Linux & PowerShell Professional Mastery

Linux Command Reference & Cheat Sheet

Master the Command Line. Understand Your Systems. Secure Your Network. Automate Your Work.

30 Days: From Beginner to Advanced IT Professional
Ubuntu 24.04 LTS · Windows 11 · Windows PowerShell 5.1 · PowerShell 7.x

Edition 2026.11.08 · Days 01–02 of 30 · Built 2026-11-08

Copyright © 2026 Linux & PowerShell Professional Mastery contributors. Released under the MIT License.

Contents

1. Linux Command Reference 3
2. Bash ↔ PowerShell Side-by-Side 11

Linux Command Reference

Platform: **Ubuntu 24.04 LTS**, Bash 5.2, GNU coreutils 9.4. Commands marked *GNU* may differ on macOS/BSD.

Navigation & System Information

whoami

Field	Detail
OS	All Linux (coreutils)
Description	Prints the effective user name of the current process.
Syntax	`whoami`
Parameters	`--help`, `--version`
Example	`whoami`
Expected output	`student`
Equivalent	PowerShell: `whoami` (prints `HOST\user`), `$env:USERNAME`
Common errors	None in practice. Under `sudo` it prints `root`, which is expected.
Use case	Confirm the account before administrative work, or during incident triage.
Docs	https://man7.org/linux/man-pages/man1/whoami.1.html

hostname

Field	Detail
OS	All Linux
Description	Shows (or, as root, temporarily sets) the system host name.
Syntax	`hostname [-s | -f | -I]`
Parameters	`-s` short name · `-f` FQDN · `-I` all IP addresses (Linux)
Example	`hostname -I`
Expected output	`192.168.56.10 10.0.2.15`
Equivalent	PowerShell: `hostname`, `$env:COMPUTERNAME`
Common errors	`hostname -f` returning just the short name means DNS/`/etc/hosts` has no FQDN. Use `hostnamectl set-hostname` for a permanent change.
Use case	Confirm you are on the correct server before a restart.
Docs	https://man7.org/linux/man-pages/man1/hostname.1.html

pwd

Field	Detail
OS	Bash built-in and coreutils
Description	Prints the absolute path of the current working directory.
Syntax	`pwd [-L | -P]`
Parameters	`-L` logical (default, keeps symlinks) · `-P` physical (resolves symlinks)
Example	`cd /bin && pwd -P`
Expected output	`/usr/bin`
Equivalent	`Get-Location`
Common errors	None
Use case	Check location before relative-path operations such as deletes.
Docs	https://man7.org/linux/man-pages/man1/pwd.1.html

ls

Field	Detail
OS	All Linux (coreutils)
Description	Lists directory contents.
Syntax	`ls [OPTION]... [FILE]...`
Parameters	`-l` long · `-a` all/hidden · `-h` human sizes · `-t` by time · `-S` by size · `-r` reverse · `-R` recursive · `-d` the directory itself · `-i` inode
Example	`ls -lht /var/log | head -5`
Expected output	`-rw-r----- 1 syslog adm 38K Nov 8 09:17 auth.log` …
Equivalent	`Get-ChildItem` (`-Force` for hidden)
Common errors	`ls: cannot open directory '/root': Permission denied`, because you need rights on the directory.
Use case	Find the most recently modified log files.
Docs	https://man7.org/linux/man-pages/man1/ls.1.html

uname

Field	Detail
OS	All Linux (coreutils)
Description	Prints kernel and machine information.
Syntax	`uname [-a] [-s] [-n] [-r] [-v] [-m] [-o]`
Parameters	`-a` all · `-r` kernel release · `-m` architecture · `-n` node name · `-o` OS
Example	`uname -r`

