



Section 1: Basic Linux Commands

Command	Description->	Example	Explanation
ls	List directory contents	ls	Lists files and directories in the current directory
cd	Change directory	cd /path/to/directory	Changes the current directory to the specified path
pwd	Print working directory	pwd	Displays the full path of the current directory
mkdir	Create a new directory	mkdir newdir	Creates a directory named "newdir"
rmdir	Remove a directory	rmdir olddir	Removes the directory named "olddir" if it is empty
rm -r	Remove directory recursively	rm -r olddir	Removes the directory named "olddir" and its contents
touch	Create a new file	touch newfile	Creates an empty file named "newfile"
echo	Print text to the terminal or file	echo "Hello" > file.txt	Writes "Hello" to file.txt, creating it if it doesn't exist
cat	Concatenate and display file contents	cat file.txt	Displays the contents of file.txt
cp	Copy files or directories	cp file1 file2	Copies file1 to file2
mv	Move or rename files or directories	mv file1 file2	Moves or renames file1 to file2
clear	Clears the screen		
exit	Exit the shell or current session		
rm	Remove files or directories	rm file.txt	Deletes file.txt

Section 2: Getting Help at Command Line

Command	Description	Example	Explanation
man	Display the manual for a command	man ls	Opens the manual page for the <code>ls</code> command, detailing its usage and options <code>man -k=></code> Search for manual pages containing the keyword
info	Display information about a command	info ls	Opens the info page for the <code>ls</code> command, providing detailed documentation
--help	Display help for a command	ls --help	Displays a brief help message with available options for the <code>ls</code> command
whatis	Brief description of a command	whatis ls	Provides a one-line description of the <code>ls</code> command
apropos	Search for commands related to a keyword	apropos list	Searches for commands related to the keyword "list"

Section 3: Working with Directories

Command	Description	Example	Explanation
cd	Change directory	cd /var/log	Changes the current directory to /var/log
mkdir	Create a new directory	mkdir projects	Creates a directory named "projects"
rmdir	Remove a directory	rmdir projects	Removes the "projects" directory if it is empty
pwd	Print working directory	pwd	Displays the full path of the current directory
ls	List directory contents	ls -l	Lists files in the current directory with detailed information

. – This directory

.. -The parent directory

\$Path – determines command search path

./command -Execute command in this dir

rm -rf directory – recursively removes the directory

Section 4: Listing Files and Understanding Its Output

Command	Description	Example	Explanation
ls -l	List files in long format	ls -l	Displays detailed information about files, including permissions, ownership, size, and modification date
ls -F	To reveal file type		/=>directory , @=>Link , *=>Executable
ls -r	Reverse order		
ls -a	List all files including hidden	ls -a	Shows all files in the directory, including hidden files (those starting with a dot)
ls -lh	List files in human-readable format	ls -lh	Displays file sizes in a human-readable format (e.g., KB, MB)
ls -ltr	List files sorted by modification time, newest last	ls -ltr	Lists files sorted by modification time, with the newest files at the bottom
ls -R	List files recursively	ls -R	Lists all files and directories recursively, showing the contents of all subdirectories
ls -S	Sort files by size	ls -S	Lists files sorted by size, with the largest files first
ls -t	Sort files by modification time	ls -t	Lists files sorted by modification time, with the newest files first
ls -r	Reverse the order of the sort	ls -r	Lists files in reverse order of the sort, for example, ls -ltr lists files in long format with the oldest files first
Tree -C	Colorise output		
tree -d	List directories only		

Section 5: File and Directory Permission

Command	Description	Example	Explanation
chmod	Change file mode (permissions)	chmod 755 file.txt	Sets permissions for file.txt to 755 (owner: read/write/execute, group: read/execute, others: read/execute)
chown	Change file owner and group	chown user:group file.txt	Changes the owner and group of file.txt to "user" and "group"
chgrp	Change group ownership	chgrp group file.txt	Changes the group of file.txt to "group"
umask	Set default file permissions	umask 022	Sets default permissions for newly created files (755)
ls -l	List files with permissions	ls -l	Displays file permissions in the listing

Section 6: Viewing Files and the Nano Editor

Command	Description	Example	Explanation
cat	Display file contents	cat file.txt	Displays the entire contents of file.txt
more	View file contents one screen at a time	more file.txt	Displays file.txt one screen at a time, allowing forward movement
less	View file contents with backward movement	less file.txt	Displays file.txt with navigation capabilities (forward and backward)
nano	Simple text editor	nano file.txt	Opens file.txt in the nano editor for editing

