method :

<command_name> --help or # <command_name> -h

6. Whatis -

● Used to display single line command help information

Syntax :

whatis <command>

7. Cal

● Used to display the calendar

Syntax : # cal [options]

Examples

cal 2018 → displays 2018 year calendar

cal 6 2018 → displays june month calendar

cal 15 08 1947 → displays 15 august 1947 calendar

8. Date

● Used to display day of week, date ,time and timezone

● There is no specific command to display time

Syntax

date

9. Who

- # who [option]

Find all logged Users

- List all users currently logged in to your system.

- # who
- # who -r → shows the current run level
- # who am i → Shows the current user login information.

10. Pwd

● Displays print working directory information

● Here, pwd refers to " Print Working Directory" or " Present Working Directory"

Syntax

pwd

11. ls

● Lists directories and files under present working directory

● shows the output in colour code format

● Most frequently used command in linux

Syntax

ls [options]

ls -l → shows information in long list format

ls -la → shows the hidden files

Note - hidden files in linux starts with .

ls -lh → lists the files size in human readable format

ls -lt → list based on time format (shows last modified a top or from newest to oldest)

ls -lr → reverse the order of list (in alphabetical order)

ls -ld → shows the directory permissions

FIELD EXPLANATIONS

Type	Represented by	Color code
File	-	Black /white
Directories	d	Blue
Link	l	Sky blue
Executable		Green
/tar/gz/.rpm		Red

12. cat (cat means concatenate)

- Used to create the files
- Display file contents
- Append file contents
- Overwrite file contents
- To save the file use ctrl+d
- ** we cannot create the multiple files using cat.

Syntax :

cat > file_name → to create the file , “>” is called as **REDIRECTION** symbol

13. touch command -

- Create multiple files
- Update timestamps of a file
- Modify timestamps of a file
- It creates a **Zero byte file size**

Syntax -

touch <file_name> → creates one empty file

14. vi

- Text editor
- Can create files
- Append files

Syntax : # vi <file_name>

Options :

esc + i → insert mode to enter content into file
esc + : w → to save file
esc + : q → to quit from file
esc + :wq → to save and quit from file

15. tty

- Used to know the terminal type of user logged in

Syntax -

tty

Examples :

tty

16. mkdir

- Command helps to create directory

Syntax - # mkdir <dir_name> [options]

Examples :

mkdir <dir_name> → creates a directory

mkdir d1 d2 d3 → creates three directories by name d1 d2 d3.

mkdir -p india/south/ts/hyd

to create nested folders, use option -p

17. cd

- cd means change directory
- Helps to navigate the directories

Syntax -

cd

cd ..

- To Move to users home directory from anywhere use below

cd ~

or

cd press enter key gets to home directory of the user

- Show last working directory from where we moved (use '–' switch)

cd -

18. rmdir

- Command helps to remove a ***empty*** directory

Syntax -

rmdir <dir_name>

Examples :

rm -r <dir_name> → deletes recursively entire directory

rm -ri <dir_name> → deletes recursively entire directory with interactive mode

rm -rf <dir_name> → remove the directory forcibly

19. rm

- Used to remove the files and directories from system

Syntax -

rm [options]

Examples :

rm -i <file_name> → interactive mode, asks for confirmation, default option

rm -f <file_name> → delete the file forcibly.

20. wc

- Used to count line, words, characters of a file.

Syntax -

wc file_name

wc -l filename → shows no of lines

wc -w filename → shows no of words

wc -c filename → shows no of characters

21. Uptime command -

- Uptime command helps to know when the system is up or how long the system is running.
- Shows no. of. User connected and system time

- * Load Average data (1st value - 1 to 5 minutes ; 2nd value - 5 to 10 minutes ; 3rd value - 15 minutes)

Syntax -

uptime

22. finger command -

- Shows information about system users like -

❏ Home directory
❏ Shell
❏ Login name
❏ Idle time
❏ Mail info
❏ .... etc

Syntax -

finger <user_name>

23. hostname

- Used to know the hostname of PC

Syntax -

hostname [options]

Examples :

hostname -I → displays system IP address only

24. Ping Command

- Used to check the network connection functionality between

source and destination

Syntax -

ping <ip address/URL/FQDN>

Examples :

ping www.google.com

25. Uname Command

Prints the Operating system related information that includes - kernel, network, hardware, OS etc.

