



Green University of Bangladesh
Department of Computer Science and Engineering (CSE)
Faculty of Sciences and Engineering
Semester: (Fall, Year:2022), BSc. in CSE (Day)

LAB REPORT - 04

Course Title: Computer Networking Lab

Course Code: CSE-312

Section: PC-201 DB

Student Details

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Lab Date: 19-12-2022

Submission Date: 31-12-2022

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[For Teachers use only: **Don't Write Anything inside this box**]

Lab Report Status

Marks:

Signature:

Comments:

Date:

1. TITLE OF THE LAB EXPERIMENT

Configuration of Static and Dynamic Routing Protocols in different networks using Cisco Packet Tracer.

2. OBJECTIVES/AIM

- To build and design network.
- To learn about step-by-step configuration of Computer, Server and Router.
- To transfer packet from one computer to another computer of same or different network.
- To learn how to set multiple port in Router.
- To understand the static and dynamic Routing.
- Configure static routes on each Router to allow communication between all clients.
- Configure dynamic routes on each Router to allow communication between all clients.
- To create big and complex network using multiple Router.

3. PROCEDURE / ANALYSIS / DESIGN

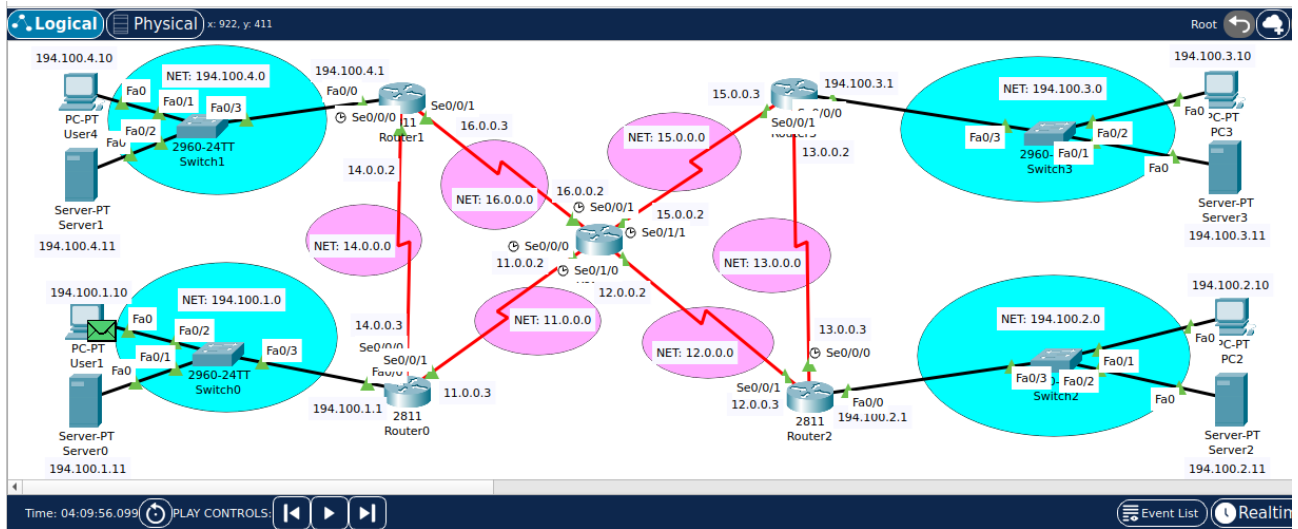
From this experiment we will create multiple networks where we can use Static and Dynamic routing protocols for different network. In this experiment there are so many networks where those networks are connected with multiple Routers. If a network is not directly connected to the router, then the router must use one of two ways to learn how to get to the remote network: static routing, and dynamic routing. For Static routes are defined manually. The route consist of a destination prefix and a next hop forwarding address. The static route is activated in the routing table and inserted into the forwarding table when the next hop address is reachable. Traffic that matches the static route is forwarded to the specified next-hop address. Dynamic routing is a technique in which a router learns about routing information without an administrator's help and adds the best route to its routing table. A router running a dynamic routing protocol adds the best route to its routing table and can also determine another path if the primary route goes down. Routing Information Protocol (RIP) is a dynamic routing protocol which uses hop count as a routing metric to find the best path between the source and the destination network.

Procedure:

- Create a network topology by setting up all the necessary devices in Cisco Packet Tracer.
- Configure static IP addresses on the PC, and other devices.
- Configure the Fast Ethernet and Serial interfaces of all the Router.
- For static routing, enable the static protocol from the router configuration mode. Then set the destination network address, sub-net mask and next hop for all the network.
- For dynamic routing, enable the RIP routing protocol from the router configuration mode. Then, add all the required network addresses for all of the routers.

