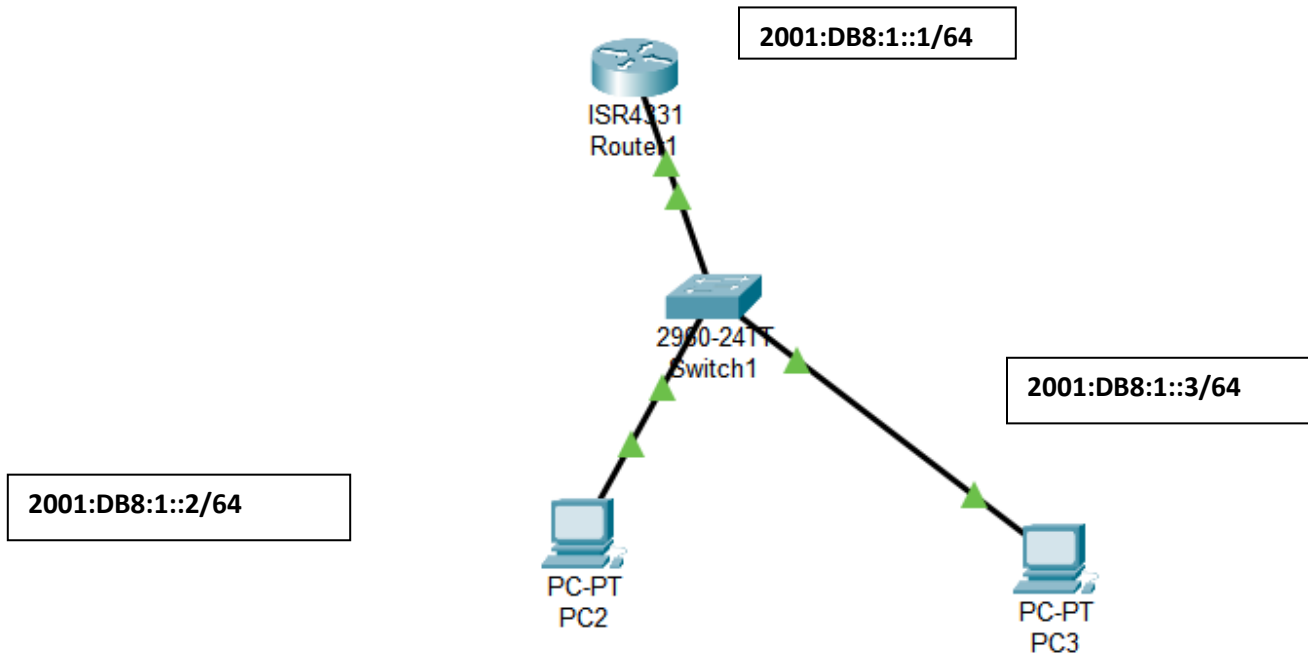


# Lab 1:- Configurations of Static Routing Addressing in IPv6 Network



## Configurations of the Router

enable

configure terminal

interface GigabitEthernet0/0/0

ipv6 address 2001:DB8:1::1/64

no shutdown

ipv6 unicast-routing

exit

write memory

### Verification step

On **PC2**, go to **Command Prompt** and type:

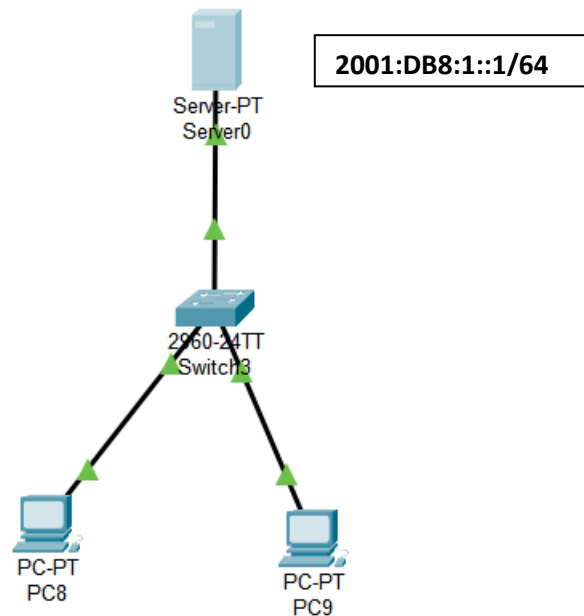
ping **2001:DB8:1::3/64**

On **PC3**, try:

ping **2001:DB8:1::3/64**

If configured correctly, you'll see successful ICMPv6 replies.

