

## IT 307- Exploring the Networks- Lab 4- Handout

### Configuring DHCP for IPv4 and IPv6 in Packet Tracer

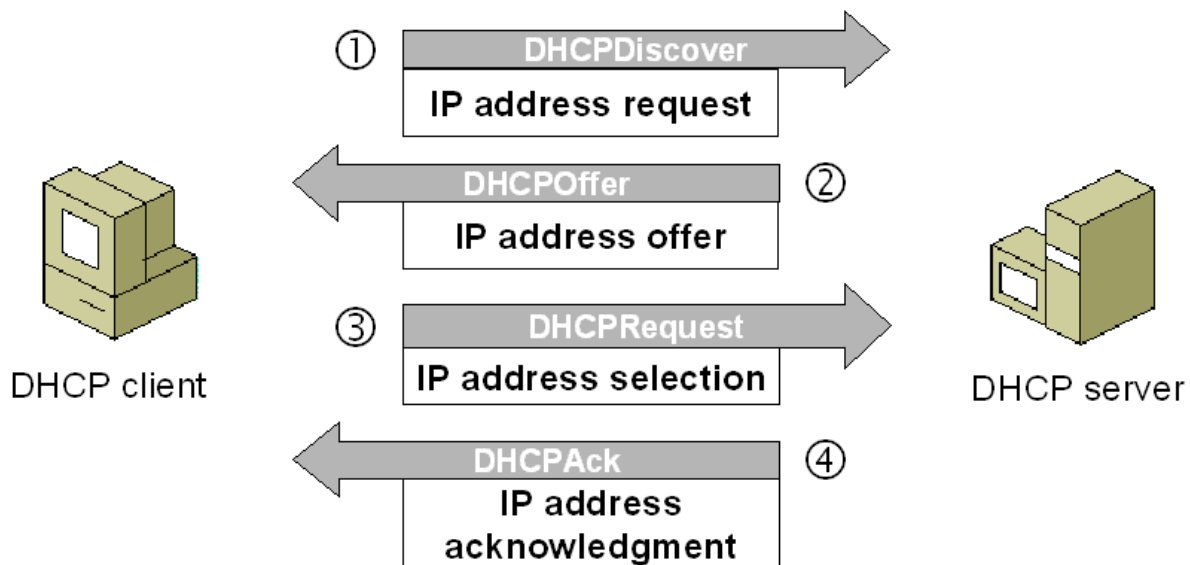
In this lab, you will learn:

- To Configure a router to act as a DHCP server for both IPv4 and IPv6 networks.
- Set up DHCP pools and assigned network parameters.
- Verify that client PCs receive IP addresses and network configurations automatically.

#### Basics of DHCP

The Dynamic Host Configuration Protocol (DHCP) is a network management protocol used to automate the process of configuring devices on IP networks. DHCP allows devices to receive IP addresses and other necessary network configuration parameters dynamically, reducing the need for manual configuration.

#### How DHCP Works?



1. **DHCP Discover:** The client broadcasts a DHCP Discover message to find available DHCP servers.

2. **DHCP Offer:** DHCP servers respond with a DHCP Offer message, offering an IP address and configuration parameters.

3. **DHCP Request:** The client selects one offer and broadcasts a DHCP Request message to accept the offer.

4. **DHCP Acknowledgment:** The selected DHCP server sends a DHCP Acknowledgment (ACK) confirming the IP address lease to the client.

#### DHCP Commands Overview

### For IPv4 DHCP Server Configuration (Command Formats)

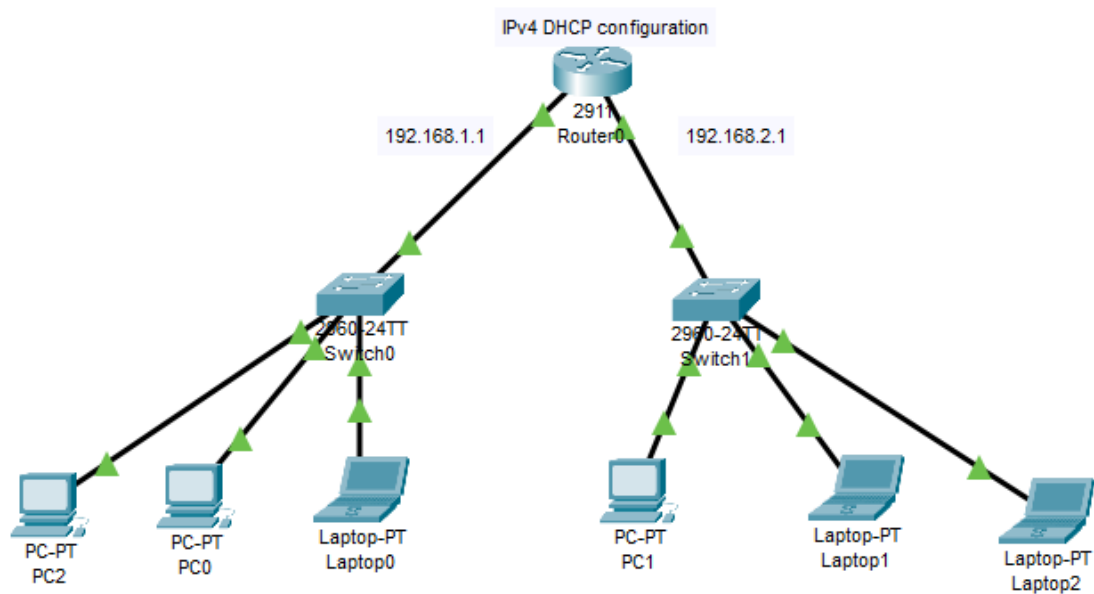
- ip dhcp pool [pool-name]`
- network [network-address] [subnet-mask]`
- default-router [gateway-address]`
- dns-server [DNS-address]`

