LAB 5: CONFIGURATION OF STATIC ROUTES AND DEFAULT ROUTES

OBJECTIVES

1. To understand the concept of Static Routing and Default Routing for manual path selection in a network.

2. To configure a network topology using Cisco Packet Tracer that connects different networks using Static and Default routes to visualize the flow of packets between different networks.

SOFTWARE AND HARDWARE REQUIREMENTS

1. Cisco Packet Tracer (Version 6.2 or higher)

2. Windows PC/Laptop

THEORY

1. Static Routing

Static routing is the practice of manually configuring routing entries in the router's routing table. It involves the network administrator defining the specific path that data packets must take to reach a destination network.

Operation: It works by using the command

```
ip route [destination_network] [subnet_mask] [next_hop_address]
```

The router looks at this manual entry to determine where to forward the packet. If the link fails, the administrator must manually update the route.

Application: Used in small networks where the topology is simple and does not change often. It is also used for security purposes to hide parts of a network.

2. Default Routing

Default routing is a specific type of static routing that acts as a "gateway of last resort." It allows the router to forward all packets to a specific next-hop router if the destination network is not found in the routing table.

Operation: It involves configuring a route with all zeros:

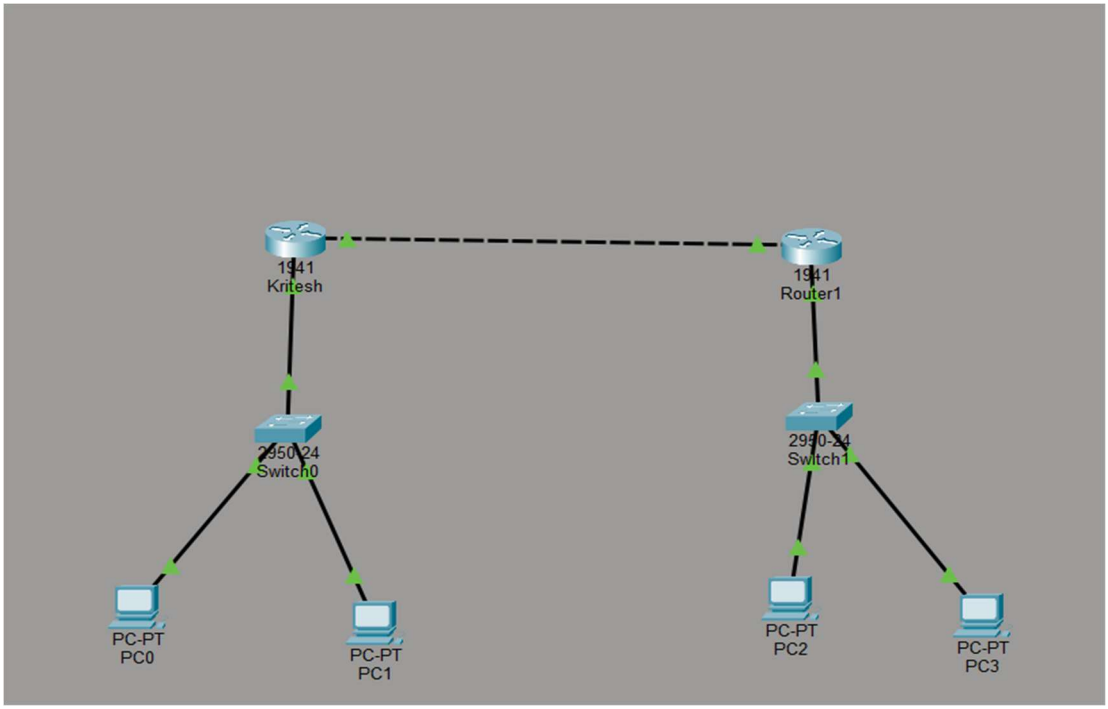
```
ip route 0.0.0.0 0.0.0.0 [next_hop_address]
```

This tells the router to send any unknown traffic to the specified neighbor.

Application: Used primarily in stub networks (networks with only one exit path) or to connect a network to the Internet via an ISP. It reduces the size of the routing table.

NETWORK TOPOLOGY

A topology was created using two routers: "Kritesh" and "Router1". These routers are connected via a serial link. Switch0 connects PC0 and PC1 to the "Kritesh" router, forming the first network. Switch1 connects PC2 and PC3 to "Router1", forming the second network.



CONFIGURATION TABLE:

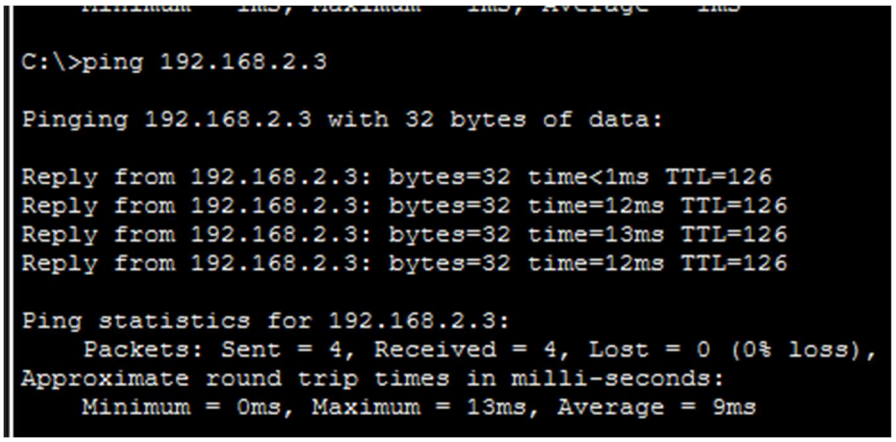
Device	Interface	IPv4 Address	Subnet Mask	Default Gateway
Router Kritesh	GigabitEthernet0/0	10.0.0.1	255.0.0.0	N/A
Router Kritesh	GigabitEthernet0/1	192.168.1.1	255.255.255.0	N/A
Router1	GigabitEthernet0/0	10.0.0.2	255.0.0.0	N/A
Router1	GigabitEthernet0/1	192.168.2.1	255.255.255.0	N/A
PC0	FastEthernet0	192.168.1.2	255.255.255.0	192.168.1.1
PC1	FastEthernet0	192.168.1.3	255.255.255.0	192.168.1.1
PC2	FastEthernet0	192.168.2.2	255.255.255.0	192.168.2.1
PC3	FastEthernet0	192.168.2.3	255.255.255.0	192.168.2.1

Routing Configuration

Device	Routing Type	Command / Route
Router Kritesh	Static Route	ip route 192.168.2.0 255.255.255.0 10.0.0.2
Router1	Static Route	ip route 192.168.1.0 255.255.255.0 10.0.0.1
Router Kritesh	Default Route (Alt)	ip route 0.0.0.0 0.0.0.0 10.0.0.2

RESULT

The network was successfully configured. To verify the connectivity, a ping request was sent from PC1 (192.168.1.3) in the first network to PC2 (192.168.2.3) in the second network. The packets were sent and received successfully which validates that the static route is correct and similar was done for default route connection testing.



DISCUSSION AND CONCLUSION

During the lab session, we implemented the concept of static routes and default routes to better understand how routers forward packets between different networks. Static routing allowed us to manually define the path for data transmission, ensuring security and control. Default routing helped in simplifying the routing table for the stub network.

Hence the lab was completed with a proper knowledge and implementation of static and default routing using Cisco Packet Tracer.