Batch: A2	Roll No.: 16010121045
Experiment / assignment / tutorial No. 8	
Grade: AA / AB / BB / BC / CC / CD /DD	
Signature of the Staff In-charge with date	

Experiment No.:8

TITLE: Study and configure RIP protocol using Cisco Packet tracer

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AIM: To study and configure RIP protocol using Cisco Packet tracer

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Expected Outcome of Experiment:

CO: To demontsrate understanding of static routing using cisco packet tracer

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Books/ Journals/ Websites referred:

1. A. S. Tanenbaum, “Computer Networks”, Pearson Education, Fourth Edition
2. B. A. Forouzan, “Data Communications and Networking”, TMH, Fourth Edition

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Pre Lab/ Prior Concepts:

IPv4 Addressing, Subnetting, Distance Vector Protocol, Router configuration Commands.

New Concepts to be learned: RIP Protocol and its configuration.

RIP (Routing Information Protocol)

RIP is a standardized Distance Vector protocol, designed for use on smaller networks. RIP was one of the first true Distance Vector routing protocols and is supported on a wide variety of systems.

RIP adheres to the following Distance Vector characteristics:

- RIP sends out periodic routing updates (every 30 seconds)
- RIP sends out the full routing table every periodic update.
- RIP uses a form of distance as its metric (in this case, hop count).

• RIP uses the Bellman-Ford Distance Vector algorithm to determine the best "path" to a particular destination

Other characteristics of RIP include:

• RIP supports IP and IPX routing.
• RIP utilizes UDP port 520
• RIP routes have an administrative distance of 120.
• RIP has a maximum hop count of 15 hops.

RIP Versions

RIP has two versions, Version 1 (RIPv1) and Version 2 (RIPv2).

RIPv1 (RFC 1058) is ***classful***, and thus does not include the subnet mask with its routing table updates. Because of this, RIPv1 does not support **Variable Length Subnet Masks (VLSMs)**. When using RIPv1, networks must be contiguous, and subnets of a major network must be configured with identical subnet masks. Otherwise, route table inconsistencies (or worse) will occur.

RIPv1 sends updates as broadcasts to address 255.255.255.255.

RIPv2 (RFC 2543) is ***classless***, and thus does include the subnet mask with its routing table updates. RIPv2 fully supports VLSMs, allowing discontiguous networks and varying subnet masks to exist.

Other enhancements offered by RIPv2 include:

• Routing updates are sent via multicast, using address 224.0.0.9
• Encrypted authentication can be configured between RIPv2 routers
• Route tagging is supported.

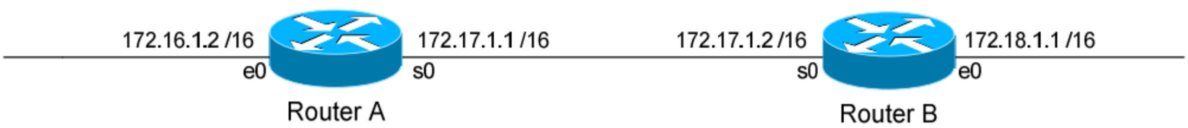
RIPv2 can interoperate with RIPv1. By default:

• RIPv1 routers will send only Version 1packets
• RIPv1 routers will receive both Version 1 and 2 updates
• RIPv2 routers will both send and receive only Version 2 updates

We can control the version of RIP a particular interface will "send" or "receive."

Unless RIPv2 is manually specified, a Cisco will default to RIPv1 when configuring RIP.

RIPv1 Basic Configuration



Routing protocol configuration occurs in Global Configuration mode. On Router A, to configure RIP, we would type:

```
Router(config)# router rip
Router(config-router)# network 172.16.0.0
Router(config-router)# network 172.17.0.0
```

The first command, router rip, enables the RIP process.

The network statements tell RIP which networks you wish to advertise to other RIP routers. We simply list the networks that are directly connected to our router. Notice that we specify the networks at their classful boundaries, and we do not specify a subnet mask.

