



DevOps Shack

Linux Complete Detailed Cheat Sheet

1. File and Directory Management

1.1 ls - List directory contents

```
ls -l /home
```

- **Description:** Lists all files and directories in /home with detailed information.
- **Options:**
 - -l: Long format (permissions, owner, size, etc.)
 - -a: Show hidden files.
 - -h: Human-readable file sizes.

1.2 cd - Change directory

```
cd /var/log
```

- **Description:** Moves to the /var/log directory.
- **Tips:**
 - cd ..: Go to the parent directory.
 - cd ~: Go to the home directory.

1.3 pwd - Print working directory

```
pwd
```

- **Description:** Outputs the full path of the current working directory.

1.4 mkdir - Create directories

```
mkdir -p /tmp/test_dir/sub_dir
```

- **Description:** Creates /tmp/test_dir and sub_dir if they don't already exist.
 - -p: Create parent directories as needed.

1.5 rmdir - Remove empty directories

```
rmdir /tmp/test_dir/sub_dir
```

- **Description:** Removes the sub_dir if it's empty.

1.6 rm - Remove files or directories

```
rm -rf /tmp/test_dir
```

- **Description:** Deletes the test_dir directory and its contents recursively.
- **Options:**
 - -r: Recursive delete.
 - -f: Force delete without confirmation.

1.7 cp - Copy files or directories

```
cp -r /etc/nginx /tmp/
```

- **Description:** Copies the /etc/nginx directory to /tmp/.
- **Options:**
 - -r: Copy directories recursively.

1.8 mv - Move or rename files

```
mv /tmp/nginx /tmp/nginx_backup
```

- **Description:** Renames or moves /tmp/nginx to /tmp/nginx_backup.

1.9 touch - Create empty files

```
touch newfile.txt
```

- **Description:** Creates an empty file named newfile.txt.

1.10 stat - Display file status

```
stat newfile.txt
```

- **Description:** Provides detailed information about the file, such as size, permissions, and timestamps.

2. File Viewing and Editing

2.1 cat - View file contents

```
cat /etc/hosts
```

- **Description:** Displays the contents of /etc/hosts.
- **Tips:**
 - Use cat file1 file2 > combined_file to concatenate files.

2.2 less - View file contents page by page

```
less /var/log/syslog
```

- **Description:** Opens the /var/log/syslog file in a scrollable view.

2.3 head - Display the first lines of a file

```
head -n 5 /etc/passwd
```

- **Description:** Shows the first 5 lines of the /etc/passwd file.

2.4 tail - Display the last lines of a file

```
tail -n 10 /var/log/syslog
```

- **Description:** Shows the last 10 lines of the /var/log/syslog file.
- **Tips:**
 - Use tail -f to monitor a file in real time.

2.5 nano - Edit files

```
nano /tmp/test.txt
```

- **Description:** Opens test.txt in the Nano text editor.
 - **Tips:**
 - Ctrl + O: Save.
 - Ctrl + X: Exit.
-

3. File Permissions and Ownership

3.1 chmod - Change file permissions

```
chmod 644 /tmp/test.txt
```

- **Description:** Sets the file permissions to rw-r--r-- for test.txt.
- **Options:**
 - 777: Full permissions for all.
 - 644: Owner can read/write, others can only read.

3.2 chown - Change file ownership

```
chown user:user /tmp/test.txt
```

- **Description:** Changes the owner and group of test.txt to user.

3.3 umask - Set default file permissions

```
umask 022
```

- **Description:** Sets the default permission for new files to 755.

4. Searching and Finding Files

4.1 find - Search for files

```
find / -name "test.txt"
```

- **Description:** Searches for files named test.txt in the root directory.
- **Options:**
 - -type f: Search for files.
 - -type d: Search for directories.

4.2 grep - Search inside files

```
grep "error" /var/log/syslog
```

- **Description:** Searches for the term error in /var/log/syslog.

5. Networking

5.1 ping - Test network connectivity

```
ping -c 4 google.com
```

- **Description:** Sends 4 ICMP packets to google.com to check connectivity.

5.2 curl - Send HTTP requests

```
curl https://example.com
```

- **Description:** Fetches the contents of https://example.com.

6. Disk and Filesystem Management

6.1 df - Display disk space usage

```
df -h
```

- **Description:** Shows disk space usage in a human-readable format.
- **Options:**
 - -h: Human-readable sizes.
 - -T: Displays filesystem type.

