## Linux commands grouped by their primary use cases.

### Compression & Archiving

* **gzip**: Compress files (creates .gz files).
* **gunzip**: Decompress .gz files.
* **bzip2**: Compress files (creates .bz2 files).
* **bunzip2**: Decompress .bz2 files.
* **xz**: Compress files (creates .xz files).
* **unxz**: Decompress .xz files.
* **zip**: Compress files into a .zip archive.
* **unzip**: Decompress .zip files.
* **tar**: Archive files (often used with compression, e.g., tar -czvf for .tar.gz).
* **rar**: Compress files into a .rar archive.
* **unrar**: Decompress .rar files.

### Development & Debugging

* **gcc**: GNU Compiler Collection (compile C/C++ code).
* **gdb**: GNU Debugger (debug programs).
* **make**: Build automation tool.
* **cmake**: Cross-platform build system.
* **git**: Version control system.
* **strace**: Trace system calls and signals.
* **ltrace**: Trace library calls.
* **valgrind**: Memory debugging and profiling.
* **objdump**: Display object file information.
* **nm**: List symbols from object files.

### Disk & Partition Management

* **fdisk**: Partition table manipulator.
* **parted**: Partition manipulation tool.
* **mkfs**: Create a filesystem.
* **mount**: Mount a filesystem.
* **umount**: Unmount a filesystem.
* **fsck**: Check and repair a filesystem.
* **dd**: Convert and copy files (often used for disk cloning).
* **lsblk**: List block devices.
* **blkid**: Print block device attributes.
* **df**: Display disk space usage.
* **du**: Display directory space usage.

### Environment Variables

* **export**: Set an environment variable.
* **env**: Display environment variables.
* **printenv**: Print environment variables.
* **set**: Display shell variables and functions.
* **unset**: Unset a variable.

### File & Directory Management

* **ls**: List files and directories.
* **cd**: Change directory.
* **pwd**: Print working directory.
* **mkdir**: Create a directory.
* **rmdir**: Remove an empty directory.
* **rm**: Remove files or directories.
* **cp**: Copy files or directories.
* **mv**: Move or rename files or directories.
* **touch**: Create an empty file or update file timestamp.
* **cat**: Display file content.
* **more / less**: View file content page by page.
* **head**: Display the first few lines of a file.
* **tail**: Display the last few lines of a file.
* **ln**: Create hard or symbolic links.
* **find**: Search for files and directories.
* **locate**: Find files by name (uses a database).
* **chmod**: Change file permissions.
* **chown**: Change file ownership.
* **chgrp**: Change file group ownership.
* **tar**: Archive files (compress/extract).
* **gzip / gunzip**: Compress/decompress files.
* **zip / unzip**: Compress/decompress ZIP files.
* **rsync**: Synchronize files and directories.

### File System & Disk Utilities

* **fdisk**: Partition table manipulator.
* **parted**: Partition manipulation tool.
* **mkfs**: Create a filesystem.
* **fsck**: Check and repair a filesystem.
* **mount**: Mount a filesystem.
* **umount**: Unmount a filesystem.
* **lsblk**: List block devices.
* **blkid**: Print block device attributes.
* **tune2fs**: Adjust filesystem parameters (ext2/ext3/ext4).
* **resize2fs**: Resize ext2/ext3/ext4 filesystems.
* **btrfs**: Manage Btrfs filesystems.

### File Transfer & Remote Access

* **scp**: Securely copy files between hosts over SSH.
* **rsync**: Synchronize files and directories between hosts.
* **sftp**: Secure file transfer protocol (interactive).
* **ftp**: File transfer protocol (less secure).
* **ssh**: Securely connect to a remote server.
* **ssh-keygen**: Generate SSH keys for authentication.
* **ssh-copy-id**: Copy SSH keys to a remote server for passwordless login.
* **nc (netcat)**: Network utility for reading/writing data across connections.
* **wget**: Download files from the web.
* **curl**: Transfer data from or to a server (supports various protocols).

