
SYSTEM MONITORING & COMPRESSION

Usage, Options, and Sample Outputs

PART 1 — SYSTEM MONITORING COMMANDS

System monitoring commands are used to check disk space, memory usage, CPU load, and system performance. These commands are very important for system administrators and Linux users to maintain system health.

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1. df — Disk Filesystem Usage

df = Disk Filesystem

This command shows how much disk space is used and available on all mounted file systems.

Used when:

- Disk is full
- Monitoring server storage
- Checking available space

Basic Usage

df

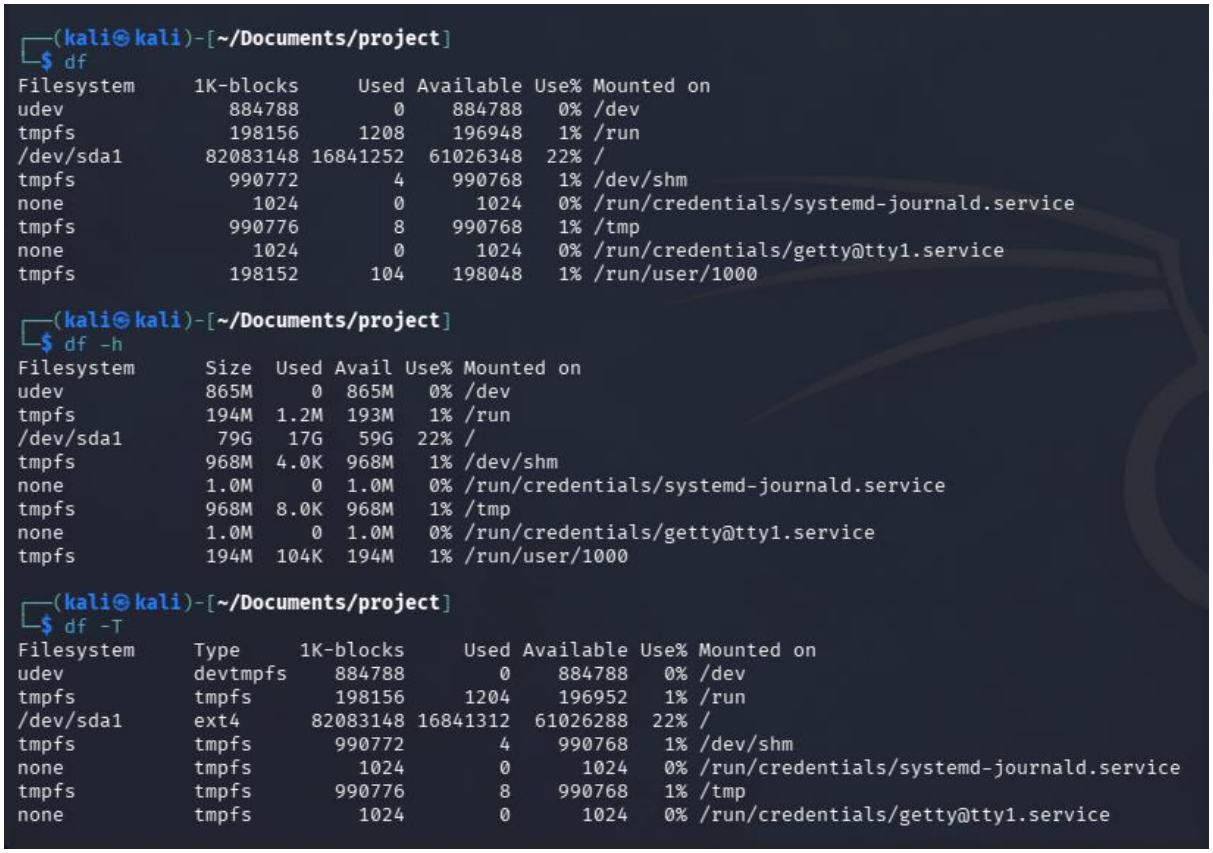
Options

- df -h → Human readable format (KB, MB, GB)
- df -T → Show filesystem type
- df -h /home → Check specific directory space

Related Commands

- du -sh * → Check folder sizes
- lsblk → Show disks and partitions

Sample Output



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2. du — Disk Usage of Files/Folders

du = Disk Usage

Shows how much space files and folders are using.