6.2 du - Display directory size

```
du -sh /var/log
```

- **Description:** Shows the size of the /var/log directory.
- **Options:**

- -s: Summary for the directory.
- -h: Human-readable format.

6.3 mount - Mount a filesystem

```
mount /dev/sdb1 /mnt
```

- **Description:** Mounts the partition /dev/sdb1 to /mnt.
- **Options:**
 - -t ext4: Specify the filesystem type.

6.4 umount - Unmount a filesystem

```
umount /mnt
```

- **Description:** Unmounts the /mnt directory.

6.5 lsblk - List information about block devices

```
lsblk
```

- **Description:** Displays information about block devices, such as partitions.

6.6 blkid - Display block device UUIDs

```
blkid
```

- **Description:** Lists the UUIDs and filesystem types of block devices.

6.7 fsck - Filesystem check and repair

```
fsck /dev/sdb1
```

- **Description:** Checks and repairs filesystem errors on /dev/sdb1.

6.8 mkfs - Create a filesystem

```
mkfs.ext4 /dev/sdb1
```

- **Description:** Formats /dev/sdb1 with the ext4 filesystem.

7. Process Management

7.1 ps - Display process information

```
ps aux | grep apache
```

- **Description:** Lists all processes with details and filters for apache.

7.2 top - Monitor system processes

```
top
```

- **Description:** Displays a real-time view of system processes and resource usage.

7.3 htop - Enhanced process viewer

htop

- **Description:** Provides an interactive process viewer (requires installation).

7.4 kill - Terminate a process

kill -9 1234

- **Description:** Sends the SIGKILL signal to terminate process 1234.

7.5 pkill - Kill processes by name

pkill -f apache

- **Description:** Terminates all processes with apache in their name.

7.6 jobs - List background jobs

jobs

- **Description:** Displays jobs running in the background.

7.7 bg - Resume a job in the background

bg %1

- **Description:** Resumes job 1 in the background.

7.8 fg - Bring a job to the foreground

fg %1

- **Description:** Brings job 1 to the foreground.

8. User Management

8.1 who - Show who is logged in

who

- **Description:** Lists users currently logged into the system.

8.2 whoami - Show the current user

whoami

- **Description:** Displays the username of the current user.

8.3 adduser - Add a new user

sudo adduser john

- **Description:** Creates a new user john.

8.4 usermod - Modify user details

sudo usermod -aG sudo john

- **Description:** Adds john to the sudo group.

8.5 passwd - Change user password

`passwd john`

- **Description:** Changes the password for user john.

8.6 deluser - Remove a user

`sudo deluser john`

- **Description:** Deletes user john.
-

9. Networking

9.1 ifconfig - Display or configure network interfaces

`ifconfig`

- **Description:** Shows network interface details.
- **Note:** Use ip a for modern systems.

9.2 ip - Display or configure IP addresses

`ip a`

- **Description:** Lists all network interfaces and their IP addresses.

9.3 netstat - Network statistics

`netstat -tuln`

- **Description:** Lists open ports and active connections.
- **Options:**
 - -t: TCP connections.
 - -u: UDP connections.

9.4 traceroute - Trace the route to a host

`traceroute google.com`

- **Description:** Displays the path packets take to reach google.com.

9.5 wget - Download files from the web

`wget https://example.com/file.zip`

- **Description:** Downloads file.zip from example.com.

9.6 scp - Securely copy files between systems

`scp file.txt user@192.168.1.10:/tmp/`

- **Description:** Copies file.txt to /tmp/ on a remote host.
-

10. System Monitoring

10.1 uptime - System uptime and load

uptime

- **Description:** Shows how long the system has been running.

10.2 free - Display memory usage

free -h

- **Description:** Displays memory usage in a human-readable format.

10.3 vmstat - System performance metrics

vmstat 1 5

- **Description:** Provides CPU, memory, and I/O stats every second for 5 seconds.

10.4 iostat - CPU and I/O statistics

iostat

- **Description:** Shows CPU and disk I/O statistics.

10.5 sar - System activity report

sar -u 1 3

- **Description:** Displays CPU usage over 3 intervals.

11. Package Management

11.1 apt - Manage packages on Debian-based systems

sudo apt update && sudo apt upgrade -y

- **Description:** Updates the package list and upgrades all packages to the latest version.
- **Options:**
 - install: Install a package (sudo apt install nginx).
 - remove: Uninstall a package (sudo apt remove nginx).
 - search: Search for a package (apt search apache).

