

[Linux Essential Operations] (CheatSheet)

1. File and Directory Operations

- List Files and Directories: `ls`
- Change Directory: `cd /path/to/directory`
- Print Working Directory: `pwd`
- Create a New Directory: `mkdir directory_name`
- Remove a Directory: `rmdir directory_name`
- Create a New File: `touch filename`
- Copy Files or Directories: `cp source destination`
- Move or Rename Files or Directories: `mv source destination`
- Delete Files: `rm filename`
- Delete Directories and Their Contents: `rm -r directory_name`

2. File Viewing and Manipulation

- Display File Content: `cat filename`
- Display the Beginning of Files: `head filename`
- Display the End of Files: `tail filename`
- Page Through Text Files: `less filename`
- Edit Files (using nano editor): `nano filename`
- Edit Files (using vi/vim editor): `vi/vim filename`
- Search Text Within Files: `grep 'search_string' filename`
- Find and Replace Text in File (using sed): `sed -i 's/original/replacement/g' filename`
- Count Words, Lines, and Characters: `wc filename`
- awk for Pattern Scanning and Processing: `awk '/pattern/ {action}' file`
- sed for Stream Editing: `sed 's/old/new/g' file`
- join for Joining Lines on a Common Field: `join file1 file2`

3. Permissions and Ownership

- Change File/Directory Permissions: `chmod permissions filename`
- Change File/Directory Ownership: `chown user:group filename`

- **Change Group Ownership:** `chgrp group filename`
- **View File Permissions and Ownership:** `ls -l filename`
- **umask for Setting Default Permissions:** `umask 022`
- **setfacl for Setting File ACLs:** `setfacl -m u:username:rwX filename`

4. Process Management

- **Display Active Processes:** `ps`
- **Display Active Processes (detailed):** `ps aux`
- **Kill a Process by PID:** `kill pid`
- **Kill a Process by Name:** `pkill process_name`
- **Start a Process in the Background:** `command &`
- **Bring a Background Process to Foreground:** `fg`
- **Stop a Process Temporarily:** `Ctrl + Z`

5. System Information and Performance Monitoring

- **Display Current Date and Time:** `date`
- **Display Disk Usage:** `df`
- **Display Disk Space Used by Directory:** `du /path/to/directory`
- **Display Memory Usage:** `free`
- **Monitor System Activity (real-time):** `top` or `htop`
- **Display System Information:** `uname -a`
- **Display Kernel Version:** `uname -r`
- **Display CPU Information:** `lscpu`
- **Display PCI Devices:** `lspci`

6. Networking

- **Display Network Configuration:** `ifconfig`
- **Ping a Host to Check Connectivity:** `ping hostname_or_ip`
- **Display Routing Table:** `route`
- **Network Scanning and Host Discovery:** `nmap ip_address`
- **Download Files from the Internet:** `wget url`
- **Transfer Files Over SSH:** `scp source user@host:destination`

7. Package Management (Debian-based systems)

- **Update Package Index:** `sudo apt update`
- **Upgrade Packages:** `sudo apt upgrade`
- **Install a Package:** `sudo apt install package_name`
- **Remove a Package:** `sudo apt remove package_name`
- **Search for a Package:** `apt search keyword`

8. Package Management (RPM-based systems)

- **Update Package Index:** `sudo yum check-update`
- **Upgrade Packages:** `sudo yum update`
- **Install a Package:** `sudo yum install package_name`
- **Remove a Package:** `sudo yum remove package_name`
- **Search for a Package:** `yum search keyword`

9. File Compression and Archiving

- **Compress Files (tar):** `tar czvf archive_name.tar.gz /path/to/directory`
- **Extract Files (tar):** `tar xzvf archive_name.tar.gz`
- **Compress Files (zip):** `zip -r archive_name.zip /path/to/directory`
- **Extract Files (unzip):** `unzip archive_name.zip`

10. Text Processing

- **Sort Lines in Text:** `sort filename`
- **Compare Two Files:** `diff file1 file2`
- **Merge Lines of Two Files:** `paste file1 file2`
- **Display Line Numbers:** `nl filename`
- **Cut Portions of Each Line:** `cut -d'delimiter' -f fields filename`

11. Disk and File System Management

- **Check Disk Space:** `df -h`
- **Check Inode Usage:** `df -i`
- **Display Mounted File Systems:** `mount | column -t`
- **Check File System Disk Space Usage:** `du -sh`
- **Format a File System:** `mkfs -t ext4 /dev/sdxn`
- **Check and Repair a File System:** `fsck /dev/sdxn`

