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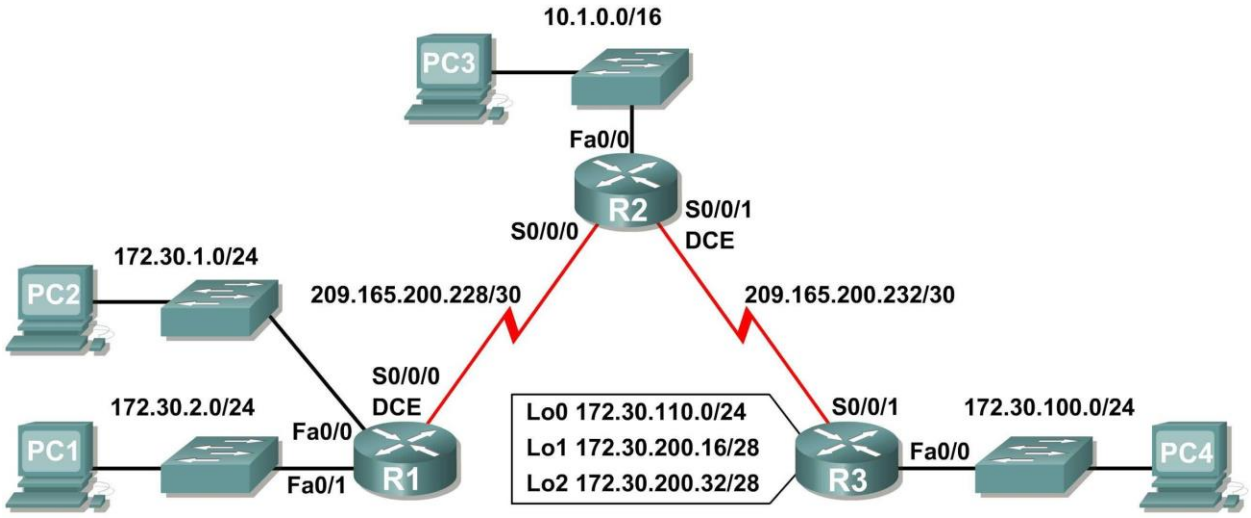
Roll No.: 2
TE COMPS
Batch: A

CEL 51, DCCN, Monsoon 2020
Lab 7: RIPv2 Router Configuration

Topology Diagram



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	**Fa0/0**	172.30.1.1	255.255.255.0	N/A
	Fa0/1	172.30.2.1	255.255.255.0	N/A
	S0/0/0	209.165.200.230	255.255.255.252	N/A
R2	**Fa0/0**	10.1.0.1	255.255.0.0	N/A
	S0/0/0	209.165.200.229	255.255.255.252	N/A
	S0/0/1	209.165.200.233	255.255.255.252	N/A
R3	**Fa0/0**	172.30.100.1	255.255.255.0	N/A
	S0/0/1	209.165.200.234	255.255.255.252	N/A

	Lo0	172.30.110.1	255.255.255.0	N/A
	Lo1	172.30.200.17	255.255.255.240	N/A
	Lo2	172.30.200.33	255.255.255.240	N/A
PC1	**NIC**	172.30.2.10	255.255.255.0	172.30.2.1
PC2	**NIC**	172.30.1.10	255.255.255.0	172.30.1.1
PC3	**NIC**	10.1.0.10	255.255.0.0	10.1.0.1
PC4	**NIC**	172.30.100.10	255.255.255.0	172.30.100.1

Learning Objectives

Upon completion of this lab, you will be able to:

- Cable a network according to the Topology Diagram.
- Load provided scripts onto the routers.
- Examine the current status of the network.
- Configure RIPv2 on all routers.
- Examine the automatic summarization of routes.
- Examine routing updates with **debug ip rip**.
- Disable automatic summarization.
- Examine the routing tables.
- Verify network connectivity.
- Document the RIPv2 configuration.

