RedHat admin

Day 1

1. Linux History

- Originated from **Unix (1969)**.
- **Linux kernel** created by **Linus Torvalds** in 1991.
- Various distributions (distros): Ubuntu, Red Hat, Fedora, etc.

2. Why Red Hat?

- Used by 90% of Fortune Global 500.
- Secure, scalable, and backed by professional support.

3. Types of Linux Installation

- **Kickstart**: Automated
- **Graphical**
- **Text-based**

4. Linux Components

- **Kernel**: Core OS component.
- **Shell**: Interface between user and kernel (bash is most common).
- **Terminal**: Interface to type and view commands.

5. Shell Types

- sh, ksh, csh, bash

Command	Explanation
command [options] [arguments]	General command structure
uname	Displays system name
uname -n	Hostname of the system
uname -a	All available system information
cal	Calendar for current month
cal 5 2004	Calendar for May 2004
date	Displays current date and time
Ctrl + c	Interrupts a running command
Ctrl + d	Ends input or logs out
man -k keyword	Search manual pages by keyword
man -s keyword	Manual section for keyword
whatis command	One-line description of a command
command --help	Show help for command
pwd	Show current directory
cd /path	Change to specified directory
cd ..	Go up one directory
cd ~	Go to home directory
cd -	Go to previous directory

ls	List directory contents
ls -a	Show all files including hidden ones
ls -l	Long listing with permissions, size, etc.
ls -F	Adds symbols to indicate file types
ls -ld dir	Show details of the directory itself
ls -R	Recursively list subdirectories
cat filename	Show file content
more filename	Scroll through file content
head -n filename	Show first n lines of file
`tail [-n	+n] filename`
touch filename	Create an empty file
mkdir dir	Create a new directory
mkdir -p dir/dir2	Create nested directories
rm filename	Delete file
rm -i filename	Ask before deletion
rm -r dirname	Delete directory and contents
rmdir dirname	Delete an empty directory
cp source target	Copy file
cp -i	Ask before overwriting file
cp -r	Copy directory recursively
mv source target	Move or rename file

Day 2

1. User and Group Administration

- **User files**: /etc/passwd, /etc/shadow, /etc/group, /etc/gshadow
- **User creation**: useradd, passwd, newusers
- **User modification**: usermod, chage
- **User deletion**: userdel
- **Group management**: groupadd, groupmod, groupdel, gpasswd, newgrp, groups

2. Permissions & Ownership

- File/Dir ownership managed using chown
- Permissions controlled with chmod
- Defaults managed using umask

3. Switching Between Users

- su, whoami, id, who, w, finger, sudo

4. Shutdown and Virtual Consoles

- Commands for shutdown, reboot, and virtual console usage

Command	Explanation
useradd username	Adds a new user
passwd username	Sets the user's password
useradd -D	Shows default useradd settings
newusers filename	Creates multiple users from file
usermod -l newname oldname	Changes a username

usermod -L username	Locks the user's password
usermod -U username	Unlocks the user's password
userdel [-r] username	Deletes a user (and optionally home directory)
chage [options] username	Manages password aging policies
groupadd groupname	Creates a new group
groupmod [options] groupname	Modifies an existing group
groupdel groupname	Deletes a group
find / -nogroup	Lists files with no valid group
gpasswd	Manages group members/admins
newgrp group	Switches to another group you're a member of
groups	Lists groups you belong to
su [-] [username]	Switches user
su [-] [username] -c command	Executes command as another user
whoami	Shows the current effective user
id	Shows UID, GID, and groups of the current user
id username	Shows UID, GID, and groups of a specific user
who	Shows who is logged in

w	Shows system usage and who is doing what
finger	Shows user info
sudo	Executes a command as another user (usually root)
visudo	Edits the sudoers file safely
chown user file	Changes file ownership to user
chown user:group file	Changes file owner and group
chmod [modes] file	Changes file permissions
chmod u+x file	Adds execute permission to the user
chmod a=rw file	Sets read/write for all
chmod 755 file	Sets permissions in octal
umask	Displays current default permission mask
umask 002	Sets default file permission mask
Ctrl+Alt+F1 to F6	Switch to virtual consoles
shutdown -k now	Sends shutdown warning only
shutdown -h now	Shuts down and halts system
poweroff	Powers off system
init 0	Shuts down the system

Day 3

1. Vi Text Editor

- Powerful, default text editor in Linux/Unix systems.
- Three modes:
    - **Command mode** – for deleting, copying, navigation.
    - **Insert mode** – for editing/inserting text.
    - **Last line mode** – for saving, searching, advanced commands.

