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REALTIME PROJECTS PLATFORM



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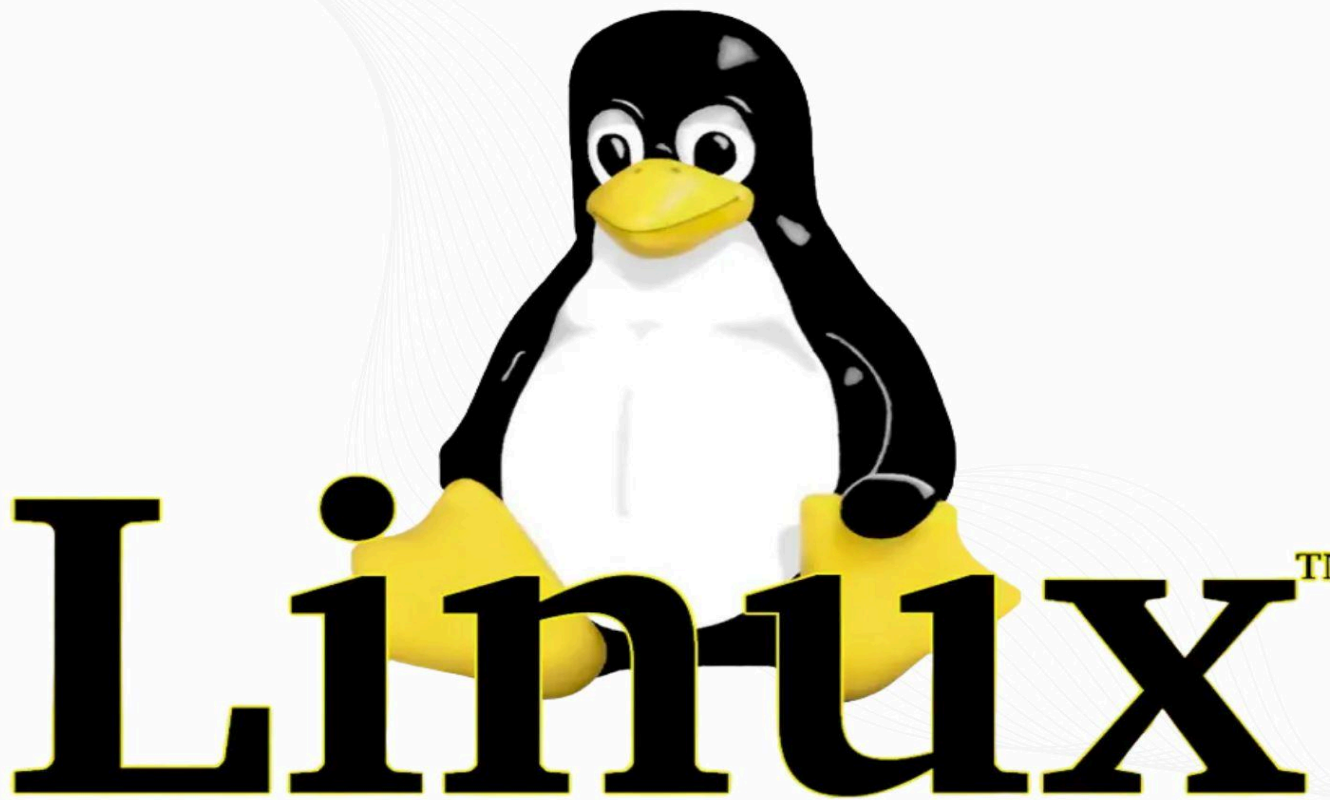


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Interview Questions Part 1





Question 1: What is the difference between a Hard Link and a Soft Link in Linux?

1. Question:

What is the difference between a Hard Link and a Soft Link in Linux?

2. Answer:

- **Hard Link:** A hard link is a mirror copy of the original file. It shares the same inode number as the original file. Deleting the original file doesn't affect the hard link.
- **Soft Link (Symbolic Link):** A soft link is more like a shortcut that points to the original file. It has a different inode number and if the original file is deleted, the soft link becomes broken (dangling link).

3. What Skills Required to Prepare This Question:

- Understanding of Linux file systems and inodes
- Basic knowledge of file linking mechanisms
- Command-line proficiency (e.g., `ln` command)

4. How to Study This Question:

- Study the Linux file system structure and inode concepts
- Practice creating hard and soft links using commands (`ln`, `ln -s`)
- Experiment by deleting original files and observing the behavior of links

5. Examples for This Question:

Unset

```
# Create a file
touch file1.txt

# Create a hard link
ln file1.txt file1_hardlink.txt

# Create a soft link
ln -s file1.txt file1_softlink.txt

# Check inodes
ls -li
```

Question 2: How do you check disk usage in Linux?

1. Question:

How do you check disk usage in Linux?



2. **Answer:**

You can use the following commands:

- **df -h**: Displays disk space usage in a human-readable format.
- **du -sh /path/to/directory**: Shows disk usage of a specific directory.
- **lsblk**: Lists block devices and their mount points.
- **ncdu**: An interactive disk usage analyzer.

3. **What Skills Required to Prepare This Question:**

- Familiarity with Linux command-line tools
- Understanding of file systems and storage
- Ability to interpret disk usage data

4. **How to Study This Question:**

- Practice using the disk usage commands
- Learn how to interpret the output (e.g., understanding mounted partitions)
- Study different disk file systems and how Linux handles storage

5. **Examples for This Question:**

Unset

```
# Check overall disk usage
df -h
```

```
# Check usage of a specific directory
du -sh /var/log
```

```
# List block devices
lsblk
```

```
# Use ncdu for interactive analysis
ncdu /home
```

Question 3: Explain the Linux boot process.

1. **Question:**

Explain the Linux boot process.

2. **Answer:**

The Linux boot process consists of several stages:

- **BIOS/UEFI**: Initializes hardware and finds the boot loader.
- **Boot Loader (GRUB/LILO)**: Loads the kernel into memory.
- **Kernel**: Initializes system components and mounts the root file system.
- **init/systemd**: Starts system processes and services.



- **Login:** Presents the login prompt or GUI.
- 3. **What Skills Required to Prepare This Question:**
 - In-depth understanding of Linux architecture
 - Familiarity with boot loaders (GRUB, LILO)
 - Knowledge of system initialization (init/systemd)
- 4. **How to Study This Question:**
 - Study the Linux boot process flow and components
 - Practice troubleshooting boot issues (e.g., GRUB errors)
 - Learn systemd and init commands for service management
- 5. **Examples for This Question:**

Unset

```
# View boot log
dmesg | less

# Check systemd boot process
systemctl list-units --type=service

# Edit GRUB configuration
sudo nano /etc/default/grub
sudo update-grub
```

Question 4: How do you manage services in Linux?

1. **Question:**
How do you manage services in Linux?
2. **Answer:**
Service management in Linux depends on the init system:
 - **systemd-based systems (modern Linux distros):**
 - Start a service: `systemctl start service_name`
 - Stop a service: `systemctl stop service_name`
 - Enable service at boot: `systemctl enable service_name`
 - Check status: `systemctl status service_name`
 - **SysVinit-based systems (older distros):**
 - Start a service: `service service_name start`
 - Stop a service: `service service_name stop`
 - Check status: `service service_name status`



3. What Skills Required to Prepare This Question:

- Knowledge of Linux service management systems (systemd, SysVinit)
- Experience with command-line tools for service control
- Understanding of startup scripts and runlevels

4. How to Study This Question:

- Practice starting, stopping, and enabling services using `systemctl` and `service` commands
- Learn the differences between systemd and SysVinit
- Understand how to debug failed services using logs (`journalctl`)

5. Examples for This Question:

Unset

```
# Start and enable Apache service
```

```
sudo systemctl start apache2
```

```
sudo systemctl enable apache2
```

```
# Check the status of SSH service
```

```
systemctl status ssh
```

```
# View logs for a service
```

```
journalctl -u apache2
```

Question 5: What are file permissions in Linux and how do you modify them?

1. Question:

What are file permissions in Linux and how do you modify them?

2. Answer:

Linux file permissions are divided into three types:

- **Read (r):** Allows reading the contents of a file or listing a directory.
- **Write (w):** Allows modifying the contents of a file or directory.
- **Execute (x):** Allows executing a file or accessing a directory.



3. Permissions are assigned to:

- **User (u):** Owner of the file
- **Group (g):** Users who belong to the file's group
- **Others (o):** All other users

4. Modify permissions using:

- `chmod` to change permissions
- `chown` to change ownership
- `chgrp` to change group ownership

5. What Skills Required to Prepare This Question:

- Understanding of Linux file permission model
- Proficiency in using permission-related commands (`chmod`, `chown`, `chgrp`)
- Knowledge of numeric (e.g., `755`) and symbolic (e.g., `u+x`) permission notation

6. How to Study This Question:

- Practice changing file and directory permissions
- Study permission representation (`rwxr-xr--`)
- Learn how special permissions (SUID, SGID, Sticky bit) work

7. Examples for This Question:

Unset

```
# View file permissions
```

```
ls -l
```

```
# Grant execute permission to the user
```

```
chmod u+x script.sh
```

```
# Change file ownership to user 'john'
```

```
chown john file.txt
```

```
# Set read, write, execute for user, read and execute for group and others
```

```
chmod 755 myfile
```



Question 6: How do you schedule tasks in Linux?

1. Question:

How do you schedule tasks in Linux?

