ST. XAVIER'S COLLEGE
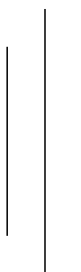## Maitighar, Kathmandu

(Affiliated by Tribhuvan University)

(Department of Computer Science)

Business Data Communication and Networking [IT 240]

Lab Report 5

DYNAMIC ROUTING

SUBMITTED BY:	SUBMITTED TO:	SIGNATURE
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LAB 5: LAB REPORT ON DYNAMIC ROUTING CONFIGURATION IN CISCO PACKET TRACER

OBJECTIVE

• To configure dynamic routing on routers in a network using Cisco Packet Tracer.

THEORY

Dynamic Routing: Dynamic routing is a network routing method where routers can select paths based on routing algorithms and network status. Unlike static routing, where routes are manually configured, dynamic routing protocols allow routers to share information about the networks they can reach and automatically update routing tables based on changes in the network topology. This enables routers to adapt to network changes such as link failures or new network connections.

Dynamic routing protocols use various algorithms to determine the best path for data packets. Common dynamic routing protocols include:

- **Routing Information Protocol (RIP):** A distance-vector routing protocol that uses hop count as a metric to determine the best path to a destination network. RIP routers broadcast routing information updates at regular intervals.
- **Open Shortest Path First (OSPF):** A link-state routing protocol that uses a cost metric based on link bandwidth to determine the best path to a destination network. OSPF routers exchange link-state advertisements (LSAs) to build a topology map of the network.
- **Enhanced Interior Gateway Routing Protocol (EIGRP):** A hybrid routing protocol that combines features of both distance-vector and link-state routing protocols. EIGRP routers exchange routing information and use a composite metric based on bandwidth, delay, reliability, and load to determine the best path.

