

# Linux Command Line Cheat Sheet: All the Commands You Need

February 14, 2023 / By Nathan House



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You may need to open a compressed file, but you've forgotten the TAR commands. Or you're new to Linux and need to know the top ten terminal commands that open and modify files and folders. The sheer volume of Linux terminal commands can overwhelm beginners, not to mention server administrators, IT professionals, and hobbyists.

Therefore, we've prepared this essential Linux command line cheat sheet to help you get familiar with Linux security commands categorized by the scope of their actions. We're confident that this compilation can help you master Linux quickly.

Feel free to download a copy of this cheat sheet **here** and scroll down to find the commands you need today.

Search cheats here

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#### **Essential Commands**

We recommend that you memorize these commands. You'll need them the most when operating Linux.

### File Management

In the following commands: X may refer to a single file, a string containing a wildcard symbol referring to a set of multiple files, e.g., file\*.txt, or the stream output of a piped command (in which case the syntax would be X | command instead of command X); Y is a single directory; A and B are path strings of files/directories.

COMMAND	DESCRIPTION
*	Wildcard symbol for variable length, e.g., * . $txt$ refers to all files with the TXT extension
?	Wildcard symbol referring to a single character, e.g., Doc?.docx can refer to Doc1.docx, DocA.docx, etc.
ls	List the names of files and subfolders in the current directory. Options include $-1$ , $-a$ , $-$ t which you may combine, e.g., $-alt$ .
ls -1	Also show details of each item displayed, such as user permissions and the time/date when the item was last modified
ls -a	Also display hidden files/folders. May be combined with ls -l to form ls -al.
ls -t	Sort the files/folders according to the last modified time/date, starting with the most recently modified item
ls X	List the files
	Change directory to Y.
cd Y	Special instances of Y: . — current directory — parent directory
cd	To the \$HOME directory
cd	Up one level to enclosing folder or parent directory
cd /etc	To the /etc directory
cmp A B	Compare two files ${\tt A}$ and ${\tt B}$ for sameness. No output if ${\tt A}$ and ${\tt B}$ are identical, outputs character and line number otherwise.

COMMAND	DESCRIPTION
diff A B	Compare two files ${\tt A}$ and ${\tt B}$ for differences. Outputs the difference.
pwd	Display the path of the current working directory.
mkdir X	Make a new directory named $\boldsymbol{x}$ inside the current directory.
mv A B	Move a file from path A to path B. Also used for renaming files.  Examples:  - Moving between directories folder1 and folder2:  mv ./folder1/file.txt ./folder2  The file name will remain unchanged, and its new path will be ./folder2/file.txt.  - Renaming a file: mv new_doc.txt expenses.txt  The new file name is expenses.txt.
ср А В	Copy a file from path A to path B. Usage similar to mv both in moving to a new directory and simultaneously renaming the file in its new location.  Example: cp ./f1/file.txt ./f2/expenses.txt simultaneously copies the file file.txt to the new location with a new name expenses.txt.
cp -r Y Z	Recursively copy a directory $Y$ and its contents to $Z$ . If $Z$ exists, copy source $Y$ into it; otherwise, create $Z$ and $Y$ becomes its subdirectory with $Y$ 's contents
rm X	Remove (delete) X permanently.
rm -r Y	Recursively delete a directory Y and its contents
rm -f X	Forcibly remove file X without prompts or confirmation
rm -rf Y	Forcibly remove directory Y and its contents recursively
rmdir Y	Remove a directory Y permanently, provided Y is empty.
open X	Open X in its default program.
open -e X	Opens X in the default text editor (macOS: TextEdit)
touch X	Create an empty file ${\tt X}$ or update the access and modification times of ${\tt X}$ .
cat X	View contents of X.