11.2 yum - Manage packages on RHEL-based systems

sudo yum install httpd

- **Description:** Installs the Apache web server on Red Hat-based distributions.
- **Options:**
 - update: Update all packages (sudo yum update).
 - remove: Remove a package (sudo yum remove httpd).

11.3 dnf - Next-gen package manager for RHEL systems

```
sudo dnf install vim
```

- **Description:** Installs the Vim editor using dnf.

11.4 rpm - Manage RPM packages

```
rpm -ivh package.rpm
```

- **Description:** Installs an RPM package.
- **Options:**
 - -e: Remove a package (rpm -e package_name).
 - -q: Query installed packages (rpm -q package_name).

11.5 snap - Manage Snap packages

```
sudo snap install vlc
```

- **Description:** Installs the VLC media player as a Snap package.
-

12. Archiving and Compression

12.1 tar - Archive files

```
tar -cvf archive.tar /path/to/files
```

- **Description:** Archives files into archive.tar.
- **Options:**
 - -c: Create an archive.
 - -x: Extract an archive.
 - -z: Compress with gzip (tar -czvf archive.tar.gz /path/to/files).

12.2 gzip - Compress files

```
gzip file.txt
```

- **Description:** Compresses file.txt into file.txt.gz.

12.3 gunzip - Decompress files

```
gunzip file.txt.gz
```

- **Description:** Decompresses file.txt.gz back to file.txt.

12.4 zip - Compress files into a zip archive

```
zip archive.zip file1.txt file2.txt
```

- **Description:** Compresses file1.txt and file2.txt into archive.zip.

12.5 unzip - Extract a zip archive

`unzip archive.zip`

- **Description:** Extracts all files from archive.zip.
-

13. Security and Permissions

13.1 sudo - Execute a command as superuser

`sudo apt install nginx`

- **Description:** Runs the apt install nginx command as a superuser.

13.2 passwd - Change user password

`sudo passwd username`

- **Description:** Sets or changes the password for the username.

13.3 chmod - Modify file permissions

`chmod 755 script.sh`

- **Description:** Sets permissions to rwxr-xr-x for script.sh.

13.4 chown - Change file ownership

`sudo chown user:group file.txt`

- **Description:** Changes the owner and group of file.txt to user and group.

13.5 iptables - Manage firewall rules

`sudo iptables -A INPUT -p tcp --dport 22 -j ACCEPT`

- **Description:** Allows incoming SSH traffic on port 22.

13.6 ufw - Uncomplicated Firewall

`sudo ufw allow 80`

- **Description:** Allows incoming HTTP traffic on port 80.

13.7 ssh - Connect to a remote server

`ssh user@192.168.1.10`

- **Description:** Connects to the remote server with IP 192.168.1.10 as user.

13.8 scp - Securely copy files

`scp file.txt user@192.168.1.10:/tmp/`

- **Description:** Copies file.txt to the /tmp/ directory on a remote host.
-

14. Text Processing

14.1 cat - Concatenate and display file contents

`cat file.txt`

- **Description:** Displays the contents of file.txt.

14.2 grep - Search text patterns in files

`grep "error" /var/log/syslog`

- **Description:** Searches for the word "error" in /var/log/syslog.

14.3 awk - Pattern scanning and processing

`awk '{print $1}' file.txt`

- **Description:** Prints the first column of file.txt.

14.4 sed - Stream editor for transforming text

`sed 's/old/new/g' file.txt`

- **Description:** Replaces "old" with "new" in file.txt.

14.5 sort - Sort lines in a file

`sort file.txt`

- **Description:** Sorts the lines in file.txt alphabetically.

14.6 uniq - Remove duplicate lines

`uniq file.txt`

- **Description:** Removes consecutive duplicate lines in file.txt.

14.7 wc - Word, line, and character count

`wc -l file.txt`

- **Description:** Counts the number of lines in file.txt.

14.8 cut - Extract sections of text

`cut -d':' -f1 /etc/passwd`

- **Description:** Extracts the first field (username) from /etc/passwd.

15. Shell Scripting

15.1 Basic Shell Script

`#!/bin/bash`

`echo "Hello, World!"`

- **Description:** A simple shell script that prints "Hello, World!".
- **Usage:**

`chmod +x script.sh`

```
./script.sh
```

15.2 Variables in Scripts

```
#!/bin/bash
```

```
name="Linux"
```

```
echo "Welcome to $name scripting!"
```

- **Description:** Demonstrates how to use variables in shell scripts.