4. IMPLEMENTATION

First, we will design the networks using multiple Routers,



Figure_01: Networks for Static and Dynamic Routing Protocol

The screenshot shows the configuration window for User1. The 'Desktop' tab is selected. The 'IP Configuration' section is expanded, showing the following settings:

- Interface:** FastEthernet0
- IP Configuration:**
 - ☐ DHCP
 - ☒ Static
 - IPv4 Address:** 194.100.1.10
 - Subnet Mask:** 255.255.255.0
 - Default Gateway:** 194.100.1.1
 - DNS Server:** 0.0.0.0
- IPv6 Configuration:**
 - ☐ Automatic
 - ☒ Static
 - IPv6 Address:** [Empty]
 - Link Local Address:** FE80::202:4AFF:FE5D:E43C
 - Default Gateway:** [Empty]
 - DNS Server:** [Empty]
- 802.1X:**
 - ☐ Use 802.1X Security
 - Authentication:** MDS
 - Username:** [Empty]
 - Password:** [Empty]

Figure_02: Device IP Configuration

The screenshot shows the configuration window for Server0. The 'Desktop' tab is selected. The 'IP Configuration' section is expanded, showing the following settings:

- Interface:** FastEthernet0
- IP Configuration:**
 - ☐ DHCP
 - ☒ Static
 - IPv4 Address:** 194.100.1.11
 - Subnet Mask:** 255.255.255.0
 - Default Gateway:** 194.100.1.1
 - DNS Server:** 0.0.0.0
- IPv6 Configuration:**
 - ☐ Automatic
 - ☒ Static
 - IPv6 Address:** [Empty]
 - Link Local Address:** FE80::201:97FF:FE80:1CAE
 - Default Gateway:** [Empty]
 - DNS Server:** [Empty]
- 802.1X:**
 - ☐ Use 802.1X Security
 - Authentication:** MDS
 - Username:** [Empty]
 - Password:** [Empty]

Figure_03: Server IP Configuration

Router4

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Serial0/0/0

Serial0/0/1

Serial0/1/0

Serial0/1/1

Port Status ☒ On

Duplex ☒ Full Duplex

Clock Rate 2000000

IP Configuration

IPv4 Address 11.0.0.2

Subnet Mask 255.0.0.0

Tx Ring Limit 10

Equivalent IOS Commands

```
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
% Unknown command or computer name, or unable to find computer address

Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up

Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#
```

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Figure_04: Router IP Configuration

Router4

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Serial0/0/0

Serial0/0/1

Serial0/1/0

Serial0/1/1

Static Routes

Network 194.100.4.0

Mask 255.255.255.0

Next Hop 16.0.0.3

Add

Network Address

194.100.1.0/24 via 11.0.0.3

194.100.2.0/24 via 12.0.0.3

194.100.3.0/24 via 15.0.0.3

194.100.4.0/24 via 16.0.0.3

Remove

Equivalent IOS Commands

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 194.100.1.0 255.255.255.0 11.0.0.3
Router(config)#ip route 194.100.2.0 255.255.255.0 12.0.0.3
Router(config)#ip route 194.100.3.0 255.255.255.0 15.0.0.3
Router(config)#ip route 194.100.4.0 255.255.255.0 16.0.0.3
Router(config)#
```

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Figure_05: Static Router Configuration

Router4

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Serial0/0/0

Serial0/0/1

Serial0/1/0

Serial0/1/1

RIP Routing

Network 194.100.2.0

Add

Network Address

11.0.0.0

12.0.0.0

13.0.0.0

14.0.0.0

15.0.0.0

16.0.0.0

194.100.1.0

Remove

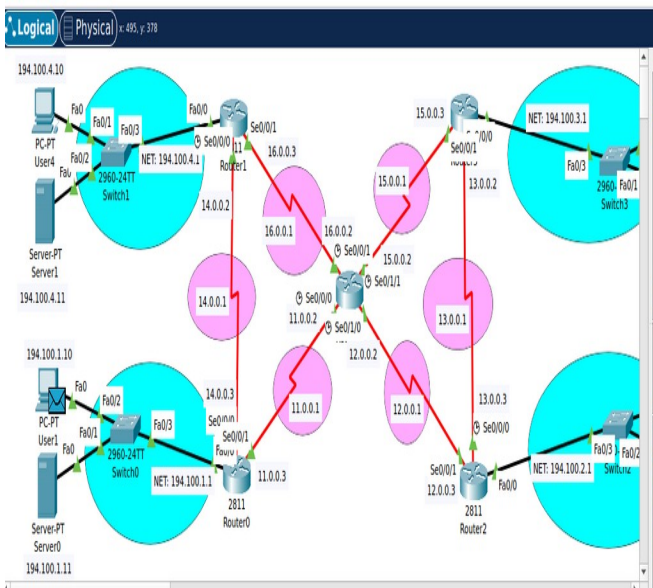
Equivalent IOS Commands