Field	Detail
Expected output	`6.8.0-48-generic`
Equivalent	`Get-ComputerInfo -Property OsName,OsVersion,OsArchitecture` (Windows), `[Environment]::OSVersion`
Common errors	Treating the kernel release as the distribution version. Use `/etc/os-release` for that.
Use case	Check kernel version against a vulnerability advisory.
Docs	https://man7.org/linux/man-pages/man1/uname.1.html

date

Field	Detail
OS	All Linux (GNU coreutils; `-d` is GNU-specific)
Description	Prints or sets the system date and time; formats and calculates dates.
Syntax	`date [-u] [-d STRING] [+FORMAT]`
Parameters	`-u` UTC · `-d 'yesterday'` arbitrary date · `-I[seconds]` ISO 8601 · `+%F` YYYY-MM-DD · `+%s` epoch
Example	`date -u -Iseconds`
Expected output	`2026-11-08T10:05:43+00:00`
Equivalent	`Get-Date`, `(Get-Date).ToUniversalTime()`, `Get-Date -Format o`
Common errors	Forgetting quotes around formats with spaces: `date +%F %T` fails, `date '+%F %T'` works.
Use case	Timestamped file names: `backup-$(date +%F).tar.gz`.
Docs	https://man7.org/linux/man-pages/man1/date.1.html

hostnamectl / timedatectl

Field	Detail
OS	systemd-based distributions (Ubuntu 15.04+)
Description	Query or change host name and OS details / time zone and NTP status.
Syntax	`hostnamectl [status | set-hostname NAME]` · `timedatectl [status | set-timezone ZONE | list-timezones]`
Example	`timedatectl`
Expected output	`Time zone: Asia/Kolkata (IST, +0530)` … `System clock synchronized: yes`
Equivalent	`Get-TimeZone`, `w32tm /query /status`, `Rename-Computer`
Common errors	`Failed to connect to bus` in containers without systemd.
Use case	Fix clock drift that breaks authentication or log correlation.
Docs	https://man7.org/linux/man-pages/man1/timedatectl.1.html

Help & Discovery

man

Field	Detail
OS	Ubuntu (man-db)
Description	Displays the manual page for a command, file format or system call.
Syntax	`man [SECTION] PAGE` · `man -k KEYWORD`
Parameters	`-k` search descriptions (= `apropos`) · `-f` one-line description (= `whatis`)
Example	`man 5 passwd`
Expected output	The manual page for the `/etc/passwd` file format, in a pager (`q` to quit)
Equivalent	`Get-Help <cmdlet> -Full`
Common errors	`No manual entry for X` on minimal images: `sudo apt install man-db manpages` (and `unminimize` on servers).
Use case	Working on air-gapped servers without internet.
Docs	https://man7.org/linux/man-pages/man1/man.1.html

type / which / help

Field	Detail
OS	Bash built-ins (`type`, `help`); `which` from debianutils
Description	`type` shows how Bash resolves a name; `which` shows the executable path; `help` documents built-ins.
Syntax	`type [-a] NAME` · `which NAME` · `help BUILTIN`
Example	`type -a ls`
Expected output	`ls is aliased to 'ls --color=auto'` / `ls is /usr/bin/ls` / `ls is /bin/ls`
Equivalent	`Get-Command NAME (-All)`
Common errors	`which cd` prints nothing, because `cd` is a built-in. Use `type`.
Use case	Detect a malicious alias or a PATH hijack (`type -a sudo`).
Docs	https://www.gnu.org/software/bash/manual/bash.html#Bash-Builtins

Files & Directories

cd

Field	Detail
OS	Bash built-in

Field	Detail
Description	Changes the shell's current directory.
Syntax	`cd [DIR | - | ~ | ..]`
Example	`cd /var/log && cd -`
Expected output	`cd -` prints the directory it returns to, e.g. `/home/student`
Equivalent	`Set-Location (cd)`; `Set-Location -` in 6.2+
Common errors	`bash: cd: too many arguments` (unquoted spaces) · `No such file or directory` · `Permission denied` (no `x` permission on the directory)
Use case	Fast navigation; `cd -` toggles between two working directories.
Docs	`help cd`

