

MIT WORLD PEACE UNIVERSITY

Computer Networks
Second Year B. Tech, Semester 3

CONFIGURATION OF ROUTING PROTOCOLS RIP,
OSPF AND EIGRP

PRACTICAL REPORT
ASSIGNMENT 7

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1 Aim and Objectives

Set up a network - configure interfaces, IP addresses and routing protocols (RIP, OSPF, EIGRP, BGP).

2 Devices

1. 2 Switchs 2950 with 24 LAN Ports
2. 4 Generic PCs
3. 4 Generic Laptops
4. 2 1841 Routers.

3 Cables

1. Straight LAN Cable to connect unlike Devices
2. Crossover LAN Cable to connect like Devices
3. Serial DCE Timed Cable to connect the 2 Routers.

4 Procedure to Configure the Network

1. Create the Network as shown in the figure below.
2. Connect the various components with respective cables.
3. find a switch, then connect it to pcs, and stuff, assign their ips according to that network family.
4. Do that 2 or 3 times with however many switch networks you want the router to connect
5. Then connect a router to the switches, in the gigabit ethernet port. Then connnec tthe routhers with each other using the serial port, which you will have to install in the router, by first switching it off, and then adding nim 2t port or any port that has a serial port to it. Then switch it on.
6. Now assign the ip addresses to the router. You would have to assign an ip of the family to which it is connected to the port where you are connecting that network like gigabit ethernet or soemthing.
7. Now assign the ip for the router network. set clock to the same as the one that is on the other router. use a clocked red serial cable to connect the 2 routers.
8. Now all the things must be on.

5 Commands

For RIP

```
conf t
router rip
ver 1
network 10.0.0.0
network 11.0.0.0
```

For EIGRP

```
no router rip
router eigrp 1
network 12.0.0.0
network 11.0.0.0
```

11 is the network of the routers. 10 would be the networks on the left and 12 would be the network on the right.

```
Router#
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#router ospf ?
<1-65535> Process ID
Router(config)#router ospf 1
Router(config-router)#network 10.0.0.0 0.255.255.255 area 0
Router(config-router)#network 11.0.0.0 0.255.255.255 area 0
Router(config-router)#
Router#
```

6 Platform

Operating System: Arch Linux x86-64

IDEs or Text Editors Used: Visual Studio Code

Programs Used: Cisco Packet Tracer v6.0.1

7 Output

```
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
```

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i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area * - candidate default, P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 10.0.0.0/8 is directly connected, GigabitEthernet0/0/0

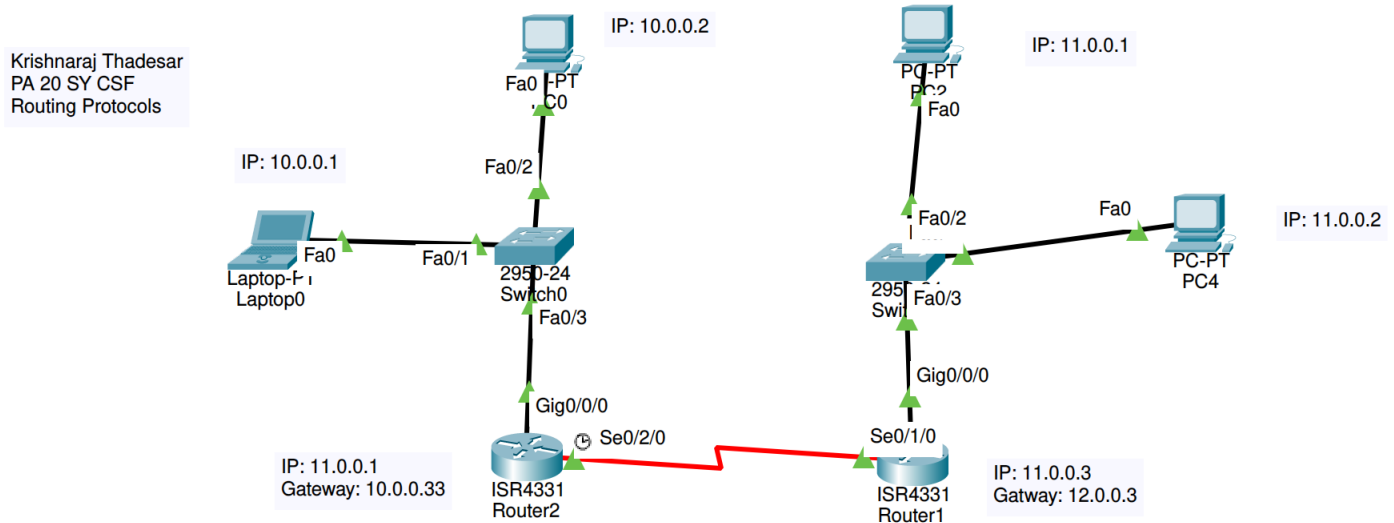
L 10.0.0.3/32 is directly connected, GigabitEthernet0/0/0

