

chapter 6 review questions linux

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Unlocking Linux Mastery: A Deep Dive into Chapter 6 Review Questions

Whether you're a seasoned sysadmin, a student tackling a Linux certification, or a hobbyist exploring the depths of open source operating systems, Chapter 6 of your textbook often contains the most challenging concepts. This chapter typically covers advanced file system management, process control, and system security—topics that require both theoretical understanding and practical application.

To help you cement your knowledge, this article presents a comprehensive set of **chapter 6 review questions** that span multiple Linux distributions and real world scenarios. We'll walk through each question, explain the reasoning behind the correct answer, and provide actionable tips for mastering these concepts.

Ready to boost your confidence? Let's dive into the heart of Linux's core functionalities and transform those review questions into learning milestones.

Why Chapter 6 Matters in Linux Education

Chapter 6 often serves as the bridge between foundational commands and complex system administration tasks. It usually covers:

- File System Hierarchy – Understanding where files reside and why.
- Process Management – From ps to nice, controlling what runs and when.
- Permissions and Ownership – The cornerstone of system security.
- Package Management – Installing, updating, and removing software safely.
- System Logging – Diagnosing issues via syslog and journalctl.
- Networking Basics – Configuring interfaces, routing, and firewall rules.

Mastering these topics not only prepares you for exams but also equips you to troubleshoot real world problems efficiently.

Getting Started: How to Use These Review Questions Effectively

1. Read the question carefully. Identify the core concept being tested.
2. Attempt the answer on your own. Don't consult the answer key until you've given it a genuine try.
3. Verify your answer. Use the provided explanation to confirm or correct your response.
4. Repeat with variations. Change parameters or contexts to deepen understanding.
5. Document your learning. Keep a log of questions, answers, and insights for future reference.

Chapter 6 Review Questions – Linux Edition

Section 1: File System Hierarchy & Permissions

Answer: The `/usr/local/bin` directory is typically owned by root and writable only by the superuser. The user lacks write privileges. To resolve, either:

- Use `sudo touch /usr/local/bin/newfile` to create the file as root.

- Change ownership or permissions (e.g., `sudo chown user:user /usr/local/bin` or `sudo chmod 755 /usr/local/bin`) if the directory is meant for user modifications.

Question: Explain the difference between `chmod 644` and `chmod 755` on a script file.

Answer: `chmod 644` sets permissions to read/write for the owner and read-only for group and others. It is suitable for data files where execution is not required. `chmod 755` adds execute permission for owner, group, and others, making the script runnable by everyone. Use 755 only when the script needs to be executed by multiple users.

Question: What is the purpose of the `/etc/passwd` and `/etc/shadow` files, and why should they be secured?

Answer: `/etc/passwd` stores user account information (username, UID, GID, home directory, shell). It is world-readable because programs need to map usernames to UIDs. `/etc/shadow` contains hashed passwords and is readable only by root to protect credentials. Securing `/etc/shadow` prevents unauthorized password retrieval and potential brute force attacks.

Section 2: Process Management

Answer: The `nice` command sets a process's niceness, influencing its priority in the scheduler. Positive nice values (e.g., +10) lower priority; negative values (e.g., -5) raise priority. The range is from -20 (highest priority) to +19 (lowest priority). Use `nice -n 10` command to start a process with lower priority.

Question: A process is stuck in a "D" state (uninterruptible sleep). What does this indicate, and how can you diagnose the issue?

Answer: The "D" state means the process is waiting for I/O, often a disk or network operation. To diagnose:

- Use `ps -o pid,stat,tty,cmd -p` to confirm the state.
- Check `dmesg` or `journalctl -k` for disk errors.
- Run `iostat` or `vmstat` to identify I/O bottlenecks.
- If the issue persists, consider hardware faults or driver problems.

Question: What is the difference between `kill -9` and `kill -15`?

Answer: `kill -15` sends `SIGTERM`, allowing the process to terminate gracefully and perform cleanup. `kill -9` sends `SIGKILL`, forcefully terminating the process without cleanup. Prefer `SIGTERM` to avoid resource leaks; use `SIGKILL` only when a process refuses to exit.

Section 3: Package Management

Answer: `apt` (Debian/Ubuntu) uses `apt-get` and `apt-cache` to manage packages, resolving dependencies automatically and storing metadata in `/var/lib/apt/`. `yum` (CentOS/RHEL) relies on `yum.conf` and `repo` files, handling dependencies via RPM metadata. Both perform dependency checks, but `yum` may require manual updates with `yum update` to refresh metadata, whereas `apt update` is typically run automatically during upgrades.

Question: What does `dpkg --configure -a` do, and when should you run it?

Answer: The command configures any packages that were unpacked but not yet configured, often after an interrupted installation. Run it when you encounter broken packages or errors like "dpkg: error processing archive ...". It ensures all packages are fully installed and configured.

Question: How can you rollback a package update if it causes system instability?

Answer: Most distributions maintain a package cache. In Debian/Ubuntu, use `apt-get install`

package=previous_version after checking /var/cache/apt/archives. In CentOS, use yum downgrade package if the previous version is still in the repository. Alternatively, restore from a backup or use snapshots (e.g., LVM snapshots) to revert the entire system state.

Section 4: System Logging & Monitoring

Answer: journalctl reads the systemd journal, a binary log format that aggregates logs from multiple sources (kernel, services, user sessions). It supports structured queries, filtering by priority, unit, or time. Traditional log files are plain text, often rotated manually, and may require parsing with tools like grep or awk. Journalctl provides a unified interface and richer metadata.

Question: A critical service fails to start at boot, and you find no entry in /var/log/syslog. What steps can you take to diagnose the issue?

Answer: Use systemctl status service_name to view the unit's status and recent logs. Then run journalctl -u service_name -b to see boot time logs for that unit. If logs are missing, check /etc/systemd/journald.conf for persistent storage settings and ensure Storage=persistent is enabled. Finally, inspect /var/log/journal for any missing entries.

Question: How do you set up log rotation for a custom application that writes to /var/log/myapp.log?

Answer: Create a logrotate configuration file under /etc/logrotate.d/myapp:

```
/var/log/myapp.log {  
    daily  
    rotate 7  
    compress  
    missingok  
    notifempty  
    create 0640 root adm  
}
```

Test the configuration with logrotate -d /etc/logrotate.d/myapp before enabling it.

Section 5: Networking Basics

Answer: /etc/hosts provides static hostname-to-IP mappings, overriding DNS for those entries. When resolving a hostname, the system first checks /etc/hosts; if no match is found, it queries DNS servers specified in /etc/resolv.conf. This mechanism is useful for local testing or when DNS is unavailable.

Question: Describe the steps to enable and configure the firewall using ufw on Ubuntu.

Answer: Install and enable ufw with sudo apt install ufw and sudo ufw enable. Configure rules: sudo ufw allow 22/tcp for SSH, sudo ufw deny 80/tcp to block HTTP. View status with sudo ufw status verbose. For advanced setups, edit /etc/ufw/ufw.conf or add custom rules in /etc/ufw/user.rules.

Question: A server's network interface eth0 is down. How can you bring it up and verify its IP configuration?

Answer: Bring the interface up with sudo ip link set eth0 up or sudo ifconfig eth0 up (deprecated). Verify IP assignment with ip addr show eth0 or ifconfig eth0. If using DHCP, run sudo dhclient eth0 to request an IP from the DHCP server.

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