2. Answer:

Linux offers several tools for scheduling tasks:

- **cron:** For recurring tasks
 - List cron jobs: `crontab -l`
 - Edit cron jobs: `crontab -e`
 - Cron syntax: `* * * * * /path/to/command`
- **at:** For one-time tasks
 - Schedule a task: `echo "command" | at 10:00 AM`
 - List scheduled tasks: `atq`
- **systemd timers:** Advanced scheduling using systemd

3. What Skills Required to Prepare This Question:

- Familiarity with cron and at syntax
- Understanding of systemd timers
- Basic shell scripting for scheduled tasks

4. How to Study This Question:

- Practice setting up cron jobs for various intervals
- Use `at` to schedule one-time tasks
- Explore systemd timers for complex scheduling needs

5. Examples for This Question:

Unset

```
# Schedule a cron job to run every day at 2 AM
```

```
crontab -e
```

```
# Add the following line
```

```
0 2 * * * /path/to/script.sh
```

```
# Schedule a one-time task with at
```

```
echo "backup.sh" | at 11:30 PM
```




```
# View existing cron jobs  
crontab -l
```

Question 7: How do you check running processes in Linux?

1. Question:

How do you check running processes in Linux?

2. Answer:

You can check running processes using the following commands:

- **ps**: Lists running processes.
 - Example: **ps aux** shows all processes.
- **top**: Real-time display of running processes and system resource usage.
- **htop**: An enhanced version of **top** with a user-friendly interface.
- **pgrep**: Searches for processes by name.
- **pstree**: Displays processes in a tree-like format.

3. What Skills Required to Prepare This Question:

- Familiarity with Linux process management
- Proficiency in using process-related commands
- Understanding of process IDs (PIDs) and parent-child relationships

4. How to Study This Question:

- Practice using process monitoring commands
- Study how to interpret CPU and memory usage in **top** and **htop**
- Learn to filter and search for specific processes using **pgrep** and **grep**

5. Examples for This Question:

Unset

```
# List all processes  
ps aux
```




```
# Display real-time processes
```

```
top
```

```
# Use htop (if installed)
```

```
htop
```

```
# Find the PID of nginx
```

```
pgrep nginx
```

```
# Display processes as a tree
```

```
pstree
```

Question 8: How do you manage users and groups in Linux?

1. Question:

How do you manage users and groups in Linux?

2. Answer:

Linux provides commands for user and group management:

- **User Management:**

- Add a user: `useradd username`
- Delete a user: `userdel username`
- Modify a user: `usermod`
- Set password: `passwd username`

- **Group Management:**

- Add a group: `groupadd groupname`
- Delete a group: `groupdel groupname`
- Add user to a group: `usermod -aG groupname username`

- User and group information is stored in `/etc/passwd`, `/etc/group`, and `/etc/shadow`.

3. What Skills Required to Prepare This Question:



- Understanding of Linux user and group management
- Familiarity with permission models and file ownership
- Proficiency with related command-line tools

4. How to Study This Question:

- Practice adding, modifying, and deleting users and groups
- Study the structure of `/etc/passwd` and `/etc/group`
- Learn how to set and manage user permissions

5. Examples for This Question:

Unset

```
# Add a new user
```

```
sudo useradd john
```

```
# Set a password for the user
```

```
sudo passwd john
```

```
# Add user to the 'sudo' group
```

```
sudo usermod -aG sudo john
```

```
# List users
```

```
cat /etc/passwd
```

```
# List groups
```

```
cat /etc/group
```

Question 9: How do you secure a Linux server?

1. Question:

How do you secure a Linux server?



2. Answer:

Securing a Linux server involves several best practices:

- **User and Access Control:**
 - Use strong passwords and SSH keys
 - Disable root login over SSH (/etc/ssh/sshd_config)
- **Firewall and Network Security:**
 - Configure firewall using `ufw` or `iptables`
 - Close unused ports
- **Updates and Patching:**
 - Regularly update the system (`apt update && apt upgrade` or `yum update`)
- **Intrusion Prevention:**
 - Use tools like `fail2ban` to block malicious IPs
- **File Permissions and SELinux/AppArmor:**
 - Set correct file permissions
 - Enforce security policies using SELinux or AppArmor

3. What Skills Required to Prepare This Question:

- Knowledge of Linux security principles
- Familiarity with firewalls and intrusion prevention tools
- Experience with user and file permission management

4. How to Study This Question:

- Practice setting up firewalls (`ufw`, `iptables`)
- Learn how to harden SSH and manage access control
- Study SELinux/AppArmor basics and how to apply security policies

5. Examples for This Question:

Unset

```
# Enable UFW firewall
```

```
sudo ufw enable
```

```
sudo ufw allow ssh
```

```
# Disable root login over SSH
```

```
sudo nano /etc/ssh/sshd_config
```

```
# Set PermitRootLogin no
```

```
sudo systemctl restart sshd
```



```
# Install and configure fail2ban  
  
sudo apt install fail2ban  
  
sudo systemctl enable fail2ban
```

Question 10: How do you monitor system performance in Linux?

1. Question:

How do you monitor system performance in Linux?

2. Answer:

You can monitor system performance using several built-in and third-party tools:

- **CPU and Memory Usage:**
 - `top` / `htop`: Real-time system performance
 - `vmstat`: Reports memory, CPU, and process statistics
- **Disk I/O:**
 - `iostat`: Monitors disk I/O performance
 - `iotop`: Displays real-time disk usage by processes
- **Network Usage:**
 - `iftop`: Real-time network traffic
 - `nload`: Shows network traffic in and out
- **System-wide Monitoring:**
 - `sar`: Collects and reports system activity
 - `dstat`: Versatile tool for various system resources

3. What Skills Required to Prepare This Question:

- Understanding of system resource management
- Familiarity with Linux performance monitoring tools
- Ability to interpret system metrics for troubleshooting

4. How to Study This Question:

- Practice using monitoring tools in different system load scenarios
- Learn how to analyze performance bottlenecks
- Study how to optimize system resources based on monitoring data



5. Examples for This Question:

Unset

Real-time CPU and memory usage

top

View disk I/O statistics

iostat

Check network traffic

iftop

Overall system performance

vmstat 5

Install and use htop

sudo apt install htop

htop

Question 11: How do you configure a firewall in Linux?

1. Question:

How do you configure a firewall in Linux?

2. Answer:

There are multiple tools to configure firewalls in Linux:

- **UFW (Uncomplicated Firewall):**

- Enable UFW: `sudo ufw enable`



- Allow SSH: `sudo ufw allow ssh`
 - Check status: `sudo ufw status`
 - **iptables:**
 - View rules: `sudo iptables -L`
 - Allow traffic on port 80: `sudo iptables -A INPUT -p tcp --dport 80 -j ACCEPT`
 - Save rules: `sudo iptables-save > /etc/iptables/rules.v4`
 - **firewalld:**
 - Start firewalld: `sudo systemctl start firewalld`
 - Allow service: `sudo firewall-cmd --permanent --add-service=http`
 - Reload rules: `sudo firewall-cmd --reload`
3. **What Skills Required to Prepare This Question:**
- Knowledge of Linux firewall tools (UFW, iptables, firewalld)
 - Understanding of networking concepts (ports, protocols)
 - Familiarity with security best practices
4. **How to Study This Question:**
- Practice setting up firewalls using UFW and iptables
 - Study how to open/close ports and create rules
 - Understand common firewall policies and configurations
5. **Examples for This Question:**

Unset

UFW example

```
sudo ufw enable
```

```
sudo ufw allow 22/tcp
```

```
sudo ufw status
```

iptables example

```
sudo iptables -A INPUT -p tcp --dport 443 -j ACCEPT
```

```
sudo iptables -L
```

firewalld example

```
sudo firewall-cmd --zone=public --add-port=8080/tcp --permanent
```



```
sudo firewall-cmd --reload
```

Question 12: How do you mount and unmount file systems in Linux?

1. Question:

How do you mount and unmount file systems in Linux?

2. Answer:

Mounting and unmounting file systems can be done using the following commands:

- **Mount a file system:**
 - `mount /dev/sdX1 /mnt/mydisk`
- **Unmount a file system:**
 - `umount /mnt/mydisk`
- **View mounted file systems:**
 - `df -h` or `mount`
- **Mount with specific options:**
 - `mount -o ro /dev/sdX1 /mnt/mydisk` (mount as read-only)
- **Persistent Mounting:**
 - Edit `/etc/fstab` to auto-mount file systems on boot.

3. What Skills Required to Prepare This Question:

- Understanding of Linux file system structures
- Knowledge of disk partitions and devices
- Familiarity with mount options and fstab configurations

4. How to Study This Question:

- Practice mounting/unmounting drives and network shares
- Study the structure of `/etc/fstab` and mount options
- Learn to troubleshoot mount errors and permissions

5. Examples for This Question:

Unset

```
# Mount a disk
```

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

```
# Unmount a disk
```




```
sudo umount /mnt/data

# View mounted file systems

df -h

# Edit fstab for persistent mount

sudo nano /etc/fstab

# Example line

/dev/sdb1 /mnt/data ext4 defaults 0 2
```

Question 13: How do you troubleshoot network issues in Linux?

1. Question:

How do you troubleshoot network issues in Linux?

2. Answer:

Network issues can be diagnosed using several tools:

- Check Network Configuration:
 - `ifconfig` or `ip addr` to view network interfaces
 - `ip route` to check routing tables
- Test Connectivity:
 - `ping` to test connectivity to another host
 - `traceroute` or `tracert` to trace the path to a host
- Check DNS Resolution:
 - `nslookup` or `dig` to verify DNS resolution
- Check Open Ports and Services:
 - `netstat -tuln` or `ss -tuln` to list listening ports
 - `lsof -i` to see which processes are using network ports
- Analyze Network Traffic:
 - `tcpdump` or `wireshark` for packet capture and analysis

3. What Skills Required to Prepare This Question:



- Understanding of networking fundamentals (IP, DNS, routing)
- Proficiency with Linux networking tools
- Ability to diagnose and resolve connectivity and performance issues

4. How to Study This Question:

- Practice using networking commands in different scenarios
- Study how to interpret traceroute and packet captures
- Simulate network issues and practice troubleshooting

5. Examples for This Question:

Unset

```
# Check network interfaces
```

```
ip addr
```

```
# Test connectivity to google.com
```

```
ping google.com
```

```
# Trace the path to a remote host
```

```
traceroute google.com
```

```
# Check DNS resolution
```

```
dig openai.com
```

```
# Capture network traffic on eth0
```

```
sudo tcpdump -i eth0
```

Question 14: How do you manage disk space in Linux?