### Miscellaneous

* **man**: Display the manual page for a command.
* **info**: Display info documentation.
* **clear**: Clear the terminal screen.
* **date**: Display or set the system date and time.
* **cal**: Display a calendar.
* **bc**: Arbitrary precision calculator.
* **cron**: Schedule recurring tasks.
* **at**: Schedule a one-time task.
* **watch**: Execute a command repeatedly.

### Networking

* **ping**: Test network connectivity.
* **ifconfig / ip**: Configure network interfaces.
* **nslookup / dig**: Query DNS records.
* **host**: Perform DNS lookups.
* **traceroute / mtr**: Trace the route to a host.
* **netstat**: Display network connections.
* **ss**: Display socket statistics.
* **scp**: Securely copy files over SSH.
* **rsync**: Synchronize files over a network.
* **ssh**: Connect to a remote server securely.
* **wget / curl**: Download files from the web.
* **nc (netcat)**: Network utility for reading/writing data across connections.
* **iptables**: Configure firewall rules.
* **ufw**: Uncomplicated Firewall (frontend for iptables).

### Networking Tools

* **nmap**: Network exploration and security auditing.
* **tcpdump**: Capture and analyze network traffic.
* **wireshark**: GUI for network traffic analysis.
* **iperf**: Measure network bandwidth.
* **mtr**: Network diagnostic tool (combines ping and traceroute).
* **ncat**: Network utility for reading/writing data across connections.
* **arp**: Display or modify the ARP cache.
* **route**: Display or modify the routing table.
* **ip**: Advanced network configuration (replaces ifconfig).

### Package Management

* **apt**: Package manager for Debian/Ubuntu.
* **yum / dnf**: Package manager for CentOS/RHEL/Fedora.
* **pacman**: Package manager for Arch Linux.
* **zypper**: Package manager for openSUSE.
* **rpm**: Manage RPM packages.
* **dpkg**: Manage Debian packages.
* **snap**: Manage snap packages.
* **flatpak**: Manage Flatpak packages.

### Process Management

* **ps**: Display running processes.
* **top / htop**: Monitor processes in real-time.
* **kill**: Terminate a process by PID.
* **killall**: Terminate processes by name.
* **pkill**: Terminate processes by pattern.
* **nice**: Change process priority.
* **renice**: Modify the priority of a running process.
* **bg**: Resume a job in the background.
* **fg**: Bring a background job to the foreground.
* **jobs**: List background jobs.
* **nohup**: Run a command immune to hangups.

### Shell & Scripting

* **echo**: Print text to the terminal.
* **printf**: Format and print text.
* **alias**: Create command aliases.
* **unalias**: Remove command aliases.
* **history**: Display command history.
* **source**: Execute commands from a file.
* **bash**: Start a new Bash shell.
* **sh**: Start a new Bourne shell.
* **zsh**: Start a new Z shell.
* **which**: Locate a command.
* **whereis**: Locate the binary, source, and manual pages for a command.
* **type**: Display information about a command.

### System Backup & Recovery

* **dd**: Low-level disk cloning and backup.
* **rsync**: Synchronize files and directories (often used for backups).
* **tar**: Create compressed archives for backup.
* **dump / restore**: Backup and restore filesystems.
* **fsck**: Check and repair filesystems.
* **partclone**: Clone and restore partitions.
* **btrfs**: Manage Btrfs filesystems (supports snapshots for backups).

### System Configuration

* **sysctl**: Configure kernel parameters at runtime.
* **grub**: Manage GRUB bootloader.
* **lspci**: List PCI devices.
* **lsusb**: List USB devices.
* **lshw**: List hardware information.
* **dmidecode**: Display hardware information from the BIOS.
* **hdparm**: Configure and tune hard disk settings.
* **modprobe**: Load and unload kernel modules.
* **lsmod**: List loaded kernel modules.

