

# NETWORKING ASSIGNMENT-3

## Cisco tracer lab assignments

### Lab Objective:

To configure static routing on a network with four routers, four switches, and eight PCs using Cisco Packet Tracer.

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### Equipment Required:

- 4 Routers
  - 4 Switches (2960)
  - 8 PCs
  - Copper Straight-Through and Serial Cables
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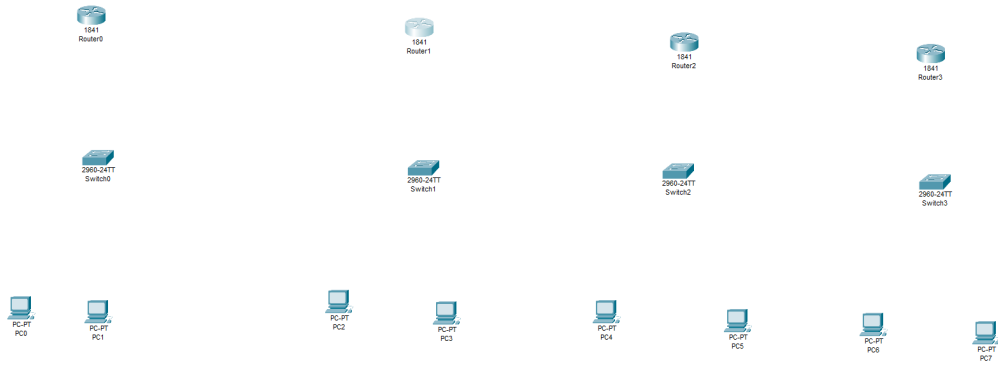
### Network Configuration Steps:

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#### Step 1: Set Up the Network Topology

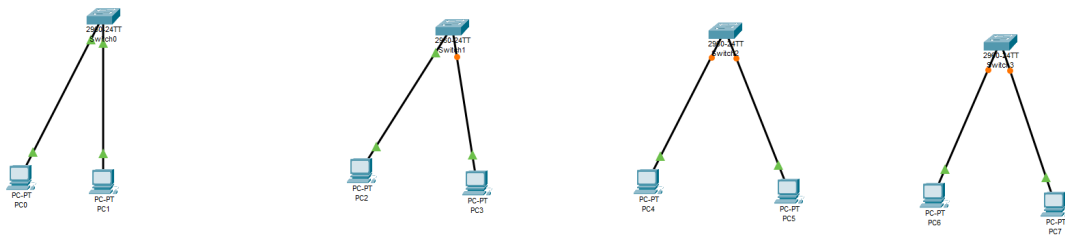
#### Add Devices to the Workspace:

1. Drag and drop four routers and four switches into the Cisco Packet Tracer workspace.
2. Add eight PCs, naming them PC1 to PC8.



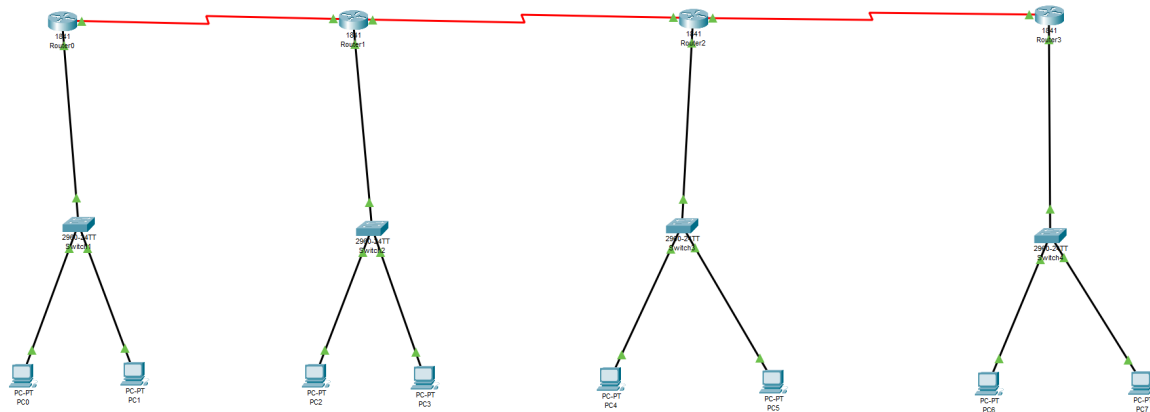
## Connect Devices Using Copper Straight-Through Cables:

1. Connect the following devices:
  - PC1 and PC2 to Switch-0
  - PC3 and PC4 to Switch-1
  - PC5 and PC6 to Switch-2
  - PC7 and PC8 to Switch-3
2. Connect each switch to its corresponding router's GigabitEthernet port.



