**Session 1 & 2: Package Management**

**🔹 Common Linux Package Managers**

| **Package Manager** | **Distribution** | **Command Example** |
| --- | --- | --- |
| apt | Debian/Ubuntu | sudo apt install package-name |
| yum / dnf | RHEL/CentOS/Fedora | sudo dnf install package-name |
| zypper | openSUSE | sudo zypper install package-name |
| pacman | Arch Linux | sudo pacman -S package-name |
| snap | Universal | sudo snap install package-name |
| flatpak | Universal | flatpak install package-name |

**🔹 Installing a Package**

**Example using apt:**

sudo apt update

sudo apt install nginx

**Example using dnf:**

sudo dnf install httpd

**🔹 Handling Dependencies**

Package managers automatically resolve and install dependencies. You can:

* Use apt-get -f install to fix broken dependencies.
* Use dnf deplist <package> to view dependencies.
* Use yum history undo to revert problematic installs.

**🔹 Package Manager vs Package Management System**

| **Feature** | **Package Manager** | **Package Management System** |
| --- | --- | --- |
| Definition | Tool to install, update, remove packages | Entire ecosystem including repositories, metadata, and tools |
| Scope | CLI tool (e.g., apt, yum) | Includes package formats (e.g., .deb, .rpm), dependency resolution, versioning |
| Example | apt | Debian Package Management System |

**Session 3: Standard I/O & Pipes**

**🔹 Troubleshooting Network Connectivity on Linux**

1. **Check IP and interface status:**
2. ip a
3. **Ping gateway or external host:**
4. ping 8.8.8.8
5. **Check DNS resolution:**
6. nslookup google.com
7. **Check firewall rules:**
8. sudo iptables -L
9. **Check routing table:**
10. ip route

**🔹 Check and Restart a Service**

sudo systemctl status nginx

sudo systemctl restart nginx

If not running:

sudo systemctl start nginx

**🔹 Diagnose Slow Server Response**

Useful commands:

* top or htop: Check CPU/memory usage
* iotop: Disk I/O
* netstat -tulnp: Network connections
* dstat: Overall system stats
* journalctl -xe: System logs
* strace: Trace system calls

**🔹 Setup /home/rhce for Group Collaboration**

# Create directory

sudo mkdir -p /home/rhce

# Create group

sudo groupadd rhce

# Change group ownership

sudo chown :rhce /home/rhce

# Set permissions for group collaboration

sudo chmod 2775 /home/rhce

This ensures:

* Group members can read/write
* New files inherit group ownership (2 in 2775 is the setgid bit)