### System Information & Monitoring

* **uname**: Display system information (kernel version, etc.).
* **hostname**: Display or set the system’s hostname.
* **uptime**: Show system uptime and load averages.
* **top / htop**: Display real-time system processes.
* **ps**: Display running processes.
* **free**: Display memory usage.
* **df**: Display disk space usage.
* **du**: Display directory space usage.
* **lscpu**: Display CPU information.
* **lsblk**: List block devices (disks, partitions).
* **dmesg**: Display kernel messages.
* **journalctl**: Query and display system logs (systemd).
* **vmstat**: Report virtual memory statistics.
* **iostat**: Report CPU and I/O statistics.
* **netstat**: Display network connections.
* **ss**: Display socket statistics.
* **lsof**: List open files and processes.

### System Logs & Monitoring

* **journalctl**: Query and display system logs (systemd).
* **dmesg**: Display kernel messages.
* **tail -f**: Monitor log files in real-time.
* **logrotate**: Manage log file rotation and compression.
* **syslog**: System logging utility.
* **rsyslog**: Enhanced system logging daemon.
* **lsof**: List open files and processes.
* **netstat**: Display network connections.
* **ss**: Display socket statistics.

### System Performance & Optimization

* **vmstat**: Report virtual memory statistics.
* **iostat**: Report CPU and I/O statistics.
* **sar**: Collect and report system activity (part of sysstat).
* **mpstat**: Report CPU statistics.
* **pidstat**: Report statistics for processes.
* **strace**: Trace system calls and signals.
* **ltrace**: Trace library calls.
* **perf**: Performance analysis tool.
* **tuned**: Optimize system performance for specific workloads.
* **nice / renice**: Adjust process priority.

### System Security

* **iptables**: Configure firewall rules.
* **ufw**: Uncomplicated Firewall (frontend for iptables).
* **fail2ban**: Ban IPs after repeated failed login attempts.
* **chroot**: Run a command with a different root directory (for security).
* **auditd**: Audit system calls and security events.
* **selinux**: Manage SELinux security policies.
* **openssl**: Manage SSL/TLS certificates and encryption.
* **gpg**: Encrypt and sign files using GPG.
* **firewalld**: Dynamic firewall management tool.

### System Shutdown & Reboot

* **shutdown**: Shutdown or restart the system.
* **reboot**: Reboot the system.
* **poweroff**: Power off the system.
* **halt**: Halt the system.

### System Startup & Services

* **systemctl**: Manage systemd services.
* **service**: Manage SysV init services.
* **chkconfig**: Manage SysV init service runlevels.
* **init**: System initialization process.
* **rc.local**: Script executed at the end of the multi-user runlevel.
* **cron**: Schedule recurring tasks.
* **at**: Schedule a one-time task.
* **reboot**: Reboot the system.
* **shutdown**: Shutdown or restart the system.

### Text Processing

* **cat**: Display file content.
* **more / less**: View file content page by page.
* **head**: Display the first few lines of a file.
* **tail**: Display the last few lines of a file.
* **grep**: Search text using patterns.
* **awk**: Text processing and pattern scanning.
* **sed**: Stream editor for filtering and transforming text.
* **cut**: Remove sections from lines of files.
* **paste**: Merge lines of files.
* **sort**: Sort lines of text files.
* **uniq**: Report or omit repeated lines.
* **wc**: Count lines, words, and characters.
* **diff**: Compare files line by line.
* **tr**: Translate or delete characters.

### User & Group Management

* **useradd**: Add a new user.
* **userdel**: Delete a user.
* **usermod**: Modify a user account.
* **passwd**: Change user password.
* **groupadd**: Add a new group.
* **groupdel**: Delete a group.
* **groupmod**: Modify a group.
* **su**: Switch user.
* **sudo**: Execute a command as superuser.
* **id**: Display user and group information.
* **who**: Display logged-in users.
* **w**: Display logged-in users and their activities.
* **last**: Display recent logins.

### Virtualization & Containers

* **docker**: Manage Docker containers.
* **docker-compose**: Manage multi-container Docker applications.
* **podman**: Manage containers without a daemon.
* **kubectl**: Manage Kubernetes clusters.
* **virsh**: Manage virtual machines (libvirt).
* **virt-manager**: GUI for managing virtual machines.
* **lxc / lxd**: Manage Linux containers.
* **vagrant**: Manage virtualized development environments.
* **qemu**: Emulate virtual machines.