Lab no: 9 ***Date: 2024/09/26***

Title: Dynamic Routing Implementation using RIP

Objectives:

- To understand the principles of dynamic routing
- To learn how to configure dynamic routes using Routing Information Protocol (RIP)

Background Theory:

Dynamic routing is a technique where routers automatically share routing information and adjust to changes in the network topology without manual intervention. Routing Information Protocol (RIP) is one of the oldest dynamic routing protocols, using a distance-vector algorithm to determine the best path for data transmission. It communicates routing updates at regular intervals, enabling routers to dynamically update their routing tables based on network changes. RIP is simple to configure and suitable for smaller networks. Proper implementation ensures adaptive communication, reducing administrative overhead compared to static routing.

Process for Dynamic Routing using RIP:

Step 1: Setup an environment with 3 routers, 3 switches and some desktops, ensuring all devices are connected properly.

Step 2: Manually assign IP addresses and subnet masks to the desktops, router interfaces, and the interface of each router.

Step 3: Access the configuration panel of the first router.

Step 4: Navigate to the ***"Routing"*** section. Select ***"RIP"*** from the routing protocols.

Step 5: Add the network addresses connected to this router under the ***"RIP"*** configuration panel.

Step 6: Follow the same process on the other router ensuring that all relevant networks are added to their respective RIP configurations.

Step 7: Verify the configuration using Ping tool to confirm end to end connectivity. Ensure that the routers have exchanged routing tables dynamically using RIP.

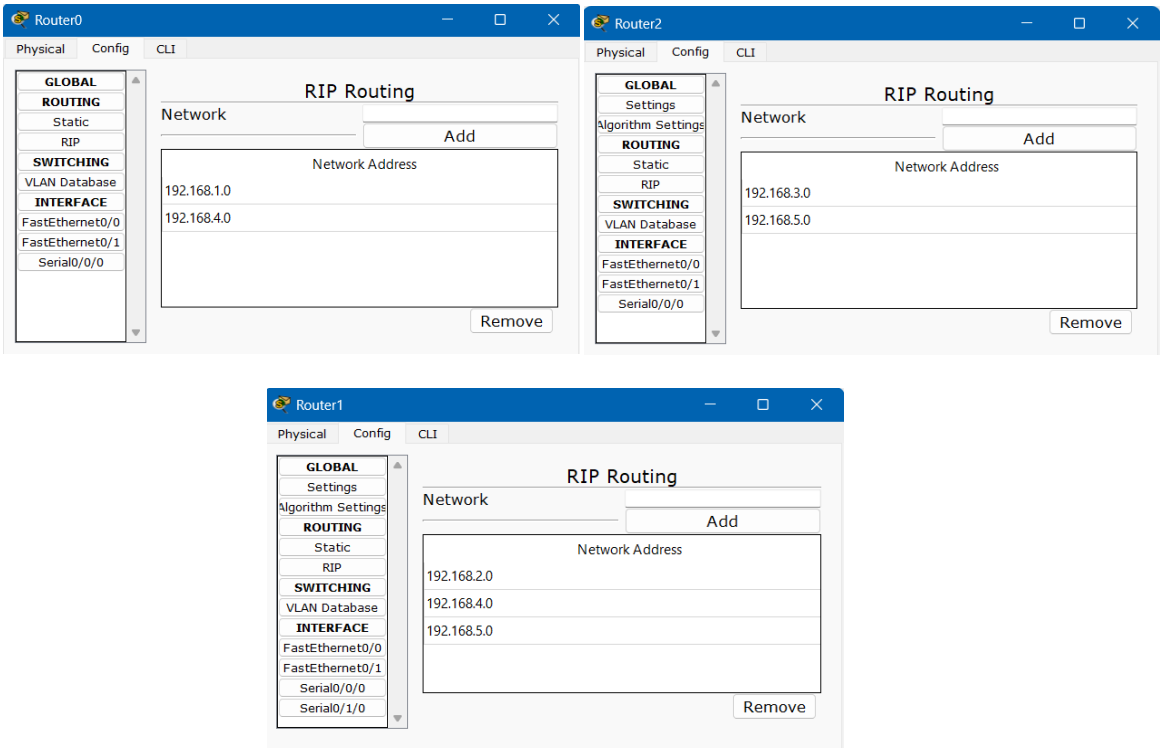

Fig: RIP Network Routing

Observation and Findings:

Implementing RIP Protocol for dynamic routing using 3 routers, 3 switches and some desktops.

