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UNIX& Linux History

- The first version of UNIX was created in 1969 by ken Thompson system engineers at AT & T Bell Labs.
- UNIX is Multi-user, Multitasking, and Internet-aware Network OS.

Linux History

- Linus Benedict Torvalds founder of the Linux Kernel at 25 Aug 1991
- Create Open Source Unix-based like kernel released under the GPL
- Today is Linux + GUI Utility Complete the Open Source Software

Linux Feature:-

- Linux is the fastest Operating system in the world. It runs 3 times fast than windows OS.
- Linux is the much secured OS because there is no any problem of virus.
- Linux file format is text format and windows file format is binary format.
- Linux is very reliable OS because kernel of Linux is very stable as compare to windows kernel not crashed easily
- Kernel of Linux is very small it can be stored in floppy.
- Economical
- Multi-user, multitasking, multi-desktop
- Virus proof
- Crash proof
- Case sensitivity
- There are two types of login screen

a. Virtual console (text mode)
b. Graphical login (Also called as Display Manager)

- Each user has a home directory. Proper Personal file storage
- A typical Linux system will run six Virtual Modes & one Graphic mode.

## What is SHELL..??

The shell is basically software program. The shell is actually interfaced between user and kernel.
The shell accepts the command the keyboard by the user and Check for their syntax and gives the error message.
The shell will execute the commands and display its output On the monitor.

```
# cp -iv file /var/tmp

1st = command
2nd = Option   [start with - or --]
3rd = argument [additional parameters]
```

### Tab completion ####

```
#pass[press TAB]           [completion]
#!10                      [to run history command no. 10]
```

[NOTE: Remember all commands are lower-case]

In this case

cp = command
-iv = options
file = source
/var/tmp = destination

Keyword:-

shift+alt+U	(upper)
shift+alt+l	(lower)
ctrl+l	(clear terminal)
Ctrl+Alt+Backspace	(logout)

Linux Basic Commands

clear	- clear the terminal
reset	- to reset the terminal
pwd	- to show current working directory
logname	- to show login user name
history	- to show command history
history -c	- to clear command history
history -r	- to recover command history
history -w	- to write (save) command history
history -a	- to update the history file (.bash_history)
init	- to change runlevel
telinit	- to change runlevel
reboot	- restart the system
poweroff	- shutdown the system
info	- to show command information
man	- to show command information
pinfo	- to show command information
date	- To show and to set date & time
hwclock	- To show hardware date & time
cal	- To show calendar
tzselect	- To set time zone
bc	- Basic calculator
ln	- To create linking
unlink	- To remove the link
mkdir	- To create a directory
touch	- To create empty file
ls	- List directory contents
lsof	- list open file
cp	- copy files
mv	- move (cut) files
cat	- To read a file
tac	- To read a file reverse
nl	- number lines of files
rm	- remove files or directories

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rmdir	- remove empty directories
tty	- to show terminal type
chvt	- To change the virtual terminal

Linux Administrative Commands

mail	- send and receive mail
grep	- print lines matching a pattern
updatedb	- updates a database used by locate
locate	- find files by name
find	- search for files in a directory hierarchy
free	- To show memory size and swap partition size
lsmod	- show the status of modules in the Linux Kernel
modinfo	- to show information about a Linux Kernel module
modprobe	- to add and remove modules from the Linux Kernel
dmidecode	- To show hardware components
uptime	- To show system uptime and system load
pinky	- print user login information
finger	- displays information about the system users
chfn	- to change the finger information
uname	- to display system information
ps	- To show process status
top	- display Linux tasks
pidof	- find the process ID of a running program.
kill	- terminate a process
pkill	- terminate a process by process name
w	- Show who is logged on and what they are doing
last	- to show last logged in users
lastb	- to show fail attempt users
lastlog	- reports the most recent login
du	- Summarize disk usage of each FILE
df	- report file system disk space usage
sort	- sort lines of text files
head	- Print the first 10 lines of each FILE
tail	- Print the last 10 lines of each FILE
wall	- send a message to everybody terminal
chmod	- to change file permission
chown	- to change file owner and group
chgrp	- to change group ownership
getfacl	- get file access control list
setfacl	- set file access control list
wc	- print newline, word, and byte counts for each file
useradd	- to create a new user
userdel	- to delete a user
usermod	- to modify a user account
groupadd	- to create a new group
groupdel	- to delete a group
groupmod	- to modify a group account
su	- switch user
passwd	- to set user password
chage	- change user password expiry information

