Green University of Bangladesh
Department of Computer Science and Engineering (CSE)
Faculty of Sciences and Engineering
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Lab Report NO: 04
Course Title: Computer Networking Lab

Course Code: CSE-304   **Section:221-D21**

Lab Experiment Name: Configuration of static and dynamic routing protocols.

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Lab Report Status
Marks: ……………………………
Signature:.....................
Comments:...
Date:.............................

1. TITLE OF THE LAB REPORT EXPERIMENT
Configuration of static and dynamic routing protocols.

2. OBJECTIVES
This lab experiment involves creating a mesh networking for both static and dynamic routing.In case of static routing, we will define the path which will be followed from source to destination carrying the message.Conversely, for dynamic routing RIP(Routing Information Protocol) will be used where we will just input the router connected with the network. The specific objectives of this lab experiment are:

- To configure static routing in a network topology.
- To implement dynamic routing protocols (e.g., RIP, OSPF) in a simulated network.
- To analyze the performance and functionality of both static and dynamic routing.
- To compare the advantages and disadvantages of static and dynamic routing in terms of scalability, simplicity, and fault tolerance

3. ANALYSIS

Routing is an essential process in computer networks, enabling data packets to find their paths from source to destination. This lab focuses on configuring and analyzing both static and dynamic routing protocols using a Packet Tracer simulation. Static routing requires manual configuration, while dynamic routing adapts automatically to changes in the network topology. By implementing both types of routing in this lab, we will explore their functionalities and evaluate their use cases.

The lab consists of a simulated network created in Cisco Packet Tracer. The topology includes multiple routers and subnets, interconnected to represent a realistic network environment. Static routes were configured manually, and dynamic routing protocols such as RIP were applied to demonstrate automatic route discovery and management.

Key Components:

1. Multiple routers with interconnected FastEthernet and Serial interfaces.
2. Various subnets configured with unique IP addressing schemes(six different networks are assigned here).
3. Static and dynamic routing protocols implemented to manage data traffic.

4. IMPLEMENTATION

The program is implemented in Java,Static Routing Configuration

Define Static Routes:

For each router, static routes were added using the Config tab in Packet Tracer.

Example:

Network: 192.168.1.0,192.168.2.0 ……………….. 192.168.6.0 (six different networks)

Mask: 255.255.255.0

Next Hop: 192.168.4.2

Verification:

Used ping commands from devices to ensure connectivity.

Checked routing tables to confirm that static routes were added correctly.

Dynamic Routing Configuration (RIP)

Enable RIP Protocol:

On each router, RIP was activated using the Config tab.

Networks directly connected to each router were added to the RIP protocol.

Example:

Router 1: Added 192.168.1.0/24 and 192.168.2.0/24 to RIP.

Verification:

Observed automatic propagation of routes in the routing tables.