## Connect Routers Using Serial Cables:

1. Use Serial DCE cables to connect the routers in the following configuration:
  - Router 1 to Router 2
  - Router 2 to Router 3
  - Router 3 to Router 4
  - Optionally, Router 4 back to Router 1 (for a loop)



## Step 2: Assign IP Addresses

### Assign IP Addresses to Routers:

#### 1. Router 1:

- Interface G0/0: 192.168.1.1/24
- Serial 0/0/0: 11.0.0.1/30 (connect to Router 2)

#### 2. Router 2:

- Interface G0/0: 192.168.2.1/24
- Serial 0/0/0: 11.0.0.2/30 (connect to Router 1)
- Serial 0/0/1: 12.0.0.1/30 (connect to Router 3)

#### 3. Router 3:

- Interface G0/0: 192.168.3.1/24
- Serial 0/0/0: 12.0.0.2/30 (connect to Router 2)
- Serial 0/0/1: 13.0.0.1/30 (connect to Router 4)

#### 4. Router 4:

- Interface G0/0: 192.168.4.1/24
- Serial 0/0/0: 13.0.0.2/30 (connect to Router 3)
- Optionally, Serial 0/0/1: 11.0.0.3/30 (connect to Router 1)

The screenshot shows the configuration window for Router0, specifically the 'Config' tab. The left sidebar contains a tree view with categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE (FastEthernet0/0, FastEthernet0/1, Serial0/0/0, Serial0/0/1). The main area is titled 'FastEthernet0/0' and contains the following settings:

- Port Status: ☒ On
- Bandwidth: ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto
- MAC Address: 00D0.FF49.0B01
- IP Configuration:
  - IPv4 Address: 192.168.1.1
  - Subnet Mask: 255.255.255.0
- Tx Ring Limit: 10

Below the configuration area, there is a section titled 'Equivalent IOS Commands' containing the following commands:

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Router(config)#interface FastEthernet0/0
Router(config-if)#
```

At the bottom left, there is a 'Top' button.

## Assign IP Addresses to PCs:

- **PC1:** 192.168.1.2/24, Default Gateway 192.168.1.1
- **PC2:** 192.168.1.3/24, Default Gateway 192.168.1.1
- **PC3:** 192.168.2.2/24, Default Gateway 192.168.2.1
- **PC4:** 192.168.2.3/24, Default Gateway 192.168.2.1
- **PC5:** 192.168.3.2/24, Default Gateway 192.168.3.1
- **PC6:** 192.168.3.3/24, Default Gateway 192.168.3.1
- **PC7:** 192.168.4.2/24, Default Gateway 192.168.4.1

- **PC8:** 192.168.4.3/24, Default Gateway 192.168.4.1

The screenshot shows the configuration window for PC0, specifically the 'Desktop' tab. The 'IP Configuration' section is active, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected for both IPv4 and IPv6 configurations. The IPv4 settings are: IPv4 Address 192.168.1.2, Subnet Mask 255.255.255.0, Default Gateway 192.168.1.1, and DNS Server 0.0.0.0. The IPv6 settings are: IPv6 Address (empty), Link Local Address FE80::210:11FF:FE2C:8677, Default Gateway (empty), and DNS Server (empty). The '802.1X' section is also visible, with 'Use 802.1X Security' unchecked, Authentication set to MD5, and Username and Password fields empty.

PC0

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.1.2

Subnet Mask 255.255.255.0

Default Gateway 192.168.1.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::210:11FF:FE2C:8677

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

### Step 3: Assign Default Gateways to PCs:

1. **PC1 & PC2:** Default Gateway 192.168.1.1
2. **PC3 & PC4:** Default Gateway 192.168.2.1
3. **PC5 & PC6:** Default Gateway 192.168.3.1
4. **PC7 & PC8:** Default Gateway 192.168.4.1

PC0

Physical **Config** Desktop Programming Attributes

**GLOBAL**

Settings

Algorithm Settings

**INTERFACE**

FastEthernet0

Bluetooth

Global Settings

Display Name PC0

Interfaces FastEthernet0

Gateway/DNS IPv4

☐ DHCP

☒ Static

Default Gateway 192.168.1.1

DNS Server

Gateway/DNS IPv6

☐ Automatic

☒ Static

Default Gateway

DNS Server

☐ Top

## Step 4: Configure Static Routing on Routers

### Router 0 Configuration (Router 1)

Configure the static routes on Router 1 (Router 0) to route traffic between different subnets and across the network.