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who	- show who is logged on
lsusb	- to show list USB port
lscpu	- to show CPU information
nice	- run a program with modified scheduling priority
renice	- to change priority of running processes
ifconfig	- to show system IP address
ss	- ss is used to dump socket statistics
netstat	- print network connections, interface statistics
ping	- To check machine connectivity
nmap	- Port Scanner (Network Mapper)
wireshark	- Analyze network traffic
hostname	- To show or to set machine name
domainname	- To show domain name OR to set domain name
tar	- To archive files
zip	- To compress files
scp	- secure copy (remote file copy)
rsync	- remote file copy
sftp	- secure file transfer program
rpm	- RPM Package Manager
yum	- Yellow-dog Updater Modified
crontab	- executes commands at a specified time.
getenforce	- get the current mode of SE-Linux
setenforce	- modify the mode SE-Linux is running in.
sestatus	- SE-Linux status tool
restorecon	- restore file(s) default SE-Linux security contexts.
fixfiles	- fix file SE-Linux security contexts
chcon	- change file SE-Linux security context
getsebool	- get SE-Linux Boolean value
setsebool	- set SE-Linux Boolean value
partx	- To update the partition table
blkid	- To print block device attributes
badblocks	- search a device for bad blocks
mkfs	- to format the Linux partition
e2lable	- to set and Change the label
swapon	- to enable swap partition
swapoff	- to disable swap partition
mkswap	- to format swap partition
pvcreate	- to create physical volume
pvdisplay	- to show physical volume status
pvremove	- to remove physical volume
vgcreate	- to create volume group
vgdisplay	- to show volume group status
vgremove	- to remove volume group
lvcreate	- to create logical volume
lvdisplay	- to show logical volume status
lvremove	- to remove logical volume
smbstatus	- The smbstatus tool provides access to information about the current connections to smbd
testparm	- The testparm utility is a simple syntax checker for SambaÂ´s smb.conf configuration file.

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```
smbtree            - A text based smb network browser
```

%%%%%%%%%%% System Shutdown,Restart & Log out %%%%%%%%%%%%%

```
# init 0                        [shutdown the system]
# init 6                        [reboot the system]
# reboot                        [restart the system]
# shutdown -r now               [restart]
# reboot -f                     [force restart]
# shutdown -h now               [shutdown now]
# shutdown -h/r minutes         [planned shutdown of the system]
# shutdown -c                   [cancel a planned shutdown of the system]
# logout                        [logout user]
# ctrl+D                        [CLI logout user]
# ctrl+alt+backspace            [GUI logout user]
```

%%%%%%%%%%%%%% Get the help command %%%%%%%%%%%%%%

```
# mkdir --help
# whatis mkdir
# info mkdir
# man mkdir
# whatis mkdir
# pinfo mkdir
```

[Option man Page]

```
PgDn = go to the next page
PgUp = go to the previous page
/    = search for a pattern
n    = jump to the next text
q    = quit and get back to the shell
h    = display help
```

To create file

```
# touch nasa.txt                   [to create empty file]
# touch file file1 file2           [to create multiple files]
# touch file{1..100}               [multiple files create]
# touch .demo.txt                  [to create hidden file]
```

COPY file & Directory

```
# cp <soure><destination>        [copy file and directory]
# cp -iv file test      [interactive mode / prompt before overwrite]
# cp -p file test                [time, owner, group-ship preserver]
# cp -c file test                [SE-Linux preserve]
# cp -r dir test                 [recursive/ all sub-dir/file copy]
```

Rename & Move file

