



Department of Computer Science and Engineering
Islamic University of Technology (IUT)
A subsidiary organ of OIC

Laboratory Report

CSE 4412: Data Communication and Networking Lab

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Section: SWE-Even (B)

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Title: Configuring and Verifying of RIP and OSPF in a network topology.

Objective:

1. Understanding Dynamic Routing
2. Configure Routing Information Protocol (RIP)
3. Understanding OSPF routing protocol
4. Advantages of OSPF over RIP

Devices/ software Used:

1. Cisco Packet Tracer Software

Theory:

Routing Information Protocol (RIP)

Two of the most common dynamic routing protocols are – RIP following the distance-vector algorithm and OSPF following the link state routing algorithm. RIP is somewhat an obsolete protocol due to its limitations and the advent of more modern and sophisticated protocols like OSPF, EIGRP etc.

Forwarding Table used in RIP

- Every RIP router keeps a routing table with a list of all known destinations (networks) and the hop count metric-based shortest path to each destination. A router modifies its routing table in response to information it gets from a neighbour.

Hop Count as cost

- The hop count measure is used by RIP to find the optimal path to a destination network. The hop count rises by one with each hop (router) on the way to a destination. Less hops on a path is preferred by RIP.

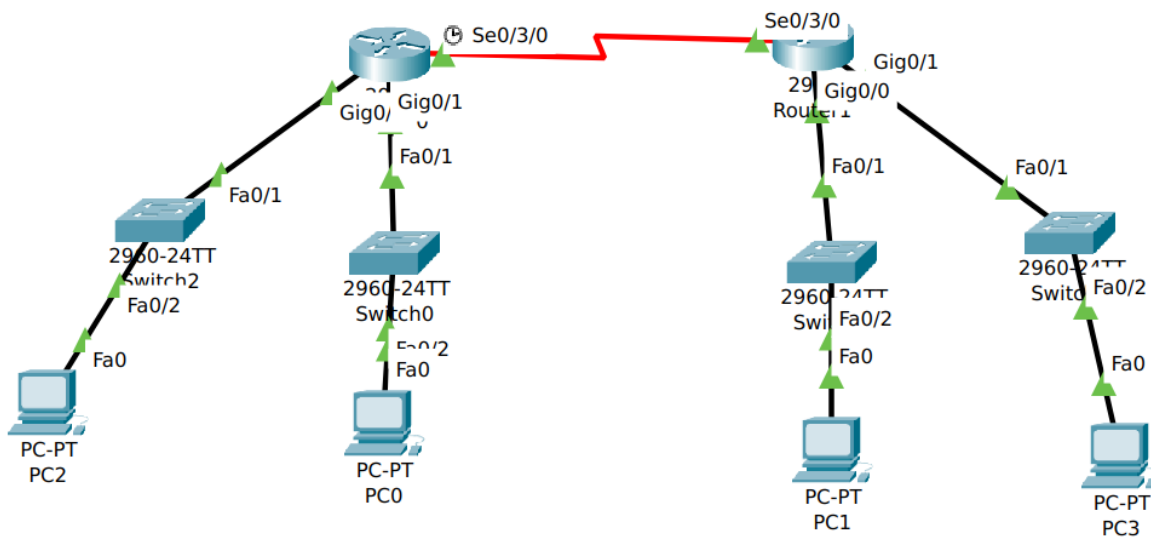
Timers in RIP

- Multiple timers are used by Routing Information Protocol (RIP) to control different parts of its functioning. These timings are essential for preserving the stability of the network and guaranteeing timely convergence and updates.

Diagram of the experiment:

(Provide screenshot of the final network topology. Make sure to label the network components.)

Task #01:



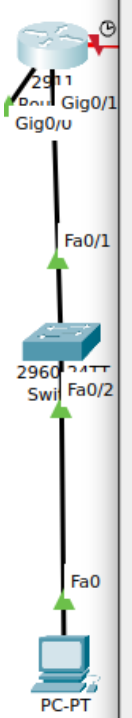
Task #02:

Working Procedure:

(Explain in brief how you completed the tasks. Provide necessary screenshots of used commands for each task.)

Task #01:

- First, we need to configure the interfaces for both the routers that are connected to the switches and with the serial port connection with the other router using the HWIC – 2T ports.



Router0

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router>
Router>
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int g0/0
Router(config-if)#ip address 172.176.0.1 255.255.255.128
Router(config-if)#no shut
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

Router(config-if)#
Router(config-if)#exit
Router(config)#int g0/1
Router(config-if)#ip address 172.176.0.150 255.255.255.128
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

Router(config-if)#
Router(config-if)#exit
Router(config)#int s0/3/0
Router(config-if)#ip address 172.174.0.1 255.255.255.224
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/3/0, changed state to down
Router(config-if)#
Router(config-if)#
```

Copy Paste

- Next we will configure the PCs according to the interface routes and IP addresses.

PC2

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 172.176.0.5

Subnet Mask 255.255.255.128

Default Gateway 172.176.0.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::230:A3FF:FE83:D08E

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

PC3

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 172.177.0.156

Subnet Mask: 255.255.255.192

Default Gateway: 172.177.0.150

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::20B:BEFF:FEB0:B171

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

- Lastly, we need to set up the RIP networks for both the router interface, which will define the common network between the routers.

IOS Command Line Interface

```
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#copy run
Router#copy running-config st
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#
Router#en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#host R1
R1(config)#
R1(config)#
R1(config)#
%LINK-5-CHANGED: Interface Serial0/3/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to up

R1(config)#
R1(config)#
R1(config)#conf t
%Invalid hex value
R1(config)#router ri
R1(config)#router rip
R1(config-router)#ver
R1(config-router)#version 2
R1(config-router)#net
R1(config-router)#network 172.176.0.0
R1(config-router)#network 172.174.0.0
R1(config-router)#
R1(config-router)#exit
R1(config)#
R1(config)#
```

Task #02:

Q/A for the tasks:

(There were many q/a sections inside the task pdfs. Copy the questions and your answers here.)

Task #02:

Observation:

Challenges (if any):

- I could not implement the Task 2.