mkdir

Field	Detail
OS	All Linux (coreutils)
Description	Creates directories.
Syntax	`mkdir [-p] [-v] [-m MODE] DIR...`
Parameters	`-p` create parents, no error if existing · `-v` verbose · `-m 750` set permissions
Example	`mkdir -pv /tmp/app/{logs,conf}`
Expected output	`mkdir: created directory '/tmp/app'` … `'/tmp/app/logs'` … `'/tmp/app/conf'`
Equivalent	`New-Item -ItemType Directory -Force` (`mkdir` function on Windows)
Common errors	`File exists` (add `-p`) · `Permission denied` (parent not writable)
Use case	Idempotent setup of application directory trees.
Docs	https://man7.org/linux/man-pages/man1/mkdir.1.html

touch

Field	Detail
OS	All Linux (coreutils)
Description	Creates an empty file, or updates the timestamps of an existing file without changing its content.
Syntax	`touch [-c] [-a|-m] [-d DATE] FILE...`
Parameters	`-c` do not create · `-a`/`-m` access/modify time only · `-d '2026-01-01 09:00'` set a specific time
Example	`touch report.txt && ls -l report.txt`
Expected output	`-rw-rw-r-- 1 student student 0 Nov 8 16:02 report.txt`

Field	Detail
Equivalent	`New-Item -ItemType File` (new) · `(Get-Item f).LastWriteTime = Get-Date` (update)
Common errors	`Permission denied` in directories you cannot write to
Use case	Create marker/lock files; reproduce time-based test conditions.
Docs	https://man7.org/linux/man-pages/man1/touch.1.html

cp

Field	Detail
OS	All Linux (coreutils)
Description	Copies files and directories.
Syntax	`cp [-r] [-i|-n] [-v] [-p|-a] [-u] SOURCE... DEST`
Parameters	`-r` recursive · `-a` archive (preserve all, recursive) · `-p` preserve attributes · `-i` prompt · `-n` no-clobber · `-u` only newer · `-v` verbose
Example	`sudo cp -a /etc/ssh/sshd_config /etc/ssh/sshd_config.bak.$(date +%F)`
Expected output	No output on success (add `-v` to see `'a' -> 'b'`)
Equivalent	`Copy-Item` (`-Recurse`), `robocopy` for attribute-preserving copies
Common errors	`-r not specified; omitting directory` · nested-folder surprise when the destination exists
Use case	Timestamped backups before configuration changes.
Docs	https://man7.org/linux/man-pages/man1/cp.1.html

mv

Field	Detail
OS	All Linux (coreutils)
Description	Moves or renames files and directories.
Syntax	`mv [-i|-n] [-v] [-u] SOURCE... DEST`
Parameters	`-i` prompt before overwrite · `-n` never overwrite · `-v` verbose · `-u` only if newer
Example	`mv -v app.log app.log.1`
Expected output	`renamed 'app.log' -> 'app.log.1'`
Equivalent	`Move-Item`, `Rename-Item`
Common errors	Silent overwrite of an existing destination (use `-i`/`-n`) · `cannot stat` (source missing)
Use case	Manual log rotation; archiving processed files.
Docs	https://man7.org/linux/man-pages/man1/mv.1.html

rm

Field	Detail
OS	All Linux (coreutils)
Description	Removes files and (with `-r`) directory trees. **Permanent: no trash.**
Syntax	`rm [-i|-I] [-r] [-f] [-v] [--] FILE...`
Parameters	`-i` prompt each · `-I` prompt once · `-r` recursive · `-f` force (no prompts) · `-v` verbose · `--` end of options
Example	`rm -Iv *.tmp`
Expected output	`rm: remove 4 arguments?` then `removed 'a.tmp'` …
Equivalent	`Remove-Item` (`-Recurse`, `-Force`, `-WhatIf`, `-Confirm`)
Common errors	`Is a directory` (needs `-r`) · `Permission denied` (no write permission on the parent directory)
Use case	Cleaning build artefacts after previewing with `ls`.
Docs	https://man7.org/linux/man-pages/man1/rm.1.html

