

- Lab 9 : Routing and switching
- Lecturer : Prof. Oumaima FADI
- T.A: Prof. Abdoulghaniyu HARAZEEM

Lab 9 – Routing and switching

Objective:

The general objective of this lab is to understand and master dynamic routing configuration to ensure network connectivity between multiple subnets, while configuring RIP protocol.

At the end of this lab, you will be able to:

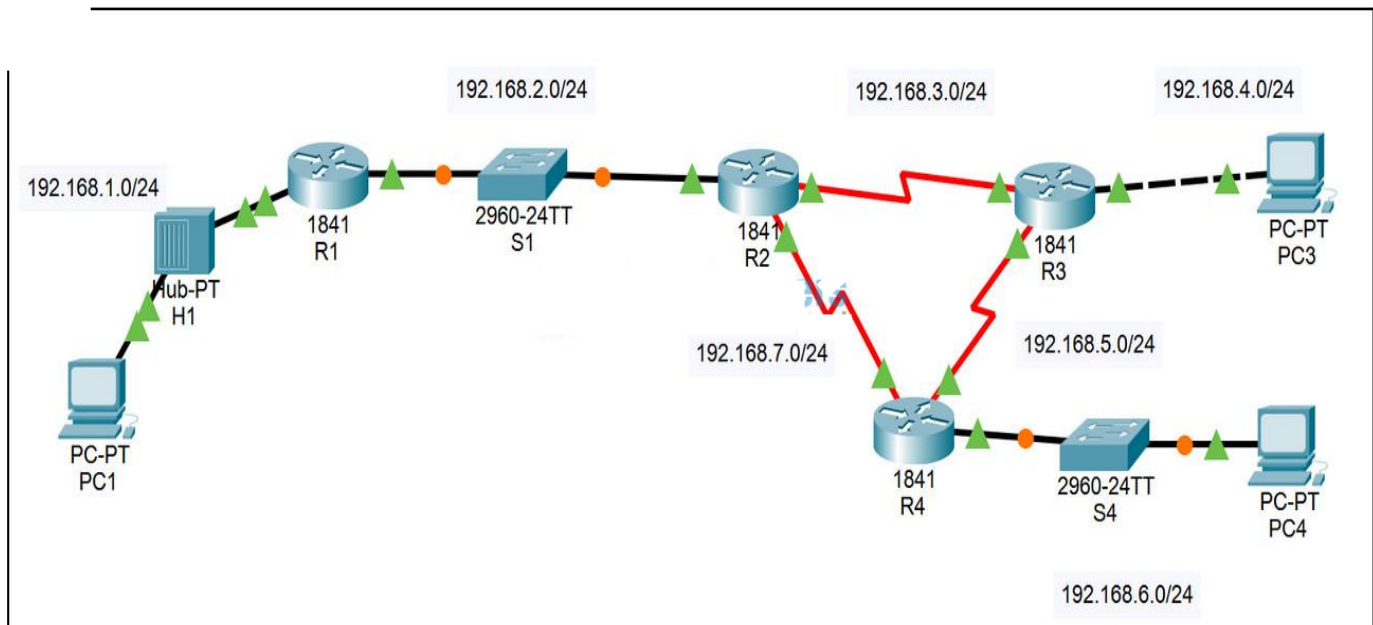
- Describe the function of the RIP routing table.
- Describe how a routing table can contain and use dynamic routes.

Instructions:

1. The lab report must be submitted one week after the session in electronic format to Moodle platform
2. The lab must be done in class in groups of maximum 2 students.
3. Groups should remain the same for both reports and upcoming labs.

Topology

NB: Use **DTE** for the serial connection



Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	192.168.1.1	255.255.255.0	N/A

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Device	Interface	IP Address	Subnet Mask	Default Gateway
	Fa0/1	192.168.2.1	255.255.255.0	N/A
R2	Fa0/0	192.168.2.2	255.255.255.0	N/A
	S0/0/0	192.168.7.1	255.255.255.0	N/A
	S0/0/1	192.168.3.1	255.255.255.0	N/A
R3	Fa0/0	192.168.4.1	255.255.255.0	N/A
	S0/0/0	192.168.5.1	255.255.255.0	N/A
	S0/0/1	192.168.3.2	255.255.255.0	N/A
R4	Fa0/0	192.168.6.1	255.255.255.0	N/A
	S0/0/0	192.168.7.2	255.255.255.0	N/A
	S0/0/1	192.168.5.2	255.255.255.0	N/A
PC1	NIC	192.168.1.10	255.255.255.0	192.168.1.1
PC3	NIC	192.168.4.10	255.255.255.0	192.168.4.1
PC4	NIC	192.168.6.10	255.255.255.0	192.168.6.1

Task 1: Enter RIP as the dynamic routing protocol on R2, R3, and R4.