Section 7: Editing Files in vi

Command	Description	Example	Explanation
vi	Text editor with two modes: command and insert	vi file.txt	Opens file.txt in the vi editor, starting in command mode
vim	Improved version of vi	vim file.txt	Opens file.txt in the vim editor, which has additional features over vi
Insert Mode	Mode to insert text	i	Enter insert mode to add text
Command Mode	Mode to execute commands	Esc	Exit to command mode to execute commands
:w	Save file in vi/vim	:w	Saves changes made to the file
:q	Quit vi/vim	:q	Quits the editor without saving changes
:wq	Save and quit vi/vim	:wq	Saves changes and quits the editor
:q!	Quit vi/vim without saving	:q!	Discards changes and quits the editor

Section 8: Deleting, Copying, Moving and Renaming

Command	Description	Example	Explanation
rm	Remove files or directories	rm file.txt	Deletes file.txt
rm -r	Remove directory recursively	rm -r dir	Deletes the directory "dir" and its contents

rm -i	Prompt before every removal	rm -i file.txt	Asks for confirmation before deleting file.txt
rm -f	Force remove files or directories	rm -f file.txt	Deletes file.txt without prompting, ignoring non-existent files and never prompting
cp	Copy files or directories	cp file1 file2	Copies file1 to file2
cp -r	Copy directories recursively	cp -r dir1 dir2	Copies directory dir1 and its contents to dir2
mv	Move or rename files or directories	mv file1 file2	Moves or renames file1 to file2
mv -i	Prompt before overwrite	mv -i file1 file2	Prompts before overwriting file2 with file1
rename	Rename multiple files	rename 's/old/new/' *	Renames all files by replacing 'old' with 'new'

Section 9: Wildcards

Wildcard	Description	Example	Explanation
*	Matches any number of characters	ls *.txt	Lists all .txt files in the directory
?	Matches a single character	ls file?.txt	Lists files like file1.txt, file2.txt
[]	Matches any one of the enclosed characters	ls file[1-3].txt	Lists files file1.txt, file2.txt, file3.txt
{}	Matches any of the patterns within braces	ls file{1,2}.txt	Lists files file1.txt, file2.txt

Section 10: Input and Output Redirection

Command	Description	Example	Explanation
>	Redirect output to a file, overwriting it	echo "Hello" > file.txt	Writes "Hello" to file.txt, creating or overwriting it
>>	Append output to a file	echo "Hello" >> file.txt	Appends "Hello" to the end of file.txt
<	Redirect input from a file	wc -l < file.txt	Counts the lines in file.txt
`	`	Pipe output to another command	`ls

Section 11: Searching Files and Directories

Command	Description	Example	Explanation
find	Search for files and directories	find /home -name "*.txt"	Finds all .txt files in /home and its subdirectories
locate	Quickly find files by name	locate file.txt	Searches the prebuilt database for file.txt
grep	Search text using patterns	grep "hello" file.txt	Searches for the string "hello" in file.txt
grep -r	Recursively search directories	grep -r "hello" /home	Recursively searches for "hello" in /home

Section 12: File Compression and Archiving

Command	Description	Example	Explanation
tar	Archive files	tar -cvf archive.tar file1 file2	Creates an archive named "archive.tar" containing file1 and file2
tar -xvf	Extract files from an archive	tar -xvf archive.tar	Extracts files from "archive.tar"
tar -tvf	List contents of an archive	tar -tvf archive.tar	Lists the contents of "archive.tar"
gzip	Compress files	gzip file.txt	Compresses file.txt and creates file.txt.gz
gunzip	Decompress files	gunzip file.txt.gz	Decompresses file.txt.gz and restores file.txt
zip	Compress files into a zip archive	zip archive.zip file1 file2	Creates a zip archive "archive.zip" containing file1 and file2
unzip	Extract files from a zip archive	unzip archive.zip	Extracts files from "archive.zip"

Section 13: Transferring and Copying Files Over Network

Command	Description	Example	Explanation
scp	Secure copy files between hosts	scp file.txt user@remote:/path/to/destination/	Copies file.txt to a remote server at the specified path
rsync	Sync files and directories between hosts	rsync -avz file.txt user@remote:/path/to/destination/	Synchronizes file.txt to the remote server, preserving permissions and compressing data
sftp	Secure file transfer protocol	sftp user@remote	Opens an SFTP session to the remote server for file transfers
ftp	File Transfer Protocol (less secure)	ftp remote	Connects to a remote FTP server to transfer files