12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 12.0.0.0/8 is directly connected, Serial0/2/0

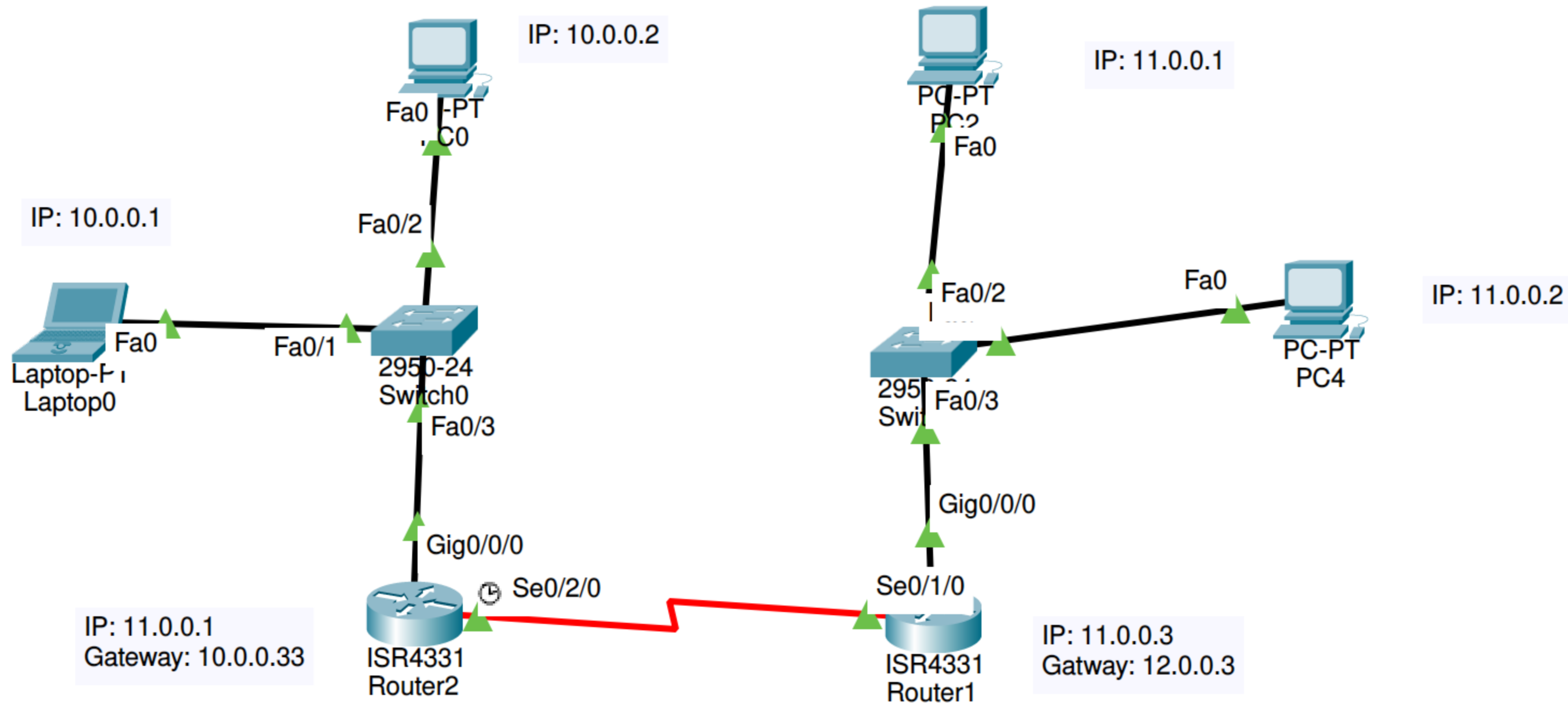
L 12.1.1.2/32 is directly connected, Serial0/2/0

8 Connection Screenshot



9 Conclusion

Thus routing Protocols were Executed on a simple LAN, and the connection was verified using the ping command. 3 Routing Protocols were executed successfully. RIP, OSPF and EIGRP. Their Differences were studied and understood.



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CN Assignment

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Routing Algorithms

Theory

- ① Distance vector Routing : The router gets data from the routing table. Every neighbouring router gets the information updated. Based on the number of hops, packet queue length, and turn delay, it decides which router is better.
- ② Link state routing : Each router shares its neighbourhood's knowledge with each other creating a topology of network. It then uses Dijkstra's algorithm to calculate optimal route to all nodes.
- ③ Path vector routing : It is like distance vector routing but instead it relies on analysis of path.
- ④ RIP Implementation :
 1. Introduction and Algorithm : It is one of the least distance vector routing algorithm which employs hop count as a routing metric.
 2. Messages :
 1. Request message : Asking a neighbouring router to send its table.
 2. Response message : Carries the routing table of a router.

