

# 1. File and Directory Management

- **ls** : Lists the contents of a directory
- **cp** : Copies files and directories
- **mv** : Moves or renames files and directories
- **rm** : Removes (deletes) files or directories
- **touch** : Creates a new empty file or update file timestamps
- **nano** : Text editor (terminal-based)
- **vim / vi** : Advanced text editors
- **cat** : Concatenates and displays file content
- **tac** : Concatenate and display file content in reverse
- **less** : Displays file content one screen at a time, allowing for scrolling
- **more** : Displays file content one screen at a time, but with less functionality than less
- **head** : Displays the beginning of a file
- **tail** : Displays the end of a file
- **diff** : Compares two files line by line
- **grep** : Searches for patterns within files
- **find** : Searches for files and directories in a directory hierarchy
- **file** : Determines file type
- **chmod** : Changes file permissions
- **chown** : Changes file owner
- **chgrp** : Changes file group ownership
- **ln** : Creates links (hard or symbolic) between files
- **locate** : Find files by name
- **stat** : Display file or file system status
- **sed** : Stream editor for filtering and transforming text.
- **awk** : Pattern scanning and processing language
- **cut** : Remove sections from each line of files
- **sort** : Sort lines of text files.
- **uniq** : Report or omit repeated lines

## Directory Commands

- **pwd** : Prints the current working directory
- **cd** : Changes the current directory
- **mkdir** : Creates new directories
- **rmdir** : Removes empty directories
- **tree** : Lists contents of directories in a tree-like format

## 2. Filesystem Permissions and Security

- **chmod** : Change file permissions
  - `chmod 755 file.txt` – Give read, write, and execute permissions to owner, and read-execute permissions to others
- **chown** : Change file owner and group
  - `chown user:group file.txt` – Change owner and group of a file
- **chgrp** : Change group ownership of a file
  - `chgrp group file.txt` – Change the group of a file
- **umask** : Set default permissions for new files
  - `umask 022` – Set default permissions for newly created files to 755
- **setfacl** : Set access control lists (ACL) for file permissions
- **getfacl** : Get access control lists (ACL) for file permissions

## 3. User and Group Management

- **useradd** : Creates a new user account
- **adduser** : Creates a new user account with interactive prompts and generally sets up a home directory and other default configurations
- **userdel** : Deletes a user account
- **usermod** : Modifies an existing user account's properties
- **passwd** : Changes a user's password
- **chage** : Changes user password expiry information
- **id** : Displays user and group identity information
- **whoami** : Displays the effective username of the current user
- **su** : Switches to another user account or becomes the superuser
- **sudo** : Executes a command with elevated privileges
- **last** : Displays information about the last logged-in users
- **who** : Displays information about currently logged-in users
- **groupadd** : Creates a new group
- **groupdel** : Deletes a group
- **groupmod** : Modifies an existing group's properties
- **groups** : Displays the groups a user belongs to
- **newgrp** : Changes the current group ID, effectively switching to a new group for the current session
- **gpasswd** : Administers the `/etc/group` and `/etc/gshadow` files, used for managing group passwords and memberships

- **chgrp** : Changes the group ownership of files or directories

## 4.Disk Management

- **lsblk** : Lists block devices, including disks and their partitions, in a tree-like format
- **fdisk** : partition table manipulator for linux
- **parted** : A partition manipulator program
- **blkid** : Locates and displays the attributes (UUID, LABEL, TYPE) of block devices
- **df** : Reports filesystem disk space usage
- **du** : Estimates file and directory space usage

### Filesystem Creation

- **mkfs** : Builds a Linux filesystem on a device or partition. It's a front-end for various filesystem-specific tools (e.g., mkfs.ext4, mkfs.xfs)
- **mkswap** : Sets up a Linux swap area
- **fsck** : Checks and optionally repairs a Linux filesystem. It's a front-end for filesystem-specific check tools (e.g., fsck.ext4)
- **e2fsck** : Checks and repairs ext2, ext3, or ext4 filesystems

### Mounting and Unmounting Filesystems

- **mount** : Attaches a filesystem to a specified mount point in the directory tree, making it accessible
- **umount** : Detaches a mounted filesystem from the directory tree
- **/etc/fstab** : A system configuration file that contains information about filesystems to be mounted automatically at boot time

### Logical Volume Management (LVM)

- **pvcreate** : Initializes a physical volume for use by LVM
- **pvdisk** : Displays attributes of physical volumes
- **vgcreate** : Creates a volume group
- **vgdisplay** : Displays attributes of volume groups
- **lvcreate** : Creates a logical volume
- **lvdisplay** : Displays attributes of logical volumes
- **lvextend** : Extends the size of a logical volume
- **lvreduce** : Reduces the size of a logical volume
- **vgremove** : Removes a volume group
- **lvremove** : Removes a logical volume

## 5.Process management

- `ps` : Report a snapshot of current processes.
- `top` : Display Linux tasks.
- `htop` : Interactive process viewer (advanced top).
- `kill` : Send a signal to a process, typically to terminate.
- `killall` : Terminate processes by name.
- `bg` : Resume a suspended job in the background.
- `fg` : Bring a job to the foreground.
- `jobs` : List active jobs.
- `nice` : Run a program with modified scheduling priority.
- `renice` : Alter priority of running processes.
- `uptime` : Show how long the system has been running.
- `time` : Measure program running time.