Section 14: Customizing Shell Prompt

Command	Description	Example	Explanation
PS1	Customize the shell prompt	export PS1="\u@\h:\w\\$\n"	Sets the shell prompt to display username, hostname, and current working directory
PROMPT_COMMAND	Command to execute before the prompt	export PROMPT_COMMAND='echo -n "\$(date) "'	Executes the date command before displaying the prompt
.bashrc	Shell configuration file for bash	source ~/.bashrc	Loads the settings from the .bashrc file, which may include prompt customizations

Section 15: Shell Aliases

Command	Description	Example	Explanation
alias	Create a shortcut for a command	alias ll='ls -l'	Defines ll as a shortcut for ls -l
unalias	Remove an alias	unalias ll	Removes the alias ll

Section 16: Environment Variables

Command	Description	Example	Explanation
export	Set or export environment variables	export PATH=\$PATH:/new/path	Adds /new/path to the system PATH variable
env	Display all environment variables	env	Lists all currently set environment variables
printenv	Print environment variable values	printenv PATH	Shows the value of the PATH environment variable

Section 17: Processes and Job Control

Command	Description	Example	Explanation
ps	Display current processes	ps aux	Lists all running processes with detailed information
top	Display a real-time view of processes	top	Provides a dynamic, real-time view of system processes
jobs	List background jobs	jobs	Lists all jobs that are running in the background
bg	Resume a suspended job in the background	bg %1	Resumes the job with ID 1 in the background
fg	Bring a job to the foreground	fg %1	Brings the job with ID 1 to the foreground
kill	Terminate a process by PID	kill 1234	Sends a SIGTERM signal to process with PID 1234
killall	Terminate processes by name	killall processname	Sends a SIGTERM signal to all processes named processname
pkill	Terminate processes by pattern	pkill pattern	Sends a SIGTERM signal to all processes matching the pattern

Section 18: Scheduling Repeated Jobs with Cron

Command	Description	Example	Explanation
crontab	Manage cron jobs	crontab -e	Edit the current user's cron jobs
crontab -l	List cron jobs	crontab -l	List all scheduled cron jobs for the current user
crontab -r	Remove all cron jobs	crontab -r	Remove all cron jobs for the current user
* * * * * command	Cron job timing syntax	0 5 * * * /path/to/command	Executes /path/to/command at 5 AM every day

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*      *      *      *      *      command to be executed
-      -      -      -      -
|      |      |      |      |
|      |      |      |      +----- day of week (0 - 6) (Sunday=0)
|      |      |      +----- month (1 - 12)
|      |      +----- day of          month (1 - 31)
|      +----- hour (0 - 23)
+----- min (0 - 59)

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Section 19: Switching Users and Running Commands

Command	Description	Example	Explanation
su	Switch user	su - username	Switches to the user username with a login shell
sudo	Execute commands as another user	sudo ls /root	Executes ls /root with root privileges
sudo -i	Start a root shell	sudo -i	Opens an interactive root shell

Section 20: Shell History and Tab Completion

Command	Description	Example	Explanation
history	Display command history	history	Lists the command history of the current shell session
!number	Execute command from history	!10	Repeats the command at history position 10
TAB	Autocomplete commands and filenames	ls /u[TAB]	Completes the path to /usr/ if it exists

Section 21: Installing Software

Command	Description	Example	Explanation
apt-get	Debian-based package manager	sudo apt-get install package	Installs the specified package on Debian-based systems
yum	Red Hat-based package manager	sudo yum install package	Installs the specified package on Red Hat-based systems
dnf	Next-generation Red Hat package manager	sudo dnf install package	Installs the specified package on Fedora-based systems
rpm	RPM package manager	sudo rpm -ivh package.rpm	Installs the RPM package file

Section 22: Linux Boot Process

Command	Description	Example	Explanation
dmesg	Display boot messages	`dmesg	less`
systemctl	Manage system services	systemctl status	Displays the status of system services
journalctl	View system logs	journalctl -b	Shows logs from the current boot
telinit	Changes system runlevel or state	telinit runlevel	telinit 0 – shutdown system telinit 6-reboot