To configure Router B:

```
Router(config)# router rip
Router(config-router)# network 172.17.0.0
Router(config-router)# network 172.18.0.0
```

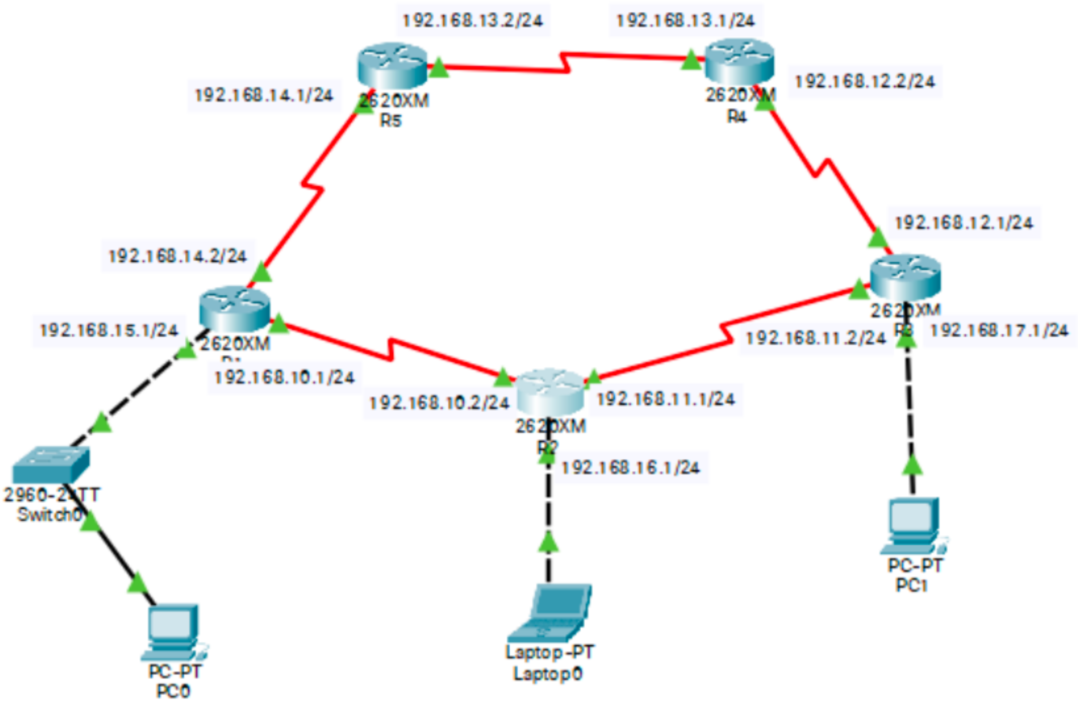
The routing table on Router A will look like:

```
RouterA# show ip route

Gateway of last resort is not set
 C      172.16.0.0 is directly connected, Ethernet0
 C      172.17.0.0 is directly connected, Serial0
 R      172.18.0.0 [120/1] via 172.17.1.2, 00:00:00, Serial0
```

