



# **University of Asia Pacific**

Department of Computer Science & Engineering

Computer Networks Lab

CSE 320

RIP Version 2 Report

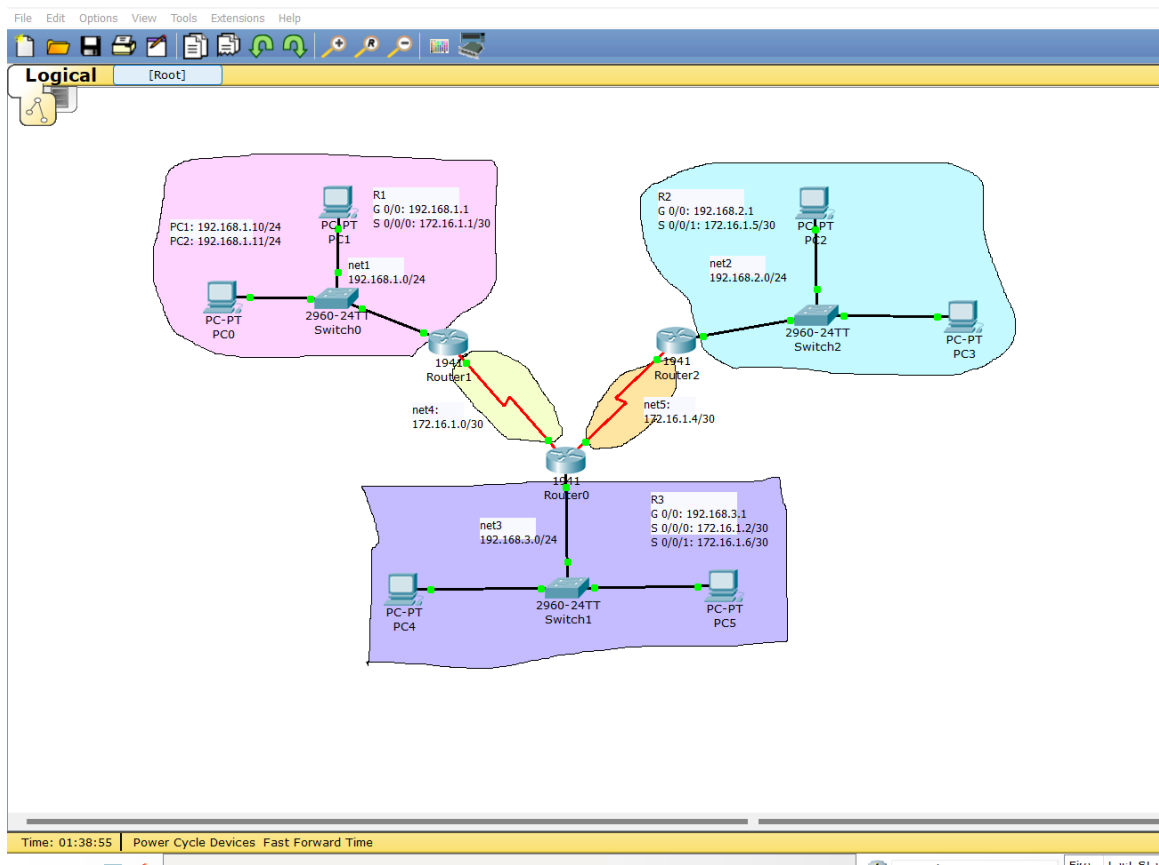
**Submitted to:**

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## RIP V2:

RIP version 2 was developed in 1993. It supports classless Inter-Domain Routing (CIDR) and has the ability to carry subnet information, its metric is also hop count, and max hop count 15 is the same as RIP version 1. It supports authentication and does subnetting and multicasting. Auto summary can be done on every router. In RIPv2 Subnet masks are included in the routing update. RIPv2 multicasts the entire routing table to all adjacent routers at the address 224.0.0.9, as opposed to RIPv1 which uses broadcast (255.255.255.255).

## Structure:



## Equipments:

- 1941 router
- 2960-24TT switch
- PC-PT end devices
- wire

## Steps:

- Place routers, switches, end devices.
- Get into router 1(R1) and turn off the switch(S) .Add HWIC-2T module into R1 and turn on the switch.
- Same thing will happen for router 2 (R2) and router 3 (R3).
- Then connect the router to switch with copper straight-through and use GigabitEthernet 0/0 to GigabitEthernet 0/1. And switch to end devices using FastEthernet 0/1 to Fast ethernet 0.
- This way connects all the routers,switches and end devices(R1-S1)(R2-S2)(R3-S3) and (S1-PC:0,1)(S2-PC:2,3)(S3-PC:4,5) .
- Highlight all the networks by coloring.
- Connect R3 router to R1 router using serial DCE and use serial 0/0/0 to serial 0/0/0 .From router 3 to router 2 use serial 0/0/1 to serial 0/0/1.And highlight the networks.
- Used network address for R1 and R3 -172.16.1.0/30 .For R3 and R2 : 172.16.1.4/30.
- Now set the ip address of the PC.

