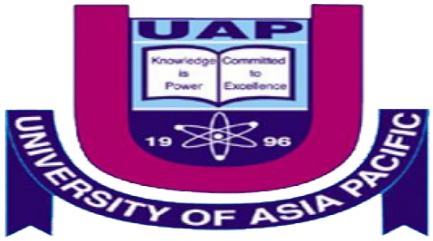

UNIVERSITY OF ASIA PACIFIC

Department of Computer Science & Engineering

Dynamic Protocols RIP V2

Course Code : CSE 319

Course Title : Computer Networks Lab

Submitted by:

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Definition of RIP

Routing Information Protocol (RIP) is a **dynamic distance-vector routing protocol**. Routers running the distance-vector protocol send all or a portion of their routing tables in routing-update messages to their neighbors. We can use RIP to configure the hosts as part of a RIP network. It uses hop count as a routing metric to find the best path between the source and the destination network. It is a distance-vector routing protocol that has an AD value of 120 and works on the Network layer of the OSI model. RIP uses port number 520.

Features of RIP

-Updates of the network are exchanged periodically.
-Updates (routing information) are always broadcast.
- Full routing tables are sent in updates.
- Routers always trust routing information received from neighbor routers. This is also known as *Routing on rumors*.

RIP Versions

There are three versions of routing information protocol – **RIP Version1**, **RIP Version2**, and **RIPng**.

RIP Version-2

The **Routing Information Protocol, version 2 (RIPv2)** is an enhanced version of RIP that includes support for important routing features such as class-less addressing and variable-length subnet masks. RIPv2 is a distance-vector protocol that has been in use for many years.

Dynamic Routing protocols

Dynamic routing is a networking technique that provides *optimal* data routing. Unlike static routing, dynamic routing enables routers to select paths according to real-time logical network layout changes.

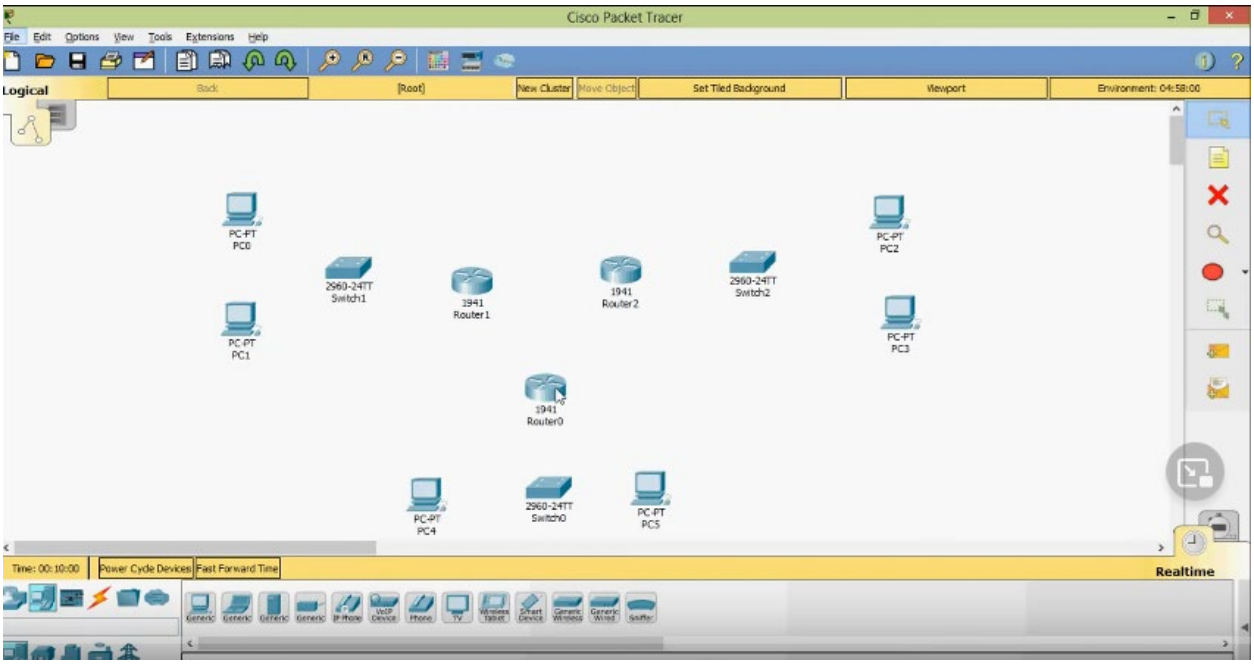
Dynamic routing uses multiple algorithms and protocols. The most popular are Routing Information Protocol (RIP) and Open Shortest Path First (OSPF).
Dynamic routing protocols allow routers to share information about the network with other routers to allow them to select the best path to reach a destination.

Advantages of Dynamic Routing

- Allows the exchange of routing information whenever the network experiences a change in topology.
- Since the routes do not have to be configured manually, there is less administrative overhead.
- Less error-prone than static routing.
- Allows scalability since there is less administrative overhead involved.

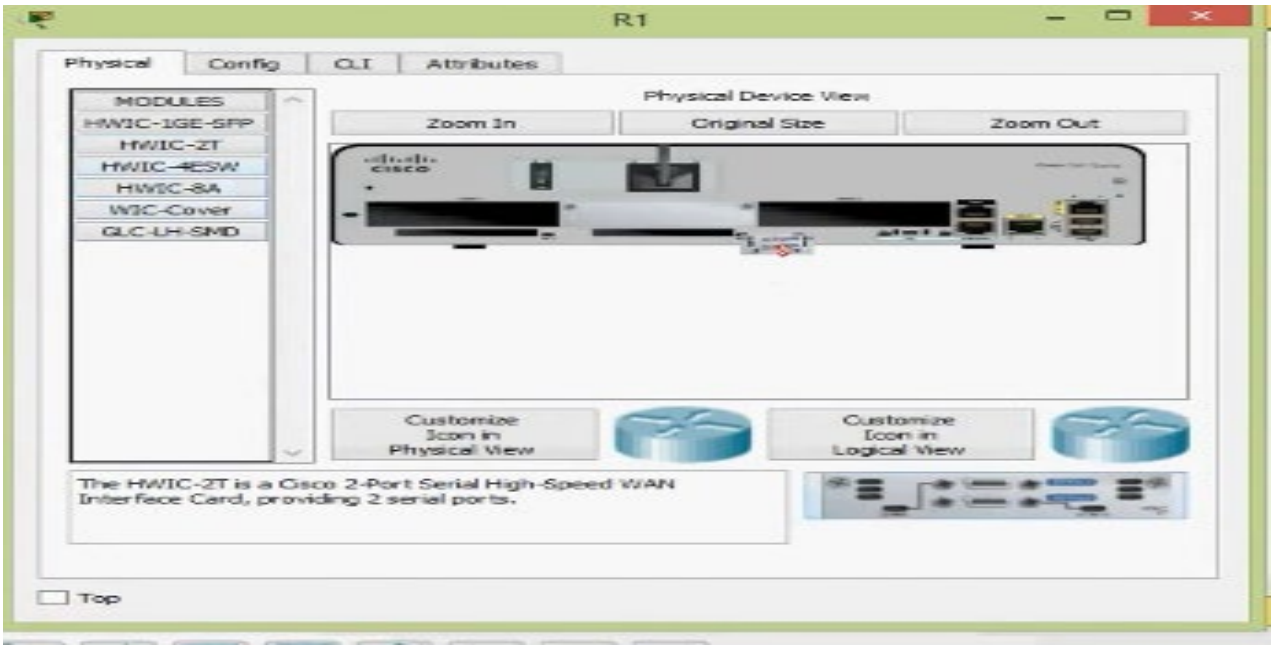
How to implement **Dynamic protocols RIPv2**

Step-1: Open a project in Cisco Packet Tracer. Take router, switch, PC & laptop's from the drop down menu. The amount of these equipment's depends on the architecture of the project.

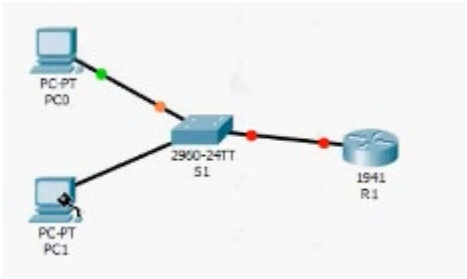


Step-2: Rename the equipment's to avoid confusion.

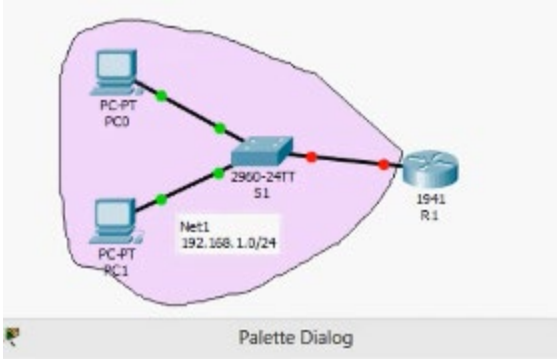
Step-3: Add serial interface for the routers. Open a router, put off the device, select HWIC-2T and add that interface. Repeat process for all routers. Then turn on the module.



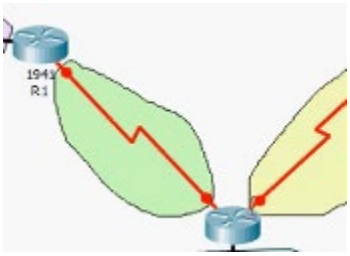
Step-4: Connect router with switch using g 0/0 and g 0/1& f 0/1, f 0/2 to connect PC & laptop's with switch.



Step-5: Highlight it and note the network address. Repeat process for all networks. I'm using 192.168.1.0/24 for Network-1, 192.168.2.0/24 for Network-2, 192.168.3.0/24 for Network-3 & 192.168.4.0/24 for Network-4.