1. Question:

How do you manage disk space in Linux?



2. Answer:

Disk space management involves monitoring usage, cleaning up files, and managing partitions:

- **Check Disk Usage:**
 - `df -h` to display disk space usage
 - `du -sh /path/to/directory` to check directory size
- **Find Large Files:**
 - `find / -type f -size +500M` to locate files over 500MB
- **Clean Up Space:**
 - Remove unused files and logs
 - Use `logrotate` to manage log file sizes
- **Manage Partitions:**
 - `fdisk` or `parted` for partition management
 - `resize2fs` or `xfs_growfs` to resize file systems

3. What Skills Required to Prepare This Question:

- Knowledge of Linux file systems and partitions
- Familiarity with disk monitoring and cleanup tools
- Understanding of file system resizing and disk optimization

4. How to Study This Question:

- Practice monitoring and managing disk space
- Learn how to safely clean up system logs and temporary files
- Study partitioning tools and file system resizing techniques

5. Examples for This Question:

Unset

```
# Check overall disk usage
```

```
df -h
```

```
# Check disk usage in a specific directory
```

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

```
# Find large files over 1GB
```

```
find / -type f -size +1G
```



```
# Manage partitions

sudo fdisk /dev/sdb


# Resize ext4 file system

sudo resize2fs /dev/sdb1
```

Question 15: How do you create and manage symbolic and hard links in Linux?

1. Question:

How do you create and manage symbolic and hard links in Linux?

2. Answer:

Linux supports two types of links:

○ Hard Links:

- Point directly to the inode of a file
- Cannot span across file systems
- Created using: `ln source_file link_name`

○ Symbolic (Soft) Links:

- Point to the path of the target file
- Can link directories and cross file systems
- Created using: `ln -s source_file link_name`

3. Managing Links:

- Use `ls -l` to view links (`l` indicates a symbolic link)
- Use `readlink` to display the target of a symlink
- Remove links with `rm link_name`

4. What Skills Required to Prepare This Question:

- Understanding of Linux file system structures and inodes
- Familiarity with `ln` and link management commands
- Knowledge of differences and use cases for hard and symbolic links

5. How to Study This Question:

- Practice creating and managing both types of links
- Study how links behave when the source file is moved or deleted
- Understand the implications of using links in scripts and applications

6. Examples for This Question:



Unset

```
# Create a hard link
```

```
ln original.txt hardlink.txt
```

```
# Create a symbolic link
```

```
ln -s /var/www/html website_link
```

```
# View links
```

```
ls -l
```

```
# Check the target of a symlink
```

```
readlink website_link
```

```
# Remove a link
```

```
rm hardlink.txt
```

Question 16: How do you set up a cron job in Linux?

1. **Question:**

How do you set up a cron job in Linux?

2. **Answer:**

Cron is a time-based job scheduler in Linux used to run scripts and commands at specified intervals.

- **Edit crontab:**

- `crontab -e` to edit the user's cron jobs
- `crontab -l` to list existing cron jobs
- `crontab -r` to remove all cron jobs

- **Cron Syntax:**

- `* * * * * /path/to/command`



- Format: minute hour day month day_of_week command
- **System-Wide Cron Jobs:**
 - Placed in `/etc/crontab` or `/etc/cron.d/`
- **Logs:**
 - Cron logs can be found in `/var/log/syslog` or `/var/log/cron`

3. What Skills Required to Prepare This Question:

- Understanding of cron syntax and scheduling
- Familiarity with Linux command-line tools
- Ability to debug and monitor scheduled tasks

4. How to Study This Question:

- Practice creating and managing cron jobs
- Study different cron timing examples
- Learn to troubleshoot common cron issues

5. Examples for This Question:

Unset

```
# Edit user's crontab
```

```
crontab -e
```

```
# Run a script every day at midnight
```

```
0 0 * * * /home/user/backup.sh
```

```
# List cron jobs
```

```
crontab -l
```

```
# View cron logs
```

```
tail -f /var/log/syslog | grep CRON
```

Question 17: How do you configure SSH for secure remote access?



1. **Question:**

How do you configure SSH for secure remote access?

2. **Answer:**

SSH (Secure Shell) allows secure remote login and command execution.

○ **Basic Setup:**

- Install SSH: `sudo apt install openssh-server`
- Start service: `sudo systemctl start ssh`

○ **Security Enhancements:**

- **Disable root login:**
 - Edit `/etc/ssh/sshd_config`: `PermitRootLogin no`
- **Use SSH Keys:**
 - Generate key: `ssh-keygen`
 - Copy key to server: `ssh-copy-id user@server`
- **Change default port:**
 - Edit `/etc/ssh/sshd_config`: `Port 2222`

○ **Restart SSH Service:**

- `sudo systemctl restart ssh`

3. **What Skills Required to Prepare This Question:**

- Understanding of SSH protocol and configuration
- Knowledge of Linux security best practices
- Familiarity with key-based authentication

4. **How to Study This Question:**

- Practice setting up and securing SSH connections
- Study SSH configuration options and logs
- Learn to troubleshoot common SSH issues

5. **Examples for This Question:**

Unset

```
# Install SSH server
```

```
sudo apt install openssh-server
```

```
# Generate SSH key pair
```

```
ssh-keygen
```

```
# Copy key to remote server
```




```
ssh-copy-id user@remote_server
```

```
# Edit SSH config to disable root login
```

```
sudo nano /etc/ssh/sshd_config
```

```
# Set PermitRootLogin no
```

```
# Restart SSH service
```

```
sudo systemctl restart ssh
```

Question 18: How do you manage services in Linux using systemd?

1. Question:

How do you manage services in Linux using systemd?

2. Answer:

Systemd is a system and service manager for Linux.

○ Service Management Commands:

- Start a service: `sudo systemctl start service_name`
- Stop a service: `sudo systemctl stop service_name`
- Restart a service: `sudo systemctl restart service_name`
- Enable service at boot: `sudo systemctl enable service_name`
- Disable service: `sudo systemctl disable service_name`

○ Check Service Status:

- `sudo systemctl status service_name`

○ View Logs:

- Use `journalctl: journalctl -u service_name`

3. What Skills Required to Prepare This Question:

- Understanding of systemd and service management
- Familiarity with Linux boot processes
- Ability to read and interpret system logs

4. How to Study This Question:

- Practice managing services with systemd
- Study unit files and how to create custom services



- Learn how to debug service startup issues

5. Examples for This Question:

Unset

```
# Start and enable nginx service
```

```
sudo systemctl start nginx
```

```
sudo systemctl enable nginx
```

```
# Check service status
```

```
sudo systemctl status nginx
```

```
# View service logs
```

```
journalctl -u nginx
```

```
# Disable a service
```

```
sudo systemctl disable apache2
```

Question 19: How do you set file permissions in Linux?

1. Question:

How do you set file permissions in Linux?

2. Answer:

Linux uses a permission model with three sets of permissions: user (owner), group, and others.

- **View Permissions:**

- `ls -l filename` shows permissions (e.g., `-rwxr-xr--`)

- **Change Permissions with `chmod`:**

- Symbolic Mode: `chmod u+x script.sh` (add execute for user)



- Numeric Mode: `chmod 755 script.sh`
 - 7 = read + write + execute (rwx)
 - 5 = read + execute (r-x)
 - 5 = read + execute (r-x)
 - Change Ownership with **chown**:
 - `sudo chown user:group file`
 - Change Group with **chgrp**:
 - `sudo chgrp groupname file`
3. What Skills Required to Prepare This Question:
- Understanding of Linux file permission structure
 - Familiarity with `chmod`, `chown`, and `chgrp` commands
 - Knowledge of symbolic and numeric permission modes
4. How to Study This Question:
- Practice modifying permissions on files and directories
 - Study the implications of different permission sets
 - Learn about special permissions like SUID, SGID, and sticky bits
5. Examples for This Question:

Unset

View permissions

```
ls -l file.txt
```

Give execute permission to the owner

```
chmod u+x script.sh
```

Set permissions to `rwxr-xr--`

```
chmod 754 file.txt
```

Change file ownership

```
sudo chown user1:usergroup file.txt
```



```
# Change group ownership
```

```
sudo chgrp devteam project/
```

Question 20: How do you configure NFS (Network File System) in Linux?

1. Question:

How do you configure NFS (Network File System) in Linux?

2. Answer:

NFS allows file sharing between Linux systems over a network.

○ On the NFS Server:

- Install NFS: `sudo apt install nfs-kernel-server`
- Configure exports in `/etc/exports`:
 - Example: `/shared_folder`
`192.168.1.0/24(rw,sync,no_subtree_check)`
- Apply exports: `sudo exportfs -a`
- Start NFS service: `sudo systemctl start nfs-kernel-server`

○ On the NFS Client:

- Install NFS: `sudo apt install nfs-common`
- Create mount point: `sudo mkdir /mnt/nfs_share`
- Mount share: `sudo mount server_ip:/shared_folder /mnt/nfs_share`
- Add to `/etc/fstab` for persistent mount

3. What Skills Required to Prepare This Question:

- Understanding of network file sharing protocols
- Familiarity with NFS server/client setup
- Knowledge of permissions and network security

4. How to Study This Question:

- Practice setting up NFS on a local network
- Study export options and security considerations
- Learn to troubleshoot common NFS issues

5. Examples for This Question:

Unset

```
# On NFS server - configure exports
```



```
echo "/srv/nfs 192.168.1.0/24(rw,sync,no_subtree_check)" | sudo tee -a /etc/exports
```

```
sudo exportfs -a
```

```
sudo systemctl restart nfs-kernel-server
```

```
# On NFS client - mount the share
```

```
sudo mkdir /mnt/nfs_share
```

```
sudo mount 192.168.1.10:/srv/nfs /mnt/nfs_share
```

```
# Verify mount
```

```
df -h | grep nfs
```

Question 21: How do you manage users and groups in Linux?