COMMAND	DESCRIPTION	
cat -b X	Also display line numbers as well.	
wc X	Display word count of X.	
head X	Display the first 10 lines of X. If more than a single file is specified, each file is preceded by a header consisting of the string "==> $\underline{X}$ <==" where "X" is the name of the file.	
head -n 4 X	Show the first 4 lines of X.	
ls *.c   head -n 5	Display the first 5 items of a list of $\star$ . $\circ$ files in the current directory.	
tail X	Display the last (10, by default) lines of $X$ . If more than a single file is specified, each file is preceded by a header consisting of the string "==> $X$ <==" where " $X$ " is the name of the file.	
tail -n +1	Display entire contents of the file(s) ${\tt X}$ specified, with header of respective file names	
tail -f X	Display the last 10 lines of the file(s) $x$ specified, and track changes appended to them at the end. Overwriting $x$ or modifying $x$ with a text editor such as vim would mess up this command's output.	
less	Read a file with forward and backward navigation. Often used with pipe, e.g., cat file.txt   less	
ln -s A S	Create symbolic link of path A to link name S.	

# **Input/Output Redirection**

These are helpful for logging program output and error messages.

COMMAND	DESCRIPTION
echo TEXT	Display a line of TEXT or the contents of a variable.
echo -e TEXT	Also interprets escape characters in TEXT, e.g., $\n \rightarrow$ new line, $\b \rightarrow$ backslash, $\t \rightarrow$ tab.

COMMAND	DESCRIPTION	
echo -n TEXT	Omits trailing newline of TEXT.	
cmd1   cmd2	is the pipe character; feeds the output of the command cmd1 and sends it to the command cmd2, e.g., ps aux   grep python3.	
cmd > file	Redirect output of a command cmd to a file file. Overwrites pre-existing content of file.	
cmd >& file	Redirect output of cmd to file. Overwrites pre-existing content of file. Suppresses the output of cmd.	
cmd > /dev/null	Suppress the output of cmd.	
cmd >> file	Append output of cmd to file.	
cmd < file	Read input of cmd from file.	
cmd << delim	Read input of cmd from the standard input with the delimiter character delim to tell the system where to terminate the input. Example for counting the number of lines of ad-hoc input:  wc -1 << EOF  > I like  > apples  > and  > oranges.  > EOF  4  Hence there are only 4 lines in the standard input delimited by EOF.	
cmd <<< string	Input a text string to cmd.	
cmd 2> foo	Redirect error messages of cmd to foo.	
cmd 2>> foo	Append error messages of cmd to foo.	
cmd &> file	Redirect output and error messages of cmd to file.	

### **Search and Filter**

These commands help you find the files you want.

COMMAND	DESCRIPTION
<pre>grep patt /path/to/src</pre>	Search for a text pattern patt in X. Commonly used with pipe e.g., ps aux   grep python3 filters out the processes containing python3 from all running processes of all users.
grep -r patt /path/to/src	Search recursively (the target directory /path/to/src and its subdirectories) for a text pattern patt.
grep -v patt X	Return lines in X not matching the specified patt.
grep -l patt X	Write to standard output the names of files containing patt.
grep -i patt X	Perform case-insensitive matching on X. Ignore the case of patt.
find	Find files.
<pre>find /path/to/src - name "*.sh"</pre>	Find all files in /path/to/src matching the pattern "*.sh" in the file name.
find /home -size +100M	Find all files in the /home directory larger than 100MB.
locate name	Find files and directories by name.
sort X	Arrange lines of text in $\mathbf X$ alphabetically or numerically.

### **Archives**

These commands are for unpacking compressed files (.zip, .gz, .bz2, .tar, etc.) with large or complex contents, such as programs.