15.3 Loops in Scripts

```
#!/bin/bash
```

```
for i in 1 2 3 4 5; do
```

```
    echo "Number: $i"
```

```
done
```

- **Description:** A for loop that prints numbers from 1 to 5.

15.4 Conditional Statements

```
#!/bin/bash
```

```
if [ $1 -gt 10 ]; then
```

```
    echo "Greater than 10"
```

```
else
```

```
    echo "Less than or equal to 10"
```

```
fi
```

- **Description:** A script that checks if a number is greater than 10.
-

16. System Information

16.1 uname - System information

```
uname -a
```

- **Description:** Displays system kernel and architecture details.

16.2 hostname - Display hostname

```
hostname
```

- **Description:** Outputs the hostname of the machine.

16.3 uptime - System uptime

```
uptime
```

- **Description:** Shows how long the system has been running.

17. System Performance Monitoring

17.1 vmstat - System performance statistics

`vmstat 1 5`

- **Description:** Displays system performance metrics (CPU, memory, I/O) every 1 second for 5 iterations.

17.2 iostat - CPU and I/O usage

`iostat -x`

- **Description:** Shows detailed CPU and disk I/O statistics.

17.3 sar - Historical performance data

`sar -u 1 5`

- **Description:** Displays CPU usage over 5 intervals, collected every 1 second.

17.4 top - Real-time process monitoring

`top`

- **Description:** Shows a dynamic real-time view of processes and system resource usage.

17.5 htop - Interactive process monitoring

`htop`

- **Description:** Interactive and visually enriched version of top (requires installation).

17.6 free - Memory usage

`free -m`

- **Description:** Displays memory usage in megabytes.
- **Options:**
 - `-g`: Display in gigabytes.
 - `-h`: Human-readable format.

17.7 dstat - Comprehensive system monitoring

`dstat`

- **Description:** Displays real-time CPU, disk, and network usage.
-

18. Troubleshooting and Logs

18.1 dmesg - Kernel ring buffer

`dmesg | grep error`

- **Description:** Filters kernel logs for "error" messages.

18.2 journalctl - Systemd logs

```
journalctl -u nginx.service
```

- **Description:** Shows logs related to the nginx service.

18.3 lsof - List open files

```
lsof -i :80
```

- **Description:** Lists processes using port 80.

18.4 strace - Trace system calls

```
strace -c ls
```

- **Description:** Tracks and summarizes system calls made by the ls command.

18.5 tcpdump - Network packet analyzer

```
sudo tcpdump -i eth0 port 80
```

- **Description:** Captures network traffic on port 80 for the eth0 interface.

18.6 netstat - Network connections

```
netstat -tuln
```

- **Description:** Lists all listening ports and established connections.

18.7 ss - View network sockets

```
ss -tuln
```

- **Description:** Displays listening TCP and UDP ports.

19. Advanced Scripting

19.1 Functions in Shell Scripts

```
#!/bin/bash
greet() {
    echo "Hello, $1!"
}
greet "World"
```

- **Description:** Demonstrates a function that greets the given input.

19.2 Array Handling

```
#!/bin/bash
arr=("apple" "banana" "cherry")
for fruit in "${arr[@]"; do
    echo "Fruit: $fruit"
done
```

- **Description:** Iterates through an array and prints each element.

19.3 Reading User Input

```
#!/bin/bash
read -p "Enter your name: " name
echo "Welcome, $name!"
```

- **Description:** Prompts the user for input and prints a welcome message.
-

20. Development Tools

20.1 gcc - Compile C programs

```
gcc -o hello hello.c
```

- **Description:** Compiles hello.c into an executable named hello.

20.2 make - Build automation

```
make
```

- **Description:** Executes the build process defined in a Makefile.

20.3 git - Version control

```
git clone https://github.com/example/repo.git
```

- **Description:** Clones a Git repository from the specified URL.
 - **Other Commands:**
 - git add file: Stage changes.
 - git commit -m "message": Commit staged changes.
-

21. Scheduling and Automation

21.1 cron - Schedule recurring tasks

- **Setup a Cron Job:**

```
crontab -e
```

- **Example Cron Entry:**

```
javascript
Copy code
0 2 * * * /path/to/script.sh
```

- **Description:** Runs script.sh every day at 2:00 AM.