1. Question:

How do you manage users and groups in Linux?

2. Answer:

Linux provides several commands to manage users and groups:

○ Create User:

- `sudo useradd -m username` (creates user with home directory)
- Set password: `sudo passwd username`

○ Modify User:

- `sudo usermod -aG groupname username` (add user to a group)
- `sudo usermod -s /bin/bash username` (change default shell)

○ Delete User:

- `sudo userdel -r username` (removes user and home directory)

○ Manage Groups:

- Create group: `sudo groupadd groupname`
- Delete group: `sudo groupdel groupname`
- Change group ownership: `sudo chgrp groupname file`

3. What Skills Required to Prepare This Question:



- Understanding of Linux user/group management
- Familiarity with system permissions and file ownership
- Knowledge of user security policies

4. How to Study This Question:

- Practice creating, modifying, and deleting users/groups
- Study `/etc/passwd` and `/etc/group` files
- Learn to manage user permissions and roles

5. Examples for This Question:

Unset

```
# Create a new user with a home directory
```

```
sudo useradd -m john
```

```
# Set user password
```

```
sudo passwd john
```

```
# Add user to sudo group
```

```
sudo usermod -aG sudo john
```

```
# Create a new group
```

```
sudo groupadd developers
```

```
# Add user to the developers group
```

```
sudo usermod -aG developers john
```

```
# Delete user and their home directory
```

```
sudo userdel -r john
```



Question 22: How do you monitor system performance in Linux?

1. Question:

How do you monitor system performance in Linux?

2. Answer:

Linux provides several tools to monitor system performance:

- **CPU and Memory Usage:**
 - `top` or `htop` for real-time system monitoring
 - `vmstat` for system performance statistics
- **Disk Usage and I/O:**
 - `df -h` for disk space usage
 - `iostat` for disk I/O statistics
 - `du -sh /path/to/directory` for directory size
- **Network Monitoring:**
 - `iftop` or `nload` for real-time network traffic
 - `netstat` or `ss` for active connections
- **System Logs:**
 - View logs in `/var/log/` (e.g., `syslog`, `dmesg`)
- **Advanced Monitoring:**
 - Use tools like `sar`, `glances`, or `nmon` for comprehensive monitoring

3. What Skills Required to Prepare This Question:

- Familiarity with Linux performance monitoring tools
- Understanding of system resources (CPU, memory, disk, network)
- Ability to interpret performance metrics

4. How to Study This Question:

- Practice using system monitoring commands
- Study performance bottlenecks and their resolutions
- Learn to set up alerts and log monitoring

5. Examples for This Question:

Unset

```
# Monitor CPU and memory
```

```
top
```

```
# Display disk usage
```




```
df -h
```

```
# Check disk I/O
```

```
iostat
```

```
# Monitor network traffic
```

```
iftop
```

```
# View system logs
```

```
tail -f /var/log/syslog
```

Question 23: How do you configure a firewall in Linux using iptables or firewalld?

1. Question:

How do you configure a firewall in Linux using iptables or firewalld?

2. Answer:

Linux firewalls can be configured using `iptables` or `firewalld`.

○ Using firewalld:

- Start/enable firewalld: `sudo systemctl enable --now firewalld`
- Check status: `sudo firewall-cmd --state`
- Allow a port: `sudo firewall-cmd --permanent --add-port=80/tcp`
- Reload firewall: `sudo firewall-cmd --reload`

○ Using iptables:

- Allow traffic on port 22 (SSH): `sudo iptables -A INPUT -p tcp --dport 22 -j ACCEPT`
- Drop all other incoming traffic: `sudo iptables -P INPUT DROP`
- List rules: `sudo iptables -L -v`
- Save rules: `sudo iptables-save > /etc/iptables/rules.v4`

3. What Skills Required to Prepare This Question:

- Understanding of network security and firewall principles



- Familiarity with `iptables` and `firewalld` commands
- Knowledge of ports, protocols, and traffic filtering

4. How to Study This Question:

- Practice configuring firewalls in a safe environment
- Study different rule sets and their implications
- Learn to troubleshoot connectivity issues caused by firewall rules

5. Examples for This Question:

Unset

```
# Using firewalld - allow HTTP traffic
```

```
sudo firewall-cmd --permanent --add-service=http
```

```
sudo firewall-cmd --reload
```

```
# Using iptables - allow SSH traffic
```

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

```
# Block all incoming traffic except SSH
```

```
sudo iptables -P INPUT DROP
```

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

```
# View iptables rules
```

```
sudo iptables -L -v
```

Question 24: How do you configure RAID in Linux?

1. Question:

How do you configure RAID in Linux?

2. Answer:

RAID (Redundant Array of Independent Disks) improves performance and redundancy.



- **Install mdadm:**
 - `sudo apt install mdadm`
- **Create RAID Array:**
 - Example for RAID 1 (mirroring):
`sudo mdadm --create --verbose /dev/md0 --level=1 --raid-devices=2 /dev/sd[b-c]`
- **Check RAID Status:**
 - `cat /proc/mdstat`
 - `sudo mdadm --detail /dev/md0`
- **Create File System and Mount:**
 - `sudo mkfs.ext4 /dev/md0`
 - `sudo mount /dev/md0 /mnt/raid`
- **Save Configuration:**
 - `sudo mdadm --detail --scan | sudo tee -a /etc/mdadm/mdadm.conf`
 - Update initramfs: `sudo update-initramfs -u`

3. What Skills Required to Prepare This Question:

- Understanding of RAID levels and their use cases
- Familiarity with `mdadm` and disk management tools
- Knowledge of redundancy and performance optimization

4. How to Study This Question:

- Practice setting up different RAID levels
- Study the pros and cons of various RAID configurations
- Learn how to handle disk failures and RAID recovery

5. Examples for This Question:

Unset

```
# Install mdadm
```

```
sudo apt install mdadm
```

```
# Create RAID 1 array
```

```
sudo mdadm --create --verbose /dev/md0 --level=1 --raid-devices=2 /dev/sdb /dev/sdc
```

```
# Check RAID status
```

```
cat /proc/mdstat
```



```
sudo mdadm --detail /dev/md0

# Format and mount RAID

sudo mkfs.ext4 /dev/md0

sudo mount /dev/md0 /mnt/raid
```

Question 25: How do you troubleshoot network issues in Linux?

1. Question:

How do you troubleshoot network issues in Linux?

2. Answer:

Linux offers several tools to diagnose and troubleshoot network problems:

- **Check Network Interfaces:**
 - `ip addr` or `ifconfig` to view IP addresses
 - `ip link` to view network interface status
- **Test Connectivity:**
 - `ping google.com` to check external connectivity
 - `ping 8.8.8.8` to check DNS issues
- **Check Routing and DNS:**
 - `ip route` or `route -n` to view routing tables
 - `cat /etc/resolv.conf` to check DNS configuration
- **Analyze Network Traffic:**
 - `netstat -tuln` or `ss -tuln` to list open ports
 - `tcpdump` or `wireshark` for packet analysis
- **Check Firewall Rules:**
 - `sudo iptables -L -v` or `sudo firewall-cmd --list-all`

3. What Skills Required to Prepare This Question:

- Understanding of network protocols (TCP/IP, DNS, etc.)
- Familiarity with Linux networking tools
- Ability to interpret network diagnostics

4. How to Study This Question:

- Practice diagnosing real-world network issues
- Study network troubleshooting flowcharts



- Learn common causes of network failures in Linux

5. Examples for This Question:

Unset

```
# Check IP address and network interfaces
```

```
ip addr
```

```
# Test internet connectivity
```

```
ping google.com
```

```
# View routing table
```

```
ip route
```

```
# Check DNS settings
```

```
cat /etc/resolv.conf
```

```
# List open ports
```

```
ss -tuln
```

```
# Capture packets on eth0
```

```
sudo tcpdump -i eth0
```

Question 26: How do you create and manage logical volumes using LVM?

1. Question:

How do you create and manage logical volumes using LVM in Linux?



2. Answer:

LVM (Logical Volume Manager) allows flexible disk management.

- Install LVM Tools:
 - `sudo apt install lvm2`
- Create Physical Volumes (PV):
 - `sudo pvcreate /dev/sd[b-c]`
- Create Volume Group (VG):
 - `sudo vgcreate my_vg /dev/sd[b-c]`
- Create Logical Volume (LV):
 - `sudo lvcreate -L 10G -n my_lv my_vg`
- Format and Mount:
 - `sudo mkfs.ext4 /dev/my_vg/my_lv`
 - `sudo mkdir /mnt/my_lv`
 - `sudo mount /dev/my_vg/my_lv /mnt/my_lv`
- Extend Logical Volume:
 - `sudo lvextend -L +5G /dev/my_vg/my_lv`
 - `sudo resize2fs /dev/my_vg/my_lv`

3. What Skills Required to Prepare This Question:

- Understanding of LVM concepts (PV, VG, LV)
- Familiarity with disk partitioning and file systems
- Ability to manage storage dynamically

4. How to Study This Question:

- Practice creating and modifying LVM setups
- Study LVM best practices and recovery methods
- Learn to handle disk failures in LVM

5. Examples for This Question:

Unset

Create physical volumes

```
sudo pvcreate /dev/sdb /dev/sdc
```

Create volume group

```
sudo vgcreate data_vg /dev/sdb /dev/sdc
```

Create logical volume



```
sudo lvcreate -L 20G -n data_lv data_vg

# Format and mount

sudo mkfs.ext4 /dev/data_vg/data_lv

sudo mount /dev/data_vg/data_lv /mnt/data

# Extend logical volume

sudo lvextend -L +10G /dev/data_vg/data_lv

sudo resize2fs /dev/data_vg/data_lv
```

Question 27: How do you secure a Linux server?