COMMAND	DESCRIPTION
tar	Manipulate archives with .tar extension.
tar -v	Get verbose output while manipulating TAR archives. May combine this

COMMAND	DESCRIPTION
	option with others, e.g., tar -tvf.
tar -cf archive.tar Y	Create a TAR archive named archive.tar containing Y.
tar -xf archive.tar	Extract the TAR archive named archive.tar.
tar -tf archive.tar	List contents of the TAR archive named archive.tar.
tar -czf archive.tar.gz	Create a gzip-compressed TAR archive named archive.tar.gz containing Y.
tar -xzf archive.tar.gz	Extract the gzip-compressed TAR archive named archive.tar.gz.
tar -cjf archiave.tar.bz2 Y	Create a bzip2-compressed TAR archive named archive.tar.bz2 containing Y.
tar -xjf archive.tar.bz2	Extract the bzip2-compressed TAR archive named archive.tar.bz2.
gzip	Manipulate archives with .gz extension.
gzip Y	Create a gzip archive named Y.gz containing Y.
gzip -l Y.gz	List contents of gzip archive Y.gz.
gzip -d Y.gz gunzip Y.gz	Extract Y . gz and recover the original file Y.
bzip2	Manipulate archives with .bz2 extension.
bzip2 Y	Create a bzip2 archive named Y.bz2 containing Y.
bzip2 -d Y.gz bunzip2 Y.gz	Extract Y.bz2 and recover the original file Y.
zip -r Z.zip Y	Zip Y to the ZIP archive Z.zip.
unzip Z.zip	Unzip Z.zip to the current directory.
unzip Z.zip	List contents of Z.zip.

# File Transfer

These commands are for logging in to local and remote hosts, and for uploading and downloading files, transferring them between devices. Remember to omit the square brackets "[" and "]" when you input the optional parameters they enclose.

COMMAND	DESCRIPTION
ssh user@access	Connect to access as user.
ssh access	Connect to access as your local username.
ssh -p port user@access	Connect to access as user using port.
	Login to hostN as userN via secure copy protocol for N=1, 2.
	Example usage:
scp [user1@]host1: [path1] [user2@]host2:	scp alice@pi:/home/source bob@arduino:/destination
[path2]	path1 and path2 may be local or remote, but ensure they're absolute
	rather than relative paths, e.g., /var/www/*.html, /usr/bin.
	If user1 and user2 are not specified, scp will use your local username.
scp -P port	
[user1@]host1:[path1]	Connect to hostN as userN using port for N=1, 2.
[user2@]host2:[path2]	
scp -r [user1@]host1:	
<pre>[path1] [user2@]host2: [path2]</pre>	Recursively copy all files and directories from path1 to path2.
	Login to access as user via secure file transfer protocol. If user is not
sftp [user@]access	specified, your local username will be used.
sftp access	Connect to access as your local username.
sftp -P port	Connect to access as user using port.
user@access	Connect to access as aser asing por c.
rsync -a [path1]	Synchronize [path1] to [path2], preserving symbolic links, attributes,
[path2]	permissions, ownerships, and other settings.

COMMAND	DESCRIPTION	
	Synchronize [path1] on the remote host host1 to the local path	
rsync -avz host1:	[path2], preserving symbolic links, attributes, permissions, ownerships,	
[path1] [path2]	and other settings. It also compresses the data involved during the	
	transfer.	

### **File Permissions**

Not all files are equally accessible. To prevent unwanted tampering, some files on your device may be read-only. For more information about file permissions on Linux, refer to our <u>Linux File Permissions</u>

Cheat Sheet.

COMMAND	DESCRIPTION
chmod permission file	Change permissions of a file or directory. Permissions may be of the form $[u/g/o/a]$ $[+/-/=][r/w/x]$ (see examples below) or a three-digit octal number.
chown user2	Change the owner of a file to user2.
chgrp group2	Change the group of a file to group2.

#### Usage examples:

- chmod +x testfile → allow all users to execute the file
- ullet chmod u-w testfile o forbid the current user from writing or changing the file
- chmod u+wx,g-x,o=rx testfile → simultaneously add write and execute permissions to user, remove execute permission from group, and set the permissions of other users to only read and write.

#### **Numeric Representation**

The table below compares Linux file permissions in octal form and in the format [u/g/o/a][+/-/=] [r/w/x].