Step-6: Connect the routers using serial cable and highlight them.



Step-7: Note down the network addresses beside the routers. I'm using 192.168.1.0/24 for Network-1, 192.168.2.0/24 for Network-2, 192.168.3.0/24 for Network-3 & 192.168.4.0/24 for Network-4.

Step-8: Set IP address for the PC & laptop's. Select a PC/laptop, write down IP address, and default gateway for the PC/laptop. I'm using-

PC0: 192.168.1.10/24
PC1: 192.168.1.11/24
PC2: 192.168.1.12/24
LAPTOP6: 192.168.1.13/24
LAPTOP7: 192.168.1.14/24

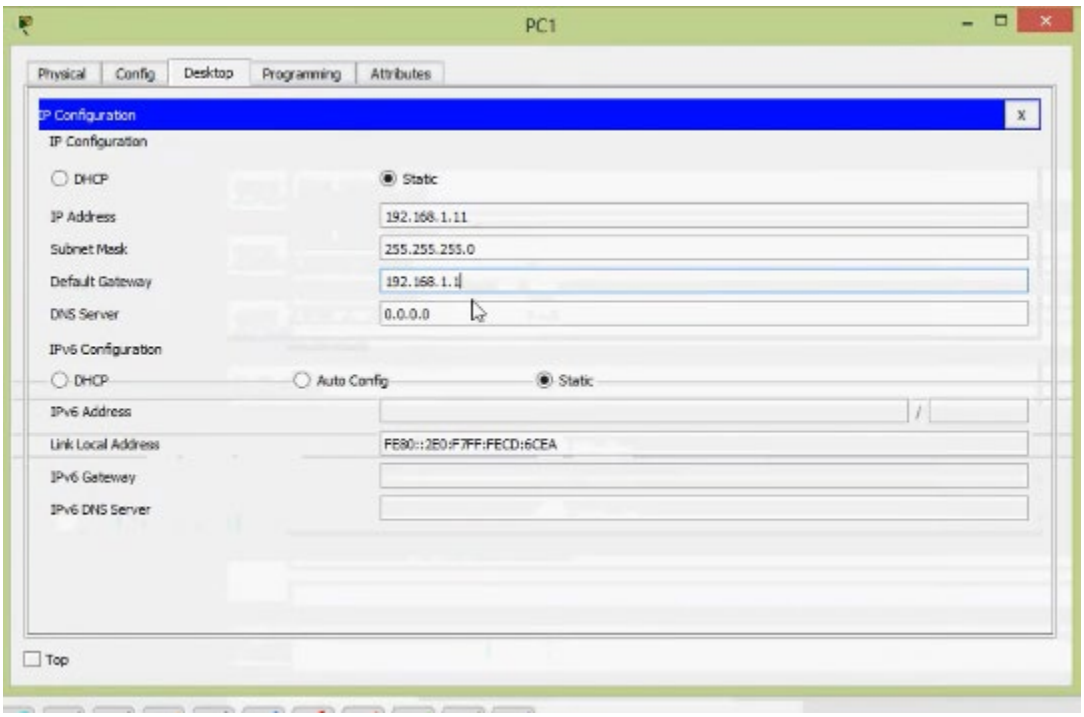
PC3: 192.168.4.10/24
PC4: 192.168.4.11/24
PC5: 192.168.4.12/24
LAPTOP1: 192.168.4.13/24

LAPTOP0: 192.168.4.14/24

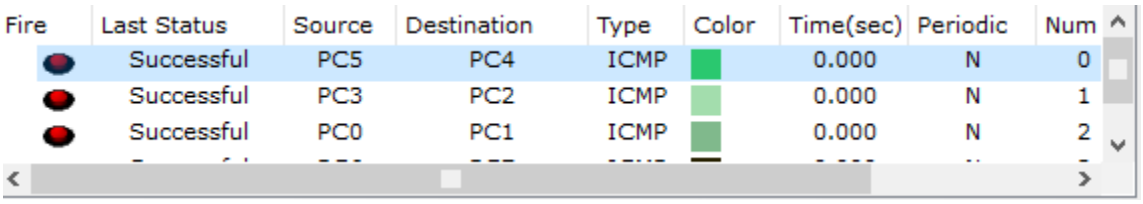
PC6: 192.168.2.10/24
PC7: 192.168.2.11/24
PC8: 192.168.2.12/24
LAPTOP5: 192.168.2.13/24
LAPTOP4: 192.168.2.14/24

PC9: 192.168.3.10/24
PC10: 192.168.3.11/24
PC11: 192.168.3.12/24
LAPTOP2: 192.168.3.13/24
LAPTOP3: 192.168.3.14/24

Default gateway's- 192.168.1.1, 192.168.2.1, 192.168.3.1, 192.168.4.1



Step-9: Verify each local networks. It should become successful.



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	PC5	PC4	ICMP		0.000	N	0
	Successful	PC3	PC2	ICMP		0.000	N	1
	Successful	PC0	PC1	ICMP		0.000	N	2

Step-10: Configure the default gateway of each network using the routers. Open terminal and write down the codes for the each dedicated routers, here I have 4 routers so I have to write 4 times-

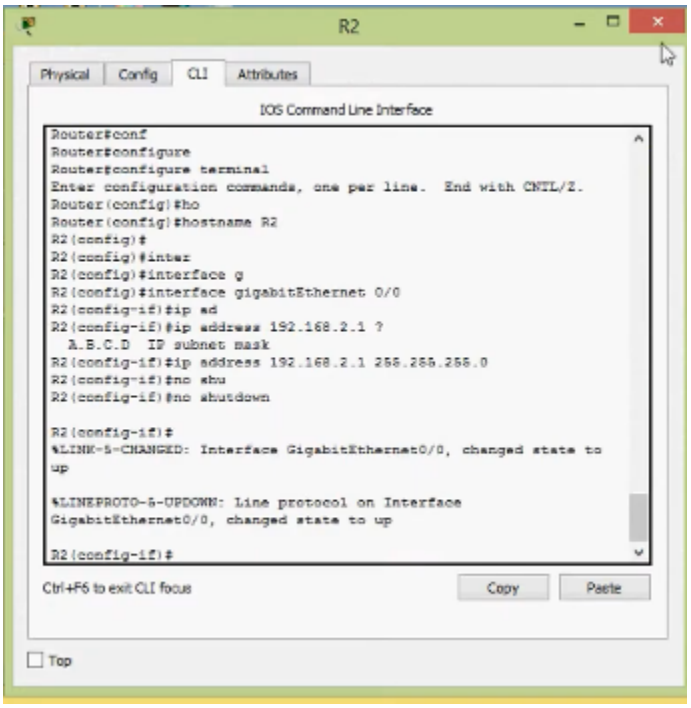
enable
configure terminal
hostname R1
interface gigabitEthernet 0/0
ip address 192.168.1.1 255.255.255.0
no shutdown

enable
configure terminal
hostname R2
interface gigabitEthernet 0/0
ip address 192.168.2.1 255.255.255.0
no shutdown

enable
configure terminal
hostname R3
interface gigabitEthernet 0/0
ip address 192.168.3.1 255.255.255.0
no shutdown

enable

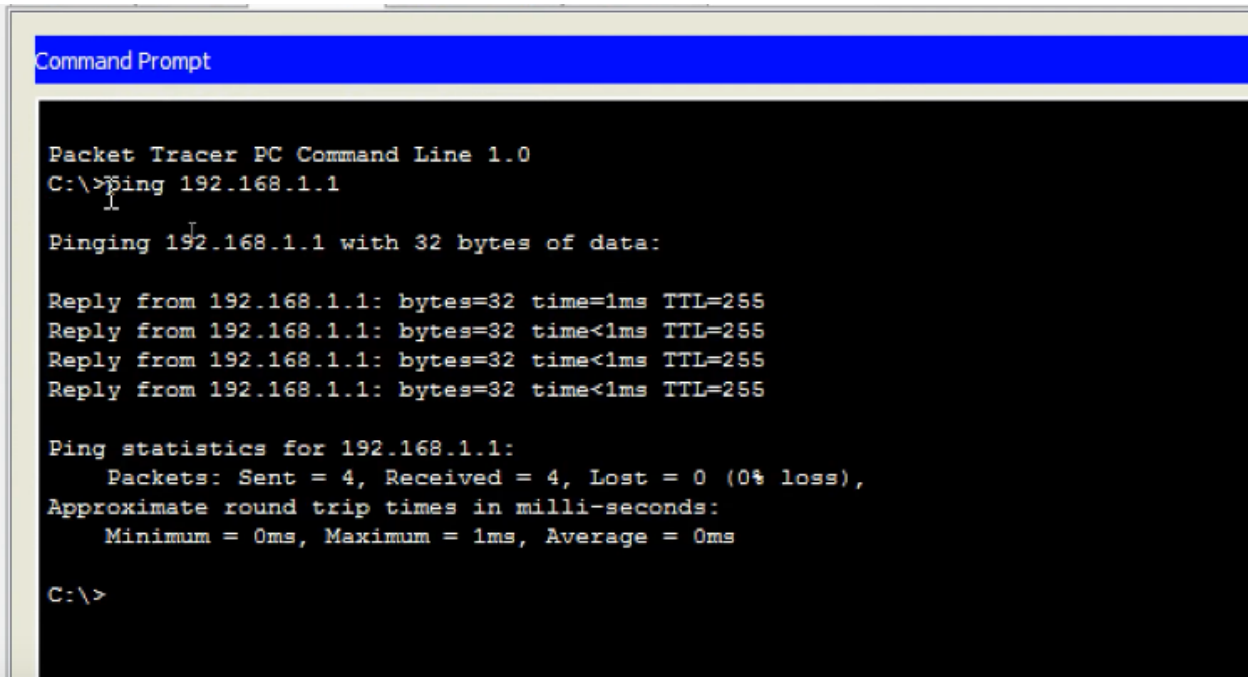
configure terminal
hostname R4
interface gigabitEthernet 0/0
ip address 192.168.4.1 255.255.255.0
no shutdown



Step-11: Ping each PC & laptop's to its default gateway. Commands for each section is-

ping 192.168.1.1
ping 192.168.2.1
ping 192.168.3.1
ping 192.168.4.1

Then we will see we are getting the reply.