rmdir

Field	Detail
OS	All Linux (coreutils)
Description	Removes **empty** directories only.
Syntax	`rmdir [-p] [-v] DIR...`
Example	`rmdir -v old-empty-dir`
Expected output	`rmdir: removing directory, 'old-empty-dir'`
Equivalent	`Remove-Item DIR` (prompts if not empty)
Common errors	`Directory not empty`, which is the intended safety behaviour
Use case	Safe cleanup scripts that must never delete content.
Docs	https://man7.org/linux/man-pages/man1/rmdir.1.html

file / stat

Field	Detail
OS	All Linux
Description	`file` identifies content type by inspecting bytes; `stat` shows full metadata.
Syntax	`file FILE...` · `stat FILE...`
Example	`file /usr/bin/ls`
Expected output	`/usr/bin/ls: ELF 64-bit LSB pie executable, x86-64, ...`

Field	Detail
Equivalent	`Get-Item f | Format-List *` (metadata); first bytes via `Get-Content -Encoding Byte -TotalCount 4` (5.1) / `-AsByteStream` (7)
Common errors	None common
Use case	Spot executables disguised with document extensions.
Docs	https://man7.org/linux/man-pages/man1/file.1.html · https://man7.org/linux/man-pages/man1/stat.1.html

Bash ↔ PowerShell Side-by-Side

Rows are added as each day is released. ⚠ marks behaviour that differs in an important way.

Identity & system

Task	Bash (Ubuntu)	PowerShell	Notes
Current user	`whoami`	`whoami` · `$env:USERNAME`	
Host name	`hostname`	`hostname` · `$env:COMPUTERNAME`	
OS version	`cat /etc/os-release`	`Get-ComputerInfo -Property OsName,OsVersion`	Windows-only cmdlet
Kernel / build	`uname -r`	`[Environment]::OSVersion.Version`	
Architecture	`uname -m`	`$env:PROCESSOR_ARCHITECTURE`	
Shell version	`echo $BASH_VERSION`	`$PSVersionTable.PSVersion`	
Date / UTC	`date` · `date -u`	`Get-Date` · `(Get-Date).ToUniversalTime()`	
ISO timestamp	`date -Iseconds`	`Get-Date -Format o`	

Help

Task	Bash	PowerShell	Notes
Full help	`man cmd`	`Get-Help cmd -Full`	`Update-Help` first
Examples	`man cmd` (EXAMPLES section)	`Get-Help cmd -Examples`	
Find commands	`apropos word`	`Get-Command *word*`	
What runs?	`type -a name`	`Get-Command name -All`	

Navigation & files

Task	Bash	PowerShell	Notes
Where am I	`pwd`	`Get-Location`	
List (incl. hidden)	`ls -la`	`Get-ChildItem -Force`	⚠ `ls -la` fails in PowerShell
Recursive list	`ls -R`	`Get-ChildItem -Recurse`	
Change dir	`cd dir`	`Set-Location dir`	
Previous dir	`cd -`	`Set-Location -`	6.2+ only
Make dirs	`mkdir -p a/b`	`New-Item a\b -ItemType Directory -Force`	
New empty file	`touch f`	`New-Item f -ItemType File`	⚠ `-Force` overwrites

Task	Bash	PowerShell	Notes
Copy	`cp a b`	`Copy-Item a b`	
Copy tree	`cp -r a b`	`Copy-Item a b -Recurse`	Same nesting rule
Move / rename	`mv a b`	`Move-Item a b` · `Rename-Item a -NewName b`	
Delete	`rm f`	`Remove-Item f`	No recycle bin
Delete tree	`rm -r d`	`Remove-Item d -Recurse`	
Force	`rm -rf d`	`Remove-Item d -Recurse -Force`	⚠ `-rf` is not a PS parameter
Simulate	*(preview with ls)*	`-WhatIf`	
Exists?	`[ -e p ]`	`Test-Path p`	
Literal name	`'a[1].txt'`	`-LiteralPath 'a[1].txt'`	