2. Initialization Files

- Global:
  /etc/profile, /etc/bash.bashrc
- User-specific:
    - ~/.profile, ~/.bash_profile, ~/.bash_login, ~/.bashrc

3. Environment Variables

- Examples: $HOME, $PATH, $PWD, $SHELL, $USER, $HOSTNAME

4. Aliases and Command History

- Create, list, or remove aliases.
- Recall and repeat previous commands with history.

VI EDITOR COMMANDS WITH EXPLANATIONS

Command	Function
vi filename	Open file in vi
vi -r filename	Recover unsaved file
view filename	Open in read-only mode

Insert Mode Shortcuts

Key	Action
i	Insert before cursor
a	Append after cursor

o	Open new line below
O	Open new line above
A	Append at end of line
I	Insert at beginning of line

Cursor Movement

Key	Action
h, <-, Backspace	Left
l, ->, Space	Right
j, Down Arrow	Down
k, Up Arrow	Up
w	Next word
b	Previous word
e	End of word
0	Beginning of line
G	End of file
nG / :n	Go to line number n
Ctrl+F/B	Scroll forward/back
Ctrl+L	Refresh screen

Editing Text

Key	Action
s	Replace character

x	Delete character
dw	Delete word
dd	Delete line
D	Delete to end of line
n,nd	Delete lines n through n

Search & Replace

Command	Function
/text	Search forward
?text	Search backward
n, N	Next/previous match
:%s/old/new/g	Global replace

Copy & Paste

Command	Function
yy	Yank line
p, P	Paste after/before line
n,n co n	Copy lines to line n
n,n m n	Move lines to line n

Save & Quit

Command	Function
:w	Save
:w new_file	Save as new file
:q!	Quit without saving

:wq, :x, ZZ	Save and exit

Customization

Command	Function
:set nu / :set nonu	Show/hide line numbers
:set ic / :set noic	Case insensitive/sensitive
:set showmode	Show mode info

SHELL & BASH COMMANDS

Environment Variables

Variable	Description
$HOME	Home directory
$PATH	Executable paths
$PWD	Current directory
$SHELL	Current shell
$USER	Current user
$HOSTNAME	System name
echo $VAR	Show value of VAR
set	Show all variables

ALIAS COMMANDS

Command	Explanation
alias ll='ls -l'	Create alias for ls -l

alias	Show all aliases
unalias name	Remove alias
\command	Run command without alias

COMMAND HISTORY USAGE

Command	Function
!!	Repeat last command
!string	Repeat last command starting with "string"
!n	Run command by number
!-n	Run n commands back
^old^new	Replace text in previous command

Day 4

1. Processes, Priorities, and Signals

- **Process**: Program running on CPU, has a **PID**.
- **Daemon**: Background process.
- **Parent & Child**: Parent process creates child process.
- **Priority/Niceness**:
    - -20 (highest priority) to +19 (lowest).
    - Users can only lower their process priority (+19); root can raise it (-20).

2. Redirection

- Redirect standard output, input, and error.
- Combine output and errors.

3. Pipelines

- Use | to send output of one command as input to another.

4. Word Count and String Processing

- Using wc, diff, grep, cut, tr, sort for text and file processing.

COLLECTED LINUX COMMANDS & THEIR EXPLANATIONS

Process Management

Command	Explanation
nice [-n adjustment] command	Start a process with a specific niceness
nice -n 20 makewhatis	Example: start makewhatis with niceness +20
renice priority -p PID	Change priority of a running process
ps [options]	Show process status
ps -e	List all system processes
ps -f	Full details
ps -u UID	Show processes of a specific user
top	Live view of running processes
pgrep pattern	Find processes matching a pattern

pgrep -l pattern	List PID and process name
kill PID	Send SIGTERM (default) to a process
kill -SIGNAL PID	Send specific signal
pkill process_name	Kill processes by name
pkill -9 process_name	Force kill process

Job Control

Command	Explanation
sleep 500 &	Run process in background
jobs	List background jobs
fg %job_number	Bring job to foreground
bg %job_number	Resume job in background
kill -STOP %job_number	Stop (pause) background job
kill %job_number	Kill background job