1. **Question:**

How do you secure a Linux server?

2. **Answer:**

Securing a Linux server involves multiple layers of protection:

- **User and Authentication Security:**
 - Disable root SSH login: Edit `/etc/ssh/sshd_config` → `PermitRootLogin no`
 - Enforce strong passwords and use SSH keys
- **Firewall and Network Security:**
 - Use `iptables` or `firewalld` to restrict traffic
 - Close unnecessary ports and services
- **File and Directory Permissions:**
 - Set appropriate permissions using `chmod` and `chown`
 - Use `umask` to define default permissions
- **Updates and Patching:**
 - Regularly apply updates: `sudo apt update && sudo apt upgrade`
 - Automate updates using tools like `unattended-upgrades`
- **Intrusion Detection and Monitoring:**
 - Install tools like `fail2ban` and `tripwire`
 - Monitor logs with `logwatch` or `logrotate`



3. What Skills Required to Prepare This Question:

- Knowledge of Linux security best practices
- Familiarity with authentication and firewall configurations
- Understanding of intrusion detection and system monitoring

4. How to Study This Question:

- Practice securing test servers
- Study security hardening guides for Linux
- Learn to perform security audits

5. Examples for This Question:

Unset

```
# Disable root SSH login
```

```
sudo sed -i 's/PermitRootLogin yes/PermitRootLogin no/'  
/etc/ssh/sshd_config
```

```
sudo systemctl restart ssh
```

```
# Set up UFW firewall
```

```
sudo ufw enable
```

```
sudo ufw allow 22/tcp
```

```
sudo ufw allow 80/tcp
```

```
sudo ufw deny 23/tcp # Block Telnet
```

```
# Install and configure fail2ban
```

```
sudo apt install fail2ban
```

```
sudo systemctl enable fail2ban
```

Question 28: How do you set up passwordless SSH in Linux?



1. **Question:**

How do you set up passwordless SSH in Linux?

2. **Answer:**

Passwordless SSH allows users to authenticate using SSH keys instead of passwords.

○ **Generate SSH Key Pair:**

- On the client machine: `ssh-keygen -t rsa -b 4096`
- This generates a public (`~/.ssh/id_rsa.pub`) and private (`~/.ssh/id_rsa`) key.

○ **Copy Public Key to Remote Server:**

- Use `ssh-copy-id: ssh-copy-id user@remote_server`
- Alternatively, manually copy:

Unset

```
cat ~/.ssh/id_rsa.pub | ssh user@remote_server 'cat >>
~/.ssh/authorized_keys'
```

○ **Set Correct Permissions:**

- On the remote server:

Unset

```
chmod 700 ~/.ssh
```

```
chmod 600 ~/.ssh/authorized_keys
```

○ **Test Passwordless SSH:**

- `ssh user@remote_server`

3. **What Skills Required to Prepare This Question:**

- Understanding of SSH protocols and key-based authentication
- Familiarity with Linux permissions and user configurations
- Basic networking knowledge

4. **How to Study This Question:**

- Practice setting up passwordless SSH between systems
- Study SSH configurations (`/etc/ssh/sshd_config`)
- Learn to troubleshoot SSH connection issues

5. **Examples for This Question:**



Unset

```
# Generate SSH key
```

```
ssh-keygen -t rsa -b 4096
```

```
# Copy public key to server
```

```
ssh-copy-id user@192.168.1.100
```

```
# Test passwordless login
```

```
ssh user@192.168.1.100
```

Question 29: How do you manage and schedule tasks using cron in Linux?

1. Question:

How do you manage and schedule tasks using cron in Linux?

2. Answer:

Cron is a time-based job scheduler in Unix-like systems.

- **Edit Crontab:**

- `crontab -e` to edit the user's crontab file.

- **Crontab Syntax:**

Unset

```
* * * * * command_to_execute
```

```
| | | | |
```

```
| | | | +----- Day of the week (0 - 7) [Sunday=0 or 7]
```

```
| | | +----- Month (1 - 12)
```

```
| | +----- Day of the month (1 - 31)
```

```
| +----- Hour (0 - 23)
```



+----- Minute (0 - 59)

- **List and Remove Crontab Jobs:**
 - `crontab -l` to list jobs
 - `crontab -r` to remove crontab
- **Common Cron Directories:**
 - `/etc/crontab`, `/etc/cron.d/`, `/etc/cron.daily/`, `/etc/cron.hourly/`
- 3. **What Skills Required to Prepare This Question:**
 - Understanding of cron job scheduling
 - Familiarity with Linux file permissions
 - Basic shell scripting knowledge
- 4. **How to Study This Question:**
 - Practice creating and managing cron jobs
 - Study cron logs (`/var/log/syslog` or `/var/log/cron`)
 - Learn to debug and handle common cron errors
- 5. **Examples for This Question:**

Unset

Open crontab

`crontab -e`

Example jobs:

Run backup script daily at 2 AM

`0 2 * * * /home/user/backup.sh`

Clear temp files every Sunday at midnight

`0 0 * * 0 rm -rf /tmp/*`

List current cron jobs



```
crontab -l
```

Question 30: How do you recover a Linux system with a forgotten root password?

1. Question:

How do you recover a Linux system with a forgotten root password?

2. Answer:

To reset a forgotten root password:

- **Boot into GRUB:**
 - Restart the system and access GRUB menu (usually by pressing **Esc** or **Shift**).
- **Edit GRUB Entry:**
 - Highlight the boot entry and press **e** to edit.
 - Find the line starting with **linux** and append **init=/bin/bash**.
- **Boot into Single-User Mode:**
 - Press **Ctrl + X** or **F10** to boot.
- **Remount Root Filesystem:**
 - `mount -o remount,rw /`
- **Reset Password:**
 - `passwd root` and enter a new password.
- **Reboot System:**
 - `exec /sbin/init` or `reboot`

3. What Skills Required to Prepare This Question:

- Understanding of GRUB and Linux boot processes
- Familiarity with filesystem permissions
- Knowledge of system recovery techniques

4. How to Study This Question:

- Practice password recovery on a test system
- Study Linux boot process and GRUB configurations
- Learn security implications of this method

5. Examples for This Question:

Unset

```
# After booting into single-user mode
```

```
mount -o remount,rw /
```



```
# Reset root password
```

```
passwd root
```

```
# Reboot the system
```

```
reboot
```

Question 31: How do you configure a static IP address in Linux?

1. Question:

How do you configure a static IP address in Linux?

2. Answer:

Static IP configuration depends on the Linux distribution.

On Debian/Ubuntu-based systems:

- Edit the network interfaces file:

Unset

```
sudo nano /etc/network/interfaces
```

- Add the following:

Unset

```
auto eth0
```

```
iface eth0 inet static
```

```
address 192.168.1.100
```

```
netmask 255.255.255.0
```



```
gateway 192.168.1.1
```

```
dns-nameservers 8.8.8.8 8.8.4.4
```

- Restart networking:

Unset

```
sudo systemctl restart networking
```

3.

On RHEL/CentOS-based systems:

- Edit the interface configuration file:

Unset

```
sudo nano /etc/sysconfig/network-scripts/ifcfg-eth0
```

- Update with:

Unset

```
BOOTPROTO=static
```

```
ONBOOT=yes
```

```
IPADDR=192.168.1.100
```

```
NETMASK=255.255.255.0
```

```
GATEWAY=192.168.1.1
```

```
DNS1=8.8.8.8
```

- Restart network service:

Unset

```
sudo systemctl restart network
```



4.

What Skills Required to Prepare This Question:

- Knowledge of Linux networking
- Familiarity with network configuration files
- Understanding of IP addressing and subnetting

5. **How to Study This Question:**

- Practice static IP configuration on virtual machines
- Study network configuration tools like **netplan** and **nmcli**
- Learn basic networking concepts

6. **Examples for This Question:**

Unset

```
# Check current IP configuration
```

```
ip addr
```

```
# Apply new IP settings (Ubuntu)
```

```
sudo systemctl restart networking
```

```
# Verify static IP
```

```
ping google.com
```

Question 32: How do you monitor system performance in Linux?

1. **Question:**

How do you monitor system performance in Linux?

2. **Answer:**

Linux offers several tools to monitor system performance:

- **CPU Usage:**
 - **top** or **htop** for real-time process monitoring
 - **mpstat** (from **sysstat** package) for CPU stats
- **Memory Usage:**



- `free -h` to view RAM usage
- `vmstat` for virtual memory statistics
- **Disk Usage and I/O:**
 - `df -h` to check disk space
 - `du -sh /path/to/directory` for directory size
 - `iostat` to monitor disk I/O
- **Network Monitoring:**
 - `iftop` for real-time bandwidth usage
 - `nload` for network traffic
- **Overall System Health:**
 - `sar` (from `sysstat`) for historical data
 - `glances` for an all-in-one system monitor

3. What Skills Required to Prepare This Question:

- Understanding of Linux system resources
- Familiarity with system monitoring tools
- Ability to analyze performance data

4. How to Study This Question:

- Use the tools regularly on active systems
- Study performance tuning guides
- Learn to identify system bottlenecks

5. Examples for This Question:

Unset

Monitor CPU and memory

`top`

Check disk usage

`df -h`

View network usage

`iftop`



```
# Monitor overall system health  
glances
```

Question 33: How do you configure a firewall using iptables in Linux?