```
plaintext
Copy code
Router0(config)# ip route 192.168.2.0 255.255.255.0 11.0.0.2
Router0(config)# ip route 192.168.3.0 255.255.255.0 12.0.0.
```

```
2
Router0(config)# ip route 192.168.4.0 255.255.255.0 13.0.0.
2
Router0(config)# ip route 12.0.0.0 255.0.0.0 11.0.0.2
Router0(config)# ip route 13.0.0.0 255.0.0.0 12.0.0.2
```

## Router 1 Configuration (Router 2)

```
Router1(config)# ip route 192.168.1.0 255.255.255.0 11.0.0.
1
Router1(config)# ip route 192.168.3.0 255.255.255.0 12.0.0.
3
Router1(config)# ip route 192.168.4.0 255.255.255.0 12.0.0.
3
Router1(config)# ip route 13.0.0.0 255.0.0.0 12.0.0.3
```

## Router 2 Configuration (Router 3)

```
Router2(config)# ip route 192.168.1.0 255.255.255.0 12.0.0.
1
Router2(config)# ip route 192.168.2.0 255.255.255.0 12.0.0.
1
Router2(config)# ip route 192.168.4.0 255.255.255.0 13.0.0.
3
Router2(config)# ip route 11.0.0.0 255.255.255.252 12.0.0.1
```

## Router 3 Configuration (Router 4)

```
Router3(config)# ip route 192.168.1.0 255.255.255.0 13.0.0.
1
Router3(config)# ip route 192.168.2.0 255.255.255.0 13.0.0.
```

1

