

7BUIISO22W Cyber Security Applications

Linux Commands for Beginners

A Comprehensive and Practical Guide

Introduction

Linux is an open-source, UNIX-like operating system widely used in servers, cloud platforms, embedded systems, and software development environments. While Linux is often perceived as complex—especially by beginners—its flexibility, performance, and command-line power make it one of the most efficient operating systems available today.

Once users become familiar with Linux commands and workflows, many find it difficult to return to traditional graphical-only environments. Developers, system administrators, and DevOps engineers particularly benefit from Linux due to its automation capabilities, stability, and extensive tooling.

This document is designed for **beginners and professionals alike**. It covers essential and advanced Linux commands, including: - File and directory operations - File permissions and ownership - Compression and archiving - Process and system management - Networking - Environment variables - User management - Productivity shortcuts (Bash, Nano, Vi, and Vim)

By the end of this guide, readers will have a solid foundation in Linux commands and practical knowledge to use Linux effectively in real-world scenarios.

What Is Linux?

Linux is an open-source operating system kernel originally developed by Linus Torvalds. An operating system (OS) manages a computer's hardware resources—such as CPU, memory, and storage—and provides an interface through which users and applications interact with the system.

Linux acts as a bridge between applications and hardware, ensuring efficient communication and resource utilization. It supports both graphical user interfaces (GUIs) and command-line interfaces (CLIs), with the latter offering powerful control and automation capabilities.

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1. File and Directory Operations Commands

File and directory management is fundamental when working in Linux. The following commands are among the most commonly used.

Common Commands

Command	Description	Options	Example
<code>ls</code>	List files and directories	-l long format, -a include hidden files, -h human-readable sizes	<code>ls -lh</code>

Command	Description	Options	Example
<code>cd</code>	Change directory	—	<code>cd /path/to/directory</code>
<code>pwd</code>	Print current working directory	—	<code>pwd</code>
<code>mkdir</code>	Create a directory	—	<code>mkdir my_directory</code>
<code>rm</code>	Remove files or directories	<code>-r</code> recursive, <code>-f</code> force	<code>rm -r my_directory</code>
<code>cp</code>	Copy files or directories	<code>-r</code> recursive	<code>cp file.txt /dest</code>
<code>mv</code>	Move or rename files	—	<code>mv file.txt new.txt</code>
<code>touch</code>	Create empty files	—	<code>touch file.txt</code>
<code>cat</code>	Display file contents	—	<code>cat file.txt</code>
<code>head</code>	Show first lines of a file	<code>-n</code> number of lines	<code>head -n 5 file.txt</code>
<code>tail</code>	Show last lines of a file	<code>-n</code> number of lines	<code>tail -n 5 file.txt</code>
<code>ln</code>	Create links	<code>-s</code> symbolic link	<code>ln -s src link</code>
<code>find</code>	Search files and directories	<code>-name</code> , <code>-type</code>	<code>find . -name "*.txt"</code>

2. File Permission Commands

Linux uses a permission model based on **read (r)**, **write (w)**, and **execute (x)** permissions, applied to three user classes: owner, group, and others.

Command	Description	Example
<code>chmod</code>	Change file permissions	<code>chmod u+rwx file.txt</code>
<code>chown</code>	Change file owner	<code>chown user file.txt</code>
<code>chgrp</code>	Change group ownership	<code>chgrp group file.txt</code>
<code>umask</code>	Set default permissions	<code>umask 022</code>

3. File Compression and Archiving Commands

Command	Description	Example
<code>tar</code>	Create or extract archives	<code>tar -czvf archive.tar.gz files/</code>
<code>gzip</code>	Compress files	<code>gzip file.txt</code>

Command	Description	Example
<code>zip</code>	Create ZIP archives	<code>zip archive.zip file1 file2</code>

4. Process Management Commands

Command	Description	Example
<code>ps</code>	Display running processes	<code>ps aux</code>
<code>top</code>	Real-time process monitoring	<code>top</code>
<code>kill</code>	Terminate a process	<code>kill -9 PID</code>
<code>pkill</code>	Kill processes by name	<code>pkill nginx</code>
<code>pgrep</code>	Find process IDs	<code>pgrep ssh</code>
<code>grep</code>	Search text patterns	<code>grep -i "error" file.txt</code>

5. System Information Commands

Command	Description	Example
<code>uname</code>	System information	<code>uname -a</code>
<code>whoami</code>	Current user	<code>whoami</code>
<code>df</code>	Disk usage	<code>df -h</code>
<code>du</code>	Directory size	<code>du -sh folder</code>
<code>free</code>	Memory usage	<code>free -h</code>
<code>uptime</code>	System uptime	<code>uptime</code>
<code>lscpu</code>	CPU information	<code>lscpu</code>
<code>lsusb</code>	USB devices	<code>lsusb</code>

6. Networking Commands

Command	Description	Example
<code>ifconfig</code>	Network interfaces	<code>ifconfig</code>
<code>ping</code>	Connectivity test	<code>ping google.com</code>
<code>netstat</code>	Network statistics	<code>netstat -tuln</code>
<code>ss</code>	Socket statistics	<code>ss -tuln</code>
<code>ssh</code>	Remote login	<code>ssh user@host</code>
<code>scp</code>	Secure file copy	<code>scp file user@host:/path</code>
<code>wget</code>	Download files	<code>wget url</code>

Command	Description	Example
<code>curl</code>	Data transfer	<code>curl url</code>

7. I/O Redirection Commands

Syntax	Description
<code>cmd > file</code>	Redirect output
<code>cmd >> file</code>	Append output
<code>cmd < file</code>	Redirect input
<code>cmd 2> file</code>	Redirect errors
<code>cmd &> file</code>	Redirect all output
<code>cmd > /dev/null</code>	Discard output

8. Environment Variable Commands

Command	Description
<code>export VAR=value</code>	Set variable
<code>echo \$VAR</code>	Display variable
<code>env</code>	List variables
<code>unset VAR</code>	Remove variable
<code>printenv</code>	Show environment

9. User Management Commands

Command	Description
<code>who</code>	Logged-in users
<code>adduser</code>	Create user
<code>deluser</code>	Remove user
<code>passwd</code>	Manage passwords
<code>usermod</code>	Modify user
<code>su</code>	Switch user

10. Shortcut Commands

10.1 Bash Shortcuts

Shortcut	Description
Ctrl + A	Start of line
Ctrl + E	End of line
Ctrl + C	Cancel command
Ctrl + R	Search history
Ctrl + L	Clear screen

10.2 Nano Shortcuts

Shortcut	Description
Ctrl + O	Save file
Ctrl + X	Exit Nano
Ctrl + W	Search
Ctrl + K	Cut line

10.3 Vi / Vim Shortcuts

Command	Description
i	Insert mode
dd	Delete line
yy	Copy line
p	Paste
:w	Save
:q	quit
:q!	quit without saving
:wq	Save and quit

Conclusion

Linux is a powerful and versatile operating system that plays a critical role in modern computing and software development. Mastering Linux commands enables users to work efficiently, automate tasks, and manage systems with confidence.

This guide provides a structured, practical reference to essential [Kail Linux](#) commands and shortcuts. By practicing these commands regularly, readers can significantly improve productivity and technical proficiency when working in Linux-based environments.