1. **Question:**

How do you configure a firewall using iptables in Linux?

2. **Answer:**

`iptables` is a command-line firewall tool in Linux.

- **View Existing Rules:**

Unset

```
sudo iptables -L -v
```

-

Basic Commands:

- **Allow SSH (port 22):**

Unset

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

- **Allow HTTP (port 80):**

Unset

```
sudo iptables -A INPUT -p tcp --dport 80 -j ACCEPT
```

- **Block an IP address:**

Unset

```
sudo iptables -A INPUT -s 192.168.1.50 -j DROP
```



- Drop all other incoming traffic:

Unset

```
sudo iptables -P INPUT DROP
```

○

Save and Persist Rules:

- On Debian/Ubuntu:

Unset

```
sudo iptables-save > /etc/iptables/rules.v4
```

- On CentOS/RHEL:

Unset

```
sudo service iptables save
```

3.

What Skills Required to Prepare This Question:

- Knowledge of network protocols and ports
- Familiarity with firewall concepts
- Understanding of Linux security practices

4. How to Study This Question:

- Practice configuring iptables on test systems
- Study iptables rules syntax and chains
- Learn about common firewall policies

5. Examples for This Question:

Unset

```
# Allow SSH and HTTP
```

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

```
sudo iptables -A INPUT -p tcp --dport 80 -j ACCEPT
```



```
# Block an IP

sudo iptables -A INPUT -s 203.0.113.1 -j DROP


# View rules

sudo iptables -L -v


# Save rules (Ubuntu)

sudo iptables-save > /etc/iptables/rules.v4
```

Question 34: How do you manage services using systemd in Linux?

1. **Question:**

How do you manage services using systemd in Linux?

2. **Answer:**

systemd is a system and service manager for Linux, controlling how services run.

- **Start/Stop/Restart a Service:**

Unset

```
sudo systemctl start apache2

sudo systemctl stop apache2

sudo systemctl restart apache2
```

- **Enable/Disable Service at Boot:**



Unset

```
sudo systemctl enable apache2  
sudo systemctl disable apache2
```

○

Check Service Status:

Unset

```
sudo systemctl status apache2
```

○

Reload Systemd and Daemons:

Unset

```
sudo systemctl daemon-reload
```

○

List All Services:

Unset

```
systemctl list-units --type=service
```

3.

What Skills Required to Prepare This Question:

- Knowledge of `systemd` and its components
- Understanding of Linux service management
- Familiarity with system boot processes

4. **How to Study This Question:**

- Practice managing services on Linux systems
- Study the structure of systemd unit files (`/etc/systemd/system/`)
- Explore advanced options like creating custom services

5. **Examples for This Question:**



Unset

```
# Start and enable Nginx

sudo systemctl start nginx

sudo systemctl enable nginx


# Check status

sudo systemctl status nginx


# Reload systemd after changes

sudo systemctl daemon-reload
```

Question 35: How do you configure NFS (Network File System) in Linux?

1. Question:

How do you configure NFS (Network File System) in Linux?

2. Answer:

NFS allows file sharing between Linux systems over a network.

On NFS Server:

- **Install NFS:**

Unset

```
sudo apt install nfs-kernel-server # Debian/Ubuntu

sudo yum install nfs-utils         # RHEL/CentOS
```

- **Create a Shared Directory:**

Unset

```
sudo mkdir -p /srv/nfs/shared
```



```
sudo chown nobody:nogroup /srv/nfs/shared
```

- **Edit Exports File:**

Unset

```
sudo nano /etc/exports  
  
/srv/nfs/shared 192.168.1.0/24(rw,sync,no_subtree_check)
```

- **Export Shares and Start NFS:**

Unset

```
sudo exportfs -a  
  
sudo systemctl restart nfs-server
```

3.

On NFS Client:

- **Install NFS Client:**

Unset

```
sudo apt install nfs-common      # Debian/Ubuntu  
  
sudo yum install nfs-utils      # RHEL/CentOS
```

- **Mount the NFS Share:**

Unset

```
sudo mount 192.168.1.100:/srv/nfs/shared /mnt
```

- **Persist Mount in fstab:**



Unset

```
echo "192.168.1.100:/srv/nfs/shared /mnt nfs defaults 0 0" | sudo tee  
-a /etc/fstab
```

4.

What Skills Required to Prepare This Question:

- Understanding of NFS protocol
- Familiarity with network configurations and permissions
- Knowledge of mounting and sharing file systems

5. **How to Study This Question:**

- Practice setting up NFS on test machines
- Study NFS options and security considerations (e.g., `no_root_squash`)
- Learn troubleshooting NFS connectivity and permission issues

6. **Examples for This Question:**

Unset

```
# Server-side
```

```
sudo exportfs -v
```

```
# Client-side
```

```
sudo mount 192.168.1.100:/srv/nfs/shared /mnt
```

```
# Verify mount
```

```
df -h | grep nfs
```

Question 36: How do you set up RAID in Linux?

1. **Question:**

How do you set up RAID in Linux?

2. **Answer:**

RAID (Redundant Array of Independent Disks) enhances storage performance and redundancy.



- **Install mdadm (RAID utility):**

Unset

```
sudo apt install mdadm      # Debian/Ubuntu
```

```
sudo yum install mdadm     # RHEL/CentOS
```

- **Create RAID Array (e.g., RAID 1):**

Unset

```
sudo mdadm --create --verbose /dev/md0 --level=1 --raid-devices=2  
/dev/sd[b-c]
```

- **Verify RAID Status:**

Unset

```
cat /proc/mdstat
```

```
sudo mdadm --detail /dev/md0
```

- **Create Filesystem and Mount:**

Unset

```
sudo mkfs.ext4 /dev/md0
```

```
sudo mkdir /mnt/raid
```

```
sudo mount /dev/md0 /mnt/raid
```

- **Persist RAID Configuration:**



Unset

```
sudo mdadm --detail --scan | sudo tee -a /etc/mdadm/mdadm.conf  
  
sudo update-initramfs -u
```

3.

What Skills Required to Prepare This Question:

- Understanding of RAID levels and their use cases
- Familiarity with disk partitioning and management
- Knowledge of Linux storage and file systems

4. **How to Study This Question:**

- Practice RAID setup using virtual disks
- Study different RAID levels (0, 1, 5, 6, 10)
- Learn to troubleshoot RAID failures and rebuild arrays

5. **Examples for This Question:**

Unset

```
# Create RAID 5 with 3 disks
```

```
sudo mdadm --create --verbose /dev/md0 --level=5 --raid-devices=3  
/dev/sd[b-d]
```

```
# Check RAID status
```

```
cat /proc/mdstat
```

```
# Format and mount RAID
```

```
sudo mkfs.ext4 /dev/md0
```

```
sudo mount /dev/md0 /mnt/raid
```

Question 37: How do you set file permissions using chmod in Linux?



1. **Question:**

How do you set file permissions using `chmod` in Linux?

2. **Answer:**

The `chmod` command changes file and directory permissions in Linux.

○ **Symbolic Method:**

- Grant read, write, and execute to the owner:

Unset

```
chmod u+rw file.txt
```

- Remove write permission from the group:

Unset

```
chmod g-w file.txt
```

- Add execute for others:

Unset

```
chmod o+x script.sh
```

○

Numeric Method:

Permissions use a three-digit octal representation:

- $r = 4, w = 2, x = 1$
- Example: `chmod 755 script.sh` sets:
 - Owner: read, write, execute (7)
 - Group: read, execute (5)
 - Others: read, execute (5)

○ **Recursive Permission Change:**

Unset

```
chmod -R 755 /var/www/html
```



3.

What Skills Required to Prepare This Question:

- Understanding of Linux file permission models
- Familiarity with symbolic and numeric permission methods
- Knowledge of security best practices

4. **How to Study This Question:**

- Practice modifying permissions on files and directories
- Study the differences between user, group, and others
- Learn about potential security risks of incorrect permissions

5. **Examples for This Question:**

Unset

```
# Grant read, write to owner, read-only to others
```

```
chmod 644 file.txt
```

```
# Make a script executable by everyone
```

```
chmod 755 script.sh
```

```
# Remove all permissions for others
```

```
chmod o-rwx confidential.txt
```

Question 38: How do you manage users and groups in Linux?

1. **Question:**

How do you manage users and groups in Linux?

2. **Answer:**

Linux provides several commands for managing users and groups.

- **Add a New User:**



Unset

```
sudo adduser john
```

○

Delete a User:

Unset

```
sudo deluser john
```

○

Modify a User (e.g., change shell):

Unset

```
sudo usermod -s /bin/bash john
```

○

Add User to a Group:

Unset

```
sudo usermod -aG sudo john
```

○

Create a Group:

Unset

```
sudo groupadd developers
```

○

Change File Ownership:



Unset

```
sudo chown john:developers project.txt
```

○

List User and Group Info:

Unset

```
id john
```

```
groups john
```

3.

What Skills Required to Prepare This Question:

- Understanding of Linux user and group management
- Familiarity with file permissions and ownership
- Knowledge of security policies and user roles

4. **How to Study This Question:**

- Practice adding, modifying, and deleting users and groups
- Study the `/etc/passwd`, `/etc/group`, and `/etc/shadow` files
- Learn about user access controls and privilege escalation

5. **Examples for This Question:**

Unset

```
# Add user and grant sudo privileges
```

```
sudo adduser alice
```

```
sudo usermod -aG sudo alice
```

```
# Change ownership of a directory
```

```
sudo chown -R alice:developers /home/alice/projects
```

```
# List all users
```



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

Question 39: How do you troubleshoot network issues in Linux?

1. **Question:**

How do you troubleshoot network issues in Linux?

2. **Answer:**

Several tools help diagnose and fix network problems in Linux.