# LAB 2 :- DHCPv6 Server Configuration



## Configure the DHCPv6 Server

1. Click on the **DHCPv6 Server**.
2. Go to the **Services** tab.
3. Select **DHCPv6** from the left panel.
4. Configure the following settings:
  - o **Service**: Click **On**.
  - o **IPv6 Address Pool Name**: IPv6-Pool.
  - o **Prefix**: 2001:DB8:1::/64.
  - o **DNS Server**: 2001:4860:4860::8888 (Google's public IPv6 DNS).
  - o **Domain Name**: example.com.
5. Click **Save**.

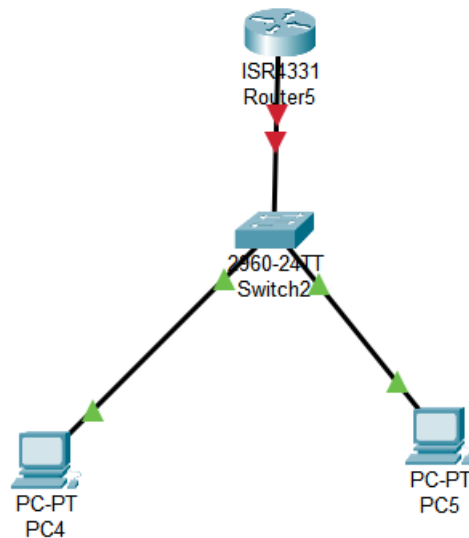
## Configure Clients (PC1 and PC2) for DHCPv6

1. Click on **PC1**.
2. Go to **Desktop** → **IP Configuration**.
3. Select **Auto Config (IPv6)**.
4. Repeat the same steps for **PC2**.

# LAB 3:- IPV6 SLAAC Configuration

## Addressing Scheme (Example):

- **Router5 to Switch2 Link:** 2001:DB8:1:1::/64
- **PC4 and PC5 Network (SLAAC):** 2001:DB8:2:10::/64 (We'll use this prefix for SLAAC)



## Configuration Steps:

### 1. Router5 Configuration

```
Router> enable
Router# configure terminal
Router(config)# ipv6 unicast-routing // Enable IPv6 routing
Router(config)# interface GigabitEthernet0/0 // Interface connected to Switch2
Router(config-if)# ipv6 address 2001:DB8:1:1::1/64 // Assign IPv6 address to interface
Router(config-if)# ipv6 enable // Enable IPv6 on the interface (required for SLAAC)
Router(config-if)# ipv6 nd other-config-flag // Optional: Set the "Other Config" flag
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# end
Router# copy running-config startup-config // Save configuration
```