Difference:

- df → total disk usage
- du → file/folder usage

Basic Usage

du

Options

- du -h → Human readable
- du -sh → Total size of current folder
- du -h * → Size of each folder
- du -sh /home/user → Specific directory size

Combined Commands

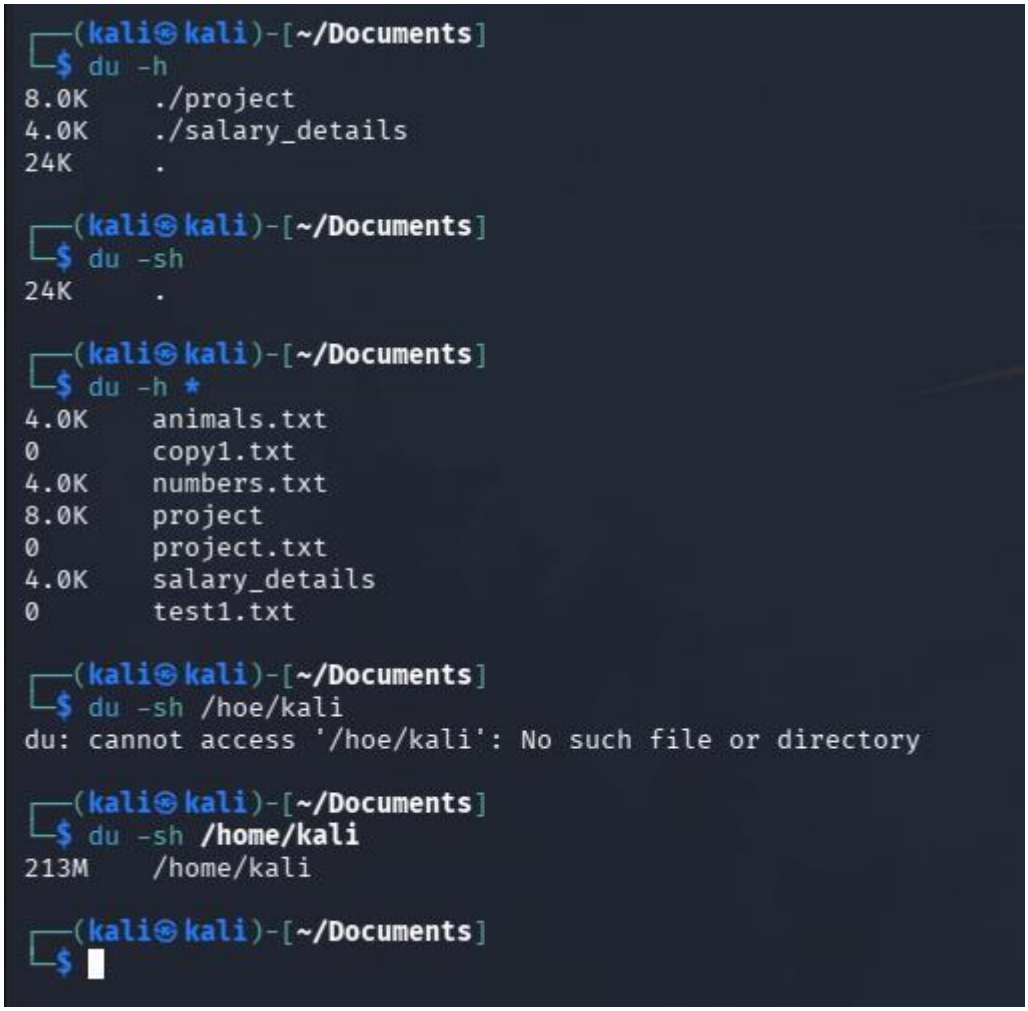
du -h | sort -h

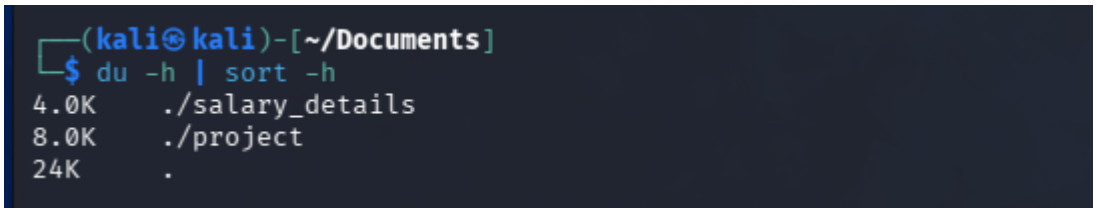
Sort folders by size.

du -ah | sort -rh | head -10

Show top 10 largest files.