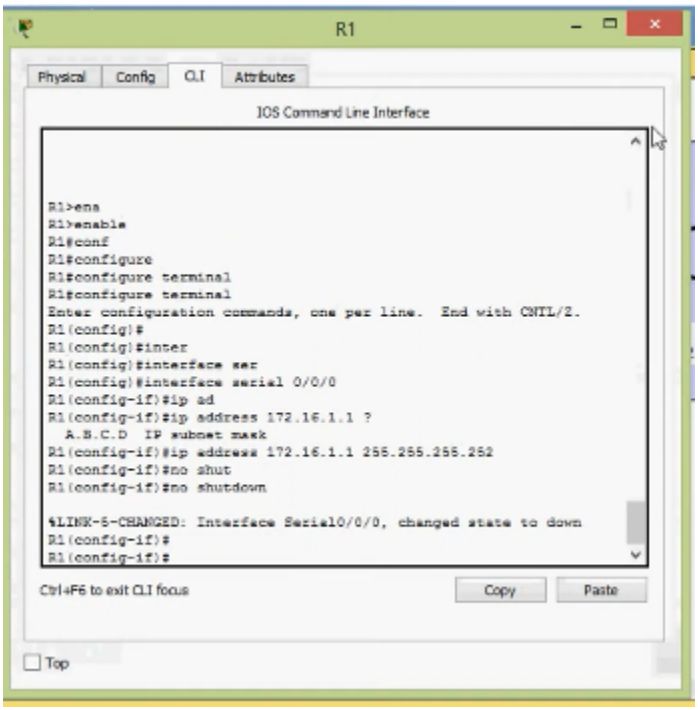
Step-12: Configure interface on each routers. Codes are-

enable
configure terminal
interface serial 0/0/0
ip address 172.16.1.1 255.255.255.252
no shutdown

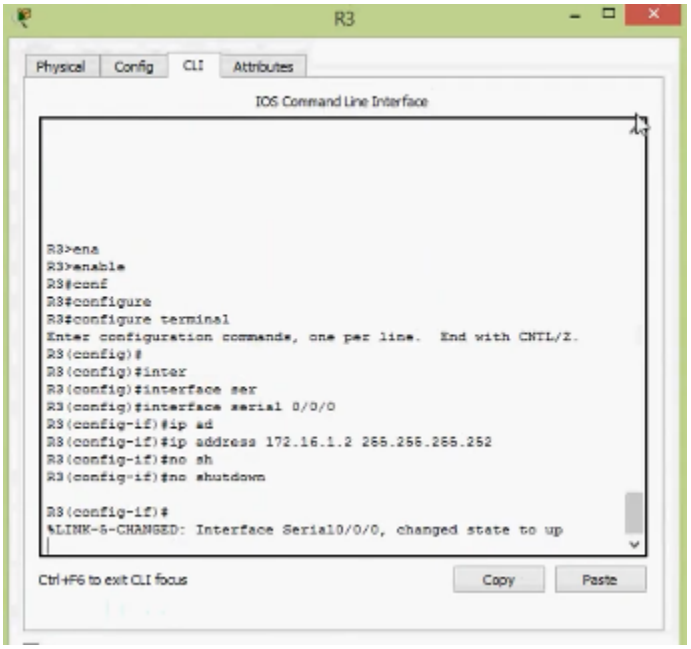
enable
configure terminal
interface serial 0/0/0
ip address 172.16.1.13 255.255.255.252
no shutdown

enable
configure terminal
interface serial 0/0/1
ip address 172.16.1.6 255.255.255.252
no shutdown

enable
configure terminal
interface serial 0/0/1
ip address 172.16.1.2 255.255.255.252
no shutdown



After operation in R1, between R1 and R3 the link is still down because we have to give no shut command to the other end.

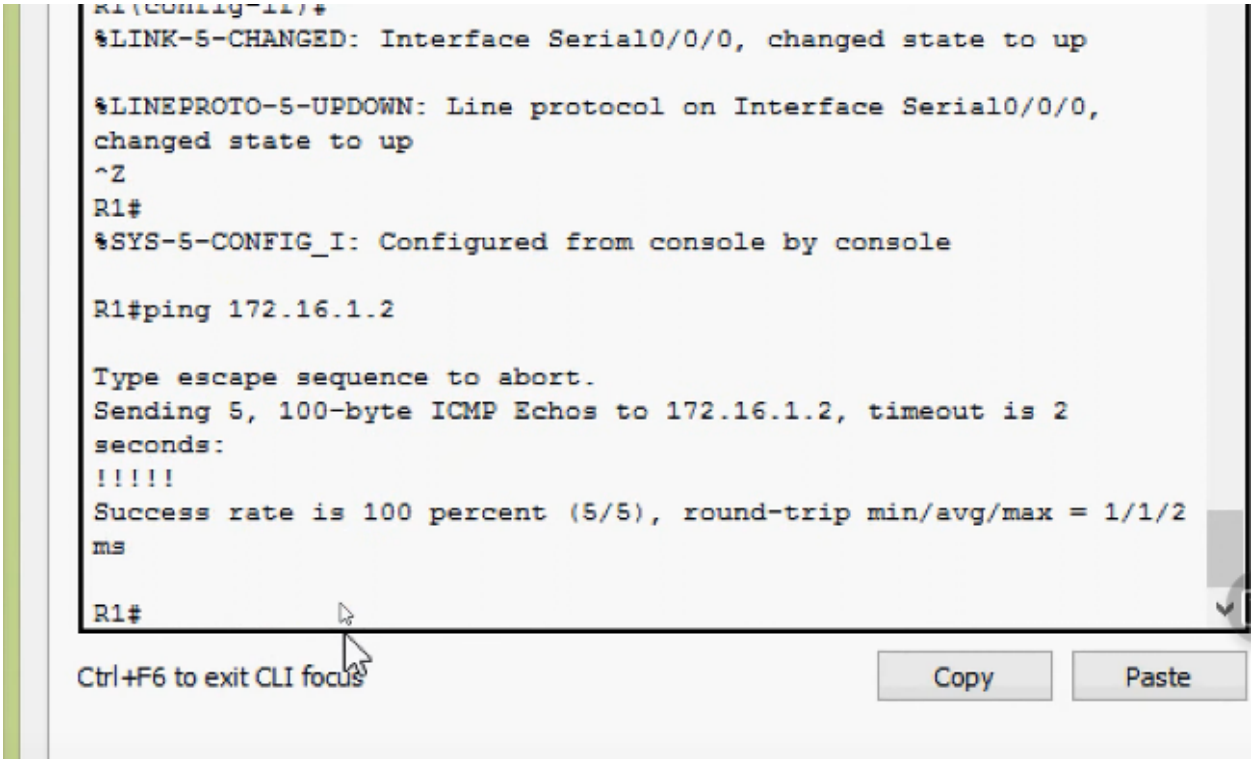


Then link between respective routers will be up. Repeat the process for all connection types.

Step-13: Verify by pinging to R1 and R3 and vice versa. Commands are-

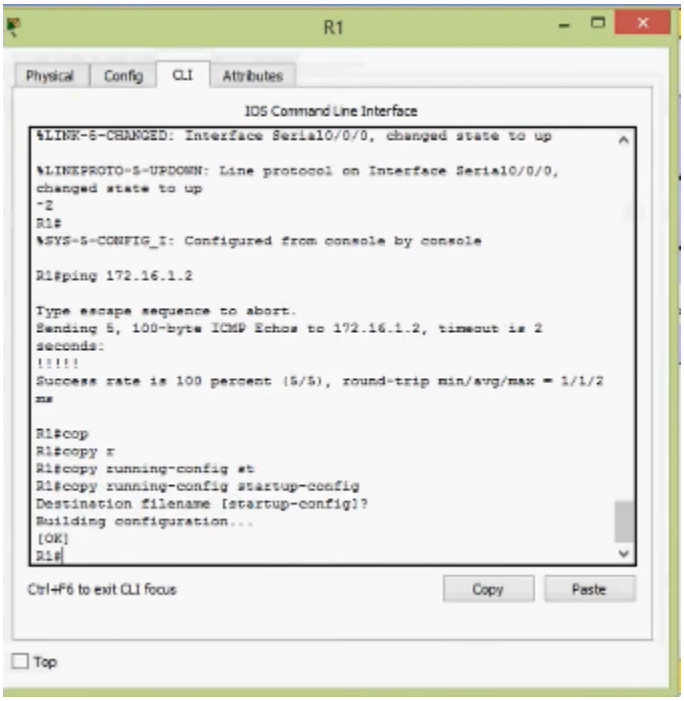
ping 172.16.1.1
ping 172.16.1.13
ping 172.16.1.6
ping 172.16.1.2