OCTAL	PERMISSION(S)	EQUIVALENT TO APPLICATION OF
0	No permissions	-rwx
1	Execute permission only	=X
2	Write permission only	=w
3	Write and execute permissions only: $2 + 1 = 3$	=WX
4	Read permission only	=r
5	Read and execute permissions only: $4 + 1 = 5$	=rx
6	Read and write permissions only: 4 + 2 = 6	=rw
7	All permissions: $4 + 2 + 1 = 7$	=rwx

#### **Examples**

- chmod 777 testfile → allow all users to execute the file
- chmod 177 testfile → restrict current user (u) to execute-only, while the group (g) and other users (o) have read, write and execute permissions
- chmod 365 testfile → user (u) gets to write and execute only; group (g), read and write only;
   others (o), read and execute only.

#### Other Links You Might Like:

- Linux File Permissions Cheat Sheet
- Linux Command Line Cheat Sheet
- Unix Commands Cheat Sheet
- Tmux Cheat Sheet
- Tcpdump Cheat Sheet
- Bash Cheat Sheet
- Our Linux Courses Collection

# **System Information**

These commands come in handy when you're developing new applications for Linux or troubleshooting your Linux machine.

### General

These provide information about your Linux machine and perform administrative tasks.

COMMAND	DESCRIPTION
uname	Show the Linux system information.
uname -a	Detailed Linux system information
uname -r	Kernel release information, such as kernel version
uptime	Show how long the system is running and load information.
su sudo	Superuser; use this before a command that requires root access e.g., su shutdown
cal	Show calendar where the current date is highlighted.
date	Show the current date and time of the machine.
halt	Stop the system immediately.
shutdown	Shut down the system.

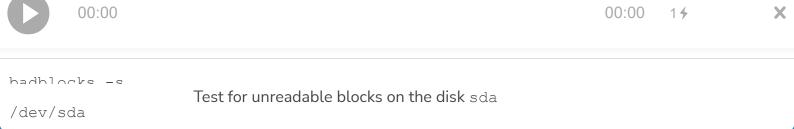
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man COMMAND	Shows the manual for a given COMMAND. To exit the manual press "a"
hostname	Show system host name
hostname -I	Display IP address of host
cat /etc/*- release	Show the version of the Linux distribution installed. For example, if you're using Red Hat Linux, you may replace * with redhat.

### Hardware

These commands provide details about the hardware supporting your Linux machine.

COMMAND	DESCRIPTION
dmesg	Display messages in kernel ring buffer (data structure that records messages related to the operation of the program running the operating system)
cat /proc/cpuinfo	Display information about the central processing unit (CPU)
cat /proc/meminfo	Display memory information
lspci -tv	Displays information about each Peripheral Component Interconnect (PCI) device on your system. The option $-t$ outputs the information as a tree diagram, and $-v$ is for verbose output.
lsusb -tv	Display information about Universal Serial Bus (USB) devices and the devices connected to them. The option $-t$ outputs the information as a tree diagram, and $-v$ is for verbose output.
dmidecode	Display system hardware components, serial numbers, and BIOS version
hdparm -i /dev/sda	Display information about the disk sda
00:00	00:00 1 <b>∳</b>



### **Disk Usage**

These commands provide storage details regarding your Linux machine.

COMMAND	DESCRIPTION
df	Display free disk space.
du	Show file/folder sizes on disk.
du -ah	Disk usage in human readable format (KB, MB etc.)
du -sh	Total disk usage of the current directory
du -h	Free and used space on mounted filesystems
du -i	Free and used inodes on mounted filesystems
fdisk -l	List disk partitions, sizes, and types
free -h	Display free and used memory in human readable units.
free -m	Display free and used memory in MB.
free -g	Display free and used memory in GB.

# **Process Management and Performance Monitoring**

The following is redolent of functions in Windows Task Manager, but on the command line.