```
Router3(config)# ip route 192.168.3.0 255.255.255.0 13.0.0.1
```

1

```
Router3(config)# ip route 11.0.0.0 255.255.255.252 13.0.0.1
```

The screenshot shows the configuration interface for Router0. The 'Config' tab is selected, and the 'Static Routes' section is active. The left sidebar shows a tree view with categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE (FastEthernet0/0, FastEthernet0/1, Serial0/0/0, Serial0/0/1). The 'Static Routes' section has input fields for Network, Mask, and Next Hop, with an 'Add' button. Below this is a table of configured static routes:

Network Address
192.168.2.0/24 via 11.0.0.3
192.168.3.0/24 via 11.0.0.3
192.168.4.0/24 via 11.0.0.3
12.0.0.0/8 via 11.0.0.3
13.0.0.0/8 via 12.0.0.3

At the bottom, the 'Equivalent IOS Commands' section shows a terminal window with the following commands:

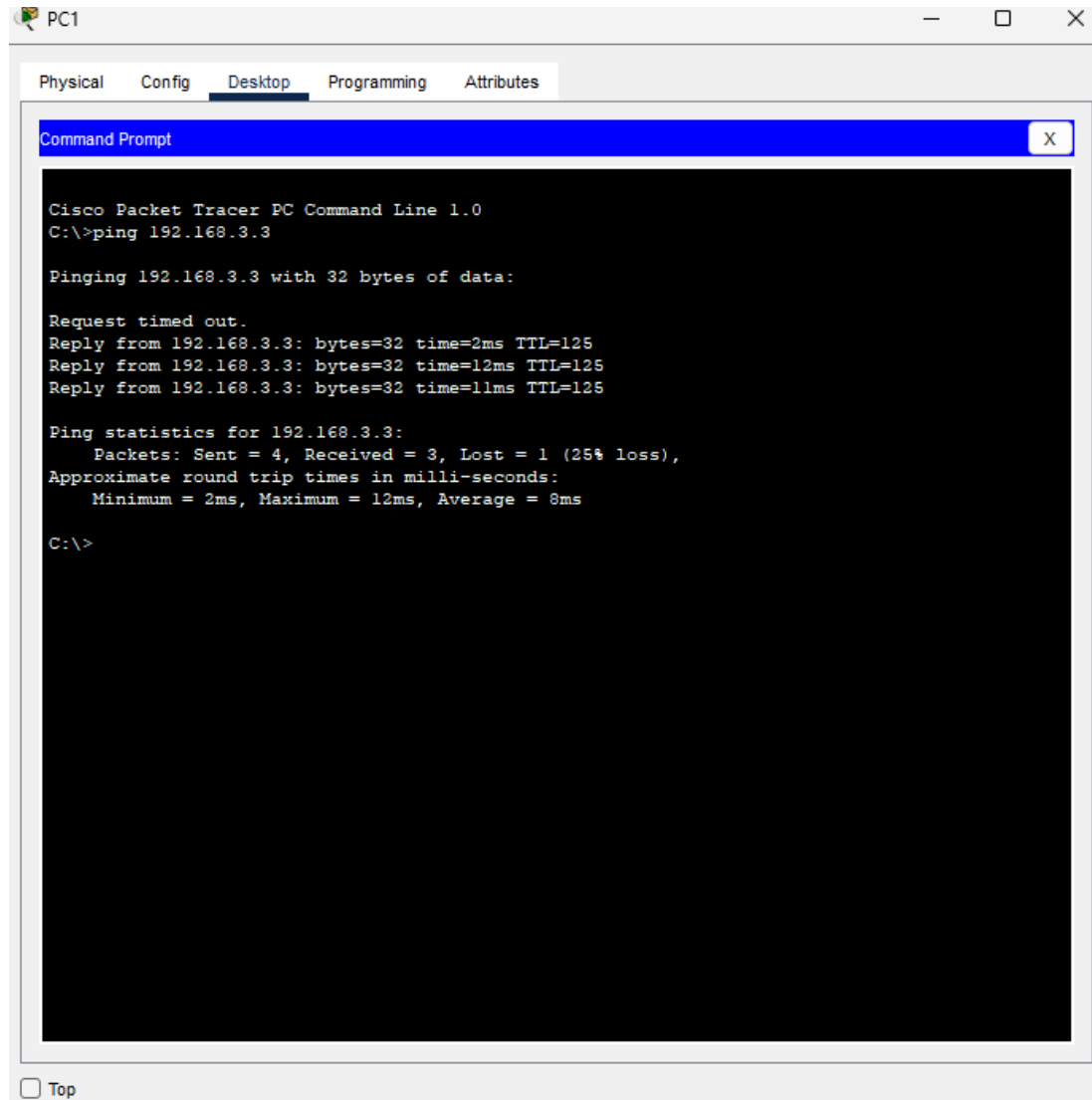
```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#
```

## Step 5: Verify Connectivity

### 1. Ping Tests:



- After configuring static routes, test the connectivity between PCs on different networks using **ping**.
- Example: Ping from **PC1** to **PC5** to verify communication across routers.



The screenshot shows a Cisco Packet Tracer PC Command Line window for PC1. The window has tabs for Physical, Config, Desktop (selected), Programming, and Attributes. The Command Prompt displays the following text:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.3.3

Pinging 192.168.3.3 with 32 bytes of data:

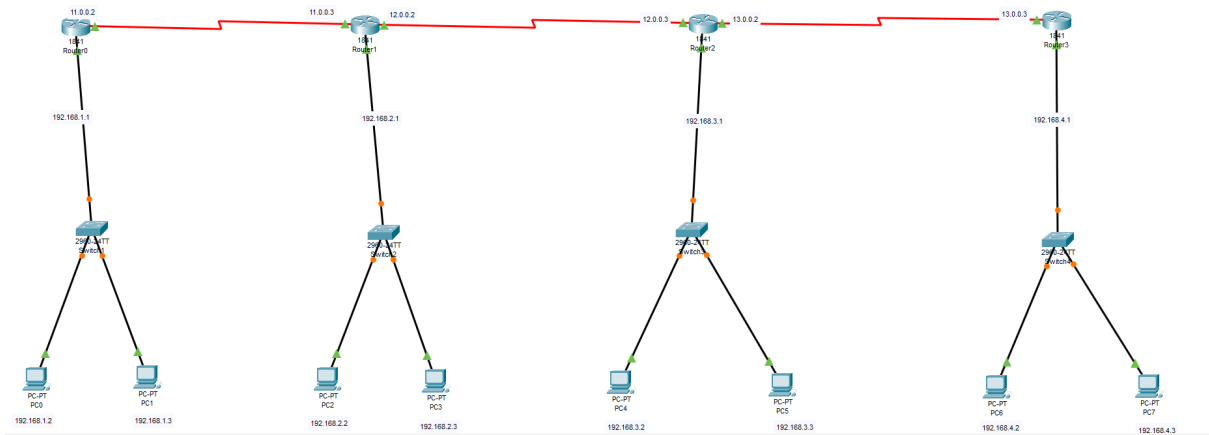
Request timed out.
Reply from 192.168.3.3: bytes=32 time=2ms TTL=125
Reply from 192.168.3.3: bytes=32 time=12ms TTL=125
Reply from 192.168.3.3: bytes=32 time=11ms TTL=125

Ping statistics for 192.168.3.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 12ms, Average = 8ms

C:\>
```

At the bottom left of the window, there is a checkbox labeled "Top" which is currently unchecked.

## Final Look



## Conclusion:

This lab successfully configured static routing across four routers, allowing PCs from different subnets to communicate with each other. The process demonstrated the importance of static routing in directing traffic between different networks and provided a foundational understanding of routing, IP addressing, and subnetting.

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