Scenario

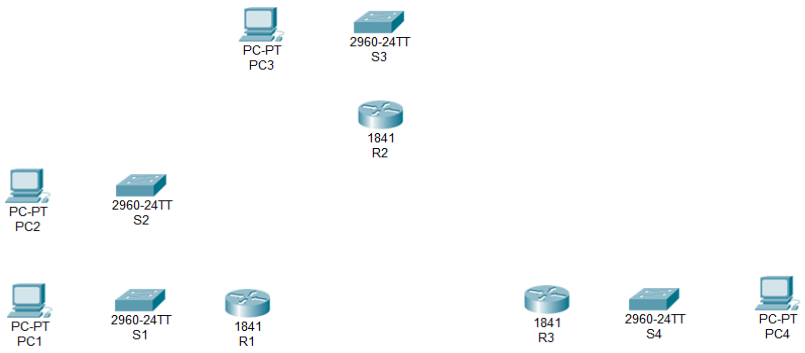
The network shown in the Topology Diagram contains a discontiguous network, 172.30.0.0. This network has been subnetted using VLSM. The 172.30.0.0 subnets are physically and logically divided by at least one other classful or major network, in this case the two serial networks 209.165.200.228/30 and 209.165.200.232/30. This can be an issue when the routing protocol used does not include enough information to distinguish the individual subnets. RIPv2 is a classless routing protocol that can be used to provide subnet mask information in the routing updates. This will allow VLSM subnet information to be propagated throughout the network.

Task 1: Cable, Erase, and Reload the Routers.

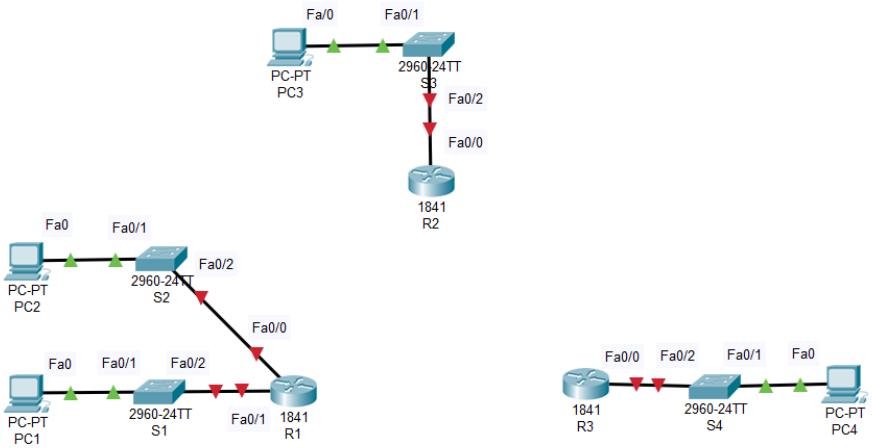
Step 1: Cable a network.

Cable a network that is similar to the one in the Topology Diagram.

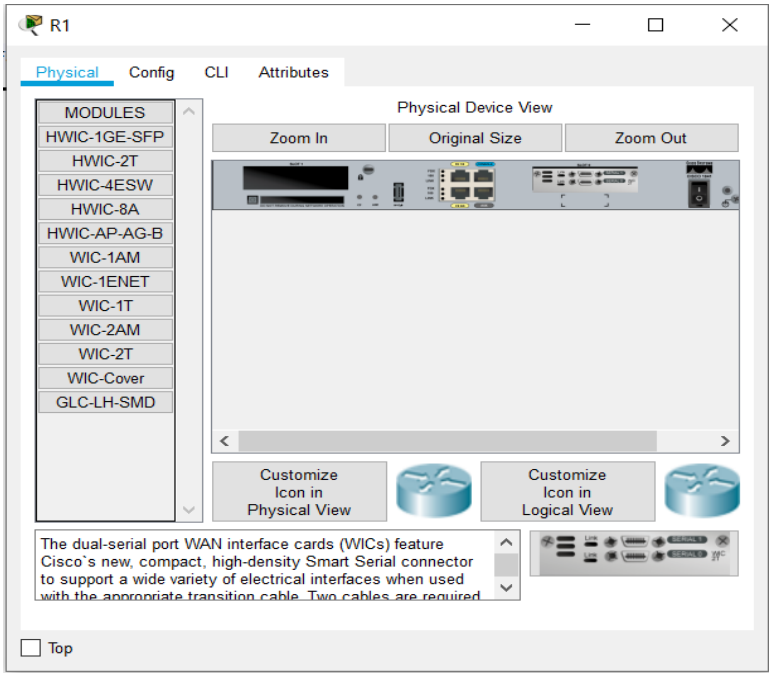
- Arrange 4 PC's, 4 2960 Switches and 3 1841 routers.