```
# mv <soure><destination>         [move file or dir]
# mv <oldname><newname>           [rename file or dir]
```

Create Directory

```
# mkdir <dirname>                  [create dirs]
# mkdir -v data1                   [verbose mode show]
# mkdir -p /data/data1/data2       [parent directory create]
# mkdir -m 764 data                [mode/ to set permission]
```

Directory List

```
# ls                          [listing]
# ls -l                       [long list]
# ls -r                       [reverse listing]
# ls -a                       [all]
# ls -i                       [inode no show]
# ls -F                       [classify dirs and files]
# ls -sh                      [to show human readable size]
# ls -n                       [Numeric UID/GID]
# ls -t                       [sort by modification time]
# ls -ld <directoryname>      [only show this dir list]
# ls -l <filename>            [only show this file list]
# ls -l | grep ^d             [only dir show]
# ls -l | grep ^-             [only Regular file show]
# ls -l | grep ^l             [only link file show]
# lsof                        [List open files]
# tree /root                  [show files and directory in a tree]
```

Change Directory

```
# cd                    [change directory]
# cd /home              [go to home dir]
# cd /                  [go to /]
# cd ~user              [user home directory]
# cd ~                  [go to home directory]
# cd ..                 [go to one level back]
# cd ../..              [go to two level back]
# cd -                  [go to privise directory]
```

To read a file

```
# cat <exitingfilename>       [to read file]
# cat ><newfilename>         [overwrite file]
# cat >><exitingfilename>    [append file]
# tac <filename>              [file read in reverse]
```

To remove files and directory

```
# rm <filename>              [remove file and directory]
# rm -rf <diretory name>     [recursive / force]
```

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```
# rm -v <filename>          [verbose mode]
# rmdir  <emptydirname>     [Remove empty folder(s)]
```

Hard Link and Soft Link

=======================

## Different between Soft links and hard link..?

Hard Link is a mirror copy of the original file. Hard links share the same inode. Any changes made to the original or hard linked file will reflect the other. Even if you delete any one of the files, nothing will happen to the other.

Soft Link is a symbolic link to the original file. Soft Links will have a different Inode value.A soft link points to the original file. If you delete the original file, the soft link fails.
If you delete the soft link, nothing will happen.

```
# ln -s <target><linkname>             [to create soft link]
# ls -il                            [to show inode No]
# ln <target><linkname>                [to create hard link]
# ls -il                            [to show inode No]
# unlink softlink                   [for soft link delete link file]
```

###### Text Mode Editor nano,vi,vim ######

nano, Vi and Vim Text Editor.......

```
# nano <new/exiting file name>         [to create / editing file]
# vi  <file_name>                      [to create / editing file]
# vim <file_name>                      [to create / editing file]
```

VIM = the vim utility is a powerful command-line based text editor which is more complex and powerful than
other editor.In fact it's an implementation of the vi utility.

<u>* There are three mode of vi and vim editor</u>

1. **Command Mode** OR **Default Mode**
(This mode to use for file read, cut,copy, paste and delete)

2. **Insert Mode**
(This mode used to normal text editing and text modified)

3. **Ex Mode**
(This mode used to save,exit,search and replace)

**** **Use the vi and vim editor** *****

```
# vim <new filename>
# vim  filename
```

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```
press i, a, insert key                (Go Command mode to  Insert mode)

 This is text file only            (add the content)

press Esc to return to command mode

Press Shift :                        (Go command mode to Ex mode)

:wq!       (w= save, q= quit and ! = forcefully)
```

-------------------- **Advance Options in vi/vim editors** --------------------