We will see the success rate is 100%



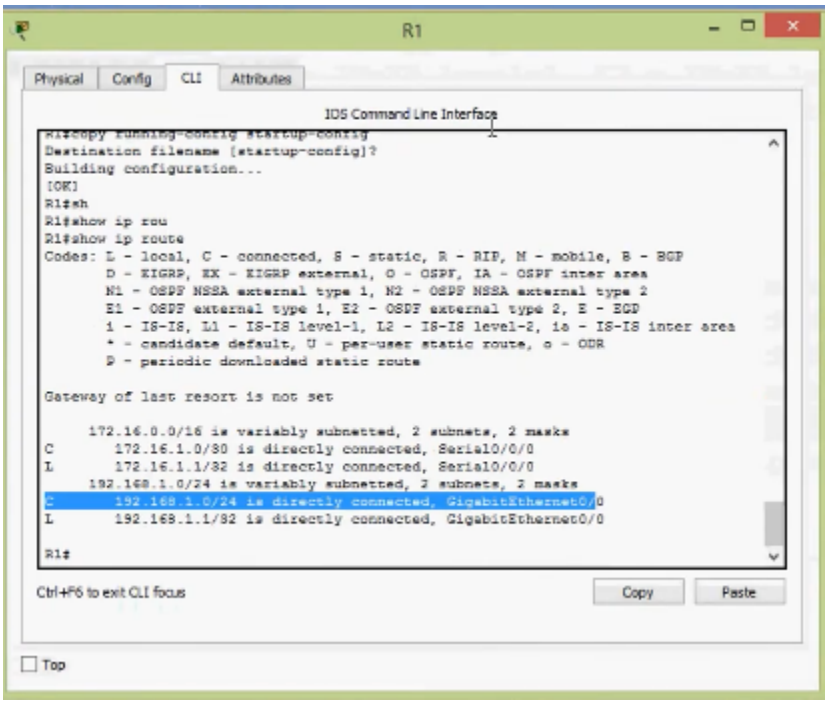
Step-14: Save the configuration on each routers. Command is-

copy running-config startup-config

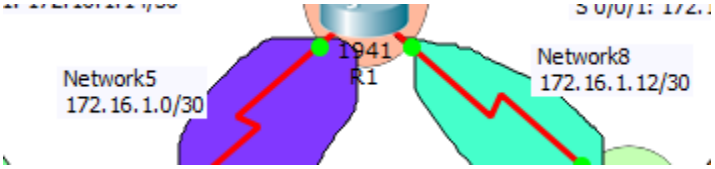


Step-15: Verify the routing table on each routers. Command is-

show ip route



Step-16: Coming to the topology, give two network names. I'm using 172.16.1.0/30 for Network-5, 172.16.1.4/30 for Network-6, 172.16.1.8/30 for Network-7 & 172.16.1.12/30 for Network-8 here.



Step-17: Each router should be aware of each networks. Configure a dynamic routing protocol which is called RIP v2. The codes for the 4 routers are-

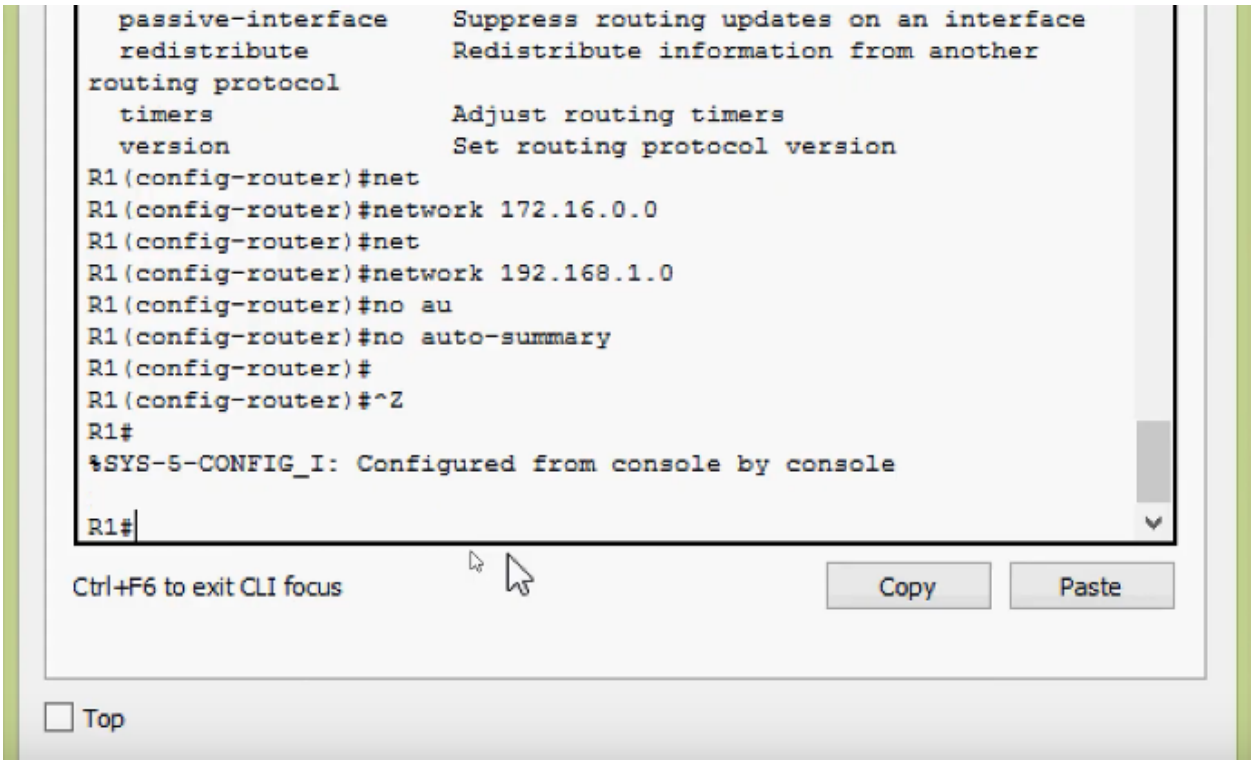
enable
configure terminal
router rip
version 2
do sh ip rou con
network 172. 16.0.0
network 192.168.1.0
no auto-summary

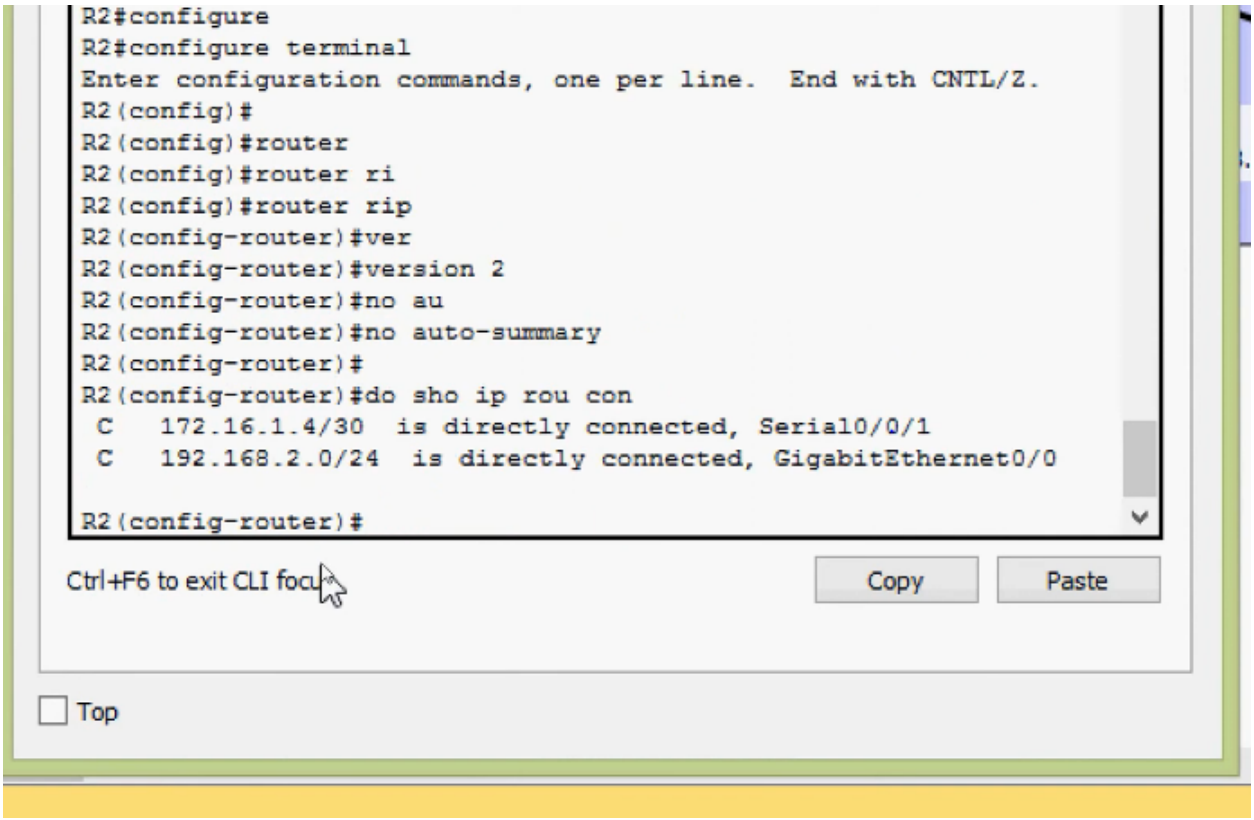
enable
configure terminal
router rip
version 2
no auto-summary
do sh ip rou con
network 172. 16.0.0
network 192.168.2.0

enable
configure terminal
router rip
version 2
no auto-summary
do sh ip rou con
network 172. 16.0.0
network 192.168.3.0

enable
configure terminal
router rip
version 2
no auto-summary
do sh ip rou con
network 172. 16.0.0