## 6. Network management

- `ifconfig` : displays and configure network interfaces
- `ip a` : shows all network interfaces and their Ips
- `ip r` : displays the routing tables
- `ping` : Send ICMP Echo requests to network hosts
- `netstat` : show open ports and listening services
- `ss` : Socket statistics and listening services (faster than netstat)
- `traceroute` : Trace the route packets take to a network host
- `nslookup` : Query Internet name servers interactively
- `dig` : DNS lookup utility
- `wget` : Non-interactive network downloader
- `curl` : Transfer data with URLs
- `scp` : Secure copy files between hosts
- `ssh` : Secure shell for remote login
- `ftp` : File Transfer Protocol client

## 7. system information and monitoring

- `uname` : print system information
- `hostname` : Shows or sets the system's hostname
- `lsusb` : Lists USB devices connected to the system
- `lspci` : Lists PCI devices connected to the system

- **lshw** : Lists hardware configuration
- **top** : Displays dynamic processes and system information
- **htop** : Interactive process and resource monitoring
- **ps** : Report a snapshot of current process
- **free** : Displays the total, used, and free amounts of physical and swap memory
- **df** : Reports file system disk space usage
- **du** : Estimates file space usage for files or directories.
- **iotop** : Reports CPU utilization and I/O statistics for devices and partitions.
- **vmstat** : Report virtual memory statistics
- **netstat** : show open ports and listening services
- **uptime** : Shows system uptime and load averages (1, 5, and 15 minutes).
- **who** : Displays information about users currently logged in.
- **w** : Shows who is logged on and what they are doing
- **dmesg** : Print the kernel ring buffer messages (system boot and hardware related message)
- **journalctl** : Query and view logs from system's journal

## 8. package management (depends on distributions)

### Debian-based (e.g., Ubuntu)

- **apt-get** : APT package handling utility
  - apt-get install : Install a package
  - apt-get update : Update package list
  - apt-get upgrade : Upgrade installed packages
  - apt-get remove : Remove a package
- **apt-cache** : Query APT cache
  - apt-cache search : Search for a package
  - apt-cache show : Show package details

### Red Hat-based (e.g., CentOS, Fedora)

- **yum** : Package manager for RPM-based systems
  - yum install : Install a package
  - yum update : Update installed packages
  - yum remove : Remove a package
- **dnf** : Next-generation package manager (Fedora, CentOS 8+)
  - dnf install : Install a package

- dnf update : Update installed packages
- dnf remove : Remove a package

### General Commands

- rpm : RPM package manager
  - rpm -i : Install an RPM package
  - rpm -e : Remove an RPM package
- dpkg – Debian package manager
  - dpkg -i : Install a Debian package
  - dpkg -r : Remove a Debian package

## 9. System Services and Daemon Management

- systemctl : Control the systemd system and service manager
  - systemctl start : Start a service
  - systemctl stop : Stop a service
  - systemctl restart : Restart a service
  - systemctl enable : Enable a service to start on boot
  - systemctl disable : Disable a service from starting on boot
  - systemctl status : Check service status
- service : Older service management command (used in non systemd systems)
  - service start : Start a service
  - service stop : Stop a service
  - service restart : Restart a service
  - service status : Check service status

## 10. Archiving and Compression

### Working with tar files

- tar -cvf archive.tar < files > : create a tar archive
- tar -xvf archive.tar : extract a tar archive
- tar -tvf archive.tar : list files in a tar archive
- tar -czvf archive.tar.gz < files > : create a compressed tar.gz archive
- tar -xzvf archive.tar.gz : extract a tar.gz archive
- tar -cJvf archive.tar.xz : Create a tar.xz archive
- tar -xJvf archive.tar.xz : Extract a tar.xz archive

## Working with zip files

- `zip archive.zip <files>` : Create a zip archive
- `unzip archive.zip` : Extract a zip archive
- `unzip -l archive.zip` : List contents of a zip file
- `zip -r archive.zip` : Zip a directory

## Working with gzip & bzip2

- `gzip <file>` : Compress a file using gzip
- `gunzip <file> .gz` : Decompress a gzip file
- `bzip2 <file>` : Compress a file using bzip2
- `bunzip2 <file>.bz2` : Decompress a bzip2 file