COMMAND	DESCRIPTION
&	Add this character to the end of a command/process to run it in the background



ne	Meaning of aux
	a = show processes for all users
	u = show user or owner column in output
	x = show processes not attached to a terminal
ps -e ps -A	Either of these two commands prints all running processes in the system

COMMAND	DESCRIPTION
ps -ef	Print detailed overview
ps -U root -u root	Display all processes running under the account root.
ps -eo pid,user,command	Display only the columns pid, user and command in ps output
top	Display sorted information about processes
htop	Display sorted information about processes with visual highlights. It allows you to scroll vertically and horizontally, so you can see every process running on your system and entire commands.
atop	Display detailed information about processes and hardware
kill PID	Kill a process specified by its process ID PID, which you obtain using the ps command
killall proc1	Kill all processes containing proc1 in their names
lsof	List all open files on the system. (This command helps you pinpoint what files and processes are preventing you from successfully ejecting an external drive.)
lsof -u root	List all files on the system opened by the root user. As the output can be long, you may use lsof -u root   less to keep this list from taking up space in the terminal output.
00:00	00:00 1 <b> ×</b>



Display virtual memory statistics (information about memory, system processes, paging, interrupts, block I/O, disk, and CPU scheduling), updated vmstat 1 every (1) second Display system input/output statistics for devices and partitions. virtual iostat 1 memory statistics, updated every (1) second

COMMAND	DESCRIPTION
tail -n 100 /var/log/messages	Display the last 100 lines in the system logs.  Replace /var/log/messages with /var/log/syslog for Debian-based systems.
tcpdump -i eth0	Capture and display all packets on interface eth0
tcpdump -i eth0 port	Monitor all traffic on interface eth0 port 80 (HTTP)
watch df -h	Execute df -h and show periodic updates.  To exit, press <b>Ctrl+C</b> .

# **User Management**

COMMAND

These commands give information on the system's users and allows superuser administrators to change user settings.

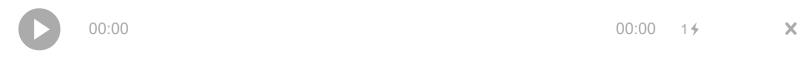
**DESCRIPTION** 

who	Display who is logged in
W	Display what users are online and what they are doing
users	List current users
whoami	Display what user you are logged in as
id	Display the user ID and group IDs of your current user
00:00	00:00 1 <b> ×</b>
groupadd gp1	Create a group named gp1
useradd -c "Alice Bob" -m ab1	Create an account named ab1, with a comment of "Alice Bob" and create the new user's home directory
userdel ab1	Delete the account named ab1
usermod -aG gp1 ab1	Add the account ab1 to the group gp1

# Networking

These commands regulate how your Linux machine communicates with other computers, such as the local area network (LAN) router or external websites.

COMMAND	DESCRIPTION
ifconfig	Display all network interfaces with IP addresses
ifconfig -a	Display all network interfaces, even if any of them is down, with IP addresses
ifconfig eth0	Display IP addresses and details of the eth0 interface
ip a	Another way to display all network interfaces with IP addresses
ethtool eth0	Query or control network driver and hardware settings of the interface eth0
netstat	Print open sockets of network connections, routing tables, interface statistics, masquerade connections, and multicast memberships.  Pipe with the less command: e.g., netstat -a   less
netstat -a	Show both listening and non-listening sockets
netstat -l	Show only listening sockets
netstat - nutlp	Show listening TCP and UDP ports and corresponding programs



trhoi o	
domain	Display whois information for domain
dig domain	Display DNS information for domain
dig -x addr	Do a reverse lookup on an IPv4 or IPv6 address addr
host domain	Display DNS IP address for domain
ı	

COMMAND	DESCRIPTION	
wget LINK	Download from location LINK	
curl LINK	Display the HTML source of LINK. Check out our $\underline{\text{curl Cheat Sheet}}$ for details.	

# **Installing New Programs**

A package file is an archive containing compiled software and other resources it uses. The package file extension and the package installer (a utility for installing new programs) depend on the Linux distribution.