Section 23: System Logging

Command	Description	Example	Explanation
journalctl	Query and view system logs	journalctl	Displays the system logs
tail	View the end of a file	tail /var/log/syslog	Shows the last lines of syslog
logrotate	Rotate, compress, and mail system logs	logrotate /etc/logrotate.conf	Rotates logs as specified in the configuration file
logrotate	Manages the rotation and compression of log files.	logrotate /etc/logrotate.conf	Rotates, compresses, and manages old log files based on the configuration in logrotate.conf.
syslogd	System logging daemon that handles logging requests from various services.	syslogd -d	Starts the syslog daemon with debugging output enabled. Typically configured through /etc/syslog.conf.
rsyslogd	Enhanced version of syslogd; manages system log messages with additional features.	rsyslogd -n	Starts the rsyslog daemon in the foreground for troubleshooting. Can be configured using /etc/rsyslog.conf.
logger	Adds entries to the system log.	logger "This is a test log message"	Writes a custom log message to the syslog, useful for logging from scripts or commands.
systemctl status	Displays the status of systemd services, including their logs.	systemctl status sshd	Shows the status and recent log entries for the SSH service.
systemctl journal	Displays logs for systemd services from the journal.	systemctl --no-pager	Views the logs of systemd services, allowing for detailed inspection.

Section 24: Disk Management

Command	Description	Example	Explanation
df	Display disk space usage	df -h	Shows disk space usage in a human-readable format
du	Display disk usage of files and directories	du -sh /path	Shows the disk usage of the directory at /path
fdisk	Partition table manipulator	fdisk /dev/sda	Opens fdisk to manage partitions on /dev/sda

Section 25: LVM - Logical Volume Manager

Command	Description	Example	Explanation
lvcreate	Create a logical volume	lvcreate -n mylv -L 10G vgname	Creates a 10GB logical volume named "mylv" in volume group "vgname"
vgcreate	Create a volume group	vgcreate vgname /dev/sda1	Creates a volume group named "vgname" with /dev/sda1
pvcreeate	Create a physical volume	pvcreeate /dev/sda1	Initializes /dev/sda1 for use by LVM

Section 26: Managing Users and Groups

Command	Description	Example	Explanation
useradd	Add a new user	useradd username	Creates a new user named "username"
usermod	Modify user account	usermod -aG group username	Adds user "username" to the "group" group
userdel	Delete a user	userdel username	Deletes the user "username"
groupadd	Add a new group	groupadd groupname	Creates a new group named "groupname"
groupdel	Delete a group	groupdel groupname	Deletes the group "groupname"

Section 27: TCP/IP Networking for Linux System

Command	Description	Example	Explanation
ip addr	Show IP addresses	ip addr show	Displays IP addresses and network interfaces
ip route	Show routing table	ip route	Displays the routing table
ifconfig	Display network interfaces	ifconfig	Displays network interfaces and their configurations
netstat	Network statistics	netstat -tuln	Shows active network connections and listening ports

Section 28: Networking

Command	Description	Example	Explanation
ping	Test network connectivity	ping google.com	Sends ICMP echo requests to google.com to test connectivity ping -c 3 google.com =>3 packets send
traceroute	Trace the route packets take	traceroute google.com	Shows the path packets take to reach google.com
nmap	Network exploration tool	nmap 192.168.1.1	Scans the network address 192.168.1.1 for open ports

Section 29: Network Troubleshooting

Command	Description	Example	Explanation
ping	Test connectivity to a host	ping -c 4 example.com	Sends 4 ICMP packets to example.com to test connectivity
traceroute	Trace the path of packets	traceroute example.com	Shows the route packets take to reach example.com
netstat	Network statistics	netstat -an	Displays all network connections and listening ports
tcpdump	Captures and displays all packets on the default network interface.	tcpdump	Basic command to start capturing packets on the default interface.
ss	Utility to investigate sockets	ss -tuln	Shows TCP and UDP sockets with detailed information

Section 30: Special Modes

Command	Description	Example	Explanation
setuid	Allows an executable file to run with the privileges of the file owner, not the user executing it.	chmod u+s /path/to/file	When set on a program like /usr/bin/passwd, any user executing the program does so with the file owner's privileges (usually root), enabling them to change passwords.
setgid	Causes an executable file to run with the group privileges of the file, or ensures directories inherit the group ownership for new files and directories.	chmod g+s /path/to/file_or_directory	For an executable, the program runs with the group permissions. For directories, all new files and directories created inside inherit the directory's group ownership.
Sticky Bit	Prevents users from deleting or renaming files in a directory unless they own the files.	chmod +t /path/to/directory	Commonly used in directories like /tmp, where many users can write files, but cannot delete or rename files owned by others, even though they have write access.
single	Single-user mode	systemctl isolate rescue.target	Switches to single-user mode for system maintenance
rescue	Rescue mode	systemctl isolate rescue.target	Boots into rescue mode for system recovery