12. User and Group Management

- **Add a New User:** `useradd username`
- **Delete a User:** `userdel username`
- **Change User Password:** `passwd username`
- **Add a New Group:** `groupadd groupname`
- **Delete a Group:** `groupdel groupname`
- **Add User to Group:** `usermod -aG groupname username`
- **usermod for Modifying User Account:** `usermod -aG groupname username`
- **groupadd for Adding a New Group:** `groupadd groupname`
- **groupdel for Deleting a Group:** `groupdel groupname`
- **groups for Displaying User Groups:** `groups username`
- **id for User Identification:** `id username`

13. System Services and Daemons

- **Start a Service:** `systemctl start service_name`
- **Stop a Service:** `systemctl stop service_name`
- **Restart a Service:** `systemctl restart service_name`
- **Enable a Service to Start on Boot:** `systemctl enable service_name`
- **Disable a Service from Starting on Boot:** `systemctl disable service_name`
- **Check Service Status:** `systemctl status service_name`

14. System Logs and Monitoring

- **Display System Log Messages:** `dmesg`
- **Tail a Log File:** `tail -f /var/log/syslog`
- **Search Through Log Files:** `grep 'search_term' /var/log/filename`
- **Monitor System Logs in Real-time:** `journalctl -f`

15. Security and Permissions

- **Add User to sudoers:** `usermod -aG sudo username`
- **Generate SSH Keys:** `ssh-keygen -t rsa -b 4096`
- **Set up a Firewall with UFW:** `ufw enable` and `ufw allow 22/tcp`

16. SSH and Remote Connection

- **SSH to a Remote Server:** `ssh user@hostname`
- **Copy Files Over SSH:** `scp file user@hostname:/path`
- **SSH Port Forwarding:** `ssh -L local_port:remote_address:remote_port user@ssh_server`
- **Terminate an SSH Session:** `exit`

17. Scripting and Automation

- **Executing a Shell Script:** `bash script.sh`
- **Setting Up a Cron Job:** `crontab -e`
- **Running a Command at a Specific Time:** `at now + 5 minutes -f script.sh`
- **Writing Bash Scripts:** `#!/bin/bash` at the start of scripts
- **Making Scripts Executable:** `chmod +x script.sh`
- **Running Scripts at Specific Times with Cron:** `0 * * * * /path/to/script.sh`

18. Disk and Storage Management

- **List Block Devices:** `lsblk`
- **Display Disk Usage:** `du -h`
- **Monitor Disk I/O:** `iostat`
- **Create a Swap File:** `fallocate -l 1G /swapfile`
- **Mount a File System:** `mount /dev/sdxn /mnt/directory`

19. Networking and Firewalls

- **Display Network Interfaces:** `ip addr show`
- **Scan Network Ports:** `nmap -sT localhost`
- **Display Open Network Connections:** `netstat -tuln`
- **Configure IP Tables (Firewall):** `iptables -L`
- **Network Packet Capture (sniffing):** `tcpdump -i eth0`

20. Text Processing and Analysis

- **awk for Text Processing:** `awk '{print $1}' filename`

- **sed for Stream Editing:** `sed 's/old/new/g' filename`
- **tr for Character Transformation:** `tr '[:lower:]' '[:upper:]' < filename`
- **uniq for Uniqueness in Text Lines:** `sort filename | uniq`
- **diff for File Differences:** `diff file1 file2`
- **patch for Applying Differences:** `patch < diff_file`

21. Archive and Compression

- **tar for Archiving Files:** `tar cvf archive_name.tar directory/`
- **gzip for Compression:** `gzip filename`
- **gunzip for Decompression:** `gunzip filename.gz`
- **zip for ZIP Archiving:** `zip archive_name.zip files`
- **unzip for Extracting ZIP Archives:** `unzip archive_name.zip`

22. Disk and Partition Management

- **fdisk for Disk Partitioning:** `fdisk /dev/sdx`
- **mkfs for Making File Systems:** `mkfs -t ext4 /dev/sdxn`
- **e2fsck for File System Checking:** `e2fsck /dev/sdxn`
- **mount for Mounting File Systems:** `mount /dev/sdxn /mnt/point`
- **umount for Unmounting File Systems:** `umount /mnt/point`
- **df for Disk Space of File Systems:** `df -h`
- **du for Disk Usage of Files and Directories:** `du -sh /path/to/dir`