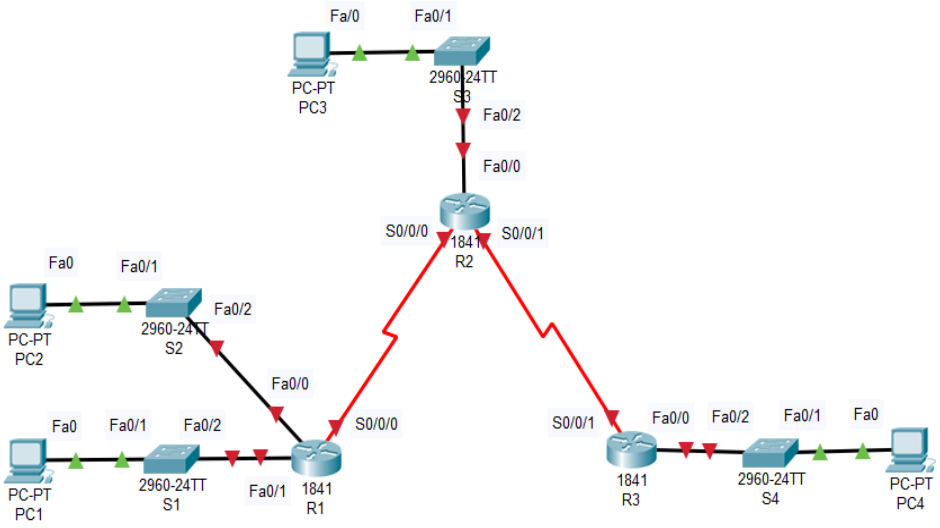
- Connect the switches, pc's and routers using copper straight through cable as shown in the diagram.



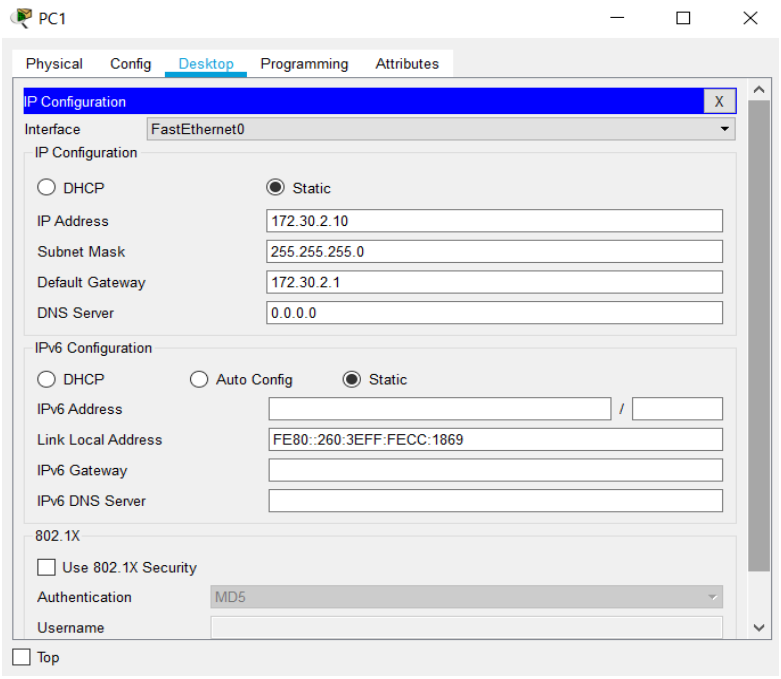
- For Serial connection between routers, add WIC-2T cards in each router.