**PC-0** ip address : 192.168.1.10

Subnet mask: 255.255.255.0

Default gateway: 192.168.1.1

**PC-1** ip address : 192.168.1.11

Subnet mask: 255.255.255.0

Default gateway: 192.168.1.1

**PC-2** ip address : 192.168.2.10

Subnet mask: 255.255.255.0  
Default gateway: 192.168.2.1

**PC-3** ip address : 192.168.2.11

Subnet mask: 255.255.255.0  
Default gateway: 192.168.2.1

**PC-4** ip address : 192.168.3.10

Subnet mask: 255.255.255.0  
Default gateway: 192.168.3.1

**PC-5** ip address : 192.168.3.11

Subnet mask: 255.255.255.0  
Default gateway: 192.168.3.1

- Configure R1 by writing code in CLI:

```
R1>enable
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#hostname R1
R1(config)#interface gigabitEthernet 0/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shutdown
```

- Configure R2 and R3 in the same way with their ip address.
- Now ping each PC's to its default gateway. In the command prompt of PC-0:

## Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time=3ms TTL=255
Reply from 192.168.1.1: bytes=32 time=0ms TTL=255
Reply from 192.168.1.1: bytes=32 time=0ms TTL=255
Reply from 192.168.1.1: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 1ms

PC>
```

We are getting the reply. Test all the PCs with their ip.

- Now we will use 172.16.1.0, interface serial 0/0/0 for R1 and 172.16.1.2, serial 0/0/0 is for R3.

- Configure R1 by writing code:

```
R1>enable
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface serial 0/0/0
R1(config-if)#ip address 172.16.1.1 255.255.255.252
R1(config-if)#no shutdown
```

- Configure R3 in this way with the ip: 172.16.1.2
- Now verify the pinging from R1 to R3 vice-versa
- Verify for R3:

```
R1#ping 172.16.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/10/27 ms
```

```
R3#ping 171.16.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 171.16.1.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
```

Success rate is 100%.

- Now we will use 172.16.1.5, interface serial 0/0/1 for R2 and 172.16.1.6, serial 0/0/1 is for R3.

- Configure R2 by writing the code:
- Configure R3 in this way with the ip 172.16.1.6

```
R2>enable
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface serial 0/0/1
R2(config-if)#ip address 172.16.1.5 255.255.255.252
R2(config-if)#no shutdown
```

- Verify pinging R2 and R3 vice versa:

```
R2#ping 172.16.1.6

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.6, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/6/16 ms


R3#ping 172.16.1.5

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.5, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/11/27 ms
```

Success rate is 100%

- Save the configuration on each routers R1,R2 and R3:

```
R1>enable
R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

- Now verify the routing table of each router.
- For R1:

```

R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R1#show ip rout
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
       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

    172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
C       172.16.1.0/30 is directly connected, Serial0/0/0
L       172.16.1.1/32 is directly connected, Serial0/0/0
R       172.16.1.4/30 [120/1] via 172.16.1.2, 00:00:18, Serial0/0/0
    192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, GigabitEthernet0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0
R       192.168.2.0/24 [120/2] via 172.16.1.2, 00:00:18, Serial0/0/0
R       192.168.3.0/24 [120/1] via 172.16.1.2, 00:00:18, Serial0/0/0

```

- For R2:

```

R2#show ip rout
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
       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

    172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
R       172.16.1.0/30 [120/1] via 172.16.1.6, 00:00:12, Serial0/0/1
C       172.16.1.4/30 is directly connected, Serial0/0/1
L       172.16.1.5/32 is directly connected, Serial0/0/1
R       192.168.1.0/24 [120/2] via 172.16.1.6, 00:00:12, Serial0/0/1
    192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, GigabitEthernet0/0
L       192.168.2.1/32 is directly connected, GigabitEthernet0/0
R       192.168.3.0/24 [120/1] via 172.16.1.6, 00:00:12, Serial0/0/1