Standard Input, Output, and Error

Command	Explanation
command > file	Redirect output to file (overwrite)
command >> file	Redirect output to file (append)
command < file	Use file as input
2> file	Redirect standard error to file
command 2> errs > results	Redirect error to errs and output to results

---

Pipelines and Redirection

Command	Explanation
`command1	command2`
`ls -lR /	more`
`ls -lR /	tee file

Word Count and Text Processing

Command	Explanation
wc [options] filename	Word count utility
wc -c filename	Character count
wc -l filename	Line count
wc -w filename	Word count
diff file1 file2	Compare two files
grep [options] pattern files	Search for patterns
grep -i pattern	Case insensitive search
grep -l pattern files	List matching files
grep -n pattern files	Show matching lines with line number
grep -v pattern files	Invert match (show non-matching lines)
grep -c pattern files	Count matches
grep -w pattern files	Match whole word only
tr [options] string1 string2	Translate characters
`echo "Hello"	tr 'A-Z' 'a-z'`
cut -f3 -d: /etc/passwd	Cut field 3 from /etc/passwd (colon-separated)
cut -c1-5 filename	Cut characters 1 to 5

sort [options] file	Sort file
sort -t: -k1 /etc/passwd	Sort by first field using ":" separator
sort -t: -k3 /etc/passwd	Sort by third field
sort -t: -n -k3 -o passwd_sorted /etc/passwd	Sort numerically by 3rd field and output to passwd_sorted

---

Day5

Topics Covered:

- **Inodes & Links**
- **Package Management (RPM & YUM)**
- **Search Commands**
- **Archiving & Compression**

COLLECTED COMMANDS & EXPLANATIONS

File System & Inodes

Command	Explanation
ls -i fname	Show inode number of a file
ls -id /	Show inode number of a directory
cp f1 f2	Creates a new inode for the copied file
mv f1 f2	Keeps the same inode if in same filesystem
ln -s file linkname	Create symbolic (soft) link
ln file linkname	Create hard link (same inode)

Disk Usage

Command	Explanation
df -h	Show free space on mounted filesystems (human readable)
du -sh [dir]	Show space used by a directory

RPM Package Management

Command	Explanation
rpm -i file.rpm	Install RPM package
rpm -e package	Remove package
rpm -U file.rpm	Upgrade (remove old, install new)
rpm -F file.rpm	Freshen (update if installed)
`rpm -qa	grep package`
rpm -qa --last	List packages by install time
rpm --import key	Import GPG key for package verification

YUM Package Manager

Command	Explanation
yum search keyword	Search for packages
yum list package	Show versions available and installed
yum list installed	List installed packages
yum list available	List packages in repo
yum grouplist "string"	Show groups matching string
yum install package	Install package and dependencies
yum localinstall /path/file.rpm	Install local RPM file

yum remove package	Uninstall a package
yum upgrade package	Upgrade and remove old version
yum update package	Update but keep old
yum provides file	Find which package owns a file
yum repolist all	Show all repos
yum clean all	Clear YUM cache

File Search

Command	Explanation
locate filename	Fast search using database (needs updatedb)
updatedb	Update locate database
find path -name "filename"	Find files by name (live search)
find path -size +10	Files larger than 10 blocks
find path -atime -7	Accessed within last 7 days
find path -mtime +5	Modified more than 5 days ago
find path -user user	Owned by user
find path -type f	Find regular files
find path -perm 644	Find files with specific permissions

Archiving & Compression

- **tar – Archive tool**

Command	Explanation
tar cvf archive.tar files	Create archive

tar tf archive.tar	View contents
tar xvf archive.tar	Extract files

- **compress**, **uncompress**, **zcat**

Command	Explanation
compress -v file	Compress file → .Z
uncompress -v file.Z	Decompress .Z file
zcat file.Z	View compressed file content

- **gzip**, **gunzip**, **gzcat**

Command	Explanation
gzip file	Compress → .gz
gunzip file.gz	Decompress .gz file
gzcat file.gz	View .gz file content

- **bzip2**, **bunzip2**, **bzcat**

Command	Explanation
bzip2 file	Compress → .bz2
bunzip2 file.bz2	Decompress .bz2 file
bzcat file.bz2	View .bz2 file content