```
1.   yy  = to copy line
2.   2yy = 2 line copy
3.   yw  = to copy word
4.   2yw = 2 word copy
5.   p   = to paste
6.   cc  = cut line
7.   cw  = cut word
8.   2cw = 2 cut word
9.   dd  = to delete line
10.  dw  = delete word
11.  2dw = 2 delete word
12.  u   = to undo
13.  x   = to delete the character under the cursor
14.  2x  = to character delete
15.  q   = quit file
16.  w   = save file
17. :set nu = to show line numbers
18. :wq   = save & quit file
19. :wq!  = forcefully save & quit
20. :No   = go to line no.
21. :help = to help
22. :!ls  = command execute
23. :/kishor = to search
24. :%s/kishor/nasa  = to search and replace the words
```

****

{**NOTE**:- The 'vimtutor 'command included with vim runs a tutorial that can help you learn more about vim outside this class.}

Compress files

```
# zip file.zip file                   (Compress file/dir)
# uzip file.zip                       (Decompress file)
# zcat file.zip                       (Read zip file)
# zip nasa.zip file file1 file2       (Multiple file Compress)
# zip -e file.zip file                (Encrypt with Password)
```

[**NOTE**: - bzip2 is usually better compression agent than gzip]

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Backup and restore

```
# tar command  =
================
c= create
x= extract
t= listing
v= verbose
f= file name
z= gzip
j= bzip
```

file folder Backup and Restore

```
# tar -cf archive.tar file file1          [archive file and file1]
# tar -xf archive                         [extract]
# tar -tvf archive.tar              [List all files in archive.tar verbosely]
# tar  -cvjf /var/tmp/etc.tar.gz /etc/    [to create backup]
```

Partition Backup and restore =

```
===============================
# xfsdump -f boot.dump /dev/sda1 [file-system backup/partition backup]
# xfsrestore -f boot.dump                    [restore backup]
```

```
 # grep   -      Print lines matching a pattern
 # more   -      To Show file in paging view
 # less   -      To Show file in paging view
 # mail   -      To Send and Receive Internet mail
 # lpr    -      To Print files
 # locate -      find files by name
 # find   -      search for files in a directory
```

```
# grep 'root' /etc/passwd                  (To show root line)
# grep -i 'ROOT' /etc/passwd               (To Ignore  case )
# grep -v root /etc/passwd            (select non-matching lines/invert-match)
# grep -m 1 root /etc/passwd                (to show 1 output only)
# grep -n root /etc/passwd                  (to show line number)
```

```
# more /etc/passwd
(To show paging) (|(Pipe symbol) to used two command run)

# less /etc/passwd                                (To show file in paging)
```

Mail send

```
# mail <user name>                                (To send mail to user)
# mail                                            (To check mailbox)
# mail -s "hi root" root                          (Subject add)
# mail -a install.log root                        (attach file)
# mail -c student root                            (Send carbon copies)
# mail -c student,alex,harry                      (multiple carbon copies)
# mail root,student                               (to send multiple users)
```

[w = save attach file, q = quit]
*[NOTE:-Mail stored in /var/spool/mail/root]

```
# lpr <file name>                       (Print the file)
# lpq                                   (Show printer queue status)
# lprm <job No>                         (Cancel print jobs)
```

Locate and find Command

```
# updatedb                         (to update file database)
# locate passwd                    (To search file or directory)
# locate -n 10 passwd              (to show only 10 output)
# locate -n 10 *.html              (to search all html files)
# locate -i Passwd                 (to ignore case)

# find <search location><options><filename>

# find /etc -name passwd             (To search by name)
# find /etc -size  1M                (To search by size)
# find /etc -perm  000               (To search by permission)
# find /home  -user <USERNAME>       (To search by user created file)
# find /home  -group <GROUPNAME>     (To search by group created file)
# find / -name *.html -user alex     (to show alex user html file)
# find /root -name '*.txt'           (to show all txt files)
# find /proc -amin 2                 (File was last accessed 2 minutes ago)
# find / -atime 1                    (File was last accessed 1 hours ago)
# find / -mmin 1                 (Files status was last changed 1 minutes ago)
# find / -mtime 1                (Files status was last changed 1 hours ago)
```

I/O Redirection
===============
***There are three type of Redirection:-**