Sample Output





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3. free — Memory (RAM) Usage

Shows RAM usage, free memory, and swap memory.

Used when:

- System slow

- Applications crash
- High RAM usage

Basic Usage

free

Options

- free -h → Human readable
- free -m → Show in MB
- free -g → Show in GB
- free -s 2 → Refresh every 2 seconds

Sample Output

[Insert Screenshot Here – free command output]

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4. uptime — System Running Status

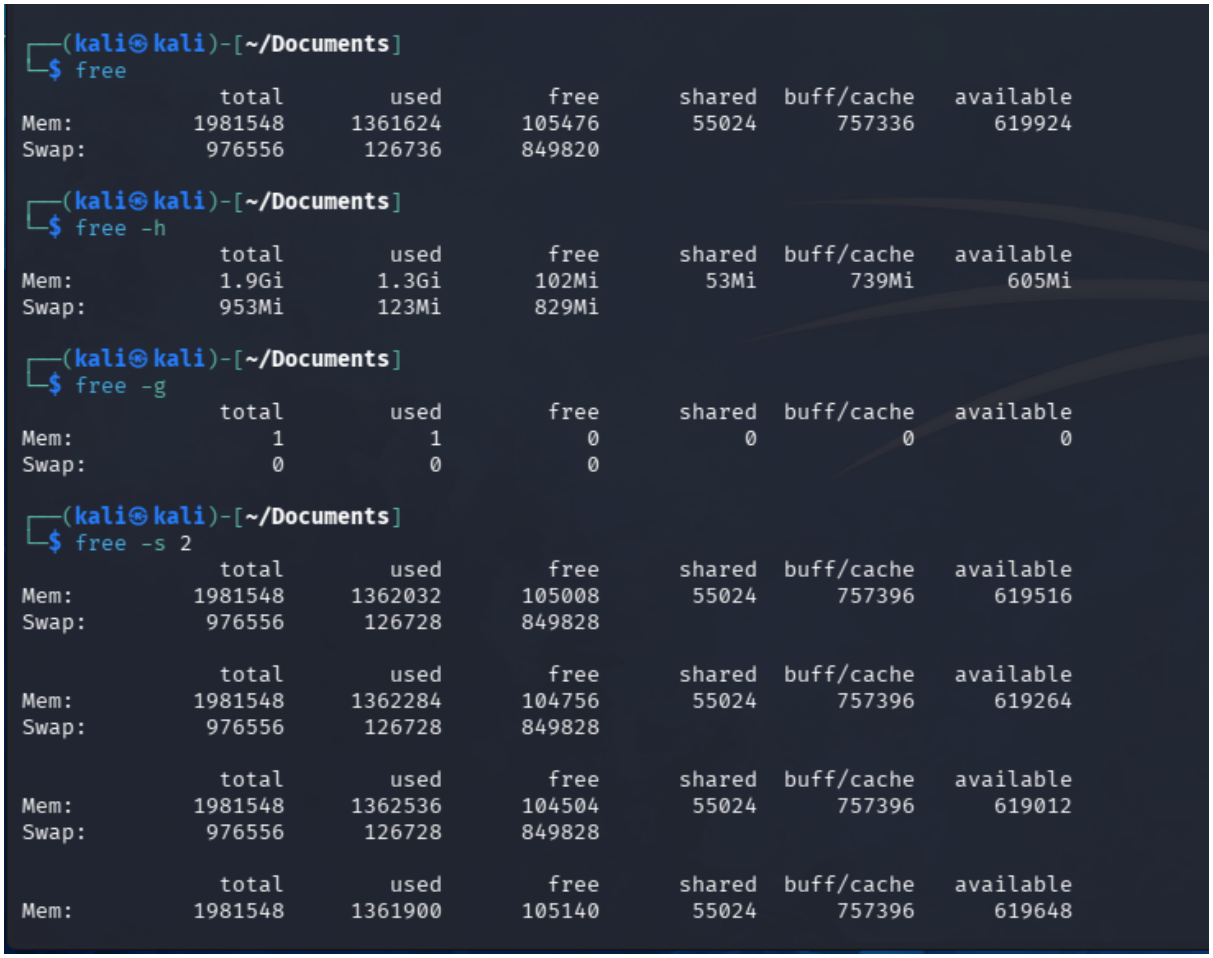
Shows:

- How long system is running
- Number of logged-in users
- CPU load average

Usage

uptime

Sample Output



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5. vmstat — Virtual Memory Statistics

Displays virtual Memory statistics ,system performance including:

- CPU usage
- Memory usage
- Processes
- I/O activity

Usage

vmstat

Live Monitoring

vmstat 2

(refresh every 2 seconds)

Sample Output

```
┌──(kali㉿kali)-[~/Documents]
└─$ vmstat
procs -----------memory---------- ---swap-- -----io---- -system-- -------cpu-------
 r  b   swpd   free   buff  cache   si   so    bi    bo   in   cs us sy id wa st gu
 1  0 126720  99380  27268 730220    0    1    15    22  322    1  0  1 99  0  0  0

┌──(kali㉿kali)-[~/Documents]
└─$ vmstat 2
procs -----------memory---------- ---swap-- -----io---- -system-- -------cpu-------
 r  b   swpd   free   buff  cache   si   so    bi    bo   in   cs us sy id wa st gu
 0  0 126672 107520  27468 730240    0    1    15    22  322    1  0  1 99  0  0  0
 0  0 126672 107428  27476 730240    0    0     0    28  601  739  0  1 99  0  0  0
 0  0 126672 107176  27476 730240    0    0     0     0  335  431  0  0 99  0  0  0
 0  0 126672 107176  27476 730240    0    0     0     0  431  517  1  1 97  0  0  0
 0  0 126672 107176  27476 730244    0    0     0     0  386  476  1  1 99  0  0  0
 0  0 126672 107176  27476 730244    0    0     0     0  305  393  0  1 99  0  0  0
^C
```

Daily Commands Used by System Administrator

These commands are commonly used daily for monitoring:

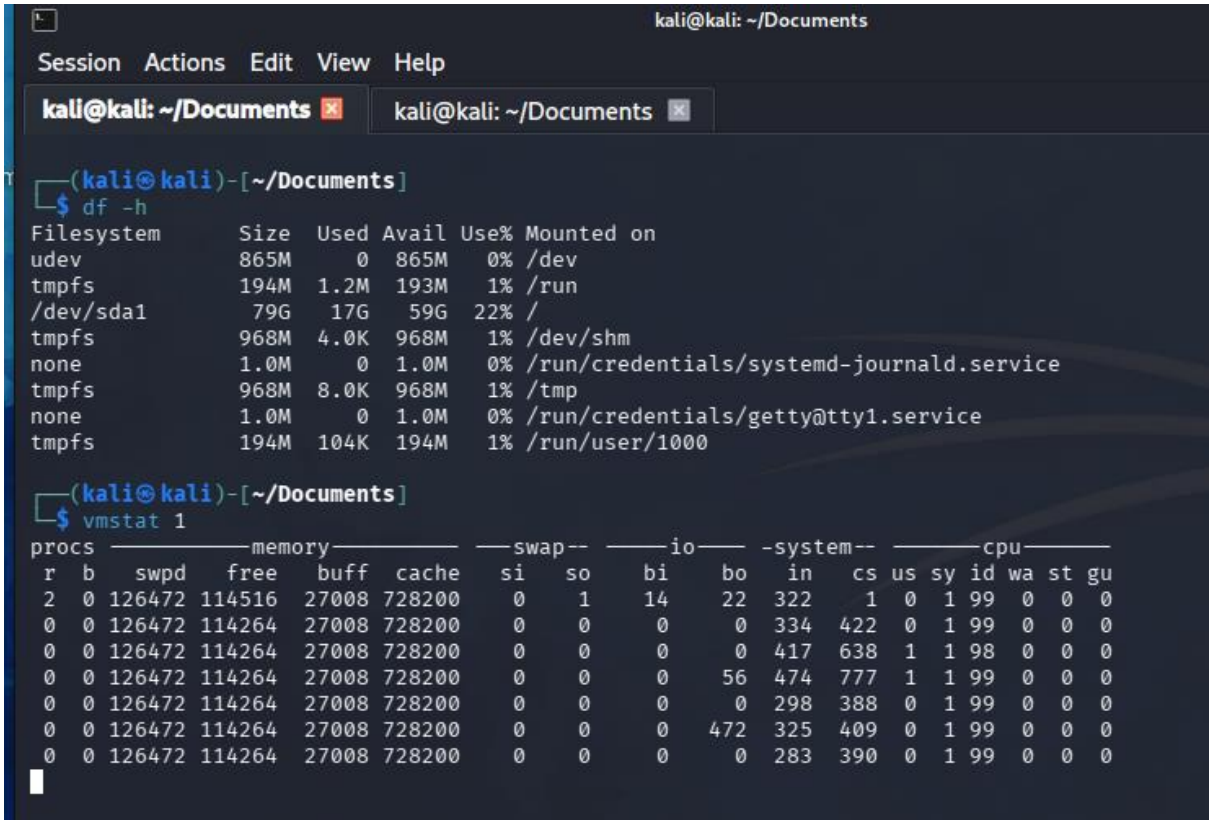
df -h → Check disk space

du -sh /* → Find large folders

free -h → Check RAM

uptime → Check system load

vmstat 1 → Deep monitoring



PART 2 — COMPRESSION & ARCHIVING

Compression reduces file size.
Archiving combines multiple files into one.

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1. tar — Archive Files

tar = Tape Archive

Used to combine multiple files/folders into a single file.

Extension: .tar

Note: tar only archives. It does not compress unless gzip/bzip2 is used.

Usage

tar -cvf archive.tar files/

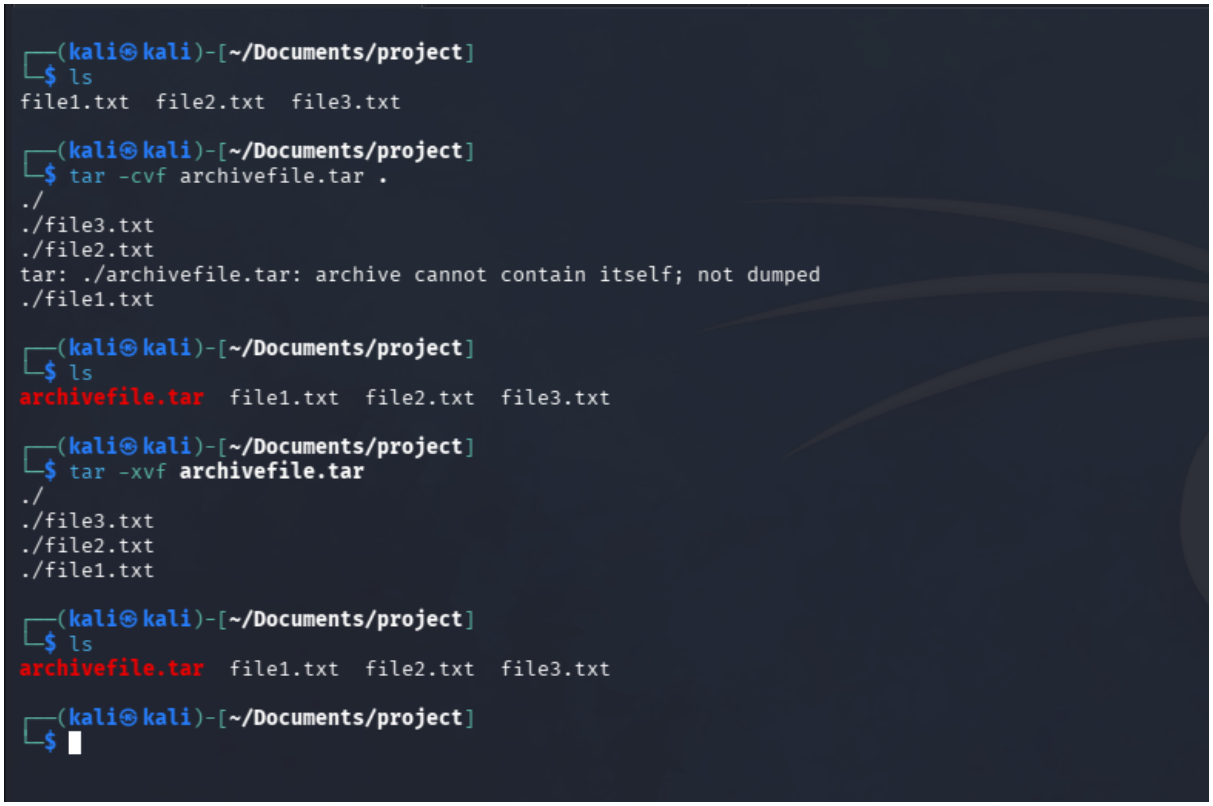
Options

- -c → Create archive
- -v → Verbose (show process)
- -f → File name

Extract

tar -xvf archive.tar

Sample Output



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2. gzip — Compress File

Compresses a file and reduces its size.