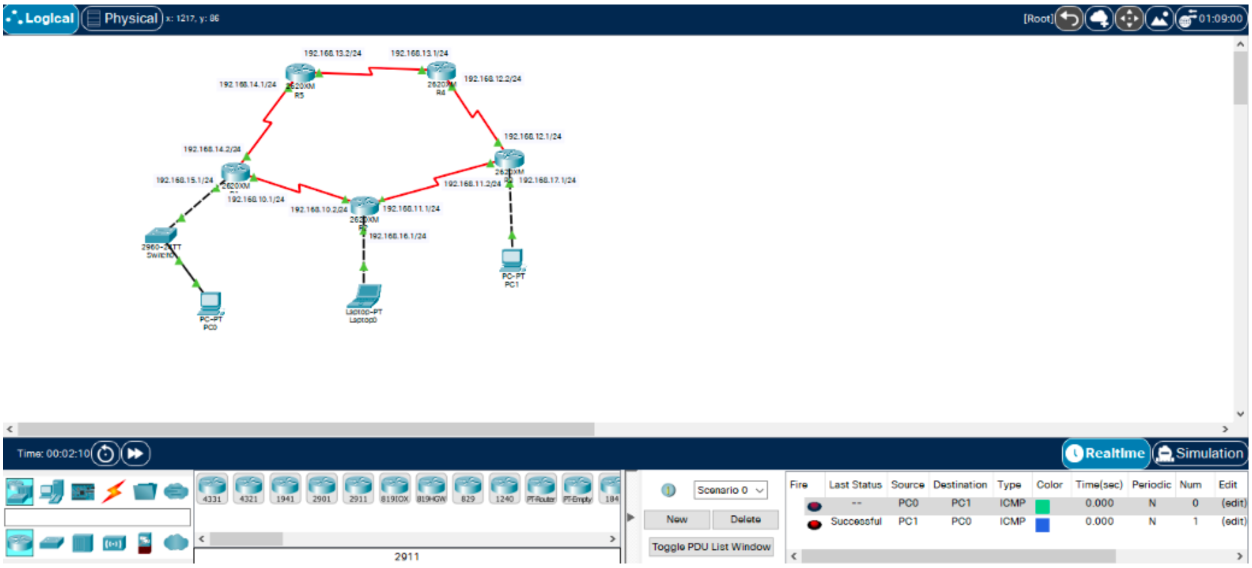
The routing table on Router B will look like:

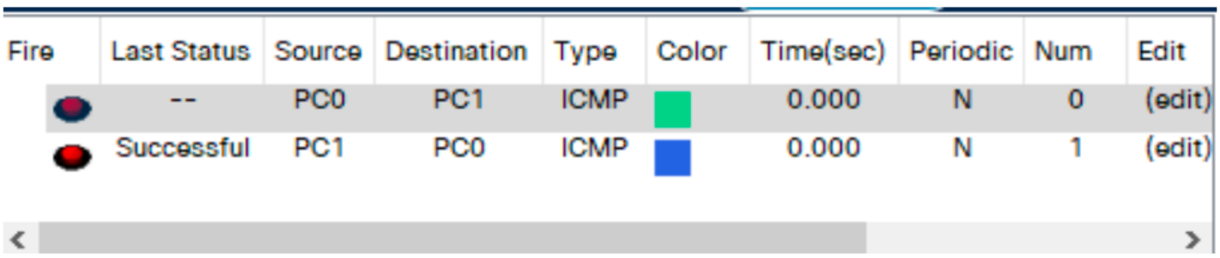
```
RouterB# show ip route

Gateway of last resort is not set
C       172.17.0.0 is directly connected, Serial0
C       172.18.0.0 is directly connected, Ethernet0
R       172.16.0.0 [120/1] via 172.17.1.1, 00:00:00, Serial0
```

IMPLEMENTATION: (printout of code)



Message sent from PC1 to PC0 is successful.





Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	--	PC0	PC1	ICMP		0.000	N	0	(edit)
	Successful	PC1	PC0	ICMP		0.000	N	1	(edit)

Dynamic Routing table entries for each router in designed network:
For router R1:

```
R1>en
R1#show ip route
Codes: C - connected, S - static, I - IGRP, 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
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

C    192.168.10.0/24 is directly connected, Serial0/0
R    192.168.11.0/24 [120/1] via 192.168.10.2, 00:00:19, Serial0/0
R    192.168.12.0/24 [120/2] via 192.168.14.1, 00:00:20, Serial0/1
                     [120/2] via 192.168.10.2, 00:00:19, Serial0/0
R    192.168.13.0/24 [120/1] via 192.168.14.1, 00:00:20, Serial0/1
C    192.168.14.0/24 is directly connected, Serial0/1
C    192.168.15.0/24 is directly connected, FastEthernet0/0
R    192.168.16.0/24 [120/1] via 192.168.10.2, 00:00:19, Serial0/0
R    192.168.17.0/24 [120/2] via 192.168.10.2, 00:00:19, Serial0/0

R1#
```