```
1. Standard Input        (STDIN) usually from the keyboard (value 0)
2. Standard Output       (STDOUT) usually from the terminal (value 1)
3. Standard Error        (STDERR) usually from the terminal (value 2)

STDOUT = >                (symbol)
STDIN =<(--#--)
STDERR = 2>               (--#--)
```

Advance Command

```
# ps aux                        (To show running processes)
# top                           (To show update run processes)
# pidstat                 (reports statistics based on the process id (PID)
# pidof firefox                 (To show PID NO)
# kill <pid no>                 (To kill processes)
# kill -9 <PID No>              (9 forcefully kill)
# pkill top                     (Stop processes by name)
# w                             (To show remote login user and longing user)
```

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```
# logname                           (Print current login name)
# groups alex                       (print the groups a user is in)
# du /etc                           (to show file/dir. usage space (in bytes)
# du -sh /etc                       (to show etc dir. Size)
(-k kilobyte -m megabyte, s= show only a total each file/directory)
# df /                             (report file system disk space usage)
# tr "a-z" "A-Z" < file            (Translate)(Lowercase to uppercase)
# head /etc/passwd                 (show 1st 10 line)
# head -n 5 /etc/passwd            (show 1st 5 line)
# tail /etc/passwd                 (To show last 10 line)
# tail -n 5 /etc/passwd            (to show last 5 line)
# cut -c1  <file name>             (to show or cut column of the file)
# wc <file name>                   (words, bytes counts for each file)
# sort <file name>                        (Ascending)
# sort -r <file name>                     (Descending)
# sort -n <file name>                     (Numeric sort)
# sort -u <file name>                     (do not show same line)
# diff  <file1><file2>              (To show different between 2 files)
# diff -r <dir1><dir2>              (To show different between 2 directory)
# firefox                            (open the web browser)
# last                        (to show login user & system reboot history)
# last tty2                               (to show tty2 user status)
# lastb                                   (show the last logged in user)
# lastlog -u alex                         (individual user log check)
# wall  "hi all"                          (to send broadcast message)
# free                        (To show RAM & swap status)
# vmstat                      (To show virtual memory Status)
# lsmod                       (To show list of modules)
# modinfo cdrom               (TO show info about module)
# modprobe cdrom              (To install the module)
# modprobe -r cdrom           (Uninstall module)
# dmidecode                   (To show all hardware info)
# uptime                      (show how long the system has been running)
# uname -a                    (print system information)
# uname -r                    (to show the kernel version)
```

```
# dd if=/dev/sr0 of=/mnt/data/file.iso    [to create iso file]
# dd if=/dev/sda of=/tmp/file1      [backup content of the hdd to a file]
# diff -r dir1 dir2                     [different between two dir.]
# mkisofs -o /data/myiso.iso /test    [to create iso file of a folder contain]
# cdrecord -v dev=/dev/cdrom cd.iso     [burn an ISO image]
# ethtool eth0                          [show status of eth0]
# smartctl -i /dev/sda                  (to show HDD information)
# smartctl -H /dev/sda                  (to show HDD health)
# look exer                   (to show lines beginning with a given word)
```

```
# sar -     (Collect, report, or save system activity information)
# lsblk -a                    (list block devices)
# lscpu                       (list CPU architecture information)
# lsusb                       (list usb devices)
# ac                          (print the user connect time (in hours))
# ac -p alex                        (only alex user individual-totals)
# netstat  (Networking information such as install protocols and port no)
# namp 192.168.0.254          (Port Scanner(Nmap (Network Mapper) tool)
# yum install wireshark* -y                     (install pkg)
# wireshark                                     (Network monitoring tool)
# ss                                 (ss is used to dump socket statistics)
# logger "welcome to skynet"                (log generate)
# osinfo                                    (to show OS information)
# osinfo -h station1.example.com            (remote info show)
# smartctl -i /dev/sda
# smartctl -H /dev/sda
# smartctl -a /dev/sda
# dd if=/dev/sr0 of=/mnt/data/file.iso    [to create iso file]
# dd if=/dev/sda of=/tmp/file1      [backup content of the HDD to a file]
# diff -r dir1 dir2                       [different between two dir]
# mkisofs -o /data/myiso.iso /test    [to create iso file of a folder contain]
# ethtool eth0                            [show status of eth0]
# cdrecord -v dev=/dev/cdrom cd.iso       [burn an ISO image]
# dumpe2fs /dev/sda1                      [to show file-system information]
# stty -echo                              [hidden command]
# stty echo                               [show command]
```

```
# sed 's/unix/linux/' file.txt            (replace words)
# sed 's/unix/& kishor/' nasa.txt         (extra modify line)
# sed '1 s/unix/linux/' nasa.txt          (line numbers replace)
# sed '1,3 s/unix/linux/' nasa.txt        (1 to 3 line replace only)
# sed '1,$ s/unix/linux/' nasa.txt        (1st line to last line replace)
# sed '2 d' nasa.txt                      (2 no line delete)
# sed '2,3 d' nasa.txt                    (2 & 3 line delete)
# sed '3,$ d' nasa.txt                    (3 to last line delete)
# sed '/^$/d' nasa.txt                    (remove all blank lines from file)
# apropos ifco                      (search the whatis database for strings)
# wget -r www.google.com                        (download the web site)
# wget -c ftp://192.168.0.254/pub/ISOs/window7.iso
                                    (Download the file current directory)
# wget -c ftp://192.168.0.254/pub/ISOs/window7.iso -O
/root/Download/window7.iso
                              (Download file on /root/Download directory)
```

```
# users    (show the user name of users currently logged in to the current
host)
# logname                 (Print current login name)
# vmstat                  (To show virtual memory Status)
# watch <command-name>    (to watch command with full-screen)
```