- **Check IP Configuration:**

Unset

```
ip addr
```

```
ifconfig (older systems)
```

- **Test Connectivity:**

Unset

```
ping google.com
```

- **Check Routing Table:**

Unset

```
ip route
```

- **DNS Resolution Issues:**



Unset

```
dig google.com
```

```
nslookup google.com
```

○

Trace Network Path:

Unset

```
tracert google.com
```

○

Check Open Ports and Connections:

Unset

```
netstat -tuln
```

```
ss -tuln (newer systems)
```

○

Monitor Network Traffic:

Unset

```
tcpdump -i eth0
```

3.

What Skills Required to Prepare This Question:

- Understanding of networking concepts (IP, DNS, routing)
- Familiarity with Linux networking tools
- Analytical and troubleshooting skills

4. **How to Study This Question:**

- Simulate network issues in a lab environment
- Study network layers and protocols (TCP/IP, UDP)
- Practice using networking tools on live systems

5. **Examples for This Question:**



Unset

```
# Check default gateway
```

```
ip route | grep default
```

```
# Test if a specific port is open
```

```
telnet google.com 80
```

```
# Capture network packets
```

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

Question 40: How do you configure a firewall using UFW in Linux?

1. **Question:**

How do you configure a firewall using UFW in Linux?

2. **Answer:**

UFW (Uncomplicated Firewall) simplifies firewall management on Linux.

- **Install UFW (if not installed):**

Unset

```
sudo apt install ufw
```

○

Enable/Disable UFW:

Unset

```
sudo ufw enable
```



```
sudo ufw disable
```

- **Allow/Deny Ports:**

Unset

```
sudo ufw allow 22/tcp      # Allow SSH
sudo ufw allow 80/tcp      # Allow HTTP
sudo ufw deny 23           # Deny Telnet
```

- **Allow Specific IP:**

Unset

```
sudo ufw allow from 192.168.1.100
```

- **Delete a Rule:**

Unset

```
sudo ufw delete allow 80/tcp
```

- **View Firewall Status and Rules:**

Unset

```
sudo ufw status verbose
```

3. **What Skills Required to Prepare This Question:**

- Understanding of Linux firewalls



- Familiarity with network protocols and ports
- Knowledge of UFW and iptables

4. How to Study This Question:

- Practice configuring UFW on test systems
- Study networking basics, including TCP/UDP protocols
- Learn about firewall policies and best practices

5. Examples for This Question:

Unset

```
# Allow HTTPS traffic
```

```
sudo ufw allow 443/tcp
```

```
# Allow access to SSH from a specific IP
```

```
sudo ufw allow from 203.0.113.10 to any port 22
```

```
# Enable UFW with default deny policy
```

```
sudo ufw default deny incoming
```

```
sudo ufw default allow outgoing
```

```
sudo ufw enable
```

Question 41: How do you configure cron jobs in Linux?

1. Question:

How do you configure cron jobs in Linux?

2. Answer:

Cron is a time-based job scheduler in Unix-like systems.

- **Edit User's Cron Table:**



Unset

```
crontab -e
```

○

Cron Syntax:

Unset

```
* * * * * /path/to/command
```

```
| | | | |
```

```
| | | | +----- Day of the week (0 - 7) (Sunday=0 or 7)
```

```
| | | +----- Month (1 - 12)
```

```
| | +----- Day of the month (1 - 31)
```

```
| +----- Hour (0 - 23)
```

```
+----- Minute (0 - 59)
```

○

View Scheduled Cron Jobs:

Unset

```
crontab -l
```

○

Remove All Cron Jobs for User:

Unset

```
crontab -r
```

○

Common Examples:

- Run backup every day at 2 AM:



Unset

```
0 2 * * * /home/user/backup.sh
```

- Clear logs every Sunday at midnight:

Unset

```
0 0 * * 0 /usr/bin/logrotate
```

3.

What Skills Required to Prepare This Question:

- Understanding of cron syntax and scheduling
- Familiarity with Linux commands and scripts
- Basic knowledge of system maintenance tasks

4. How to Study This Question:

- Practice creating and managing cron jobs
- Study cron special strings (@daily, @hourly)
- Learn about logging and troubleshooting cron jobs

5. Examples for This Question:

Unset

```
# Run a script every 15 minutes
```

```
*/15 * * * * /path/to/script.sh
```

```
# Update system packages daily at 3 AM
```

```
0 3 * * * sudo apt update && sudo apt upgrade -y
```

```
# Reboot system every Sunday at 1 AM
```

```
0 1 * * 0 /sbin/reboot
```

Question 42: How do you check system performance in Linux?



1. **Question:**

How do you check system performance in Linux?

2. **Answer:**

Linux offers several tools to monitor system performance.

- **CPU and Memory Usage:**

Unset

`top`

`htop` # Enhanced version of top

- **Disk Usage:**

Unset

`df -h` # Show disk space

`du -sh /var` # Show size of specific directories

- **I/O Performance:**

Unset

`iostat`

`vmstat`

- **Network Performance:**

Unset

`iftop` # Real-time network usage

`nload` # Network bandwidth usage



- **System Load:**

Unset

`uptime` # Shows load average

`cat /proc/loadavg`

3. **What Skills Required to Prepare This Question:**

- Understanding of Linux performance monitoring
- Familiarity with system resource management
- Knowledge of key performance metrics

4. **How to Study This Question:**

- Practice using system monitoring tools
- Study Linux resource management (CPU, RAM, Disk, Network)
- Learn how to troubleshoot performance bottlenecks

5. **Examples for This Question:**

Unset

Check memory usage

`free -m`

View top processes sorted by memory

`ps aux --sort=-%mem | head`

Monitor disk I/O

`iostat -xz 1`

Real-time network monitoring

`iftop -i eth0`



Question 43: How do you secure SSH access on a Linux server?

1. **Question:**

How do you secure SSH access on a Linux server?

2. **Answer:**

Securing SSH is crucial to prevent unauthorized access.

- **Change Default SSH Port:**

Edit `/etc/ssh/sshd_config`:

Unset

`Port 2222`

-

Then restart SSH:

Unset

`sudo systemctl restart sshd`

-

Disable Root Login:

In `/etc/ssh/sshd_config`:

Unset

`PermitRootLogin no`

-

Use SSH Key Authentication:

Generate SSH key pair on client:

Unset

`ssh-keygen`



- Copy public key to server:

Unset

```
ssh-copy-id user@server_ip
```

- Use a Firewall to Limit Access:

Unset

```
sudo ufw allow 2222/tcp
```

- Disable Password Authentication:
In `/etc/ssh/sshd_config`:

Unset

```
PasswordAuthentication no
```

3. What Skills Required to Prepare This Question:

- Understanding of SSH configuration
- Knowledge of Linux security practices
- Familiarity with networking and firewalls

4. How to Study This Question:

- Practice configuring SSH settings in a lab environment
- Study public/private key encryption
- Learn about firewall rules and network security

5. Examples for This Question:

Unset

```
# Connect to SSH on a custom port
```

```
ssh -p 2222 user@server_ip
```



```
# View current SSH connections
```

```
sudo ss -tnp | grep ssh
```

```
# Restrict SSH access to a specific IP
```

```
sudo ufw allow from 192.168.1.100 to any port 2222
```

Question 44: How do you manage disk partitions in Linux?

1. Question:

How do you manage disk partitions in Linux?

2. Answer:

Disk partitioning can be done using tools like `fdisk`, `parted`, and `lsblk`.

- **List Disks and Partitions:**

Unset

```
lsblk
```

```
fdisk -l
```

- **Create a New Partition Using fdisk:**

Unset

```
sudo fdisk /dev/sdb
```

- Press `n` to create a new partition
 - Press `w` to write changes
- **Format the New Partition:**



Unset

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

○

Mount the Partition:

Unset

```
sudo mkdir /mnt/newdisk
```

```
sudo mount /dev/sdb1 /mnt/newdisk
```

○

Make the Mount Permanent:

Add to `/etc/fstab`:

Unset

```
/dev/sdb1 /mnt/newdisk ext4 defaults 0 2
```

3.

What Skills Required to Prepare This Question:

- Understanding of disk partitioning
- Familiarity with Linux filesystems
- Knowledge of mount points and fstab

4. **How to Study This Question:**

- Practice partitioning disks on test systems
- Study file system types (ext4, xfs)
- Learn about disk management best practices

5. **Examples for This Question:**

Unset

```
# Check disk space usage
```

```
df -h
```



```
# Check partition UUID
```

```
blkid
```

```
# Resize a partition (example with parted)
```

```
sudo parted /dev/sdb resizepart 1 100GB
```

Question 45: How do you set up NFS (Network File System) on Linux?

1. Question:

How do you set up NFS (Network File System) on Linux?

2. Answer:

NFS allows sharing directories over a network.

- **Install NFS Packages:**

Unset

```
sudo apt install nfs-kernel-server nfs-common
```

- **Configure NFS Exports:**
Edit `/etc/exports`:

Unset

```
/srv/nfs/shared 192.168.1.0/24(rw,sync,no_subtree_check)
```

- **Apply Export Changes:**



Unset

```
sudo exportfs -a  
  
sudo systemctl restart nfs-kernel-server
```

- **Allow NFS Through Firewall:**

Unset

```
sudo ufw allow from 192.168.1.0/24 to any port nfs
```

- **Mount NFS Share on Client:**

Unset

```
sudo mount server_ip:/srv/nfs/shared /mnt
```

- **Make Mount Permanent on Client:**
Add to `/etc/fstab`:

Unset

```
server_ip:/srv/nfs/shared /mnt nfs defaults 0 0
```

3. **What Skills Required to Prepare This Question:**

- Understanding of NFS and file sharing
- Knowledge of Linux networking and firewalls
- Familiarity with mounting file systems

4. **How to Study This Question:**

- Practice setting up NFS in a lab environment
- Study NFS security settings (e.g., `no_root_squash`)
- Learn about NFS performance tuning

5. **Examples for This Question:**



Unset

```
# View active NFS shares
```

```
showmount -e server_ip
```

```
# Unmount an NFS share
```

```
sudo umount /mnt
```

```
# Check NFS mounts
```

```
mount | grep nfs
```

Question 46: How do you configure RAID in Linux?