PROCEDURE

To setup dynamic routing in CISCO Packet Tracer

1. **Setting Up the Topology:**
- Place three routers (Router0, Router1 and Router2) on the Packet Tracer workspace.
- Connect Router0 with
    - Router1 using serial cables, assigning IP addresses 10.0.0.1/30 in se0/0/0 port.
    - Router2 using serial cables, assigning IP addresses 10.0.0.5/30 in se0/1/0 port.
- Connect Router1 with
    - Router0 using serial cables, assigning IP addresses 10.0.0.2/30 in se0/0/0 port.
    - Router2 using serial cables, assigning IP addresses 10.0.0.10/30 in se0/1/0 port.
- Connect Router2 with
    - Router0 using serial cables, assigning IP addresses 10.0.0.6/30 in se0/0/0 port.
    - Router1 using serial cables, assigning IP addresses 10.0.0.9/30 in se0/1/0 port.
- Place two switches (Switch0 and Switch1) on the workspace.
- Connect Switch0 and Switch1 to Router0 and Router 1 respectively using appropriate cables, assigning IP addresses 192.168.1.1/24 and 192.168.2.1/24 to the router interfaces (fa0/0).
- Connect two end-devices (e.g., PCs) to each switch and assign the network addresses.
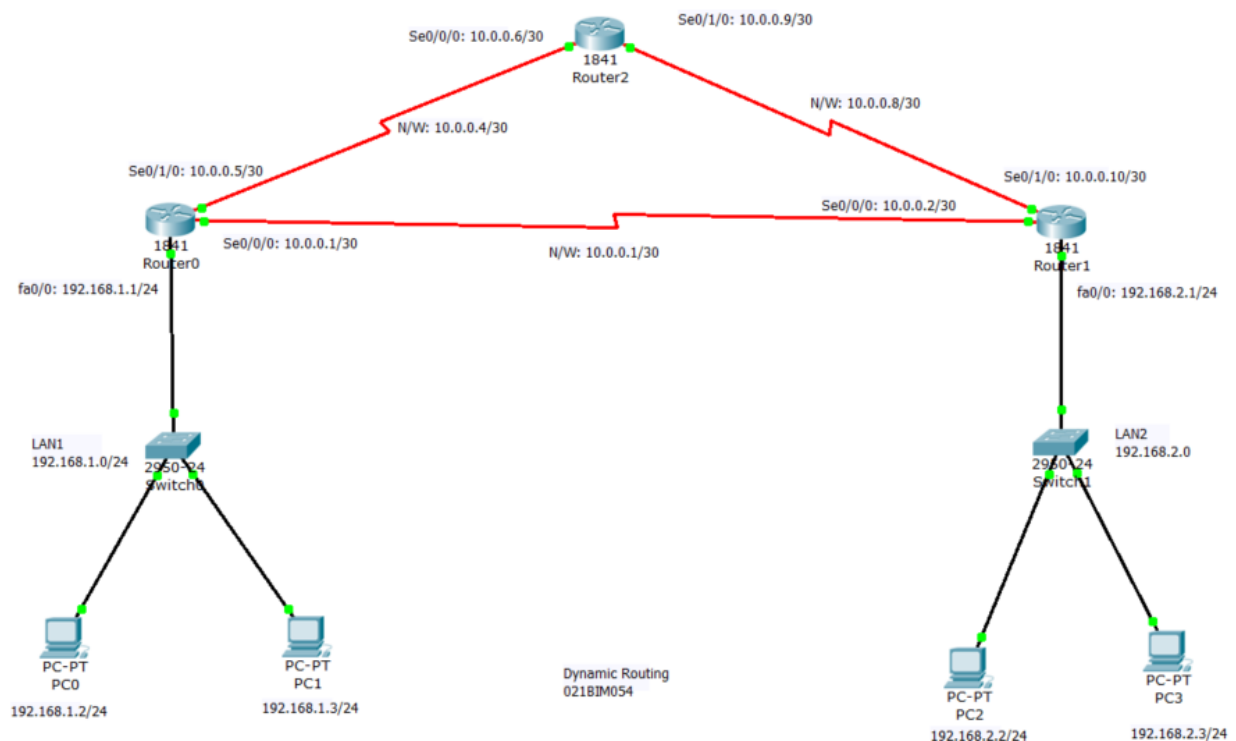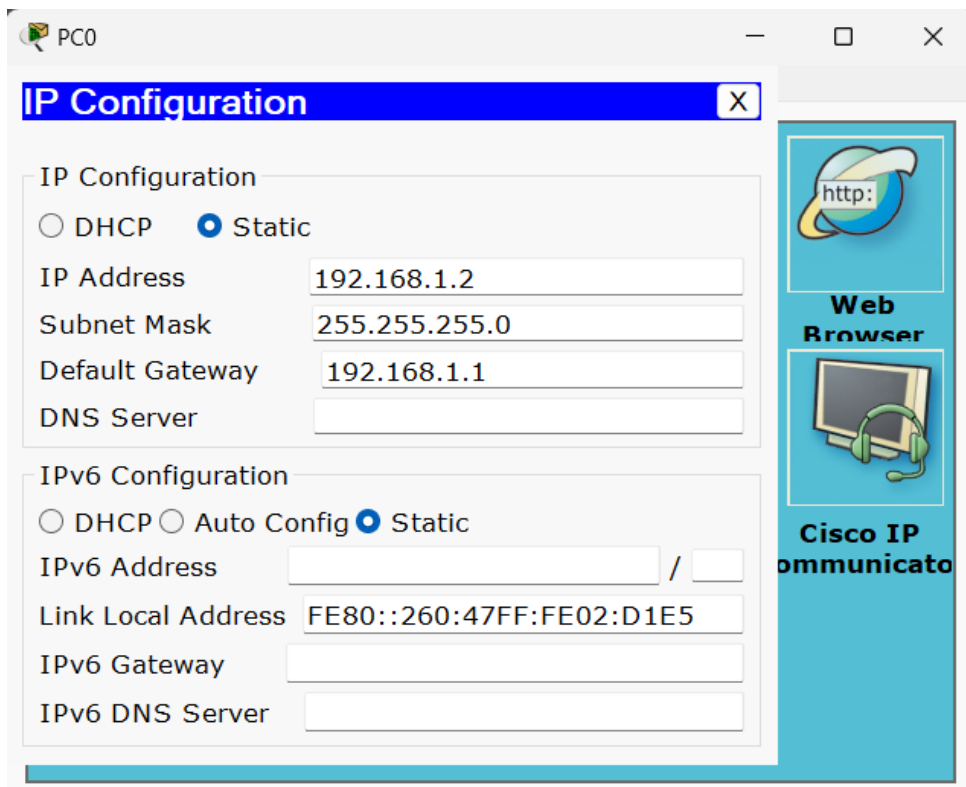
Figure 1: Network Topology

Figure 2: End-Device IP Configuration

Figure 3: Router Ip configuration.