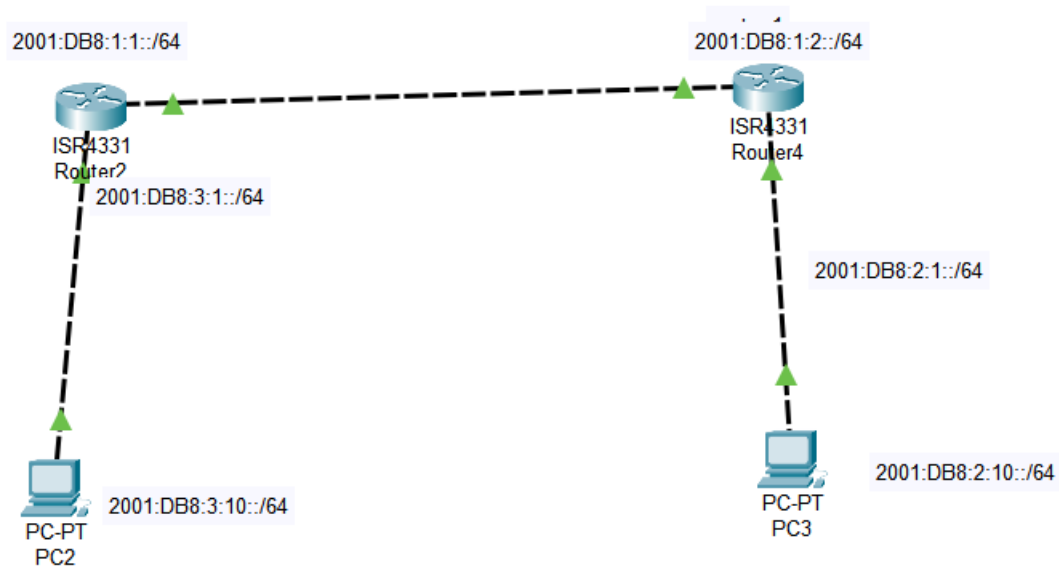
### PC4 and PC5 Configuration (SLAAC):

- **IPv6 Configuration:** Set to "Auto-Config" or "Stateless DHCP" (depending on Packet Tracer version). This tells the PCs to use SLAAC to obtain an IPv6 address.

## Verification:

- **PC IPv6 Address:** Check the IPv6 address on PC4 and PC5 using `ipconfig /all` (Windows) or `ifconfig` (Linux/macOS) to verify they received an address via SLAAC. You should see an address starting with 2001:DB8:2:10::.

## LAB 4:- Configuration of RIPng in IPv6



### Configuration Steps:

#### 1. Router2 Configuration:

```
Router> enable
Router# configure terminal
Router(config)# ipv6 unicast-routing // Enable IPv6 routing
Router(config)# interface GigabitEthernet0/0 // Interface to Router1
Router(config-if)# ipv6 address 2001:DB8:1:1::1/64
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# interface GigabitEthernet0/1 // Interface to Switch0
Router(config-if)# ipv6 address 2001:DB8:2:1::1/64
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# ipv6 router rip RIPNG // Enable RIPng
Router(config-rtr)# redistribute connected // Redistribute connected routes
Router(config-rtr)# exit
```

## 2. Router4 Configuration:

```
Router> enable
Router# configure terminal
Router(config)# ipv6 unicast-routing
Router(config)# interface GigabitEthernet0/0 // Interface to Router0
Router(config-if)# ipv6 address 2001:DB8:1:1::2/64
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# interface GigabitEthernet0/1 // Interface to Switch1
Router(config-if)# ipv6 address 2001:DB8:3:1::1/64
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# ipv6 router rip RIPNG
Router(config-rtr)# redistribute connected
Router(config-rtr)# exit
Router(config)# end
```

### PC2 Configuration (IPv6 Address and Gateway):

- **IPv6 Address:** 2001:DB8:2:10::10/64
- **IPv6 Gateway:** 2001:DB8:2:1::1

IT Can be static or may be Dynamic ip addressing

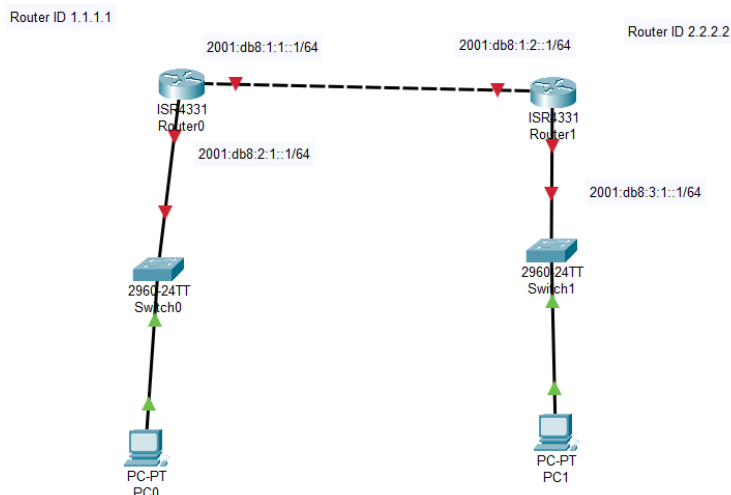
### 6. PC4 Configuration (IPv6 Address and Gateway):