### - For IPv6 DHCP Server Configuration (Command Formats)

- ipv6 unicast-routing`
- ipv6 dhcp pool [pool-name]`
- address prefix [IPv6-prefix/prefix-length]`
- dns-server [DNS-IPv6-address]`

## IPv4 DHCP configuration

**Build the following topology on packet tracer**



**Go to Router**

### **Step 1: Set up the IPv4 DHCP Pool**

```
Router>en
```

```
Router#conf t
```

```
Router(config)# ip dhcp pool PB_Pool
```

```
Router(dhcp-config)# network 192.168.1.0 255.255.255.0
```

```
Router(dhcp-config)# default-router 192.168.1.1
```

```
Router(dhcp-config)# dns-server 8.8.8.8
```

### **Step 2: Configure the Router Interface:**

```
Router(config)# interface GigabitEthernet0/0
```

```
Router(config-if)# ip address 192.168.1.1 255.255.255.0
```

```
Router(config-if)# no shutdown
```

**Similarly, for other side network 192.168.2.0**

### **Step 1: Set up the IPv4 DHCP Pool**

```
Router>en
```

```
Router#conf t
```

```
Router(config)# ip dhcp pool PB_Pool2
```

```
Router(dhcp-config)# network 192.168.2.0 255.255.255.0
```

```
Router(dhcp-config)# default-router 192.168.2.1
```

```
Router(dhcp-config)# dns-server 8.8.8.8
```

### **Step 2: Configure the Router Interface:**

```
Router(config)# interface GigabitEthernet0/1
```

```
Router(config-if)# ip address 192.168.2.1 255.255.255.0
```

```
Router(config-if)# no shutdown
```

### **Step 3: Configuring PCs to Obtain IP Automatically**

1. On each PC:

- Go to Desktop > IP Configuration.

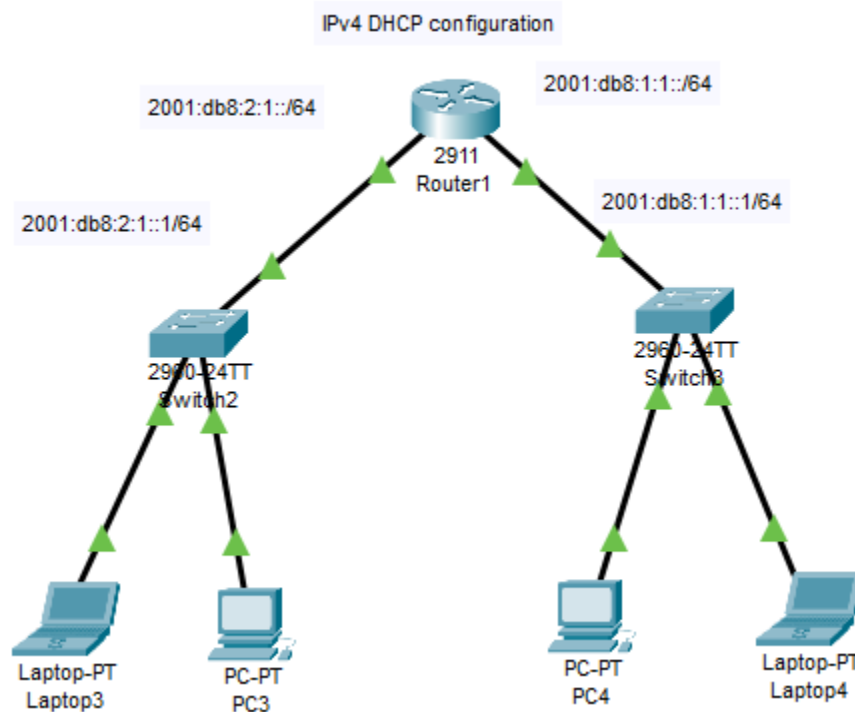
- Select DHCP.

#### Step 4: Verifying DHCP Operation

- Use the `ipconfig` command in the Command Prompt of each PC to verify they have received an IP address within the specified range.

## IPv6 DHCP configuration

**Build the following topology on packet tracer**



#### Step 1: Enabling IPv6 Routing on the Router

```
Router>en
```

```
Router#conf t
```

```
Router(config)# ipv6 unicast-routing
```

#### Step 2: Configuring the DHCPv6 Pool

```
Router(config)# ipv6 dhcp pool IPV6_POOL
```

```
Router(config-dhcpv6)# address prefix 2001:db8:1:1::/64
```

```
Router(config-dhcpv6)# dns-server 2001:4860:4860::8888
```

### **Step 3: Configuring the Router Interface for IPv6**

```
Router(config)# interface GigabitEthernet0/1
```

```
Router(config-if)# ipv6 address 2001:db8:1:1::1/64
```

```
Router(config-if)# ipv6 dhcp server IPV6_POOL
```

```
Router(config-if)# no shutdown
```

### **Step 4: Configuring PCs for IPv6 DHCP**

1. On each PC:

- Go to Desktop > IP Configuration.
- Under IPv6 Configuration, select DHCPv6.

### **Step 5: Verifying DHCPv6 Operation**

- Use the `ipconfig` command in the **\*\*Command Prompt\*\*** of each PC to verify they have received an IPv6 address from the DHCPv6 server.

### **Verification and Testing**

#### **- Ping Tests:**

- From each PC, ping the default gateway to ensure connectivity.
- Ping between PCs to verify network communication.

#### **- Check IP Configurations:**

- Use `ipconfig /all` to display detailed IP configuration information. Summary

### **Key Takeaways**

- DHCP simplifies network administration by automating IP address assignment.
- Understanding DHCP operations is crucial for managing dynamic IP networks.