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IMP FILE:

```
# vim /etc/motd                    [to store message of the day]
# vim /proc/meminfo                [to store memory info]
# vim /proc/cpuinfo                [to store CPU info]
# vim /etc/system-release          [to store OS info]
# vim  /etc/redhat-release         [to store OS info]
# vim /etc/services                [to store all port Number]
# vim /etc/issue             [pre-login message and identification file]
```

What is kernel?

Kernel is heart of Linux OS. It manages resource of Linux OS Resources mean facilities available In Linux For e.g. Facility to store data, print data on printer, memory manage, file management
Kernel decides who will use this resource for how long and when.

Kernel performance following task:-
1. I/O management
2. Process management
3. Device management
4. File management
5. Memory management

##### Linux Special Permission

Apart from traditional file permissions in Linux, there are 3 types of special permission.

1. Set User id (SUID) = only for command binaries
2. Set Group id (SGID) = for command directories
3. Sticky Bit = only for directory

SUID:- when a SUID bit is set on a command then that command always executes with the User ID of its own user owner(who created it) instead of the user who is executing it.

SGID:- when SGID permission is set on a directory, then all the new (future) files created under that directory will have the same group owner as that of the parent directory.

Sticky Bit:- The new files create under the directory having sticky bit on it can be only deleted by root or the user
who created that file. On other user can delete that file even if they have write permission on the parent directory.

######## How many types of file in Linux/Unix..? ###########

By default Unix/Linux have only 3 types of files..

1. Regular file(-)
2. Directory files(d)
3. Special files:- (This category is having 5 sub types in it.)

a. Block file(b)
b. Character device file(c)
c. Named/pipe file(p)
d. Symbolic link file(l)
e. Socket file(s

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1. YUM Pkg Manager

Yum or Yellow-dog Updater Modified is a package manager that was developed by Duke University to improve the installation of RPMs.
Yum is an automatic updater and package installer/remover for RPM Of machines without having to manually update each one using rpm.