network 192.168.4.0



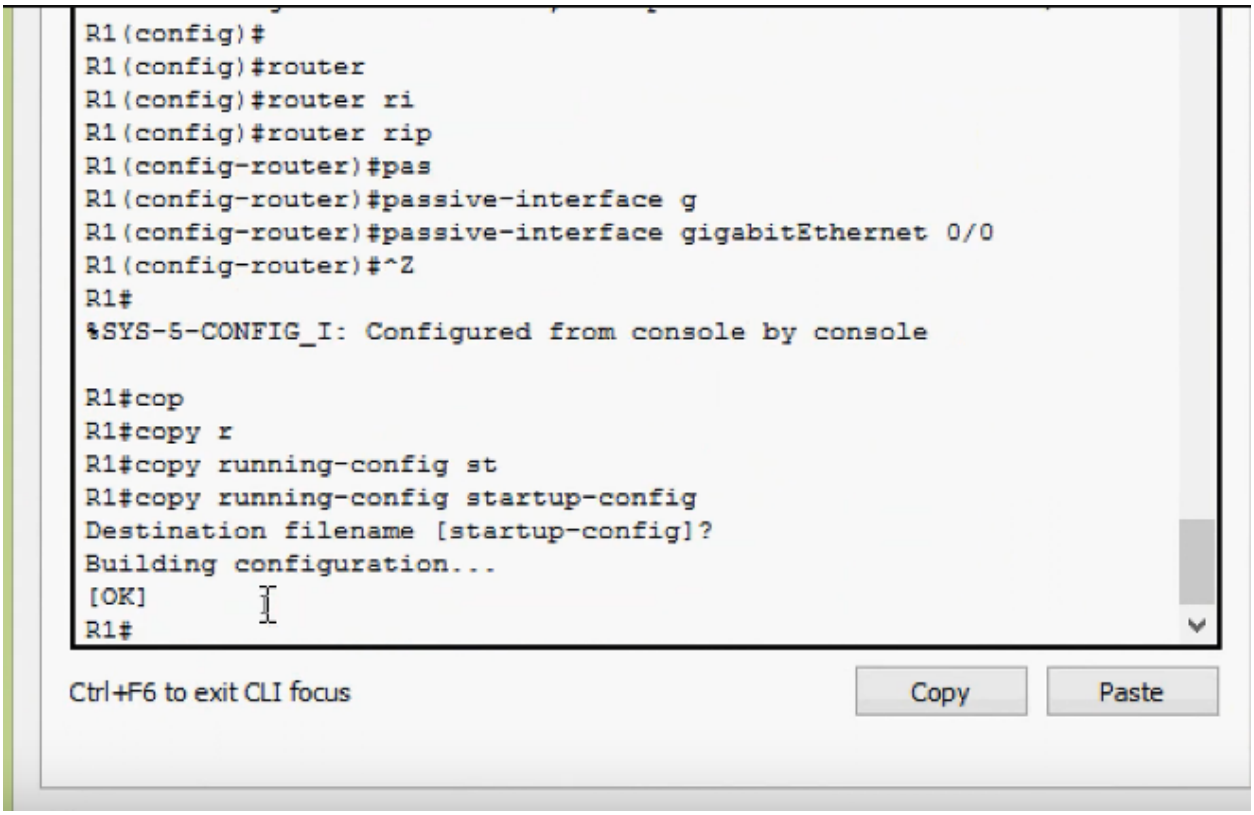


Step-18: Configure passive interface on each routers. Codes are-

configure terminal
router rip
passive-interface gigabitEthernet 0/0

also give the command-

copy running-config startup-config

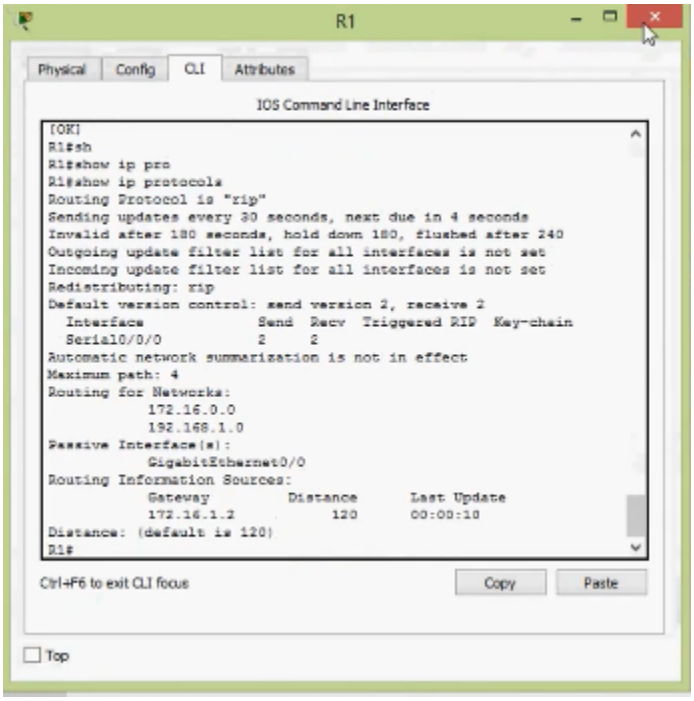


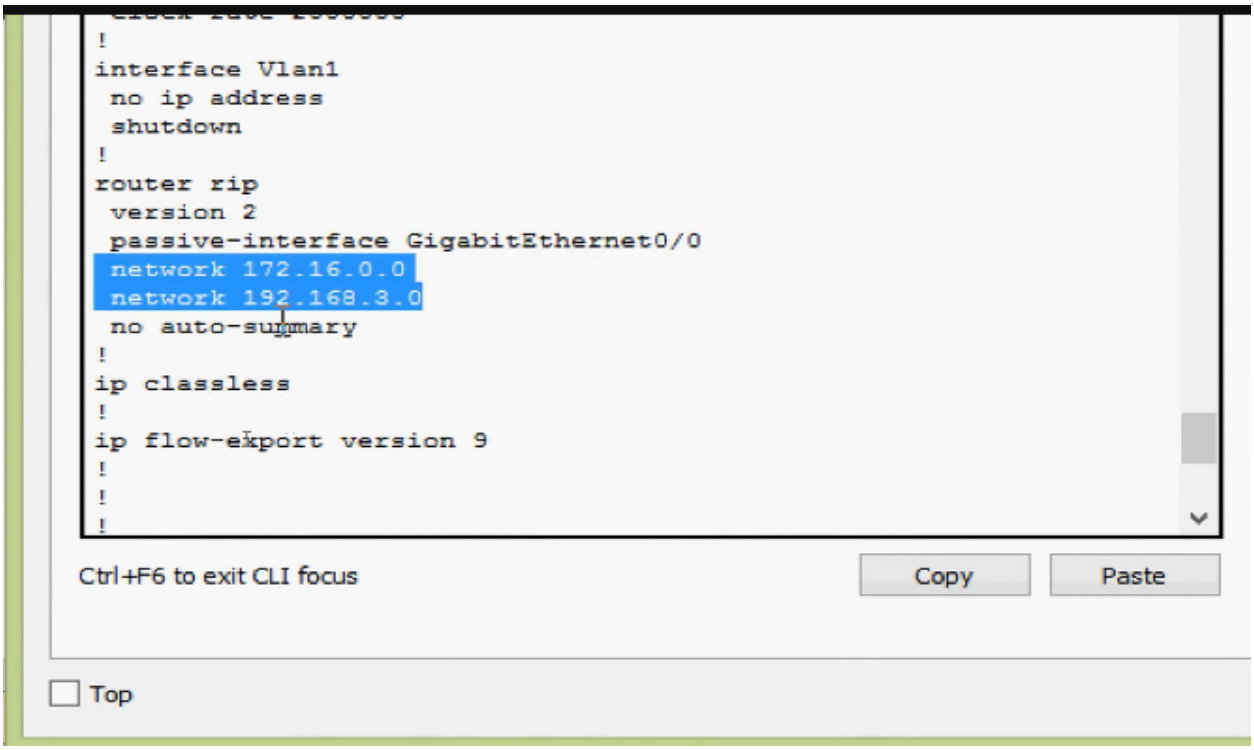
Step-19: Verify RIP configuration on each routers. Command is-

