

# 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
- **pvdisplay** : 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.
- `lstat` : 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 ter 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