Setting up DHCP (Dynamic Host Configuration Protocol) servers allows automatic assignment of IP addresses and network settings to clients. This guide covers both DHCPv4 and DHCPv6 configurations.

🌐 1. What Is DHCP?

DHCP automates the process of assigning IP addresses, gateways, DNS servers, and other network parameters to devices on a network.

- **DHCPv4**: Used for IPv4 networks.
- **DHCPv6**: Used for IPv6 networks.

🛠️ 2. Install DHCP Server

On a Debian-based system:

```
sudo apt update
sudo apt install isc-dhcp-server
```

📁 3. Configure DHCPv4

Edit /etc/dhcp/dhcpd.conf to define your IPv4 subnet:

```
subnet 192.168.1.0 netmask 255.255.255.0 {
    range 192.168.1.100 192.168.1.200;
    option routers 192.168.1.254;
    option domain-name-servers 192.168.1.1;
    option domain-name "contoso.com";
}
```

Explanation:

- range: IPs assigned to clients.
- routers: Default gateway.
- domain-name-servers: DNS server IP.
- domain-name: Local domain name.

📁 4. Configure DHCPv6

Edit `/etc/dhcp/`[dhcpd6.conf](#) to define your IPv6 subnet:

```
subnet6 2001:db8::/64 {
    range6 2001:db8::1000 2001:db8::2000;
    option dhcp6.name-servers 2001:db8::1;
    option dhcp6.domain-search "contoso.com";
}
```

Explanation:

- `subnet6`: IPv6 network prefix.
- `range6`: IPv6 address pool.
- `dhcp6.name-servers`: IPv6 DNS server.
- `dhcp6.domain-search`: Domain search suffix.

⚙️ 5. Configure Interfaces

Edit `/etc/default/isc-dhcp-server`:

```
INTERFACESv4="eth0"
INTERFACESv6="eth0"
```

🚀 6. Start the DHCP Server

```
sudo systemctl restart isc-dhcp-server
```

Check status:

```
sudo systemctl status isc-dhcp-server
```

🧪 7. Verify DHCP Operation

Use client machines or tools like `dhclient` to test:

```
sudo dhclient -v
sudo dhclient -6 -v
```

🧠 8. Teaching Tips

- Use diagrams to show how DHCP assigns IPs.
- Explain differences between DHCPv4 and DHCPv6.
- Let students simulate client requests and observe logs.

This setup provides a complete DHCP service for both IPv4 and IPv6 networks, ideal for classroom labs and real-world practice.