show ip protocols

or,

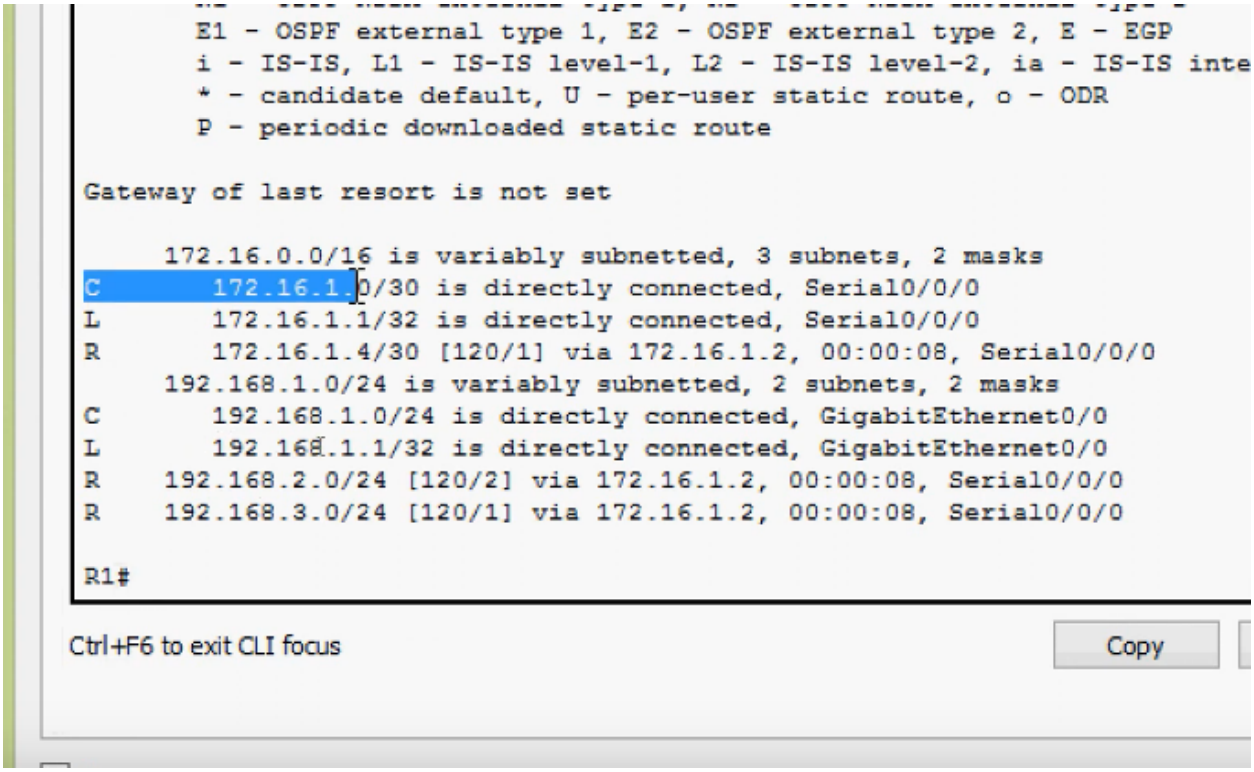
show running-config





Step-20: Verify the routing table of each routers. Command is-

Show ip route



Step-21: Ping different networks. Open PC0/any other PC/laptop & the Command is-

ping 192.168.2.10

We will see we are getting the reply.

Similarly-

ping 192.168.1.10
ping 192.168.3.10
ping 192.168.4.10

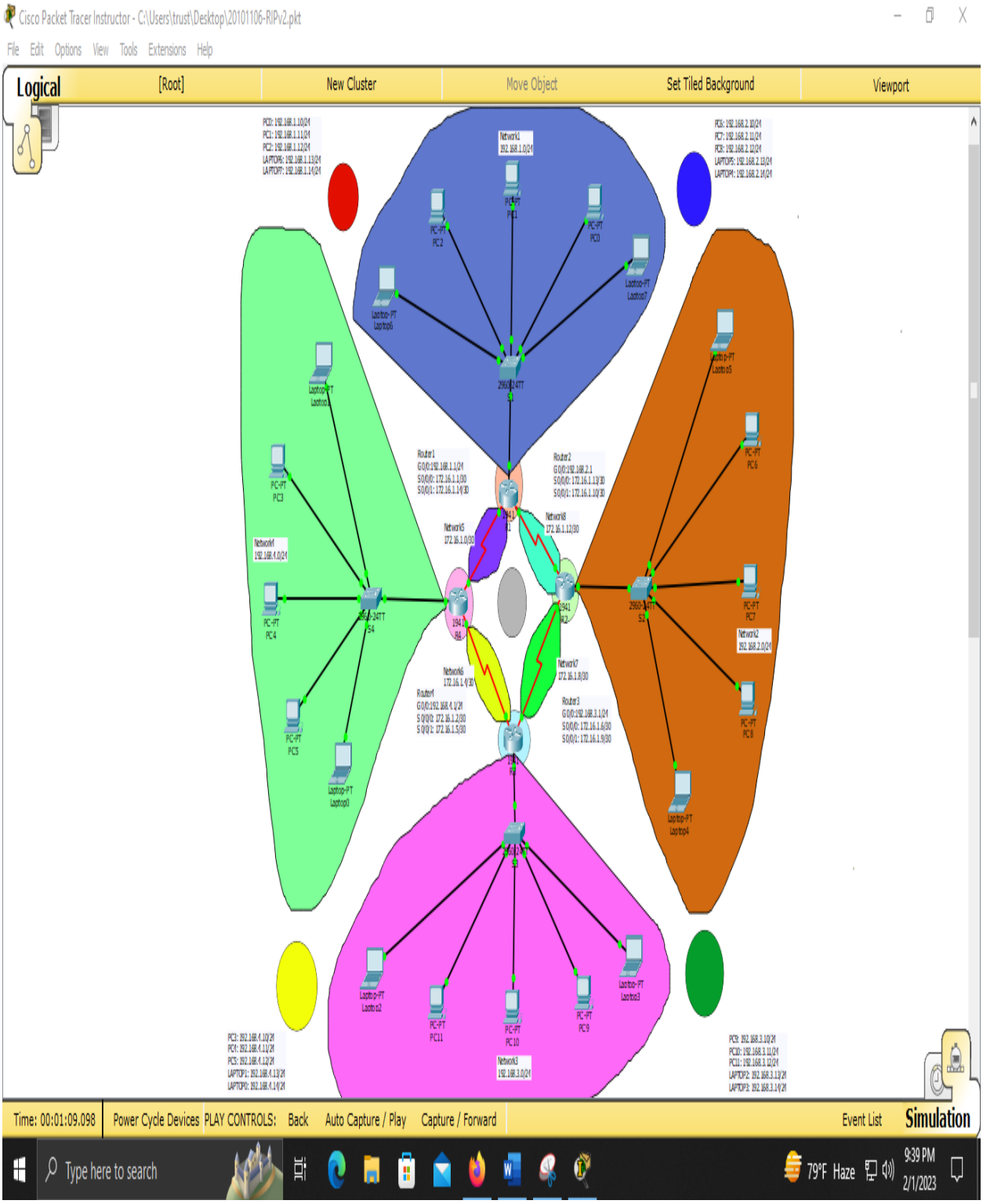
```
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

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 = 1ms, Average = 0ms

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

C:\>
```

Now, each network is aware of every other networks-

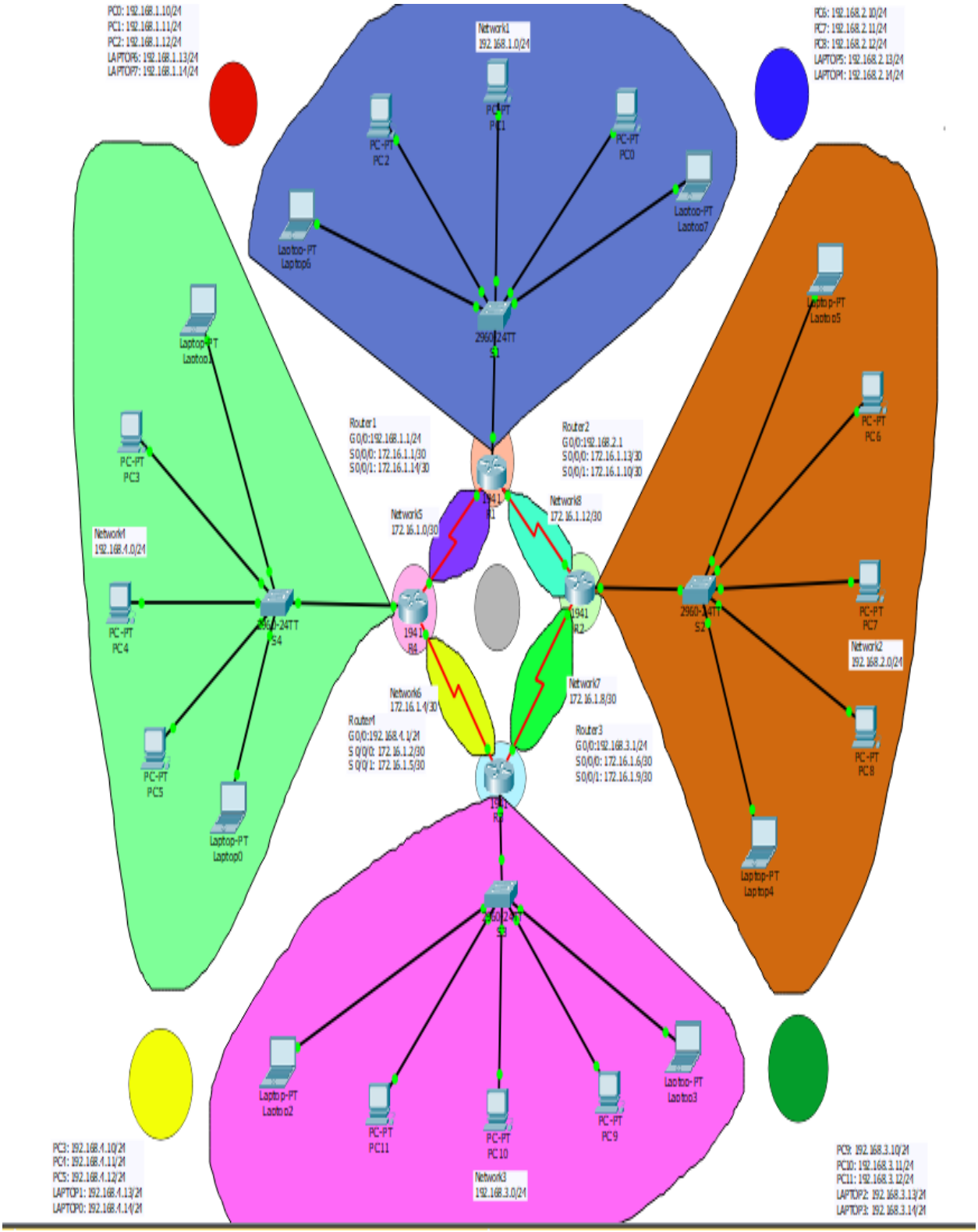
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	PC5	PC3	ICMP		0.000	N	5
	Successful	PC5	PC2	ICMP		0.000	N	6
	Successful	PC5	PC4	ICMP		0.000	N	7

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	PC11	Laptop4	ICMP		0.000	N	4
	Successful	Laptop4	PC9	ICMP		0.000	N	5
	Successful	PC2	Laptop1	ICMP		0.000	N	6