2. **Configuring Routers:**
- Enter privileged EXEC mode: enable.
- Enter global configuration mode: configure t.
- Configure static routes for networks using command:
    - route rip
    - network **<Network ID>**
- For Router 0
    - route rip
    - network 102.168.1.0
    - network 10.0.0.0
- For Router 1
    - route rip
    - network 102.168.2.0
    - network 10.0.0.0
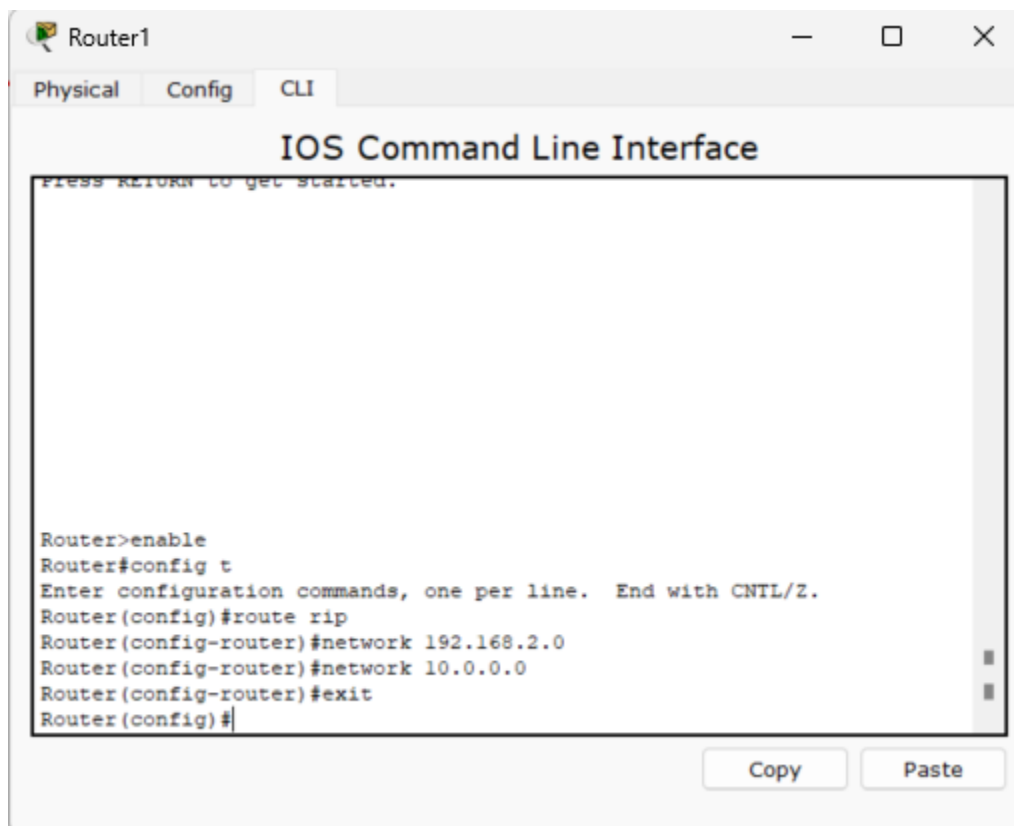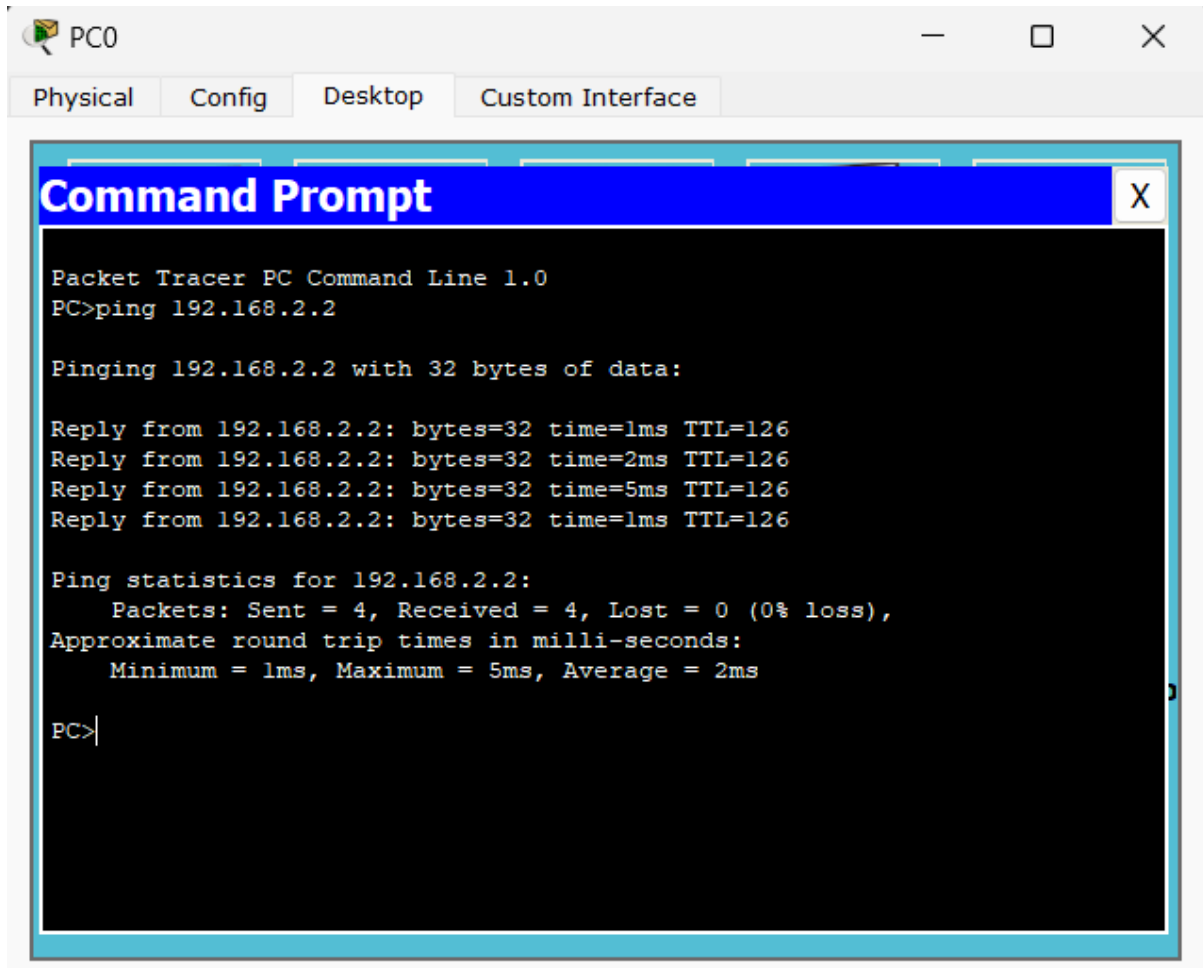- For Router 2
    - route rip
    - network 10.0.0.0

Figure 4: Dynamic Routing on Router 1

3. Testing Connectivity:

Verify connectivity between devices in different networks by pinging from one device to another.

```
PC0                                                    —    □    X

Physical    Config    Desktop    Custom Interface

Command Prompt                                              X

Packet Tracer PC Command Line 1.0
PC>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
Reply from 192.168.2.2: bytes=32 time=2ms TTL=126
Reply from 192.168.2.2: bytes=32 time=5ms TTL=126
Reply from 192.168.2.2: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 5ms, Average = 2ms

PC>
```

CONCLUSION

In this lab, we successfully configured the dynamic routes between the routers and enabled connectivity between the routers which we checked via pinging in CISCO Packet Tracer.