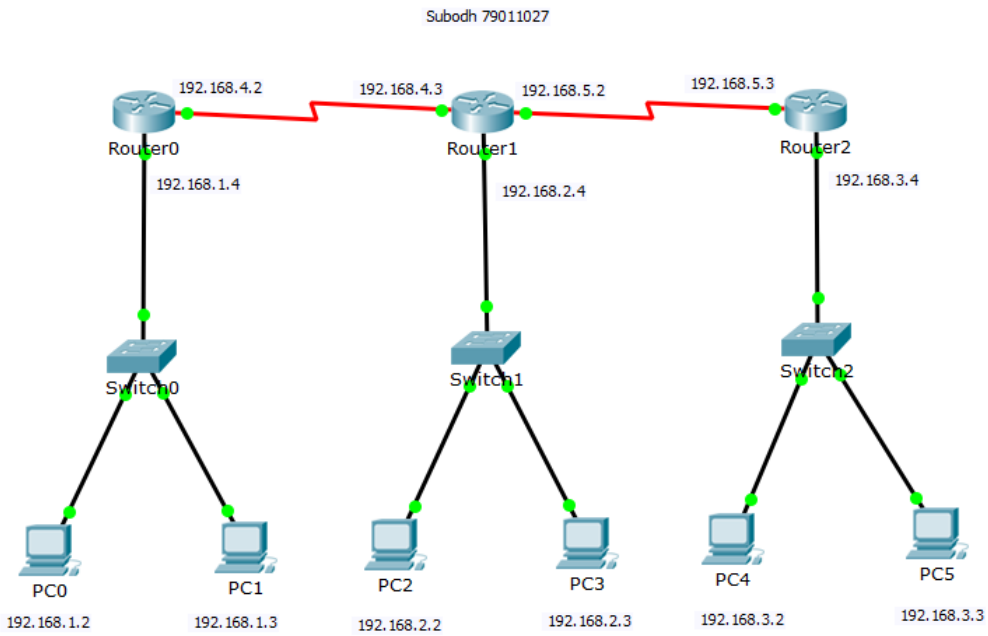

Fig: Dynamic Routing using RIP

Output:

```
Packet Tracer PC Command Line 1.0
PC>ping 192.168.2.3

Pinging 192.168.2.3 with 32 bytes of data:

Reply from 192.168.2.3: bytes=32 time=2ms TTL=126
Reply from 192.168.2.3: bytes=32 time=1ms TTL=126
Reply from 192.168.2.3: bytes=32 time=1ms TTL=126
Reply from 192.168.2.3: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.2.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms

PC>
```

Discussions:

The routers were configured using a GUI interface to implement dynamic routing with the Routing Information Protocol (RIP) for managing network traffic between different subnets. The process involved assigning IP addresses to router interfaces and desktops, enabling RIP on the routers, and specifying the networks to be advertised. RIP dynamically exchanged routing information between the routers, ensuring adaptive updates to routing tables. Successful ping tests between devices confirmed that the RIP-based dynamic routes were correctly implemented, enabling seamless communication between networks. This demonstrates the simplicity and flexibility provided by dynamic routing protocols in handling network configurations.

Conclusion:

Implementing dynamic routing using RIP allowed for efficient and automated management of network traffic between subnets. The successful connectivity tests validated that RIP was configured correctly, ensuring adaptive and efficient data flow across the networks while minimizing manual intervention.