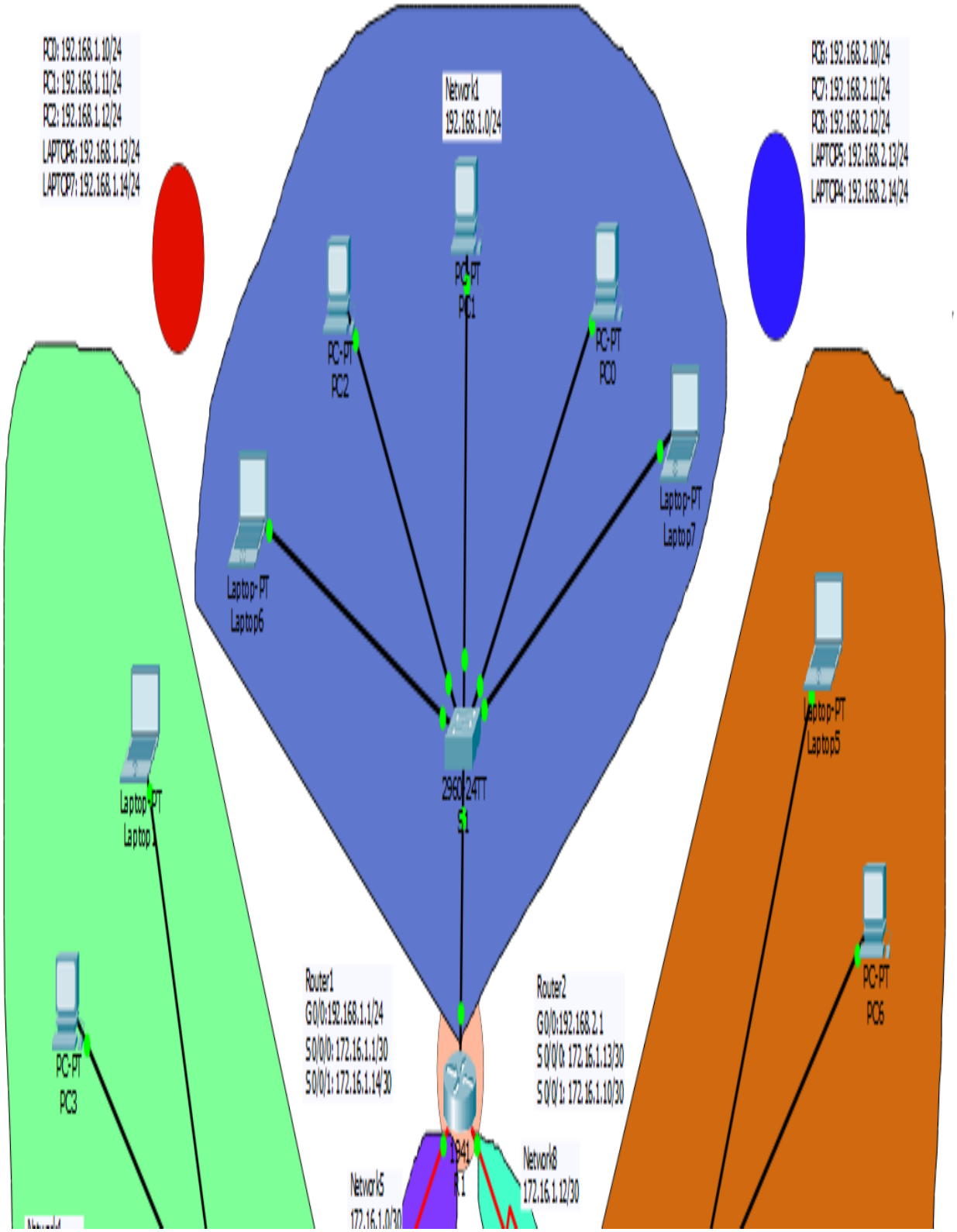
Final screenshot of the whole architecture-