Syntax - # uname [options]

uname -a

uname -r

File permissions

Permissions

```
$ ls -l
-rw-rw-r-- 1 jason users 10400 Sep 27 08:52 sales.data
```

Symbol	Type
-	Regular file
d	Directory
l	Symbolic link

TRAINER/FACULTY : MR. VIKRAM KUMAR

```
$ ls -l
-rw-rw-r-- 1 jason users 10400 Sep 27 08:52 sales.data
```

Symbol	Permission
r	Read
w	Write
x	Execute

TRAINER/FACULTY : MR. VIKRAM KUMAR

Permission	File	Directory
Read (r)	Allows a file to be read.	Allows file names in the directory to be read.
Write (w)	Allows a file to modified.	Allows entries to be modified within the directory.
Execute (x)	Allows the execution of a file.	Allows access to contents and metadata for entries.

TRAINER/FACULTY : MR. VIKRAM KUMAR

Secret Decoder Ring

TRAINER/FACULTY : MR. VIKRAM KUMAR

Permission Categories

Symbol	Category
u	User
g	Group
o	Other
a	All

TRAINER/FACULTY : MR. VIKRAM KUMAR

Changing Permissions

Item	Meaning
chmod	Change mode command
ugoa	User category user, group, other, all
+-=	Add, subtract, or set permissions
rwx	Read, Write, Execute

TRAINER/FACULTY : MR. VIKRAM KUMAR

File permissions can be set on any file or directory by using two methods -

1. Symbolic method (ugoa)
2. Absolute method (numbers)

TRAINER/FACULTY : MR. VIKRAM KUMAR

Symbolic mode permissions -

```
[jason@linuxsvr ~]$ ls -l sales.data
-rw-r--r--. 1 jason jason 36 Feb  6 16:30 sales.data
[jason@linuxsvr ~]$ chmod g+w sales.data
[jason@linuxsvr ~]$ ls -l sales.data
-rw-rw-r--. 1 jason jason 36 Feb  6 16:30 sales.data
[jason@linuxsvr ~]$ chmod g-w sales.data
[jason@linuxsvr ~]$ ls -l sales.data
-rw-r--r--. 1 jason jason 36 Feb  6 16:30 sales.data
[jason@linuxsvr ~]$ chmod g+wx sales.data
[jason@linuxsvr ~]$ ls -l sales.data
-rw-rwxr--. 1 jason jason 36 Feb  6 16:30 sales.data
[jason@linuxsvr ~]$ chmod u+rwx,g-x sales.data
[jason@linuxsvr ~]$ ls -l sales.data
-rwxrw-r--. 1 jason jason 36 Feb  6 16:30 sales.data
[jason@linuxsvr ~]$ chmod a=r sales.data
[jason@linuxsvr ~]$ ls -l sales.data
-r--r--r--. 1 jason jason 36 Feb  6 16:30 sales.data
[jason@linuxsvr ~]$ chmod u=rwx,g=rx,o= sales.data
[jason@linuxsvr ~]$ ls -l sales.data
-rwxr-x---. 1 jason jason 36 Feb  6 16:30 sales.data
[jason@linuxsvr ~]$
```

when after = if it is left blank then it means permissions are disabled for that group

TRAINER/FACULTY : MR. VIKRAM KUMAR

Case Study

- chmod: invalid mode:

Exercise -

- Give the permission of rwx to users, group, others on a file
- Give rw permission to users, groups and no permission to others on a file
- Give only read permissions to group and others

TRAINER/FACULTY : MR. VIKRAM KUMAR

Absolute Method (numbers)

- read=4 write=2 execute=1
- Maximum value (rwx) = 7
- Examples

  r-- r-- r-- 444

  r-x r-- r-- 544

  rwx --- --- 700

TRAINER/FACULTY : MR. VIKRAM KUMAR