
Introduction to Linux – Basics, Commands, History & More

What is Linux?

Linux is an open-source, Unix-like operating system based on the Linux kernel. It is widely used in servers, desktops, and embedded systems due to its security, flexibility, and performance.

Advantages of Linux

- **Open Source**: Freely available and modifiable.
- **Secure**: Better protection against viruses and malware.
- **Stable**: Rarely crashes; ideal for server environments.
- **Customizable**: Lightweight versions available for older hardware.
- **Community Support**: Huge developer and user community.

Where Can Linux Be Used?

- Web servers and hosting
- Cloud environments (AWS, Azure, GCP)
- Cybersecurity and ethical hacking
- Software development and DevOps
- Embedded systems and IoT devices

💻 Where to Practice Linux?

- **Online Terminals**:
    - https://www.javatpoint.com/unix-terminal-online
    - https://bellard.org/jslinux/
- **Install Git Bash**: Ideal for Windows users to practice Unix/Linux commands.
    - Download: https://git-scm.com/

History of Linux

- **1964**: MULTICS project started to solve complex problems in big computers.
- **1969**: UNIX was developed at Bell Labs by Ken Thompson & Dennis Ritchie.
- **UNIX**: Small, written in C, but **not** open-source.
- **1991**: Linus Torvalds created **Linux**, an open-source UNIX-like OS.

Flavors of Linux

→**Debian-based**:

- Ubuntu
- Linux Mint

→**RedHat-based**:

- CentOS
- Fedora
- AlmaLinux (Lightweight)

Package Managers:

- **Debian**: apt install firefox
- **RedHat**: yum install firefox or dnf install firefox
- **Windows**: winget, chocolatey

Number System for Permissions

Linux permissions follow a numeric system:

Stage	Symbol	Value
Read	r	4
Write	w	2
Execute	x	1

- **User**, **Group**, **Others** are the 3 permission levels.
- Combine values to assign permissions.

Examples:

- chmod 777 file: Full access to all.
- chmod 412 file: r-x---r--
- chmod u+x file: Add execute to user only.

Linux Commands:

pwd – Present Working Directory

- **Definition**: Shows current location in filesystem.
- **Usage**: To know your working path.
- **Example**: pwd

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mkdir – Make Directory

- **Definition**: Creates a new folder.
- **Usage**: To organize files into folders.
- **Example**: mkdir new_folder

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touch – Create File

- **Definition**: Creates an empty file.
- **Usage**: Used before editing or testing.
- **Example**: touch file1.txt

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vi – Visual Editor

- **Definition**: Opens file in edit mode.
- **Usage**: Used to edit content in CLI.
- **Example**: vi file.txt → Press i to insert → ESC :wq! to save and quit.

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cat – Display File Content

- **Definition**: Prints file contents.
- **Usage**: Quick view of files.
- **Example**: cat file1.txt

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whoami – Logged-in User

- **Definition**: Displays current user.
- **Example**: whoami

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uname / uname -a – System Info

- **Definition**: Shows OS and kernel info.
- **Example**: uname -a

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ls -ll – List Files

- **Definition**: Displays detailed list of files and folders.
- **Example**: ls -ll

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clear – Clear Terminal

- **Definition**: Clears terminal screen.
- **Example**: clear

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chmod – Change Permissions

- **Definition**: Sets read/write/execute permissions.
- **Example**: chmod 755 filename

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ipconfig / ifconfig – Network Info

- **Windows**: ipconfig

- **Linux**: ifconfig

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find – Search Files

- **Usage**: find . -name "file*"
- **Example**: Find all files starting with "file"

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top – Process Monitoring

- **Definition**: Shows real-time CPU/memory usage.
- **Example**: top

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du / df / df -h – Disk Usage

- du: Show file/folder size
- df: Show available disk space
- df -h: Human-readable format

Random Number Generation

- echo $RANDOM
- echo $((RANDOM % 10)) → Random 0–9
- echo $((RANDOM % 11 + 1)) → Random 1–11

Bulk Operations

Command	Purpose	Example
mkdir folder{1..40}	Create 40 folders	Creates folder1 to folder40
touch file{1..10}	Create 10 files	file1 to file10
rm file{1..10}	Remove 10 files	Deletes file1 to file10
rmdir folder{1..40}	Delete 40 folders	Removes folder1 to folder40

File & Folder Utilities

Command	Purpose	Example
uptime	System uptime	Shows how long system has been on
mv old.txt new.txt	Rename a file	Changes file name
cal	Show calendar	cal 2025 or cal Jan 2025
cp file folder/	Copy file	cp test.txt /home/user/
nano filename	Edit file	nano notes.txt → Ctrl + X to exit

File Navigation & View

- head -n 5 file.txt: Show first 5 lines
- tail -n 5 file.txt: Show last 5 lines
- sed -n 10,16p file.txt: Show lines 10–16

Recursive Deletion

- rm -rf foldername – Deletes all folders and files within.