1. Question:

How do you configure RAID in Linux?

2. Answer:

RAID (Redundant Array of Independent Disks) can be configured using the **mdadm** tool.

- **Install mdadm:**

Unset

```
sudo apt install mdadm
```

- **Create a RAID 1 Array (Mirroring):**

Unset

```
sudo mdadm --create --verbose /dev/md0 --level=1 --raid-devices=2  
/dev/sd[b-c]1
```



- **Verify RAID Status:**

Unset

```
cat /proc/mdstat  
  
sudo mdadm --detail /dev/md0
```

- **Format the RAID Array:**

Unset

```
sudo mkfs.ext4 /dev/md0
```

- **Mount the RAID Array:**

Unset

```
sudo mkdir /mnt/raid  
  
sudo mount /dev/md0 /mnt/raid
```

- **Save RAID Configuration:**

Unset

```
sudo mdadm --detail --scan | sudo tee -a /etc/mdadm/mdadm.conf  
  
sudo update-initramfs -u
```

3. **What Skills Required to Prepare This Question:**

- Understanding of RAID levels (0, 1, 5, 10)
- Familiarity with `mdadm` and disk management
- Knowledge of redundancy and performance optimization



4. How to Study This Question:

- Practice setting up different RAID levels
- Study the pros and cons of each RAID configuration
- Learn RAID failure recovery and monitoring

5. Examples for This Question:

Unset

```
# Create RAID 0 (striping)
```

```
sudo mdadm --create --verbose /dev/md0 --level=0 --raid-devices=2  
/dev/sd[b-c]1
```

```
# Monitor RAID array
```

```
watch cat /proc/mdstat
```

```
# Stop and remove a RAID array
```

```
sudo umount /mnt/raid
```

```
sudo mdadm --stop /dev/md0
```

```
sudo mdadm --remove /dev/md0
```

Question 47: How do you configure SELinux in Linux?

1. Question:

How do you configure SELinux in Linux?

2. Answer:

SELinux (Security-Enhanced Linux) adds a security layer through mandatory access control.

- **Check SELinux Status:**

Unset

```
sestatus
```




getenforce

- **Set SELinux Modes:**
 - Enforcing: SELinux policies are applied
 - Permissive: SELinux logs actions but doesn't enforce
 - Disabled: SELinux is turned off
- Change mode temporarily:

Unset

```
sudo setenforce 0    # Permissive  
sudo setenforce 1    # Enforcing
```

- Change mode permanently (edit `/etc/selinux/config`):

Unset

```
SELINUX=enforcing  
SELINUX=permissive  
SELINUX=disabled
```

- **Manage SELinux Contexts:**

Unset

```
ls -Z /var/www/html  
sudo chcon -t httpd_sys_content_t /var/www/html/index.html
```

- **Manage Policies with semanage:**



Unset

```
sudo semanage port -a -t http_port_t -p tcp 8080
```

3.

What Skills Required to Prepare This Question:

- Understanding of SELinux policies and modes
- Familiarity with Linux security practices
- Knowledge of labeling and context management

4. **How to Study This Question:**

- Practice managing SELinux contexts and policies
- Study logs (`/var/log/audit/audit.log`) for troubleshooting
- Learn SELinux modules and policy writing basics

5. **Examples for This Question:**

Unset

```
# Allow Apache to connect to the network
```

```
sudo setsebool -P httpd_can_network_connect on
```

```
# Restore default SELinux context for a directory
```

```
sudo restorecon -Rv /var/www/html
```

```
# List SELinux booleans
```

```
getsebool -a
```

Question 48: How do you manage software packages in Linux?

1. **Question:**

How do you manage software packages in Linux?

2. **Answer:**

Linux has multiple package managers based on the distribution.



- **Debian/Ubuntu (APT):**

- Update package list:

Unset

```
sudo apt update
```

- Install a package:

Unset

```
sudo apt install nginx
```

- Remove a package:

Unset

```
sudo apt remove nginx
```

- Upgrade all packages:

Unset

```
sudo apt upgrade
```

- **RedHat/CentOS (YUM/DNF):**

- Install a package:

Unset

```
sudo dnf install httpd
```

- Remove a package:

Unset

```
sudo dnf remove httpd
```

- List installed packages:



Unset

```
sudo dnf list installed
```

○

Universal Package Managers:

■ Snap:

Unset

```
sudo snap install vlc
```

■ Flatpak:

Unset

```
flatpak install flathub org.gimp.GIMP
```

3.

What Skills Required to Prepare This Question:

- Familiarity with package managers (APT, YUM, DNF)
- Understanding of repositories and package sources
- Knowledge of software dependencies and conflicts

4. How to Study This Question:

- Practice installing, updating, and removing packages
- Study repository management and adding PPAs
- Learn about troubleshooting broken dependencies

5. Examples for This Question:

Unset

```
# Clean APT cache
```

```
sudo apt clean
```

```
# List outdated packages
```

```
sudo apt list --upgradable
```



```
# Search for a package in DNF  
sudo dnf search nginx
```

Question 49: How do you configure a firewall using UFW in Linux?

1. **Question:**

How do you configure a firewall using UFW in Linux?

2. **Answer:**

UFW (Uncomplicated Firewall) is a user-friendly interface for managing iptables firewall rules.

- **Enable UFW:**

Unset

```
sudo ufw enable
```

-

Check Firewall Status:

Unset

```
sudo ufw status verbose
```

-

Allow Specific Ports/Services:

Unset

```
sudo ufw allow 22/tcp      # SSH
```

```
sudo ufw allow 80/tcp      # HTTP
```



```
sudo ufw allow 443/tcp    # HTTPS
```

- **Deny Access:**

Unset

```
sudo ufw deny 23/tcp      # Deny Telnet
```

- **Allow Specific IPs:**

Unset

```
sudo ufw allow from 192.168.1.100 to any port 22
```

- **Enable Logging:**

Unset

```
sudo ufw logging on
```

- **Disable UFW:**

Unset

```
sudo ufw disable
```

3. **What Skills Required to Prepare This Question:**

- Understanding of network ports and protocols
- Familiarity with Linux firewall tools (UFW, iptables)
- Basic networking and security principles

4. **How to Study This Question:**



- Practice configuring UFW rules in a lab environment
- Study the effects of different rules and policies
- Learn how to troubleshoot blocked connections

5. Examples for This Question:

Unset

```
# Allow a specific subnet
```

```
sudo ufw allow from 192.168.1.0/24
```

```
# Delete a firewall rule
```

```
sudo ufw delete allow 80/tcp
```

```
# Set default policies
```

```
sudo ufw default deny incoming
```

```
sudo ufw default allow outgoing
```

Question 50: How do you schedule tasks using cron in Linux?

1. Question:

How do you schedule tasks using cron in Linux?

2. Answer:

The **cron** service is used to schedule repetitive tasks.

- **Edit the Crontab:**

Unset

```
crontab -e
```

- **Crontab Syntax:**



Unset

```
* * * * * command_to_run

| | | | |
| | | | +---- Day of the week (0 - 6) (Sunday=0)
| | | +----- Month (1 - 12)
| | +----- Day of the month (1 - 31)
| +----- Hour (0 - 23)
+----- Minute (0 - 59)
```

○

Example Cron Jobs:

- Run a script every day at midnight:

Unset

```
0 0 * * * /path/to/script.sh
```

- Run a command every 5 minutes:

Unset

```
*/5 * * * * /path/to/command
```

○

List Current Cron Jobs:

Unset

```
crontab -l
```

○

Remove Cron Jobs:



Unset

```
crontab -r
```

3.

What Skills Required to Prepare This Question:

- Understanding of time-based scheduling in Linux
- Familiarity with cron syntax and scheduling logic
- Basic shell scripting

4. **How to Study This Question:**

- Practice creating and editing cron jobs
- Study common cron use cases and pitfalls
- Learn about cron logs (`/var/log/syslog`) for troubleshooting

5. **Examples for This Question:**

Unset

```
# Run a backup script every Sunday at 2 AM
```

```
0 2 * * 0 /path/to/backup.sh
```

```
# Clear /tmp directory daily at midnight
```

```
0 0 * * * rm -rf /tmp/*
```

```
# Redirect cron output to a log file
```

```
0 3 * * * /path/to/script.sh >> /var/log/script.log 2>&1
```

Question 51: How do you check system performance and resource usage in Linux?

1. **Question:**

How do you check system performance and resource usage in Linux?

2. **Answer:**

Various commands can monitor system resources and performance.



- **CPU and Memory Usage:**

Unset

`top`

`htop` # (more user-friendly, if installed)

- **Disk Usage:**

Unset

`df -h` # Show disk space usage

`du -sh *` # Show directory sizes

- **I/O Performance:**

Unset

`iostat` # Requires sysstat package

- **Network Usage:**

Unset

`iftop` # Real-time bandwidth monitoring

`netstat -tulnp`

- **System Load:**



Unset

uptime

○

Check Running Processes:

Unset

ps aux

3.

What Skills Required to Prepare This Question:

- Familiarity with Linux performance monitoring tools
- Understanding of system resource management
- Knowledge of performance bottlenecks

4. **How to Study This Question:**

- Practice using performance monitoring commands
- Study how to identify high resource usage processes
- Learn about system tuning for performance

5. **Examples for This Question:**

Unset

Find top memory-consuming processes

ps aux --sort=-%mem | head

Check open network connections

ss -tuln

Monitor real-time disk I/O

iotop



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