Step 1 – Configure RIP on R2.

1. Click R2 in the workspace.
2. Select the CLI tab.
3. From the command line interface, CLI, type the following commands:

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```
R2>enable
R2# configure terminal
R2(config)# router RIP
R2(config-router)# network 192.168.2.0
R2(config-router)# network 192.168.3.0
R2(config-router)# network 192.168.7.0
R2(config-router)# end
```

Step 2 – Configure RIP on R3.

1. Click R3 in the workspace.
2. Select the CLI tab.
3. From the CLI type the following commands:

```
R3>enable
R3# configure terminal
R3(config)# router RIP
R3(config-router)# network 192.168.3.0
R3(config-router)# network 192.168.4.0
R3(config-router)# network 192.168.5.0
R3(config-router)# end
```

Step 3 – Configure RIP on R4.

1. Click R4 in the workspace.
2. Select the CLI tab.
3. From the CLI type the following commands:

```
R4> enable
R4# configure terminal
R4(config)# router RIP
R4(config-router)# network 192.168.5.0
R4(config-router)# network 192.168.6.0
R4(config-router)# network 192.168.7.0
R4(config-router)# end
```

Task 2: Verify the static and dynamic routes.

Step 1 – Verify the routing tables on each router.

1. Click R1 in the workspace.
2. Select the CLI tab.
3. From the CLI type the following commands:

```
R1>enable
R1# show ip route
```

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(Note: The routing table should show directly connected routes and static routes, but there are no dynamic routes to remote networks)

4. Repeat the previous steps on R2, R3, and R4.

(Note: The routing tables on the other routers should show directly connected routes and combinations of static and dynamically learned routes to remote networks.)

Step 2 – Examine the routing table on R1.

1. From the CLI type the following commands:

```
R1# show ip route
```

2. Are there any static routes in the routing table? If so, list the route(s) below:

3. If there are no routes in the routing table, retrace your steps and troubleshoot the problem.

Step 3 – Ping from R3 to PC1.

1. Click R3 in the workspace.

2. Select the CLI tab.

3. From the CLI type the following commands:

```
R3#ping 192.168.1.10
```

4. Was the ping successful?

(Hint: If the ping is not successful, check the routing tables on all three routers to see if you can determine the problem.)

Task 3: Enter a static route on R2 to reach R1's LAN.

Follow the steps below to enter a static route on R2 to reach R1's LAN:

Step 1 – Configuring a static route on R2.

1. Click R2 in the workspace.

2. Select the CLI tab.

3. From the CLI type the following commands:

```
R2>enable
```

```
R2# show ip route
```

(Note: The routing table shows directly connected routes, but there are no static routes to remote networks in the routing table.)

```
R2# configure terminal
```

```
R2(config)# ip route 192.168.1.0 255.255.255.0 192.168.2.1
```

```
R2(config)# end
```

Step 2 – Examine the routing table on R2.

1. From the CLI type the following commands:

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R2# **show ip route**

2. Are there any static routes in the routing table? If so, list the route(s) below:
3. If there are no routes in the routing table, retrace your steps and troubleshoot the problem.

Step 3 – Ping from R3 to PC1.

1. Click R3 in the workspace.
2. Select the **CLI** tab.
3. From the **CLI** type the following commands:

R3# **ping 192.168.1.10**

4. Was the ping successful?

(**Hint:** This ping should be successful. If the ping is not successful, check the routing tables on all three routers to determine the problem.)

Step 4 – Check results in the activity window.

Your completion rate should be 100%. If the completion rate is not 100%, use the **Check Results** button and troubleshoot as necessary.

Task 4: View the RIP routing updates in simulation mode.

Follow the steps below to enter simulation mode in Packet Tracer:

Step 1 – Changing from Realtime to Simulation mode.

1. Located just outside of the workspace in the lower right-hand corner there is section titled **Realtime**.
2. Select the **Simulation** tab that is located just to the upper right and behind **Realtime**. You should now be in Simulation mode.

Step 2 – Filter the traffic so that only RIP packets will be viewed.

1. From the simulation mode, click on button entitled **Edit Filters**
2. Click the last box entitled **Show All/None** to clear all the boxes.
3. Click on the box entitled **RIP**, with this box selected and only RIP traffic will be displayed.

Step 3 – Start the simulation.

1. To start the flow of traffic in the simulation, click on the button entitled **Auto Capture / Play**. This will start the flow of RIP updates between the Routers. Note that R1 is not sending any RIP updates and is also dropping any RIP updates received.

Why is R1 dropping the R1 packets without sending them?

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(**Hint:** By clicking on one of the packets in the simulation that is being dropped by R1, additional information will be displayed about the packet and how R1 is handling the packet.)