21.2 at - Schedule a one-time task

```
echo "shutdown -h now" | at 10:00 PM
```

- **Description:** Schedules a system shutdown at 10:00 PM.
-

22. File Synchronization

22.1 rsync - Synchronize files/directories

```
rsync -av /source/ /destination/
```

- **Description:** Synchronizes /source/ with /destination/.
 - **Options:**
 - -a: Archive mode.
 - -v: Verbose output.
-

23. Containers and Virtualization

23.1 docker - Manage Docker containers

```
docker run -d -p 8080:80 nginx
```

- **Description:** Runs an NGINX container and maps port 8080 to the container's port 80.

23.2 kubectl - Manage Kubernetes clusters

```
kubectl get pods
```

- **Description:** Lists all running pods in the Kubernetes cluster.
-

24. Miscellaneous

24.1 alias - Create command shortcuts

```
alias ll='ls -la'
```

- **Description:** Defines ll as an alias for ls -la.

24.2 time - Measure command execution time

```
time ls
```

- **Description:** Measures how long the ls command takes to execute.

24.3 uptime - System uptime

```
uptime
```

- **Description:** Displays how long the system has been running.

5. Cloud and DevOps Tools

25.1 AWS CLI

```
aws s3 ls s3://my-bucket
```

- **Description:** Lists all objects in the my-bucket S3 bucket.

- **Other Examples:**

- Upload file: `aws s3 cp file.txt s3://my-bucket/`
- Download file: `aws s3 cp s3://my-bucket/file.txt ./`

25.2 Terraform

`terraform init`

- **Description:** Initializes a Terraform working directory.
- **Other Commands:**
 - `terraform plan`: Previews infrastructure changes.
 - `terraform apply`: Applies infrastructure changes.

25.3 Kubernetes (kubectl)

`kubectl describe pod my-pod`

- **Description:** Shows detailed information about my-pod.

25.4 Docker

`docker build -t my-app .`

- **Description:** Builds a Docker image named my-app from the current directory.
-

26. Advanced File Handling

26.1 xargs - Execute commands on input

`cat files.txt | xargs rm`

- **Description:** Reads file names from files.txt and deletes them.

26.2 tee - Redirect and output simultaneously

`echo "Logging this message" | tee log.txt`

- **Description:** Writes "Logging this message" to the terminal and log.txt.

26.3 split - Split large files

`split -b 10M largefile part_`

- **Description:** Splits largefile into 10MB chunks named part_aa, part_ab, etc.
-

27. Compression and Archiving

27.1 xz - Compress files with high compression

`xz file.txt`

- **Description:** Compresses file.txt into file.txt.xz.

27.2 7z - Compress files using 7-zip

`7z a archive.7z file.txt`

- **Description:** Compresses file.txt into a .7z archive.
-

28. Network Monitoring

28.1 nmap - Network scanner

`nmap -sV 192.168.1.1`

- **Description:** Scans the host at 192.168.1.1 for open ports and services.

28.2 dig - Query DNS records

`dig example.com`

- **Description:** Fetches DNS information for example.com.
-

29. User Management

29.1 id - Show user ID and group ID

`id`

- **Description:** Displays the current user's UID and GID.

29.2 groupadd - Add a new group

`sudo groupadd developers`

- **Description:** Creates a new group named developers.

29.3 groups - Show groups for a user

`groups username`

- **Description:** Lists all groups the username belongs to.
-

30. Security

30.1 gpg - Encrypt and decrypt files

- **Encrypt a file:**

`gpg -c file.txt`

- **Decrypt a file:**

`gpg file.txt.gpg`

30.2 fail2ban - Prevent brute-force attacks

```
sudo fail2ban-client status
```

- **Description:** Shows the status of the fail2ban service.
-

31. Process Management (Advanced)

31.1 nice - Set process priority

```
nice -n 10 ./script.sh
```

- **Description:** Runs script.sh with a lower priority (nice value of 10).

31.2 renice - Adjust priority of a running process

```
renice -n -5 -p 1234
```

- **Description:** Sets process 1234 to a higher priority (-5).
-

32. System Troubleshooting

32.1 uptime

```
uptime -p
```

- **Description:** Shows the system uptime in a human-readable format.

32.2 iotop - Monitor disk I/O usage

```
sudo iotop
```

- **Description:** Displays real-time disk I/O by processes.
-

33. Time and Date

33.1 date - Display or set the date

```
date "+%Y-%m-%d %H:%M:%S"
```

- **Description:** Displays the current date and time in the specified format.