For router R2:

```
R2>en
R2#show ip route
Codes: C - connected, S - static, I - IGRP, 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
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

C    192.168.10.0/24 is directly connected, Serial0/1
C    192.168.11.0/24 is directly connected, Serial0/0
R    192.168.12.0/24 [120/1] via 192.168.11.2, 00:00:15, Serial0/0
R    192.168.13.0/24 [120/2] via 192.168.10.1, 00:00:17, Serial0/1
                     [120/2] via 192.168.11.2, 00:00:15, Serial0/0
R    192.168.14.0/24 [120/1] via 192.168.10.1, 00:00:17, Serial0/1
R    192.168.15.0/24 [120/1] via 192.168.10.1, 00:00:17, Serial0/1
C    192.168.16.0/24 is directly connected, FastEthernet0/0
R    192.168.17.0/24 [120/1] via 192.168.11.2, 00:00:15, Serial0/0

R2#
```

For router R3:

```
R3>en
R3#show ip route
Codes: C - connected, S - static, I - IGRP, 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
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

R    192.168.10.0/24 [120/1] via 192.168.11.1, 00:00:02, Serial0/1
C    192.168.11.0/24 is directly connected, Serial0/1
C    192.168.12.0/24 is directly connected, Serial0/0
R    192.168.13.0/24 [120/1] via 192.168.12.2, 00:00:03, Serial0/0
R    192.168.14.0/24 [120/2] via 192.168.12.2, 00:00:03, Serial0/0
                     [120/2] via 192.168.11.1, 00:00:02, Serial0/1
R    192.168.15.0/24 [120/2] via 192.168.11.1, 00:00:02, Serial0/1
R    192.168.16.0/24 [120/1] via 192.168.11.1, 00:00:02, Serial0/1
C    192.168.17.0/24 is directly connected, FastEthernet0/0
```

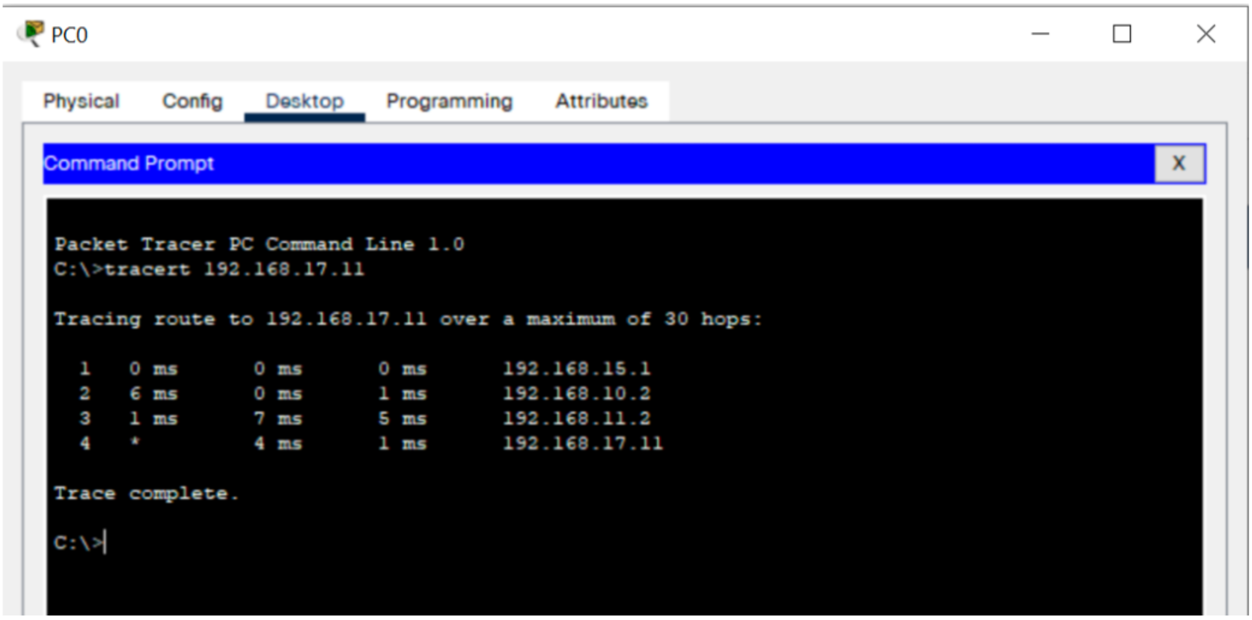
For router R4:

```
R4>en
R4#show ip route
Codes: C - connected, S - static, I - IGRP, 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
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

R    192.168.10.0/24 [120/2] via 192.168.13.2, 00:00:21, Serial0/0
                     [120/2] via 192.168.12.1, 00:00:17, Serial0/1
R    192.168.11.0/24 [120/1] via 192.168.12.1, 00:00:17, Serial0/1
C    192.168.12.0/24 is directly connected, Serial0/1
C    192.168.13.0/24 is directly connected, Serial0/0
R    192.168.14.0/24 [120/1] via 192.168.13.2, 00:00:21, Serial0/0
R    192.168.15.0/24 [120/2] via 192.168.13.2, 00:00:21, Serial0/0
R    192.168.16.0/24 [120/2] via 192.168.12.1, 00:00:17, Serial0/1
R    192.168.17.0/24 [120/1] via 192.168.12.1, 00:00:17, Serial0/1

R4#
```