Know your system's Linux distribution to understand the correct installation commands tailored to it. If the package comes with a README component, it should contain application-specific installation instructions such as extracting TAR files (refer to this article's <u>Archives</u> section), ./setup.sh, and make\_install.

#### **Package Management Overview**

The following table is on package management in popular Linux distributions.

LINUX DISTRIBUTION	PACKAGE FILE EXTENSION	PACKAGE INSTALLER(S)
Debian / Ubuntu	.deb	apt, dpkg
Rocky / Fedora / Red Hat Enterprise Linux	.rpm	yum, dnf
Arch Linux / Maniaro / Garuda /	.pkapacman.	
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### **Package Management Commands**

Here are the commands for package management in popular Linux distributions.

LINUX DISTRIBUTION	DEBIAN / UBUNTU	ROCKY / FEDORA / RED HAT ENTERPRISE LINUX	ARCH LINUX / MANJARO / GARUDA / CHAKRA
Update list of packages available from remote	sudo apt update	dnf check-update	The command pacman -Syy achieves this purpose but

LINUX DISTRIBUTION	DEBIAN / UBUNTU	ROCKY / FEDORA / RED HAT ENTERPRISE LINUX	ARCH LINUX / MANJARO / GARUDA / CHAKRA
repositories			may damage your system.  Use pacman -Syu instead.
Upgrade installed packages	sudo apt upgrade	sudo dnf upgrade	pacman -Syu
Find a package with keyword in the name	apt search keyword	dnf search keyword	pacman -Ss keyword
View description and summary information about a package	apt show package	dnf info package	pacman -Si package
Install a package (with appropriate file extension) on the local file system	sudo dpkg -i package.deb	sudo dnf install package.rpm	pacman -S package
Remove / uninstall a package	sudo apt remove package	sudo dnf erase package	pacman -R package

# Conclusion

Learning basic Linux commands is a great way to kickstart your education in IT and cyber security. You're now ready to practice them on any Linux distribution you fancy. If you want to focus on cyber security, go for **Kali Linux** and **Parrot OS**. Also, don't forget to check out our **Unix Commands Cheat**Sheet here.



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# **Frequently Asked Questions**

What is a basic Linux command?

A basic Linux command is a keyword at most ten characters long with only a few additional arguments. For example, **ls** (list directory contents) and **cd** (change directory) are basic Linux commands.

- + How do I get a list of commands in the terminal?
- + How do I learn Linux commands?
- + What is the most used Linux command?
- + Are Linux commands easy to learn?
- + What are Linux commands?
- + What are 5 Linux commands?

# **Grow your Cyber Security Skills**



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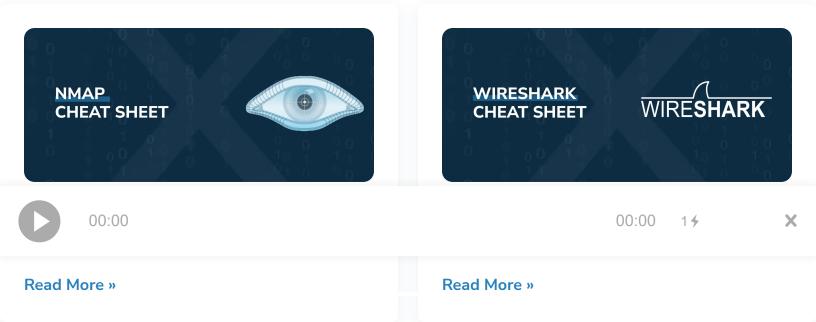
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#### **Nathan House**

Nathan House is the founder and CEO of StationX. He has over 25 years of experience in cyber security, where he has advised some of the largest companies in the world. Nathan is the author of the popular "The Complete Cyber Security Course", which has been taken by over half a million students in 195 countries. He is the winner of the Al "Cyber Security Educator of the Year 2020" award and finalist for Influencer of the year 2022.

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