33.2 timedatectl - Manage system time

```
timedatectl set-time "2024-01-01 10:00:00"
```

- **Description:** Sets the system date and time.
-

34. System Backup

34.1 rsync - Sync files and directories

```
rsync -avz /source /backup/
```

- **Description:** Backs up /source to /backup with compression (-z).
-

35. Miscellaneous

35.1 uptime - System uptime

uptime

- **Description:** Displays the time since the system last booted.

35.2 bc - Command-line calculator

echo "10+5" | bc

- **Description:** Performs basic arithmetic.

35.3 yes - Auto-answer prompts

yes | sudo apt upgrade

- **Description:** Automatically confirms all prompts with "yes."

36. Advanced Utilities

36.1 watch - Run a command periodically

watch -n 2 ls -lh

- **Description:** Runs ls -lh every 2 seconds and displays the output.

36.2 alias - Create command shortcuts

alias ll='ls -la'

- **Description:** Defines ll as a shortcut for ls -la.

36.3 unalias - Remove an alias

unalias ll

- **Description:** Removes the ll alias.

36.4 locate - Quickly find files

locate myfile.txt

- **Description:** Searches for myfile.txt using a pre-built file database.

36.5 updatedb - Update the locate database

sudo updatedb

- **Description:** Refreshes the database used by locate.
-

37. Disk Management

37.1 fdisk - Partition a disk

```
sudo fdisk /dev/sda
```

- **Description:** Opens a menu to create, modify, or delete partitions on /dev/sda.

37.2 parted - Advanced partitioning tool

```
sudo parted /dev/sdb mklabel gpt
```

- **Description:** Creates a new GPT partition table on /dev/sdb.

37.3 lsblk - List information about block devices

```
lsblk -f
```

- **Description:** Displays a tree view of block devices and their filesystems.

37.4 mkfs - Create a filesystem

```
sudo mkfs.ext4 /dev/sdb1
```

- **Description:** Formats /dev/sdb1 with the ext4 filesystem.

37.5 mount - Mount a filesystem

```
sudo mount /dev/sdb1 /mnt/data
```

- **Description:** Mounts /dev/sdb1 to /mnt/data.

37.6 umount - Unmount a filesystem

```
sudo umount /mnt/data
```

- **Description:** Unmounts /mnt/data.
-

38. System Diagnostics

38.1 uptime - System load and uptime

```
uptime
```

- **Description:** Displays system uptime and load averages.

38.2 dmesg - Kernel log messages

```
dmesg | tail -20
```

- **Description:** Shows the last 20 kernel messages.

38.3 sar - Performance statistics

```
sar -r 1 5
```

- **Description:** Displays memory usage over 5 intervals.

38.4 lsof - List open files

```
sudo lsof /path/to/file
```

- **Description:** Shows processes that have the specified file open.

38.5 iotop - Monitor disk I/O usage

```
sudo iotop
```

- **Description:** Displays real-time disk I/O by processes.
-

39. Performance Optimization

39.1 sysctl - Modify kernel parameters

```
sudo sysctl -w net.ipv4.ip_forward=1
```

- **Description:** Enables IP forwarding.

39.2 nice - Set priority for a command

```
nice -n 10 ./script.sh
```

- **Description:** Runs script.sh with a lower CPU priority.

39.3 renice - Change priority of a running process

```
renice -n 5 -p 1234
```

- **Description:** Adjusts the priority of process ID 1234 to 5.
-

40. Backup and Restore

40.1 tar - Archive files

```
tar -czvf backup.tar.gz /path/to/directory
```

- **Description:** Archives and compresses a directory into backup.tar.gz.

40.2 rsync - Sync files

```
rsync -avz /source/ /destination/
```

- **Description:** Synchronizes files between /source and /destination.

40.3 scp - Securely copy files

```
scp file.txt user@remote:/path/
```

- **Description:** Copies file.txt to a remote server.

40.4 dd - Create a disk image

```
dd if=/dev/sda of=/backup/disk.img bs=4M
```

- **Description:** Backs up the /dev/sda disk to an image file.

41. Advanced Networking

41.1 ip - Manage network interfaces

`ip a`

- **Description:** Displays all network interfaces and IP addresses.

41.2 netcat (nc) - Debug network connections

`nc -zv 192.168.1.1 22`

- **Description:** Checks if port 22 is open on 192.168.1.1.