. Multiple Repositories
. Correct dependency calculation & Fast operation
. Yum automatically synchronizes the remote Meta data to the local client

2. NTP SERVER

Port: 123
Introduce in 1985.
NTP stands for Network Time Protocol, and it is an internet protocol used to synchronize the clocks of computers to sometime reference.
NTP is an internet standard protocol originally developed by Pro. David Mills.

3. DHCP SERVER

Port: 67

DHCP stands for Dynamic Host Configuration Protocol
You need DHCP Server if you do not want to manually maintain IP Addresses or you have less IP Addresses than number of machines
you have, as dynamic DHCP Server will assign IP Addresses on machines.

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4. DNS SERVER

Port: 53

DNS Server is needed for resolving hostnames to IP addresses.
Domain names server as humanly-memorable names for Internet participants, like computers, networks, and services.

- Purpose of DNS:-

- Names are easier to remember than numbers

- DNS Features:-

a. Data is maintained locally but retrievable globally
b. No limit to the size of the database
   - One server has over 20,00000 names
c. No limit to the number of queries
- 24,000 queries per second handled easy

DNS Records:-

1. Name Server (NS)
- Every zone must have at least the master name server specified.
- A FQDN must be used for NS resource records.

2. Address (A)
- Maps a hostname to an IPv4 address.

3. Address (AAAA)
- Maps a hostname to an IPv6 address

4. Canonical Name (CNAME)
- Provides an "alias" or alternate name for an existing host.
- A CNAME record should never be referred to by another CNAME record, an MX record, or an SOA record.

5. Pointer (PTR)
- Maps an IP address to hostname.
- Used in "in-addr.arpa" zones.

6. Mail Exchange (MX)
- Define a mail exchange for a zone.
- Used by MTAs to deliver mail to the zone.
- Should not be used in reverse lookup zones.

7. SOA (start of authority)
- The SOA record provides information about the start of authority i.e. the top of the zone

8. TTL (Time to Live)
- TTL is a timer used in caches

Component Definitions:

1. serial - Used for version control. Every time an update is made to the zone,
the serial number must be updated so the slave zones know there has been an update.

2. refresh - How often the slave servers should check the serial number on the master for changes.

3. retry - Amount of time a slave should wait before attempting another "refresh" after a previous refresh has failed.

4. expire - How long a slave should use it's DNS information without a refresh from the master.

5. Minimum - How long a server should cache negative hits (e.g. no such domain/host).Values for the above entries can be specified in seconds (default), minutes (M),Hours (H), days (D), and weeks (W) you must use a capital letter to specify the unit and there can't be a space between the numbers And the unit 86400 = 24H = 1D

Stand for:-
Generic top-level domains (gTLD)
Country code top-level domains (ccTLD)

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5. FTP SERVER

Port: 21

The File Transfer Protocol (FTP) is used as one of the most common means of copying files between servers over the Internet Most
Web based download Sites use the built in FTP capabilities of web browsers.

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6. WEB SERVER

HTTP Server
Port: 80
HTTP, short for Hyper-Text Transfer Protocol, is the protocol for transferring hypertext documents
That makes the World Wide Web possible. A standard web address (such as http://www.skynet4linux.com) is called a URL; the prefix
(Http in the example) indicates its protocol.

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7. NFS SERVER

Port No: - 2049

NFS stands for Network File System
NFS is an Internet Standard protocol created by Sun Micro-systems in 1984. NFS was developed to allow file sharing between systems residing on
A local area network, NFS allows a system to share directories and files with others machine over a network.

NFS Benefits:
- Local workstations use less disk space because commonly used data can be stored
On a single machine and still remain accessible to others over the network.

- Storage devices such as CDROM drives can be used by other machines on the network.
This may reduce the number of removable media drives throughout the network.

8. KICKSTART SERVER

Kickstart installations provide an automated alternative to the normal interactive installations of Linux. The automation of installation
And post installation configuration steps represents a considerable time saving in situations where many similar installations are performed.