```

- For R3:



```

R3#show ip rout
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
       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

    172.16.0.0/16 is variably subnetted, 4 subnets, 2 masks
C       172.16.1.0/30 is directly connected, Serial0/0/0
L       172.16.1.2/32 is directly connected, Serial0/0/0
C       172.16.1.4/30 is directly connected, Serial0/0/1
L       172.16.1.6/32 is directly connected, Serial0/0/1
R       192.168.1.0/24 [120/1] via 172.16.1.1, 00:00:01, Serial0/0/0
R       192.168.2.0/24 [120/1] via 172.16.1.5, 00:00:17, Serial0/0/1
    192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.3.0/24 is directly connected, GigabitEthernet0/0
L       192.168.3.1/32 is directly connected, GigabitEthernet0/0

```

- There are 5 networks and R1,R2,R3 should be aware of 5 networks. Configure a dynamic routing protocol. Configure a reversion to each router. For R1:

```

R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#do sh rou con
sh rou con
^
% Invalid input detected at '^' marker.

R1(config-router)#do sh ip rou con
C 172.16.1.0/30 is directly connected, Serial0/0/0
C 192.168.1.0/24 is directly connected, GigabitEthernet0/0
R1(config-router)#?
auto-summary          Enter Address Family command mode
default-information    Control distribution of default information
distance              Define an administrative distance
exit                  Exit from routing protocol configuration mode
network               Enable routing on an IP network
no                    Negate a command or set its defaults
passive-interface      Suppress routing updates on an interface
redistribute           Redistribute information from another routing protocol
timers                 Adjust routing timers
version               Set routing protocol version
R1(config-router)#network 172.16.0.0
^
% Invalid input detected at '^' marker.

R1(config-router)#network 172.16.0.0
R1(config-router)#network 192.168.1.0
R1(config-router)#no auto-summary

```

- For R2:



```

R2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#no auto-summary
R2(config-router)#do sh ip rou con
C 172.16.1.4/30 is directly connected, Serial0/0/1
C 192.168.2.0/24 is directly connected, GigabitEthernet0/0
R2(config-router)#network 172.16.0.0
R2(config-router)#network 192.168.2.0

```

- For R3:

```

R3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router rip
R3(config-router)#version 2
R3(config-router)#no auto-summary
R3(config-router)#do sh ip rou con
C 172.16.1.0/30 is directly connected, Serial0/0/0
C 172.16.1.4/30 is directly connected, Serial0/0/1
C 192.168.3.0/24 is directly connected, GigabitEthernet0/0
R3(config-router)#network 172.16.0.0
R3(config-router)#network 192.168.3.0

```

- Configure a passive interface for all 3 routers so that it will stop rip updates from being propagated out of these interfaces at G0/0 on each routers.

- For R1:

```

R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#
R1(config)#router
R1(config)#router ri
R1(config)#router rip
R1(config-router)#pas
R1(config-router)#passive-interface g
R1(config-router)#passive-interface gigabitEthernet 0/0
R1(config-router)#^Z
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#cop
R1#copy r
R1#copy running-config st
R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

```

- For R2:

```
R2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#
R2(config)#router
R2(config)#router ri
R2(config)#router rip
R2(config-router)#pas
R2(config-router)#passive-interface g
R2(config-router)#passive-interface gigabitEthernet 0/0
R2(config-router)#^Z
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#cop
R2#copy r
R2#copy running-config st
R2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

- For R3:

```
R3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router
R3(config)#router ri
R3(config)#router rip
R3(config-router)#pas
R3(config-router)#passive-interface g
R3(config-router)#passive-interface gigabitEthernet 0/0
R3(config-router)#^Z
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#cp
R3#cop
R3#copy r
R3#copy running-config st
R3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

- Verify the rip configuration of the net routers:
- R1:

```

R1#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 4 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface          Send Recv Triggered RIP Key-chain
  Serial0/0/0         2    2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
    172.16.0.0
    192.168.1.0
Passive Interface(s):
    GigabitEthernet0/0
Routing Information Sources:
    Gateway           Distance      Last Update
    172.16.1.2         120          00:00:10
Distance: (default is 120)

```

- R2:

```

R2#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 10 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface          Send Recv Triggered RIP Key-chain
  Serial0/0/1         2    2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
    172.16.0.0
    192.168.2.0
Passive Interface(s):
    GigabitEthernet0/0
Routing Information Sources:
    Gateway           Distance      Last Update
    172.16.1.6         120          00:00:07
Distance: (default is 120)