- **IPv6 Address:** 2001:DB8:3:10::10/64
- **IPv6 Gateway:** 2001:DB8:3:1::1

### Verification:

- **Routing Table:** Use *show ipv6 route* on both routers to check the learned routes.
- **Connectivity:** Ping between PC2 and PC4 to verify end-to-end connectivity.

# LAB 5:- Configuration of OSPFv3 in IPv6



## For Router 1

Router>en

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#ipv6 unicast-routing

Router(config)#interface gigabitethernet0/0/0

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

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

interface gigabitethernet0/0/1

Router(config-if)#ipv6 address 2001:db8:1:2::1/64

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

interface gigabitethernet0/0/0

Router(config-if)#ipv6 ospf 1 area 0

%OSPFv3-4-NORTRID: OSPFv3 process 1 could not pick a router-id, please configure manually

Router(config-if)#interface gigabitethernet0/0/1

Router(config-if)#ipv6 ospf 1 area 0

Router(config-if)#ipv6 router ospf 1

Router(config-rtr)#router-id 1.1.1.1

Router(config-if)#end

write memory

## For router 2

Router>en

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#ipv6 unicast-routing

Router(config)#interface gigabitethernet0/0/0

Router(config-if)#ipv6 address 2001:db8:1:2::1/64

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up

interface gigabitethernet0/0/1

Router(config-if)#ipv6 address 2001:db8:3:1::1/64

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state to up

interface gigabitethernet0/0/0

Router(config-if)#ipv6 ospf 1 area 0

%OSPFv3-4-NORTRID: OSPFv3 process 1 could not pick a router-id, please configure manually

Router(config-if)#interface gigabitethernet0/0/1

Router(config-if)#ipv6 ospf 1 area 0

Router(config-if)#ipv6 router ospf 1

Router(config-rtr)#router-id 2.2.2.2

Router(config-if)#end

write memory

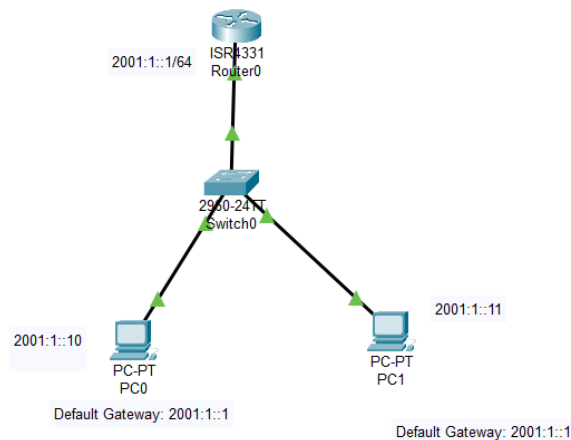
### Verification Commands:

**show ipv6 route**

**show ipv6 route ospf:** Displays the IPv6 routes learned via OSPFv3.

**show ipv6 ospf:** Shows general information about the OSPFv3 process.

# LAB 6:- ICMPv6 Configuration in Packet Tracer



## ICMPv6 Configuration in Packet Tracer

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

1. Click on **Router0**.
2. Go to the **CLI** tab.
3. Enter the following commands:

*Router> enable*

*Router# configure terminal*

*Router(config)# ipv6 unicast-routing*

### Step 2: Configure IPv6 Addresses On Router0

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

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

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

```
Router(config-if)# exit
```

### 1. On PC0

1. Click **PC0** > Desktop > **IPv6 Configuration**.
2. Uncheck **Auto Configuration**.
3. Set:
  - IPv6 Address: 2001:1::10
  - Subnet Prefix Length: 64
  - Default Gateway: 2001:1::1