Extension: .gz

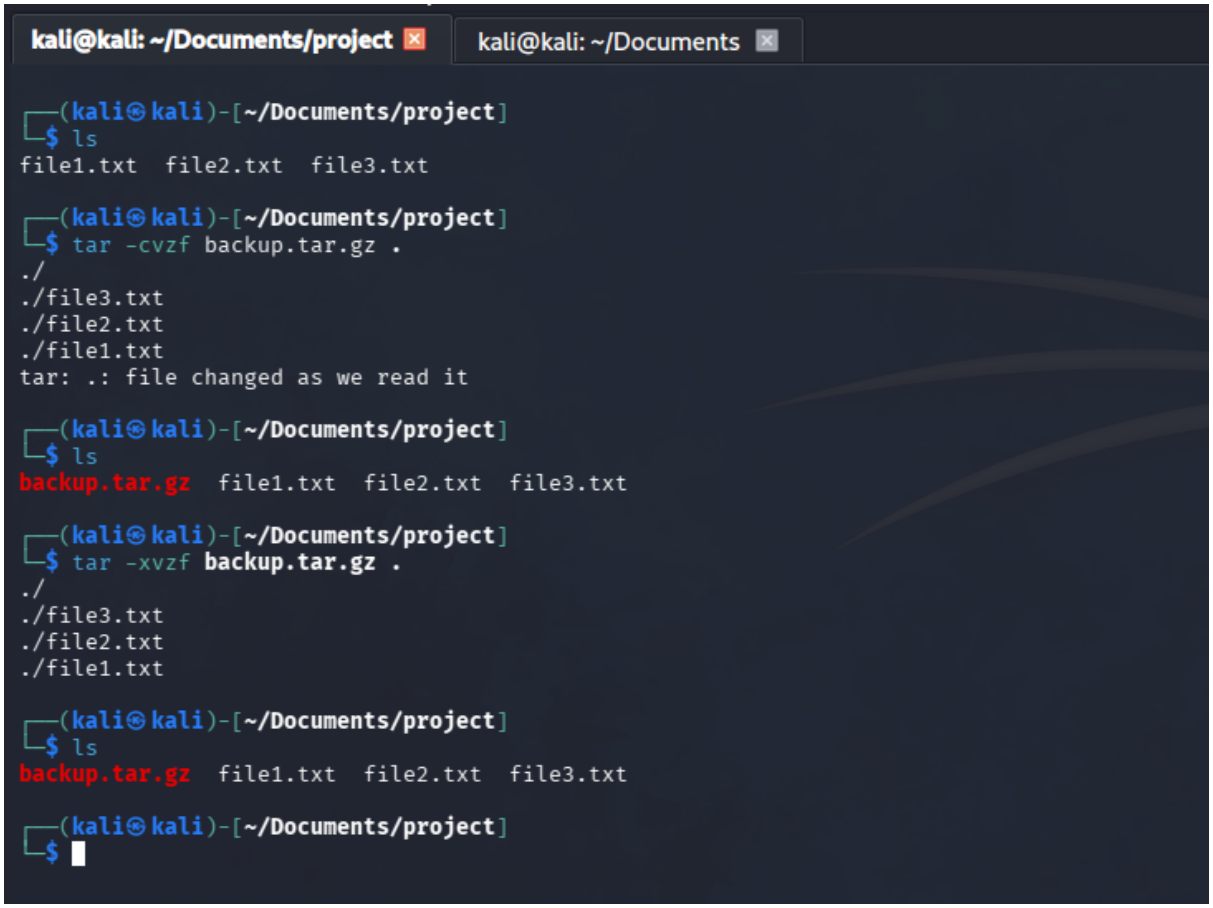
Usage

gzip filename

Decompress

gunzip filename.gz

Sample Output



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3. bzip2 — Better Compression

Provides higher compression than gzip but slower.