```

- R3:

```

R3#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 7 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface          Send  Recv  Triggered RIP  Key-chain
  Serial0/0/1         2     2
  Serial0/0/0         2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  172.16.0.0
  192.168.3.0
Passive Interface(s):
  GigabitEthernet0/0
Routing Information Sources:
  Gateway            Distance        Last Update
  172.16.1.1          120             00:00:14
  172.16.1.5          120             00:00:28
Distance: (default is 120)

```

- Verify using running-config:

```
R3#show running-config
Building configuration...

Current configuration : 905 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R3
!
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
!
license udi pid CISCO1941/K9 sn FTX1524211R
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
```



```
!  
!  
!  
!  
interface GigabitEthernet0/0  
  ip address 192.168.3.1 255.255.255.0  
  duplex auto  
  speed auto  
!  
interface GigabitEthernet0/1  
  no ip address  
  duplex auto  
  speed auto  
  shutdown  
!  
interface Serial0/0/0  
  ip address 172.16.1.2 255.255.255.252  
  clock rate 2000000  
!  
interface Serial0/0/1  
  ip address 172.16.1.6 255.255.255.252  
  clock rate 2000000  
!  
interface Vlan1  
  no ip address  
  shutdown  
!  
router rip  
  version 2  
  passive-interface GigabitEthernet0/0  
  network 172.16.0.0  
  network 192.168.3.0  
  no auto-summary  
!  
ip classless  
!  
ip flow-export version 9  
!  
!  
!  
!  
!  
!
```

```

!
!
!
line con 0
!
line aux 0
!
line vty 0 4
  login
!
!
!
end

```

- Now verify the routing table of each routers:

- For R1:

```

R1#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
       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

    172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
C       172.16.1.0/30 is directly connected, Serial0/0/0
L       172.16.1.1/32 is directly connected, Serial0/0/0
R       172.16.1.4/30 [120/1] via 172.16.1.2, 00:00:08, Serial0/0/0
    192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, GigabitEthernet0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0
R       192.168.2.0/24 [120/2] via 172.16.1.2, 00:00:08, Serial0/0/0
R       192.168.3.0/24 [120/1] via 172.16.1.2, 00:00:08, Serial0/0/0

```

- For R2:



```

R2#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
       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

    172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
R       172.16.1.0/30 [120/1] via 172.16.1.6, 00:00:13, Serial0/0/1
C       172.16.1.4/30 is directly connected, Serial0/0/1
L       172.16.1.5/32 is directly connected, Serial0/0/1
R       192.168.1.0/24 [120/2] via 172.16.1.6, 00:00:13, Serial0/0/1
       192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, GigabitEthernet0/0
L       192.168.2.1/32 is directly connected, GigabitEthernet0/0
R       192.168.3.0/24 [120/1] via 172.16.1.6, 00:00:13, Serial0/0/1

```

- For R3:

```

R3#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
       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

    172.16.0.0/16 is variably subnetted, 4 subnets, 2 masks
C       172.16.1.0/30 is directly connected, Serial0/0/0
L       172.16.1.2/32 is directly connected, Serial0/0/0
C       172.16.1.4/30 is directly connected, Serial0/0/1
L       172.16.1.6/32 is directly connected, Serial0/0/1
R       192.168.1.0/24 [120/1] via 172.16.1.1, 00:00:21, Serial0/0/0
R       192.168.2.0/24 [120/1] via 172.16.1.5, 00:00:19, Serial0/0/1
       192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.3.0/24 is directly connected, GigabitEthernet0/0
L       192.168.3.1/32 is directly connected, GigabitEthernet0/0

```

- Now try to ping different networks.
- From PC-0 to PC-2 :

```
C:\>ping 192.168.2.10

Pinging 192.168.2.10 with 32 bytes of data:

Reply from 192.168.2.10: bytes=32 time=11ms TTL=125
Reply from 192.168.2.10: bytes=32 time=13ms TTL=125
Reply from 192.168.2.10: bytes=32 time=23ms TTL=125
Reply from 192.168.2.10: bytes=32 time=14ms TTL=125

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 11ms, Maximum = 23ms, Average = 15ms
```

Another for network 3:

```
C:\>ping 192.168.3.10

Pinging 192.168.3.10 with 32 bytes of data:

Reply from 192.168.3.10: bytes=32 time=24ms TTL=126
Reply from 192.168.3.10: bytes=32 time=14ms TTL=126
Reply from 192.168.3.10: bytes=32 time=1ms TTL=126
Reply from 192.168.3.10: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.3.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 24ms, Average = 10ms
```

We are getting the reply.

So, we can say that this is a successful RIP V2.