(*)

RIP v1

- Sends updates as broadcast
- Broadcast at 255.255.255.255
- Classful routing protocol.

RIP v2

- Sends updates as multicast
- Multicast at 224.0.0.0
- Classless protocol updates support classful.

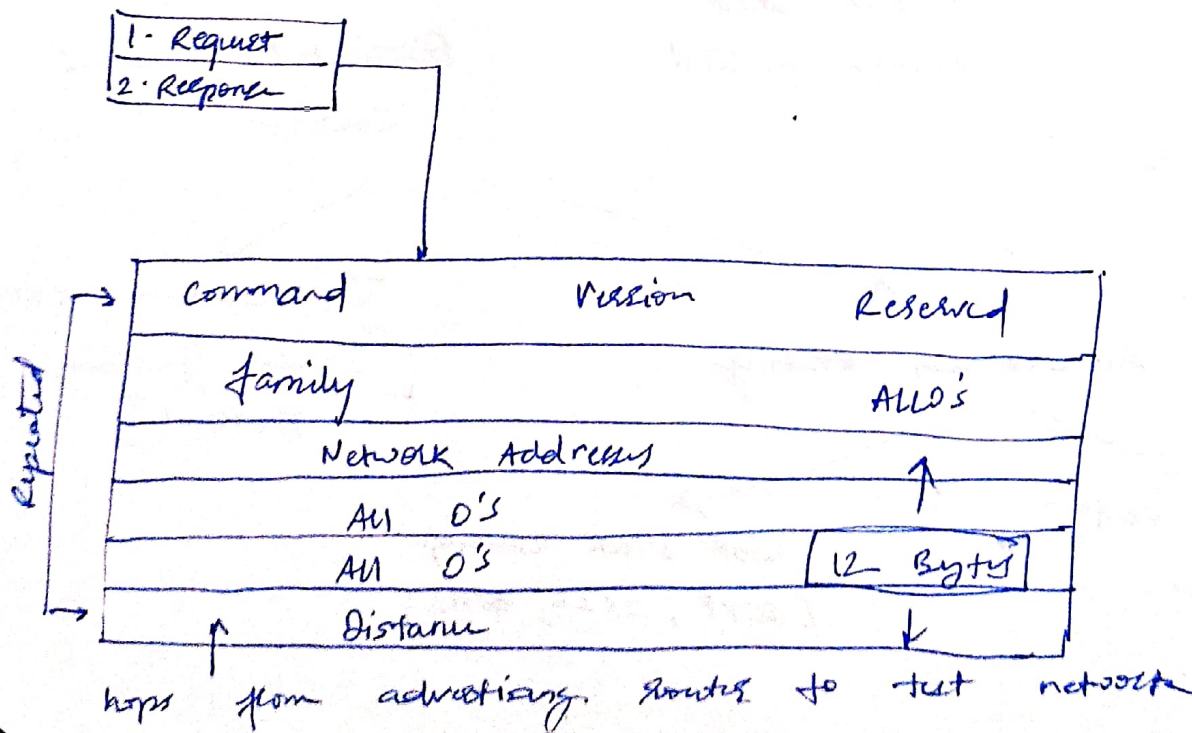
(*) Timers

- Update Timers : Controls the interval between 2 gratuitous responses.
- Invalid Times : Specifies how long a routing can be in a table without being updated.
- Flush Timers : Controls time between the route is invalidated and removal of entry from table.
- Hold down Times : It is started per route entry.

Q.1. Explain any features of RIP.

- Open Standard Protocol
- Classful Routing Protocol.
- Updates are broadcast via 255.255.255.255
- Administrative distance is 120.
- Metric : Hop ~~count~~ count.
- Max hop count = 15 ; Max routers = 15.
- Load Balancing from 4 equal paths.
- Used for small organizations.
- Exchange entire routing table for every 30 seconds.
- Each router advertises its distance vectors every 30 seconds to all of its neighbours.

Q.3 Draw and explain RIP message format.



→ it is sent by a router when booted or when an entry times out many request updates for all networks, or specific ones.

→ Solicited response to a previous request sent periodically to all neighbours.

(Q.2) State classification of Routing Protocols

(1) Routing Algorithm Types

Adaptive

Non-Adaptive Alg.

Routing

(2) Based on current measurement of traffic &/or topology

Centralized IGP

(Interior Gateway Protocol)

Island Exterior gateway protocol

Distributed Dynamic Routing

Intra Domain Routing

Distance vector Routing

RIP

Link State Routing [OSPF, ISIS, ANML]

Inter domain Routing [Border Gateway Protocol]