Extension: .bz2

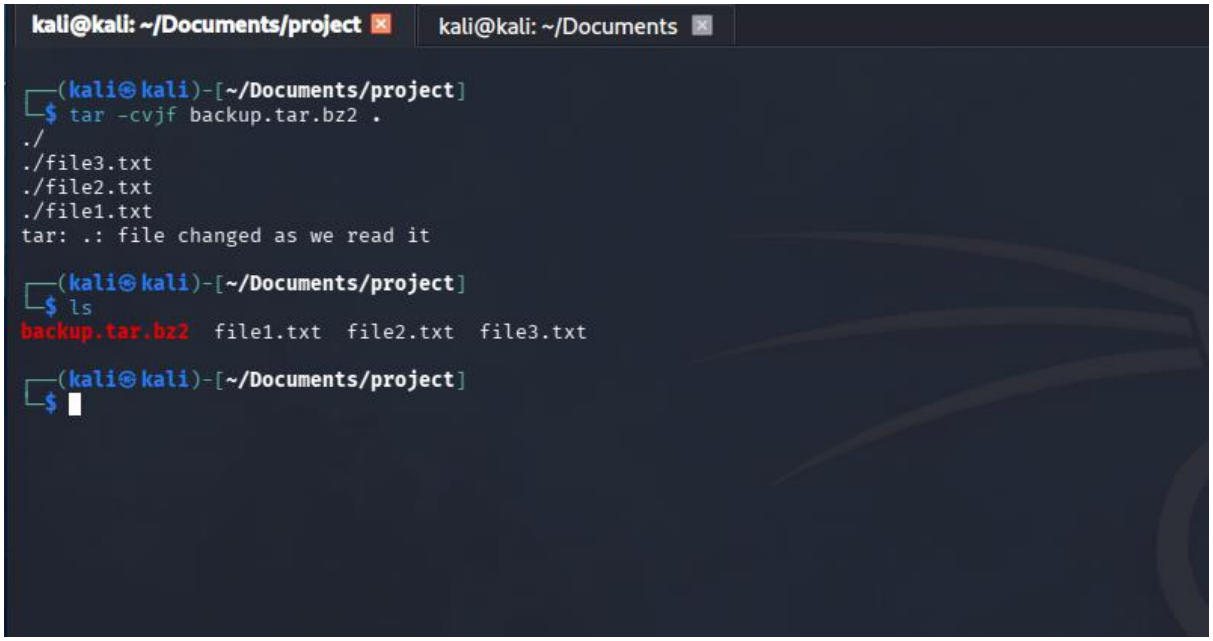
Usage

bzip2 filename

Decompress

bunzip2 filename.bz2

Sample Output



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4. zip — Create Zip File

Used to compress and archive files together.