## 2. On PC1

1. Click **PC1** > Desktop > **IPv6 Configuration**.
2. Uncheck **Auto Configuration**.
3. Set:

- IPv6 Address: 2001:1::11
- Subnet Prefix Length: 64
- Default Gateway: 2001:1::1

### Verify ICMPv6 Using Ping

On **PC0**, go to **Command Prompt** and type:

```
ping 2001:1::11
```

On **PC1**, try:

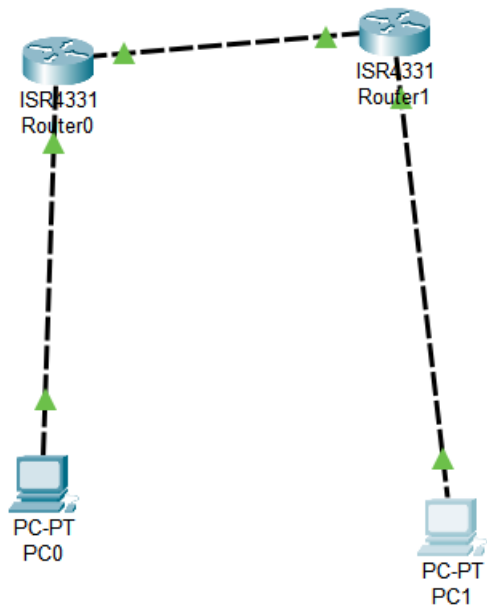
```
ping 2001:1::10
```

If configured correctly, you'll see successful ICMPv6 replies.

### To see the ICMPv6 packets in more detail:

1. Click the **"Simulation Mode"** button (looks like a fast-forward icon with a pause button below the topology).
2. **Initiate a ping from PC0 to PC1** as described in Step 3.
3. **Observe the Events:** In the "Simulation Panel" at the bottom, you will see ICMPv6 events.
4. **Click on an ICMPv6 event** to view the Packet Details at different OSI layers.

# LAB 7:- IPV6 to ipv4 tunneling



## 1.IP Addressing Plan

Device	Interface	IPv4	IPv6
PC0	NIC	192.168.10.2/24	2001:db8:10::2/64
Router0	G0/0	192.168.10.1/24	2001:db8:10::1/64
Router0	G0/1	10.0.0.1/30	2001:db8:1::1/64
Router1	G0/1	10.0.0.2/30	2001:db8:1::2/64
Router1	G0/0	192.168.20.1/24	2001:db8:20::1/64
PC1	NIC	192.168.20.2/24	2001:db8:20::2/64

## 2. Configure PC0 and PC1

Go to each PC > Desktop > IP Configuration

*For PC0:*

- IPv4 Address: 192.168.10.2
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.10.1
- IPv6 Address: 2001:db8:10::2/64
- Default Gateway: 2001:db8:10::1

*For PC1:*

- IPv4 Address: 192.168.20.2
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.20.1
- IPv6 Address: 2001:db8:20::2/64
- Default Gateway: 2001:db8:20::1

### 3. Configure Router0

```
enable
conf t

interface g0/0
ip address 192.168.10.1 255.255.255.0
ipv6 address 2001:db8:10::1/64
no shutdown

interface g0/1
ip address 10.0.0.1 255.255.255.252
ipv6 address 2001:db8:1::1/64
no shutdown

exit
ipv6 unicast-routing
```

### 4. Configure Router1

```
enable
conf t

interface g0/0
ip address 192.168.20.1 255.255.255.0
ipv6 address 2001:db8:20::1/64
no shutdown

interface g0/1
ip address 10.0.0.2 255.255.255.252
ipv6 address 2001:db8:1::2/64
no shutdown

exit
ipv6 unicast-routing
```

### Verification Step

- From PC0:
  - Ping 192.168.20.2 (PC1)
  - Ping 2001:db8:20::2
- From PC1:
  - Ping 192.168.10.2 (PC0)
  - Ping 2001:db8:10::2

Use **ping** and **ipconfig** from PC's Command Prompt