**📌 Linux Package Management (Detailed Notes)**

**1. Package Management Overview**

* Linux distributions use **package managers** to install, update, remove, and manage software.
* Package managers maintain **repositories** (online/local) where software packages are stored.
* Common package managers:
  + **RHEL / CentOS / Fedora** → rpm, yum, dnf
  + **Debian / Ubuntu** → dpkg, apt-get, apt

**2. Types of Packages**

* **Binary Packages** → Precompiled (.rpm, .deb)
* **Source Packages** → Source code (.tar.gz, .tar.bz2)

**3. Package Repositories**

* Packages are downloaded from:
  + **Official repositories** (provided by distro vendors)
  + **Third-party repos** (e.g., EPEL for RHEL/CentOS)
  + **Local repositories** (created internally in companies)
* Configuration files:
  + **RHEL/CentOS** → /etc/yum.repos.d/\*.repo
  + **Debian/Ubuntu** → /etc/apt/sources.list

**4. Installing Packages**

**RHEL/CentOS (YUM/DNF)**

# Install package

sudo yum install httpd -y

# Using dnf (newer versions)

sudo dnf install httpd -y

**Debian/Ubuntu (APT)**

# Update repo index first

sudo apt update

# Install package

sudo apt install apache2 -y

**Direct RPM/DPKG Installation**

sudo rpm -ivh package.rpm

sudo dpkg -i package.deb

**5. Updating Packages**

**Update all packages:**

# RHEL/CentOS

sudo yum update -y

sudo dnf upgrade -y

# Debian/Ubuntu

sudo apt update && sudo apt upgrade -y

**Update a single package:**

sudo yum update httpd

sudo apt install --only-upgrade apache2

**6. Excluding Packages from Update**

**RHEL/CentOS**

Add in /etc/yum.conf:

exclude=kernel\* httpd

**Debian/Ubuntu**

Hold a package:

sudo apt-mark hold apache2

To unhold:

sudo apt-mark unhold apache2

**7. Before Updating (Best Practices)**

✅ Take a **backup/snapshot** of system (important in production).  
✅ Run:

yum list updates # Check pending updates

apt list --upgradable # Check pending updates

✅ Check system health & disk space:

df -h

free -m

✅ Read release notes if doing kernel/major updates.

**8. After Update (Verification Steps)**

1. Check logs:
2. tail -f /var/log/yum.log
3. tail -f /var/log/apt/history.log
4. Verify installed version:
5. rpm -q httpd
6. dpkg -l | grep apache2
7. Restart services if needed:
8. systemctl restart httpd
9. systemctl status httpd
10. Test application/service is running fine.

**9. If Update Fails (Rollback & Fix)**

**RHEL/CentOS**

* Downgrade:
* yum downgrade httpd
* Reinstall:
* yum reinstall httpd
* Rollback transaction:
* yum history
* yum history undo <ID>

**Debian/Ubuntu**

* Downgrade (manual):
* sudo apt install apache2=<version>
* Fix broken dependencies:
* sudo apt --fix-broken install

**10. Removing Packages**

# RHEL/CentOS

yum remove httpd

# Debian/Ubuntu

apt remove apache2

apt purge apache2 # removes config too

**📌 Interview Q&A (Package Management)**

**Q1. What’s the difference between rpm and yum?**  
👉 rpm installs a package but does not resolve dependencies.  
👉 yum automatically resolves dependencies using repositories.

**Q2. What’s the difference between apt-get and apt?**  
👉 apt-get is the traditional command.  
👉 apt is a newer unified command (more user-friendly).

**Q3. How do you prevent a package from updating?**  
👉 In RHEL/CentOS → Add to exclude= in /etc/yum.conf.  
👉 In Ubuntu/Debian → Use apt-mark hold package.

**Q4. How do you check which repo a package is coming from?**  
👉 yum info httpd  
👉 apt-cache policy apache2

**Q5. What should you check before applying updates?**  
👉 Disk space, pending updates, critical services, backup/snapshot.

**Q6. If kernel update fails, what will you do?**  
👉 Boot from older kernel (GRUB menu).  
👉 Remove faulty kernel using yum remove kernel-version.

**Q7. How to verify if an update was successful?**  
👉 Check logs, verify package version, restart & test services.