Section 31: Shell Scripting

Command	Description	Example	Explanation
bash	Execute a shell script	bash script.sh	Executes the shell script "script.sh"
chmod +x	Make a script executable	chmod +x script.sh	Makes "script.sh" executable
#!/bin/bash	Shebang line for bash scripts	#!/bin/bash	Indicates that the script should be run with bash

Section 32: Finding Files and Directories

Command	Description	Example	Explanation
find	Search for files and directories	find /home -name "*.txt"	Finds all .txt files in the /home directory
locate	Quickly find files by name	locate file.txt	Finds file.txt using a prebuilt database
which	Locate a command	which ls	Shows the path to the executable for ls

Section 33: Linux Directories

Directory	Description	Typical Contents
/	Root directory; the top-level directory.	All other directories are subdirectories of /.
/bin	Essential user binaries and commands.	Common commands like ls, cp, mv, cat.
/boot	Static files for bootloader.	Kernel images, bootloader configuration files (e.g., vmlinuz, initrd.img).
/dev	Device files; represents hardware devices.	Device files like /dev/sda, /dev/tty0, /dev/null.
/etc	System-wide configuration files.	Configuration files for system services and applications (e.g., passwd, fstab, network).
/home	User home directories.	Individual user directories (e.g., /home/user1, /home/user2).
/lib	Shared libraries required by binaries in /bin and /sbin.	System libraries and kernel modules.
/lib64	Shared libraries for 64-bit systems.	64-bit system libraries.
/media	Mount point for removable media.	Mount points for USB drives, CDs, DVDs.
/mnt	Mount point for temporarily mounted filesystems.	Temporary mounts (e.g., external drives).
/opt	Optional application software packages.	Add-on application software (e.g., /opt/application).
/proc	Virtual filesystem providing process and system information.	Kernel and process information (e.g., /proc/cpuinfo, /proc/meminfo).
/root	Home directory for the root user.	Root user's personal files and settings.
/run	Runtime data; information about the system since the last boot.	PID files, lock files.
/srv	Data for services provided by the system.	Data for services (e.g., /srv/www for web data).
/sys	Virtual filesystem for kernel and device information.	Kernel and device information (e.g., /sys/class).
/tmp	Temporary files created by applications.	Temporary files and directories.
/usr	User-related programs and data.	System-wide applications and files (/usr/bin, /usr/lib).
/usr/bin	Binaries for user commands.	Executable files for user commands.
/usr/lib	Libraries for user programs.	Libraries used by binaries in /usr/bin.
/usr/sbin	System binaries for administrative tasks.	System management commands (e.g., useradd, shutdown).
/usr/local	Local software and scripts installed by the user.	Locally installed software and scripts.
/var	Variable data; files that change frequently.	Logs, spool files, mail, and temporary files (/var/log, /var/spool).
/var/log	System and application log files.	Log files for system and applications.
/var/spool	Spool directories for tasks and services.	Mail queues, print jobs.
/var/tmp	Temporary files that need to persist between reboots.	Persistent temporary files.
/var/lib	Variable data used by applications and services.	Database files, application state information.
/var/cache	Cached data from applications.	Cached files to speed up application performance.

/var/mail	User mailboxes.	Mail storage for individual users.
/var/run	Runtime information such as system and service status.	PID files, process runtime data.
/var/opt	Variable data for applications installed in /opt.	Application-specific data (similar to /opt).
/etc/passwd	User account information. Contains user details like username, UID, GID, and home directory.	User account entries (e.g., root:x:0:0:root:/root:/bin/bash).
/etc/shadow	Contains hashed passwords and account expiration information.	Password hashes and expiration info.
/etc/group	Defines user groups and their members.	Group definitions (e.g., root:x:0:).
/etc/fstab	Static filesystem information; lists filesystems and mount points.	Filesystem mount details (e.g., /dev/sda1 / ext4 defaults 0 1).
/etc/hosts	Static table of IP addresses to hostnames.	IP address and hostname mappings.
/etc/hostname	Contains the system's hostname.	The system's hostname.
/etc/resolv.conf	DNS resolver configuration file.	Nameserver IPs and domain search paths.
/etc/sysctl.conf	Configuration file for kernel parameters.	Kernel parameter settings (e.g., net.ipv4.ip_forward=1).
/etc/network/interfaces	Network interface configuration file (used in Debian-based systems).	Network interface settings (e.g., auto eth0 iface eth0 inet dhcp).
/var/log/httpd/	Directory for Apache HTTP server logs (may vary by distribution).	Apache access and error logs.
/var/log/nginx/	Directory for Nginx web server logs (may vary by distribution).	Nginx access and error logs.