23. Process Monitoring and Control

- **ps for Active Processes:** `ps aux`
- **top for Real-time Process Monitoring:** `top`
- **htop for Interactive Process Monitoring:** `htop`
- **kill for Killing Processes:** `kill pid`
- **killall for Killing Processes by Name:** `killall processname`
- **nohup for Running Commands Persistently:** `nohup command &`
- **nice for Setting Process Priority:** `nice -n 19 command`
- **renice for Changing Process Priority:** `renice 19 -p pid`

24. SSH and Remote Management

- **ssh for Remote Login:** `ssh user@hostname`
- **scp for Secure Copy over SSH:** `scp local_file user@hostname:/remote/path`
- **sftp for Secure File Transfer:** `sftp user@hostname`
- **ssh-keygen for SSH Key Generation:** `ssh-keygen -t rsa`
- **ssh-copy-id for Copying SSH Key to Server:** `ssh-copy-id user@hostname`

25. System Services and Job Scheduling

- **service for Managing Services:** `service nginx start`
- **systemctl for Systemd Management:** `systemctl status nginx`
- **crontab for Scheduling Cron Jobs:** `crontab -e`
- **at for One-time Scheduled Jobs:** `echo "command" | at now + 2 hours`

26. Monitoring and Performance

- **vmstat for Virtual Memory Statistics:** `vmstat 1`
- **iostat for Input/Output Statistics:** `iostat`
- **lsof for Open Files and Ports:** `lsof -i`
- **strace for System Call Tracing:** `strace -p pid`
- **netstat for Network Statistics:** `netstat -tulnp`
- **ss for Socket Statistics:** `ss -tuln`

27. System Information and Hardware Details

- **uname for System Information:** `uname -a`
- **lscpu for CPU Architecture Information:** `lscpu`
- **lsblk for Block Devices Information:** `lsblk`
- **lsmem for Memory Information:** `lsmem`
- **lsusb for USB Devices Information:** `lsusb`
- **lspci for PCI Devices Information:** `lspci`
- **hwinfo for Detailed Hardware Information:** `hwinfo --short`

28. Logs and Auditing

- **tail for Viewing Log Files:** `tail -f /var/log/syslog`
- **journalctl for Systemd Logs:** `journalctl -u nginx`

- **dmesg for Kernel Messages:** `dmesg | grep something`
- **auditd for Auditing System Events:** `auditctl -l`

29. Backup and Restore

- **rsync for File Transfer and Synchronization:** `rsync -av /source/ /destination/`
- **dd for Disk Cloning and Backup:** `dd if=/dev/sdx of=/dev/sdy`
- **tar for Archiving and Backup:** `tar cvzf backup.tar.gz /important/data`
- **restore for Restoring Files from Backup:** `restore -if backup.tar.gz`

30. Virtualization and Containers

- **docker for Managing Containers:** `docker run image_name`
- **docker-compose for Multi-container Docker Applications:** `docker-compose up`
- **virsh for Managing KVM/QEMU Virtual Machines:** `virsh list --all`
- **virt-manager for Virtual Machine Management:** `virt-manager`

31. Security and Encryption

- **openssl for SSL/TLS Operations:** `openssl s_client -connect example.com:443`
- **gpg for Encryption and Signing:** `gpg --encrypt --recipient 'name' file`
- **fail2ban for Intrusion Prevention:** `fail2ban-client status sshd`

32. Custom Commands and Aliases

- **Creating Aliases for Commonly Used Commands:** `alias ll='ls -la'`
- **Creating Functions in .bashrc or .bash_profile:** `function extract() { tar xvf $1; }`

33. Performance Tuning and Kernel Parameters

- **sysctl for Runtime Kernel Parameters:** `sysctl -a`
- **tuned for System Tuning Profiles:** `tuned-adm active`

34. Networking and Troubleshooting

- **ifconfig** for Configuring Network Interfaces: `ifconfig eth0`
- **iwconfig** for Configuring Wireless Networks: `iwconfig wlan0`
- **dhclient** for Obtaining IP Address via DHCP: `dhclient eth0`
- **traceroute** for Tracing Network Path: `traceroute url_to_website`
- **nslookup** for DNS Querying: `nslookup url_to_website`
- **host** for DNS Lookup: `host url_to_website`
- **dig** for DNS Lookup and Diagnosis: `dig url_to_website`
- **iptables** for Firewall Configuration: `iptables -L -n -v`
- **ip** for Advanced IP Addressing and Routing: `ip addr add 192.168.1.5 dev eth0`
- **traceroute** for Tracing Network Path: `traceroute url_to_website`
- **curl** for URL Transfer: `curl -O url_to_website`
- **wget** for Non-interactive Download: `wget url_to_website`