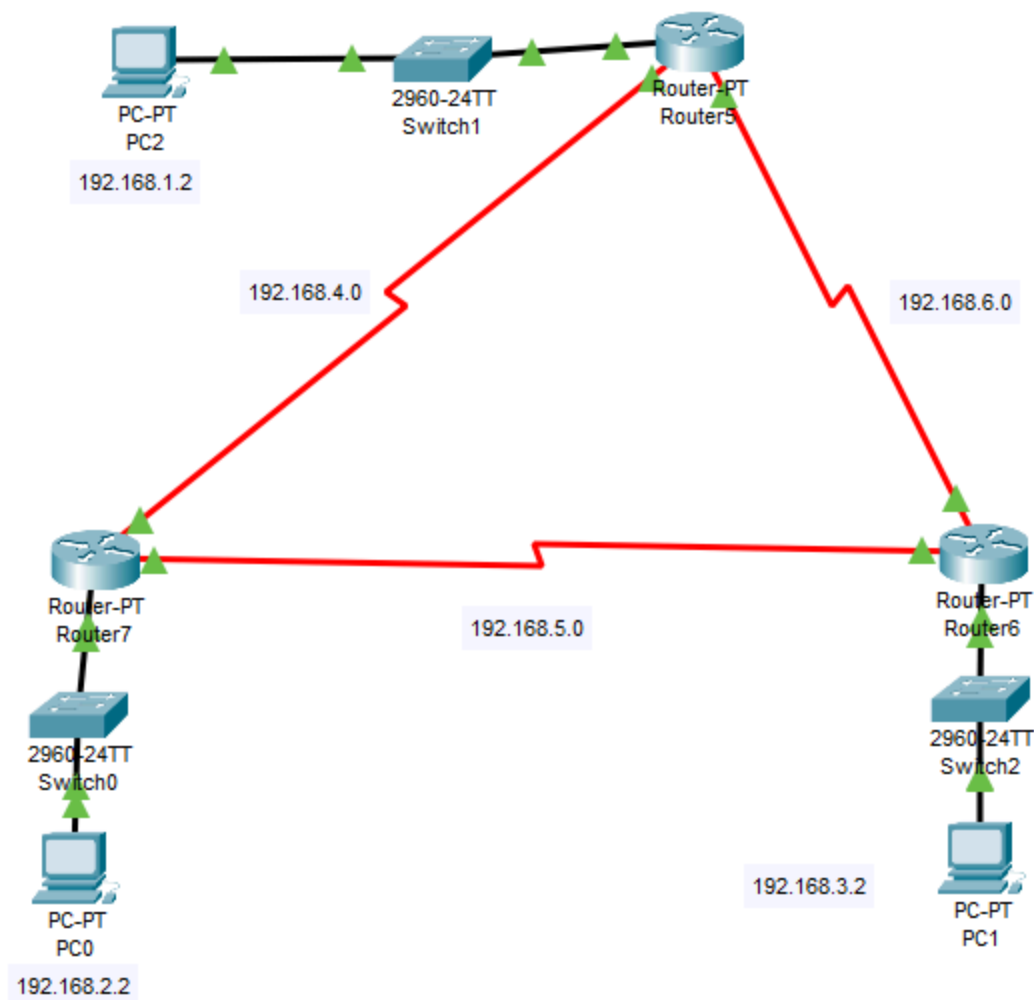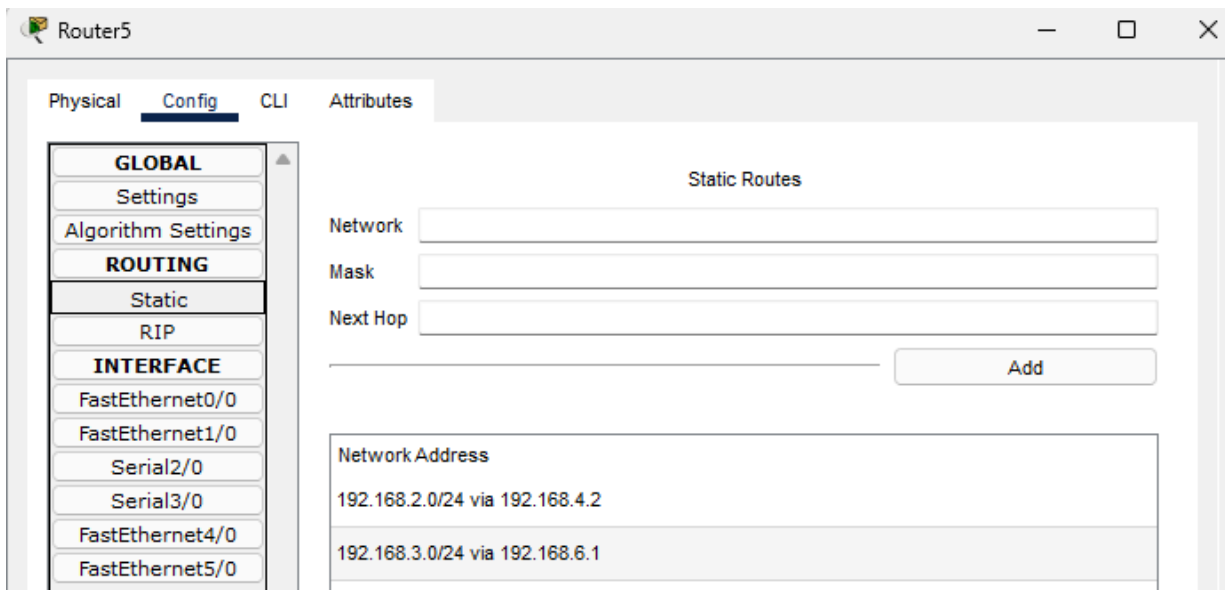Used ping commands to verify end-to-end connectivity.