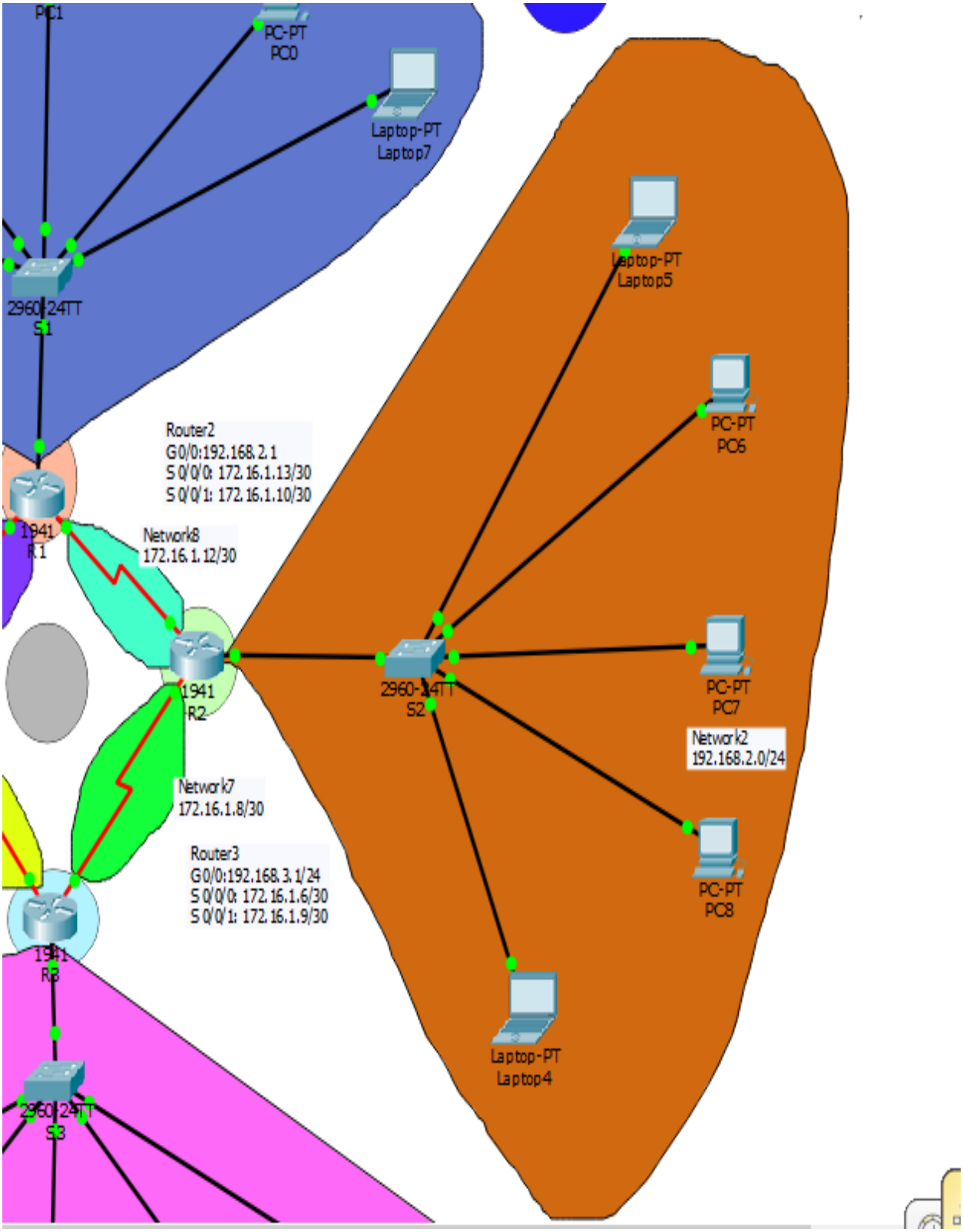


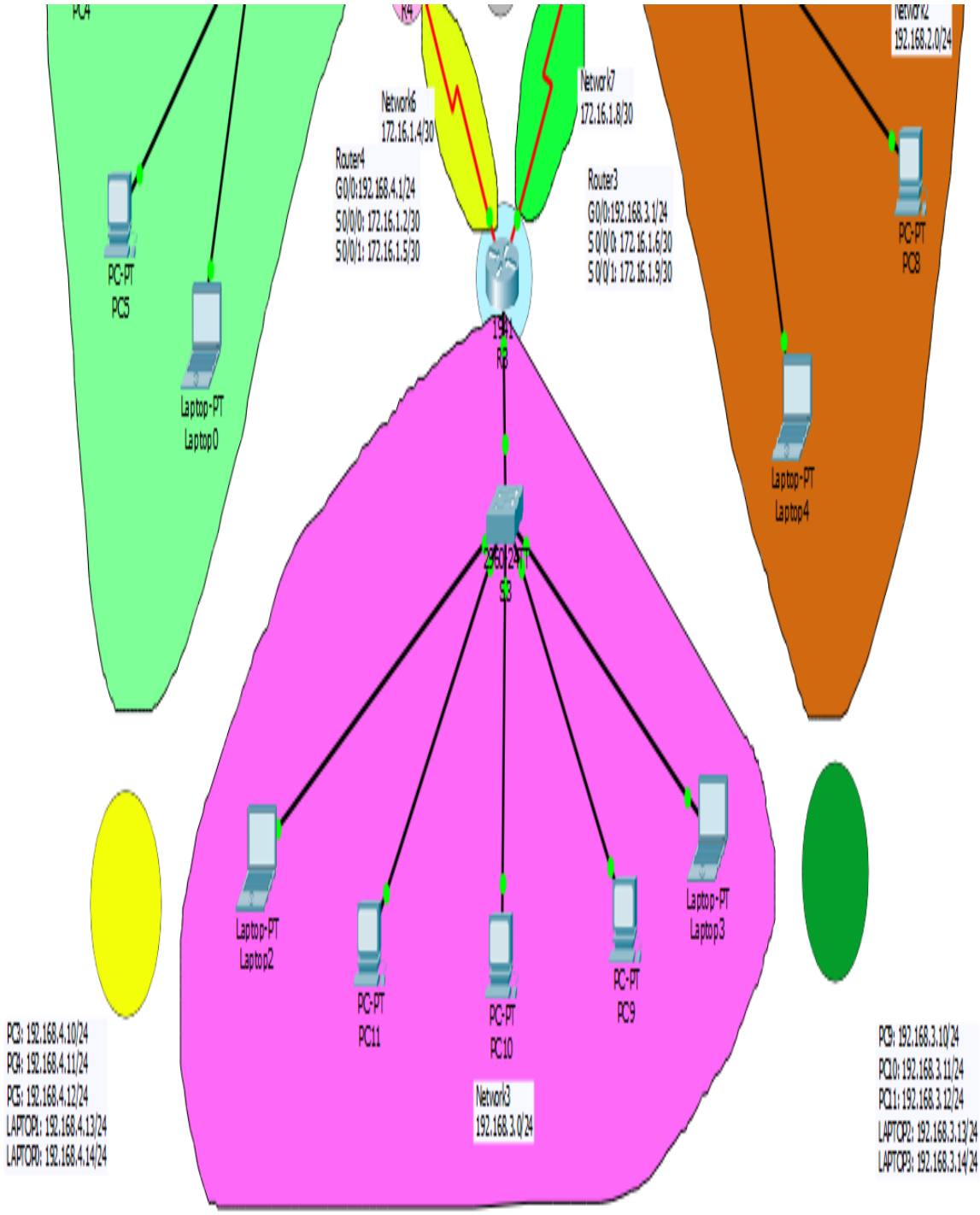
Detail view-

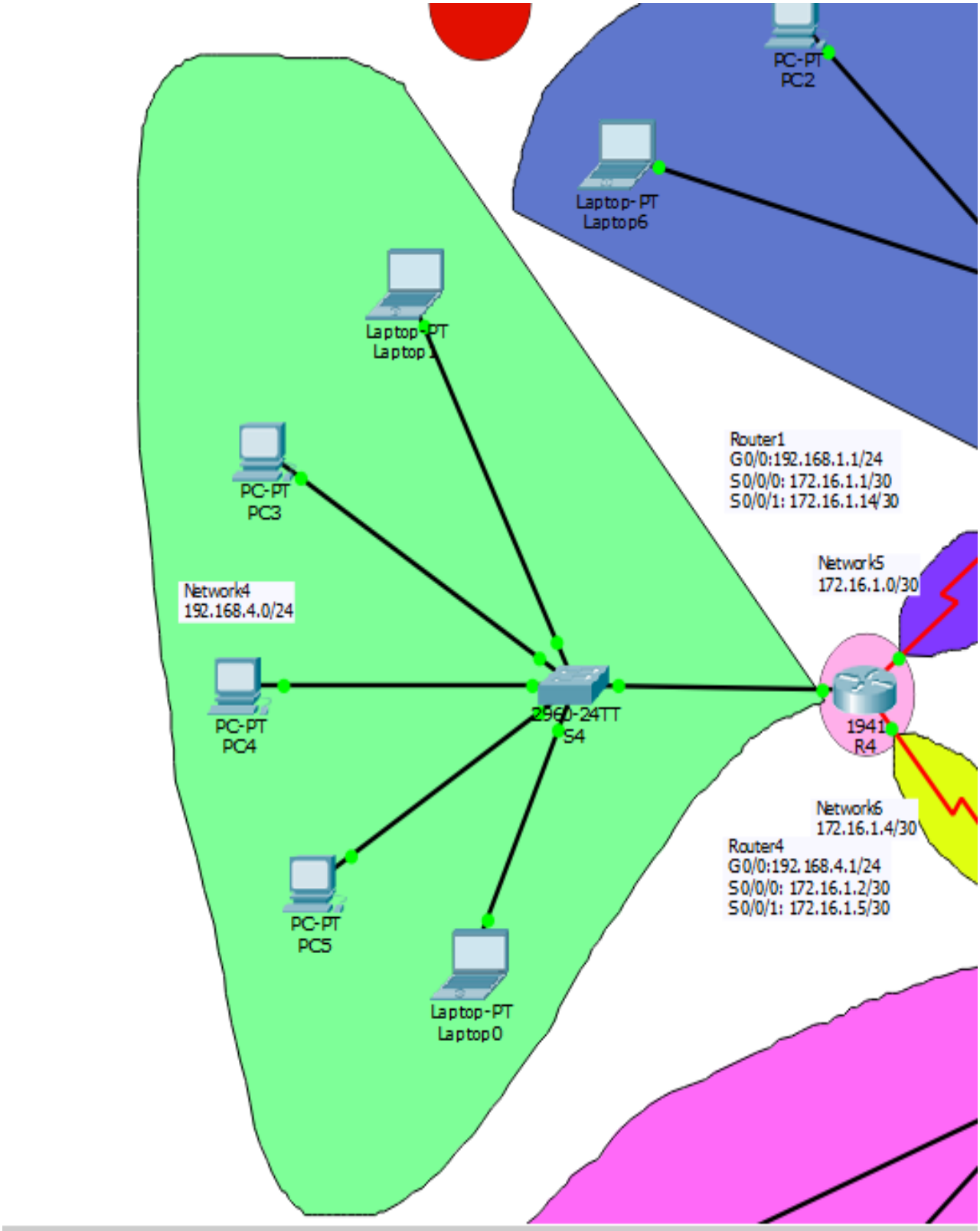

Network1
192.168.1.0/24
PC-PT PC1
PC-PT PC2
PC-PT PC0
Laptop-PT Laptop6
Laptop-PT Laptop7
2960-24TT S1
Router1
G0/0:192.168.1.1/24
S0/0/0: 172.16.1.1/30
S0/0/1: 172.16.1.14/30
1941 R1
Router2
G0/0:192.168.2.1
S0/0/0: 172.16.1.13/30
S0/0/1: 172.16.1.10/30
Network5
172.16.1.0/30
Network8
172.16.1.12/30
Network4
192.168.4.0/24
PC-PT PC4
2960-24TT S4
1941 R4
1941 R2
2960-24TT S2
Network6
172.16.1.4/30
Network7
172.16.1.8/30
Router4
G0/0:192.168.4.1/24
S0/0/0: 172.16.1.2/30
S0/0/1: 172.16.1.5/30
Router3
G0/0:192.168.3.1/24
S0/0/0: 172.16.1.6/30
S0/0/1: 172.16.1.9/30
PC-PT PC3
PC-PT PC5
Laptop-PT Laptop0
Laptop-PT Laptop1
PC-PT PC6
PC-PT PC7
PC-PT PC8
Network2
192.168.2.0/24
Laptop-PT Laptop4
Laptop-PT Laptop5
2960-24TT S3
Laptop-PT Laptop2
PC-PT PC11
PC-PT PC10
PC-PT PC9
Laptop-PT Laptop3
Network3
192.168.3.0/24
PC0: 192.168.1.10/24
PC1: 192.168.1.11/24
PC2: 192.168.1.12/24
LAPTOP6: 192.168.1.13/24
LAPTOP7: 192.168.1.14/24
PC6: 192.168.2.10/24
PC7: 192.168.2.11/24
PC8: 192.168.2.12/24
LAPTOP5: 192.168.2.13/24
LAPTOP4: 192.168.2.14/24
PC3: 192.168.4.10/24
PC4: 192.168.4.11/24
PC5: 192.168.4.12/24
LAPTOP1: 192.168.4.13/24
LAPTOP0: 192.168.4.14/24
PC9: 192.168.3.10/24
PC10: 192.168.3.11/24
PC11: 192.168.3.12/24
LAPTOP2: 192.168.3.13/24
LAPTOP3: 192.168.3.14/24

Part by part view-




PC1
PC-PT
PC0
Laptop-PT
Laptop7
2960-24TT
S1
Router2
G0/0:192.168.2.1
S0/0/0: 172.16.1.13/30
S0/0/1: 172.16.1.10/30
1941
R1
Network8
172.16.1.12/30
1941
R2
2960-24TT
S2
Laptop-PT
Laptop5
PC-PT
PC6
PC-PT
PC7
Network2
192.168.2.0/24
PC-PT
PC8
Network7
172.16.1.8/30
Router3
G0/0:192.168.3.1/24
S0/0/0: 172.16.1.6/30
S0/0/1: 172.16.1.9/30
1941
R3
Laptop-PT
Laptop4
2960-24TT
S3


PC4
Network6
172.16.1.4/30
Network7
172.16.1.8/30
Network2
192.168.2.0/24
Router4
G0/0:192.168.4.1/24
S0/0/0: 172.16.1.2/30
S0/0/1: 172.16.1.5/30
Router3
G0/0:192.168.3.1/24
S 0/0/0: 172.16.1.6/30
S 0/0/1: 172.16.1.9/30
PC-PT
PC5
Laptop-PT
Laptop0
PC-PT
PC8
Laptop-PT
Laptop4
S3
Laptop-PT
Laptop2
PC-PT
PC11
PC-PT
PC10
PC-PT
PC9
Laptop-PT
Laptop3
Network3
192.168.3.0/24
PC3: 192.168.4.10/24
PC4: 192.168.4.11/24
PC5: 192.168.4.12/24
LAPTOP1: 192.168.4.13/24
LAPTOP0: 192.168.4.14/24
PC8: 192.168.3.10/24
PC10: 192.168.3.11/24
PC11: 192.168.3.12/24
LAPTOP2: 192.168.3.13/24
LAPTOP3: 192.168.3.14/24



----------THANK YOU FOR READING----------