For router R5:

```
R5>en
R5#show ip route
Codes: C - connected, S - static, I - IGRP, 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
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

R    192.168.10.0/24 [120/1] via 192.168.14.2, 00:00:29, Serial0/0
R    192.168.11.0/24 [120/2] via 192.168.13.1, 00:00:15, Serial0/1
                     [120/2] via 192.168.14.2, 00:00:29, Serial0/0
R    192.168.12.0/24 [120/1] via 192.168.13.1, 00:00:15, Serial0/1
C    192.168.13.0/24 is directly connected, Serial0/1
C    192.168.14.0/24 is directly connected, Serial0/0
R    192.168.15.0/24 [120/1] via 192.168.14.2, 00:00:29, Serial0/0
R    192.168.16.0/24 [120/2] via 192.168.14.2, 00:00:29, Serial0/0
R    192.168.17.0/24 [120/2] via 192.168.13.1, 00:00:15, Serial0/1
```

Tracing route from PC0 to PC1:



CONCLUSION: Successfully studied and configure RIP protocol using Cisco Packet tracer.

Post Lab Questions

1. .... are two popular examples of distance vector routing protocols.

A. OSPF and RIP

B. RIP and BGP

C. BGP and OSPF

D. BGP and SPF

2. A .... routing table contains information entered manually.

A. static

B. dynamic

C. hierarchical

D. non static

3. A .... routing table is updated periodically using one of the dynamic routing protocols.

A. static

B. dynamic

C. hierarchical

D. non static

4. Which of the following is not the category of dynamic routing algorithm.

A. Distance vector protocols

B. Link state protocols

C. Hybrid protocols

D. Automatic state protocols

5. In .... forwarding, the mask and destination addresses are both 0.0.0.0 in the routing table.

A. next-hop

B. network-specific

C. host-specific

D. default

6. Differentiate between Distance Vector Routing and Link State Routing.

Distance Vector Routing	Link State Routing
Bandwidth required is less due to local sharing, small packets and no flooding.	Bandwidth required is more due to flooding and sending of large link state packets.
Based on local knowledge since it updates table based on information from neighbours.	Based on global knowledge. i.e. it has knowledge about entire network.
Make use of Bellman Ford Algorithm.	Make use of Dijkstra's algorithm
Traffic is less	Traffic is more
Converges slowly	Converges faster
Count to infinity problem	No count to infinity problem
Persistent looping problem	No Persistent looping, only transient loops.
Practical Implementation is RIP and IGRP	Practical implementation is OSPF and ISIS.

Date: ___________ **Signature of faculty in-charge**