# 11.Text Processing

- `grep` : Search for patterns within files
  - `grep 'pattern' file.txt` – Search for a pattern in a file
  - `grep -r 'pattern' /dir/` – Recursively search for a pattern
- `sed` : Stream editor for filtering and transforming text
  - `sed 's/old/new/g' file.txt` – Replace old with new globally
- `awk` : A powerful text processing language
  - `awk '{print $1}' file.txt` – Print the first column of each line in a file
- `cut` : Remove sections from each line of a file
  - `cut -d ':' -f 1 /etc/passwd` – Print the first field of each line, delimited by ":"
- `sort` : Sort lines of text files
  - `sort file.txt` – Sort file content in ascending order
- `uniq` : Report or omit repeated lines in a file
  - `sort file.txt | uniq` – Sort and remove duplicate lines
- `tee` : Read from standard input and write to standard output and files
  - `echo "text" | tee file.txt` – Write to file and show output on screen
- `tr` : Translate or delete characters
  - `echo "hello" | tr 'a-z' 'A-Z'` – Convert lowercase to uppercase
- `paste` : Merge lines of files
  - `paste file1.txt file2.txt` – Combine lines of file1 and file2 side by side
- `wc` : Word, line, character, and byte count
  - `wc -l file.txt` – Count lines in a file
  - `wc -w file.txt` – Count words in a file

## 12. System Shutdown and Reboot

- **shutdown** : Shut down the system
  - `shutdown -h now` : Immediately shut down
  - `shutdown -r now` : Reboot the system
  - `shutdown -h +10` : Shut down after 10 minutes
  - `shutdown -h 22:00` : Schedule shutdown at 10:00 PM
  - `shutdown -c` : Cancel a scheduled shutdown
- **reboot** : Reboot the system
- **halt** : Halt the system immediately (equivalent to turning off power)
- **poweroff** : Power off the system
- **init** : Change the runlevel (old-style system manager)
  - `init 0` : Shutdown
  - `init 6` : Reboot

## 13. System Diagnostics and Troubleshooting

- **dmesg** : Print the kernel ring buffer messages (system boot and hardware-related messages)
- **journalctl** : Query and view logs from systemd's journal
- **strace** : Trace system calls and signals
  - `strace` : Trace a command's system calls
- **lsof** : List open files (useful for debugging)
  - `lsof` : Show processes using a specific file
- **vmstat** : Report virtual memory statistics
- **iostat** : Report CPU and I/O statistics
- **mpstat** : Report CPU usage statistics
- **pidstat** : Report statistics by process
- **free** : Display memory usage
- **uptime** : How long the system has been running
- **watch** : Execute a program periodically, showing output
  - `watch -n 1 free` – Watch memory usage every second
- **lshw** : List hardware configuration
- **htop** : Interactive process viewer (better than top)
- **netstat** : Network statistics (deprecated in favor of ss)
- **ss** : Show socket statistics (more efficient than netstat)



## 14. Networking & Remote Management

- **ifconfig** : Configure network interfaces (older command, replaced by ip)
- **ip** : A more modern alternative for managing network interfaces and routing
  - **ip addr** : Show IP addresses
  - **ip link** : Show or manipulate network interfaces
  - **ip route** : Show or manipulate routing tables
- **ss** : Display socket statistics (useful for diagnosing network issues)
- **nmap** : Network exploration tool (can be used for security auditing)
- **telnet** : User interface to the TELNET protocol (less common nowadays)
- **nc (Netcat)** : Network utility for reading and writing from network connections
  - **nc -l -p 1234** : Listen on port 1234
  - **nc <host><port>** : Connect to a host and port
- **iptables** : Administration tool for IPv4 packet filtering and NAT (Network Address Translation)
- **firewalld** : Frontend for managing firewall rules (used in some distros like Fedora and CentOS)
- **ufw** : Uncomplicated firewall (front-end for iptables)
  - **ufw enable** – Enable firewall
  - **ufw allow <port>** – Allow traffic on a specific port
- **tcpdump** : Command-line packet analyzer
- **curl** : Transfer data from or to a server using various protocols (HTTP, FTP, etc.)
- **wget** : Download files from the web via HTTP, HTTPS, FTP
- **scp** : Secure copy over SSH (used to copy files between systems)
  - **scp file.txt user@remote:/path/to/destination/** – Copy file to remote server
- **rsync** : Remote file and directory synchronization (often used for backups)
  - **rsync -avz /local/path/ remote:/remote/path/** – Sync directories

## 15. Task Scheduling

- **cron** : Daemon for running scheduled commands
  - **crontab -e** : Edit cron jobs for the current user
  - **crontab -l** : List the current user's cron jobs
  - **crontab -r** : Remove the current user's cron jobs
- **at** : Run commands at a specified time
  - **at 09:00** : Schedule a command to run at 09:00 AM
- **batch** : Run commands when the system load is low

- **sleep** : Delay for a specified time
  - sleep 5s – Sleep for 5 seconds

## 16. System Backup and Restore

- **rsync** : Remote file and directory synchronization
  - rsync -avz source/ destination/ : Synchronize files
  - rsync -avz -e ssh source/ user@remote:/destination/ : Sync over SSH
- **cpio** : Copy files to and from archives
- **dd** : Low-level copying and backup of entire filesystems
  - dd if=/dev/sda of=/path/to/backup.img : Backup a disk/partition
  - dd if=/path/to/backup.img of=/dev/sda : Restore a disk/partition