```
Router(config)#ip route 194.100.3.0 255.255.255.0 15.0.0.3
Router(config)#ip route 194.100.4.0 255.255.255.0 16.0.0.3
Router(config)#
Router(config)#
Router(config)#router rip
Router(config-router)#network 14.0.0.0
Router(config-router)#network 11.0.0.0
Router(config-router)#network 12.0.0.0
Router(config-router)#network 13.0.0.0
Router(config-router)#network 15.0.0.0
Router(config-router)#network 16.0.0.0
Router(config-router)#network 194.100.1.0
Router(config-router)#
```

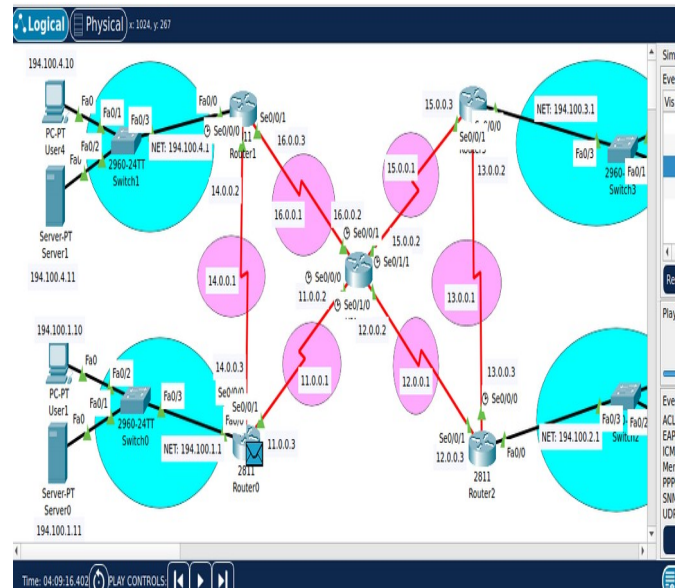
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Figure_06: Dynamic Router Configuration

5. TEST RESULT / OUTPUT

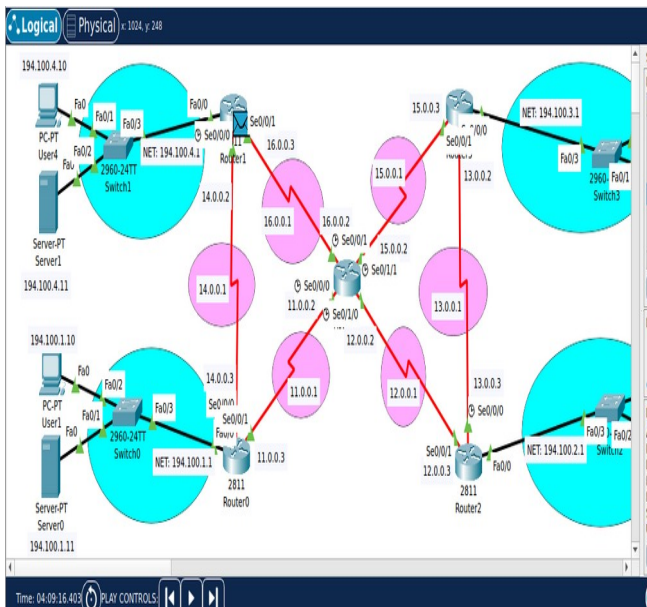


Figure_7: First step of sending message

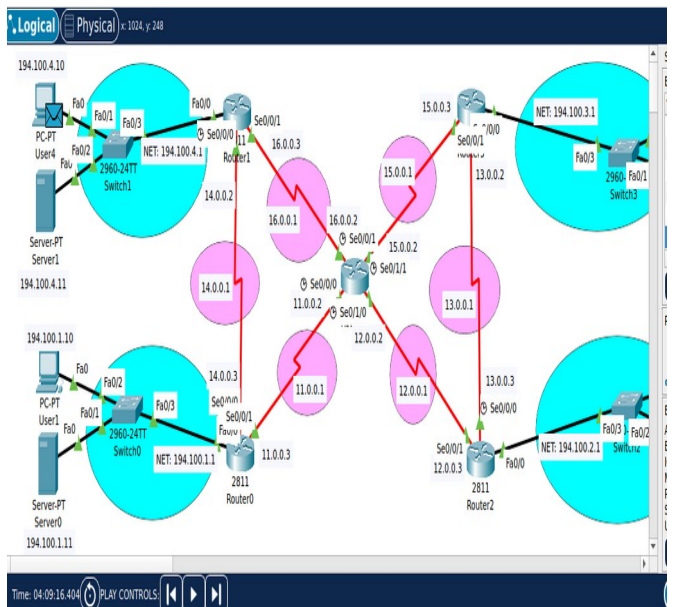


Figure_8: Second step of sending message

From this Figure_7 we send a message from User1 to User2. When we use Static Routing Protocol, we will say the next hop. Next the message will leave this hop. When we use Dynamic Routing Protocol, we will not say the next hop. It will take the shortest path but it need all networks address. Next the message will leave that shortest path. From Figure_8 we can see the message stay in router. For Static it checks next hop and for Dynamic it finds shortest part.



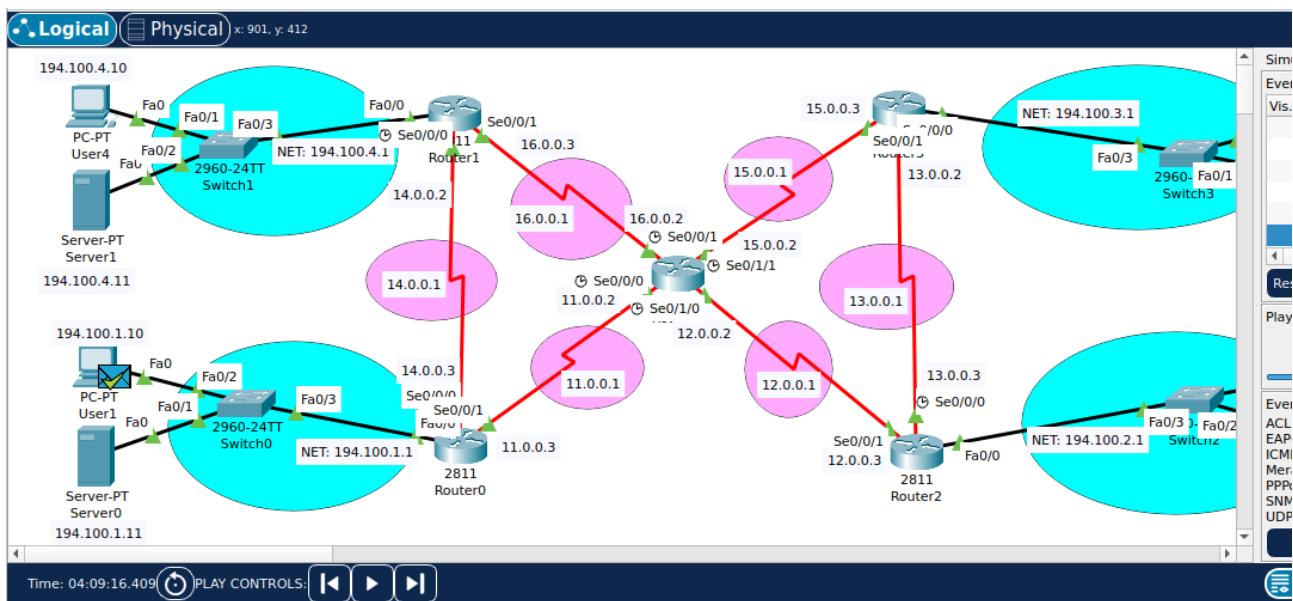
Figure_9: Third step of sending message



Figure_10: Fourth step of sending message

From Figure_9, Router0 finds next hop is Router1 that's why message stay there and finally Figure_10 the message receives the destination for Static. Again for Dynamic Router0 finds nearest

router is Router1 that's why message goes there and finally Figure_10 the message receives the destination.



Figure_11: Destination gives acknowledgment (ACK)

From this Figure_11, Destination gives acknowledgment (ACK) to source. Here source is user1 and destination is user4. We can see the message with sign that means the message send successfully for both Static and Dynamic Routing Protocols.

6. ANALYSIS AND DISCUSSION

This experiment mainly based on Cisco Packet Tracer. Based on the focused objective(s) to learn the step-by-step configuration of Computer, Server and Router (static and dynamic routing). The term routing is used for taking a packet from one device and sending it through the network to another device on a different network. The task will help us to configure static and dynamic routes for taking a packet from one device to another device. This task will help us to learn where we need to use static routing or dynamic routing. The main hard part of this experiment is successfully completed multiple networks using router and configuration them. We face so many problem for configuration Router. Now, we get so many knowledge to create a complete routing protocol.

7. SUMMARY:

In this experiment we will create multiple networks where we use Static and Dynamic routing protocols for different network. In this experiment there are so many networks where those networks are connected with multiple Routers. First we create those router in Static then we modify to Dynamic. Where we can see Dynamic need all networks address but it works very fast and use shortest part. On the other hand Static need next hop to transfer packets. Those protocols are used to create modern and complex network. That's why this experiment is very interesting and helpful for future.