9. SQUID SERVER

Port: 3128

Introduce in 1996
Squid is a caching proxy for the web supporting http, https, and ftp.
It reduces bandwidth and improves response times by caching & reusing frequently-requested web pages. Squid has extensive access
Controls and makes a great server accelerator.
Another function is internet sharing and security

10. SAMBA SERVER

Port: 139

Introduce in 1992
Samba is a popular freeware program that allows end users to access and use files, printers and other commonly shared resources on
A company's intranet or on the internet,
Microsoft Windows OS use SMB to perform client-server networking for files and printer sharing.

- SMB - Server Message Block
- CIFS - Common Internet File System.

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11. ISCSI SERVER

Port: 3260

Iscsi is a block level protocol for sharing RAW storage Devices over TCP/IP networks. Sharing and accessing storage over iscsi.
iscsi targets is a remote hard disk presented from an remote iscsi server.

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12. SSH SERVER

Port: 22
Remote Login Protocol

SSH stands for Secure Shell
Introduce in SSH is a program for logging into a remote machine and for executing commands on a remote machine. It is Replace To telnet protocol, provide secure encrypted communications between two untrusted hosts over the network.

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13. MAIL SERVER

Port: 25

SMTP stands for Simple Mail Transfer Protocol. SMTP is used when email is delivered from an email client, such as Outlook Express, To an email server or when email is delivered from one email server to another.

14. NIS SERVER

Network Information Service

A NIS/YP system maintains and distributes a central directory of user and group information, hostnames, e-mail aliases and other text-based tables of information in a computer network,originally called Yellow Pages or YP

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15. KERBEROS SERVER

Port No: - 88

Kerberos is a network authentication protocol. It is designed to provide strong authentication for Client/server applications by using secret-key cryptography, a free implementation of this protocol is available.Kerberos is available in many commercial products as well.

- Developed at MIT in the mid-1980s (Massachusetts Institute of Technology)

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16. TELNET SERVER

Port No: - 23
- telnet was developed in 1968.
- telnet provided access to a command-line interface on a remote computer.

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17. LDAP SERVER

Lightweight Directory Access Protocol

Port No: - 389

LDAP is an internet protocol that email and other programs use to look up information from a server LDAP is mostly used by medium-to-large organization.

- Centralized Authentication
- Network User Login

Linux file-system

Ext2: - Ext2 stands for second extended file system.

- Ext2 does not have journaling features.
- Maximum file size can be from up to 2TB.
- Directory can contain a maximum of 16,000 sub-directories.

Ext3: - Ext3 stands for third extended file system

- The main benefit of ext3 is that it allows journaling.
- Maximum file size can be up to 2TB.
- Directory can contain maximum of 32,000 sub-directories.

Ext4: - Ext4 stands for extended 4 file system.

- Maximum file size can be up to 16 TB
- Directory can contain maximum 64,000 sub-directories.
- New features in ext4: - Journal checksum, fast fsck.

XFS: - extent file system

- XFS is file system created by silicon graphics.
- Maximum file size up to 500TB
- Directory can contain 128,000 sub-directories
- High performance journaling & to check file-system

Ports NO:-

Service name		**Port**
0.	ftp-data	20
1.	ftp	21
2.	ssh	22
3.	TELNET	23
4.	LMTP	24
5.	SMTP	25
6.	DNS	53
7.	DHCP	67
8.	DHCP-Client	68
9.	TFTP	69
10.	http	80
11.	KERBEROS	88
12.	https	443
13.	SFTP	115
14.	SAMBA	139
15.	NTP	123
16.	IMAP	143
17.	IMAP3	220

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18.	IMAPS	993
19.	POP2	109
20.	POP3	110
21.	POP3S	995
22.	SQUID	3128
23.	ISCSI	3260
24.	NFS	2049
25.	LDAP	389
26.	LDAPS	636
27.	NIS	Random
28.	RLOGIN	513
29.	RDP	3389
30.	VNC	5900/5901
31.	Portmapper	111

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