Fig 01: Configuring the routers as well as assigning the IP address to each device.
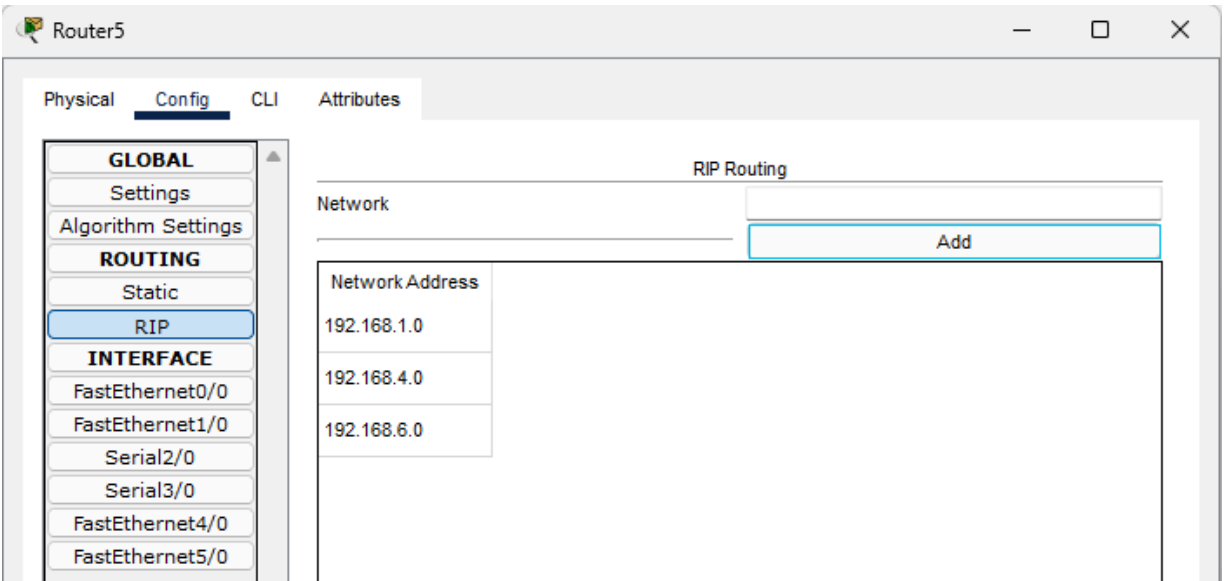

Router5

Physical   Config   CLI   Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
INTERFACE
FastEthernet0/0
FastEthernet1/0
Serial2/0
Serial3/0
FastEthernet4/0
FastEthernet5/0

Static Routes

Network

Mask

Next Hop

Add

Network Address

192.168.2.0/24 via 192.168.4.2

192.168.3.0/24 via 192.168.6.1

Fig 03: Configuring the static and dynamic routing.

OUTPUT

The console output will display the result of the DNS query based on the user's input. For example, if the user queries "google.com," the output will look like this:

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
●	Successful	PC2	PC1	ICMP		0.000	N	3	(edit)	
●	Successful	Router7	PC1	ICMP		0.000	N	4	(edit)	
●	Failed	PC2	PC0	ICMP		0.000	N	5	(edit)	
●	Successful	PC2	PC0	ICMP		0.000	N	6	(edit)	

Fig 04: Showing the message after a successful sending operation.

6. ANALYSIS AND DISCUSSION

In this lab, the configuration and comparison of static and dynamic routing protocols were successfully demonstrated. Static routing, though straightforward and predictable, is limited in scalability and adaptability. Conversely, dynamic routing protocols like RIP excel in dynamic and larger network environments by automatically adjusting to changes. Understanding these protocols and their respective strengths and weaknesses is vital for designing efficient and resilient network infrastructures. The knowledge gained from this lab will be instrumental in selecting the appropriate routing strategy based on specific network requirements.

Static routing offers precise control and simplicity but becomes impractical in larger, dynamic networks due to manual configurations. Dynamic routing, exemplified by RIP, adapts automatically to topology changes, saving time and minimizing errors. However, it demands higher resources and careful configuration. Ultimately, static routing suits small, stable networks, while dynamic routing is essential for scalability and fault tolerance in complex environments.