Extension: .zip

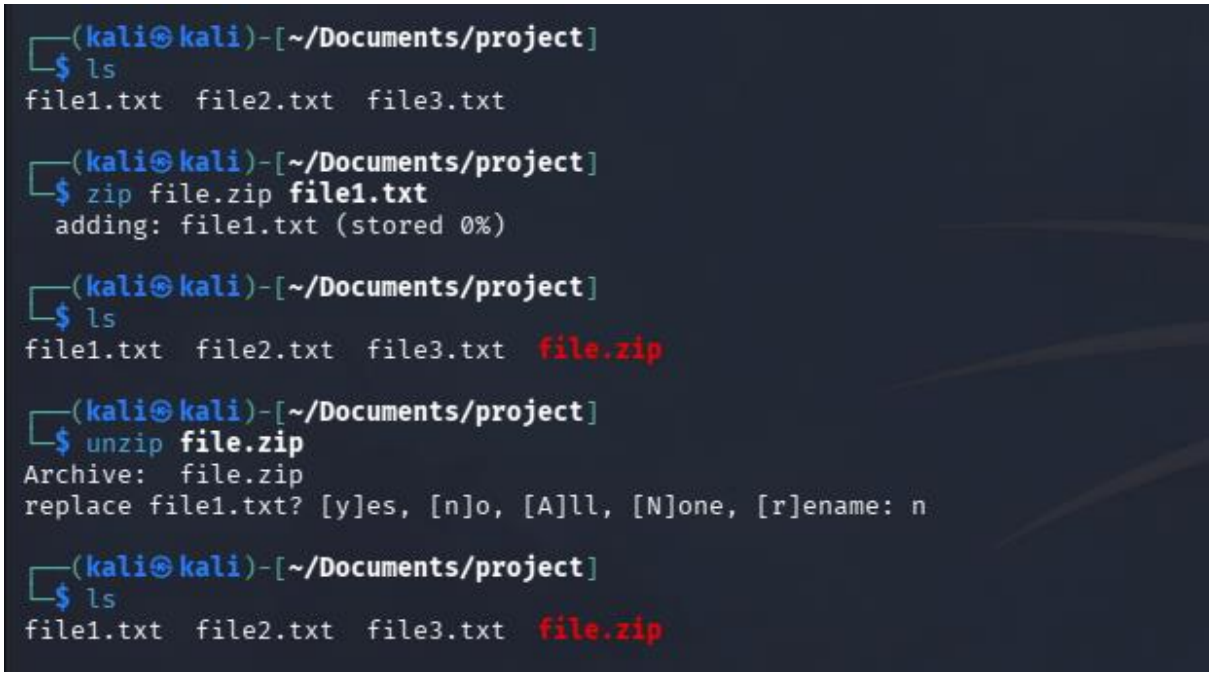
Usage

zip archive.zip file1 file2

Zip folder

zip -r archive.zip folder/

Sample Output



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5. unzip — Extract Zip File

Extract files from a zip archive.

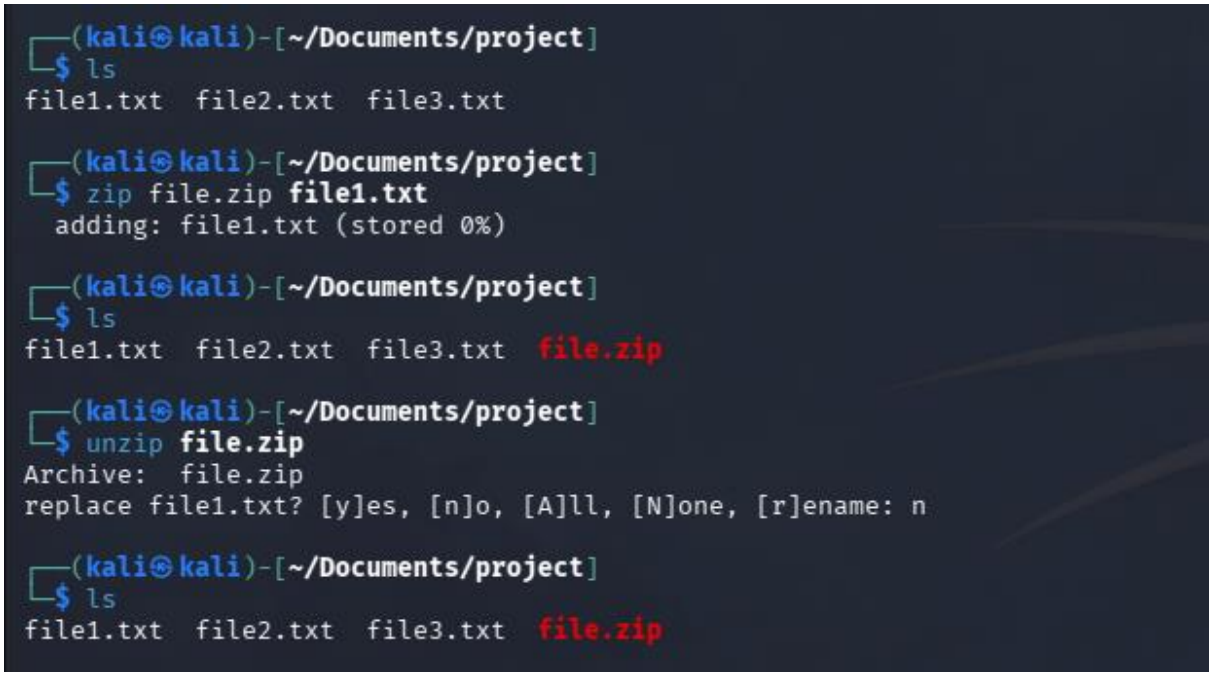
Usage

unzip archive.zip

Extract to specific folder

unzip archive.zip -d /home/user/

Sample Output



Conclusion

System monitoring commands help in checking disk, memory, CPU, and system performance.
Compression and archiving commands help reduce file size and manage multiple files efficiently.

These commands are essential for:

- System administrators
- Linux users
- Server management
- Performance troubleshooting