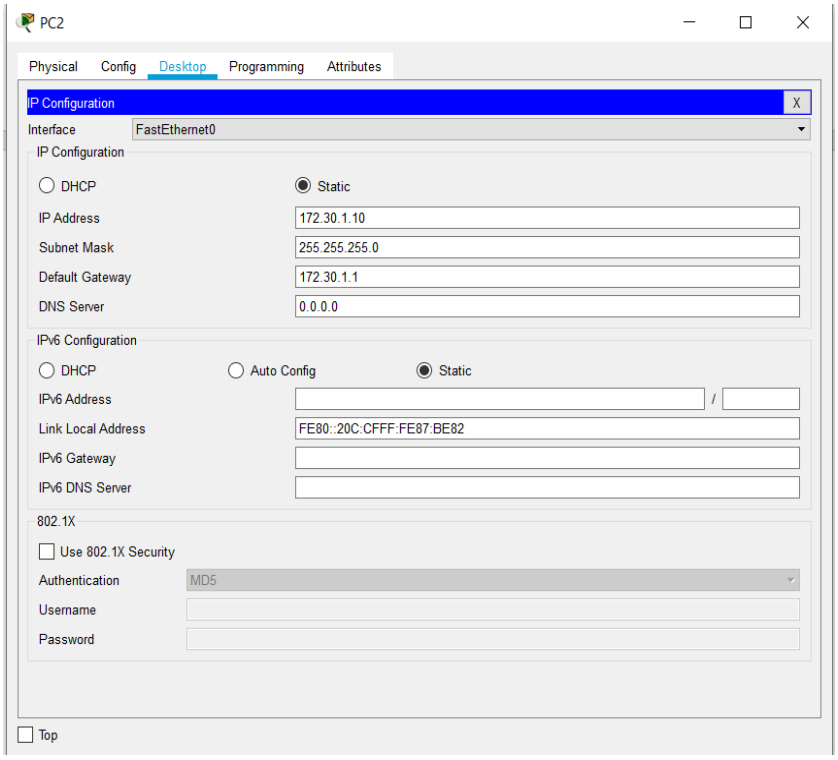
- Connect the routers with serial DCE cable.



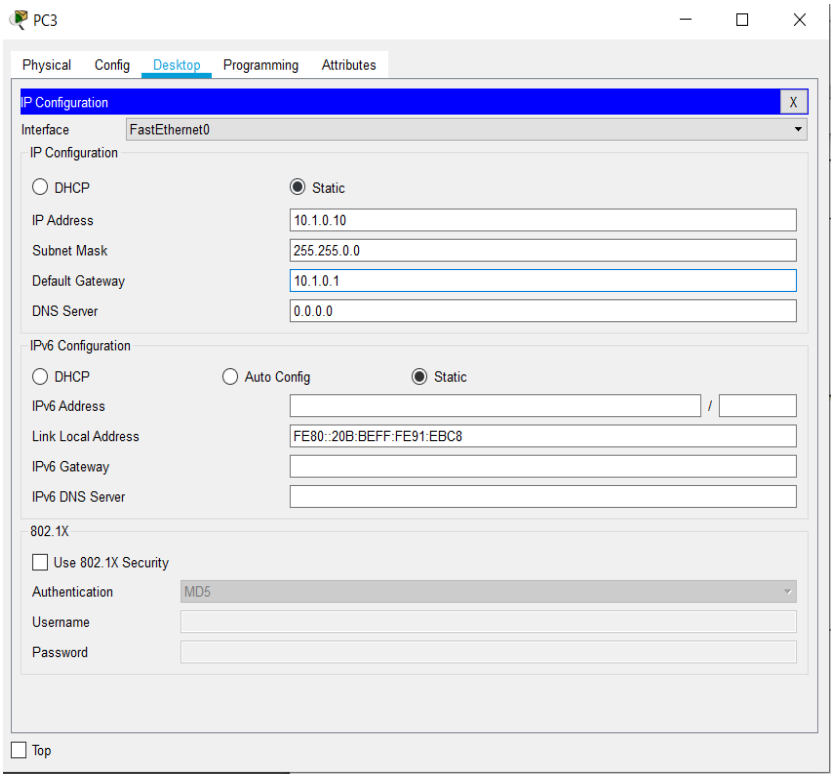
- Configuration of PC1:



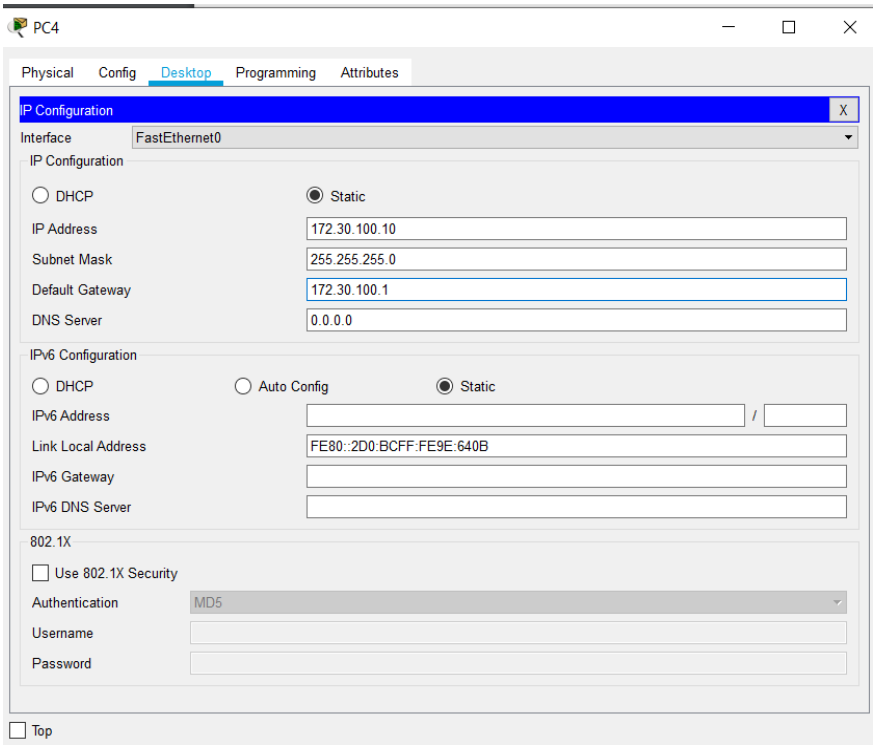
- Configuration of PC2:

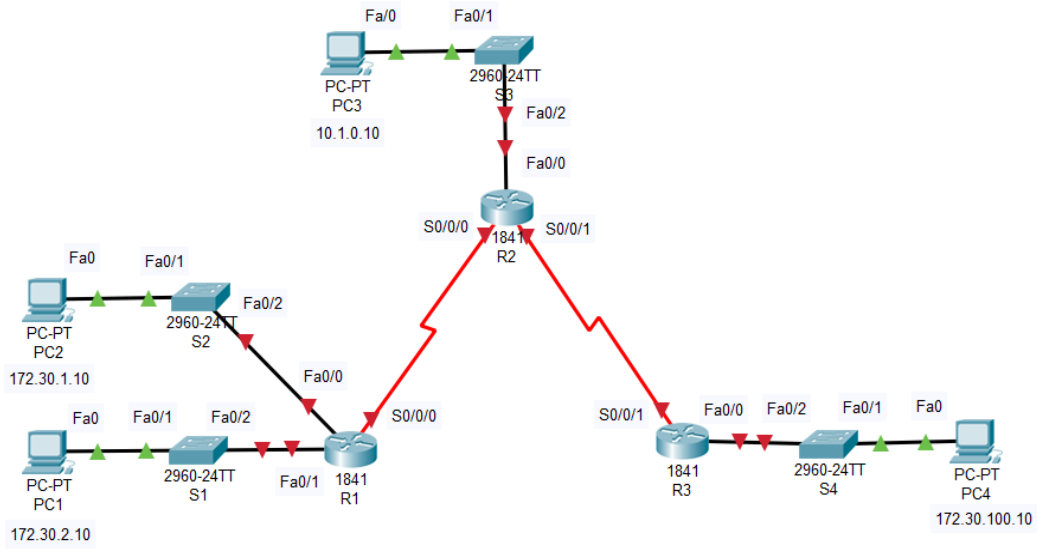


- Configuration of PC3:



- Configuration of PC4:

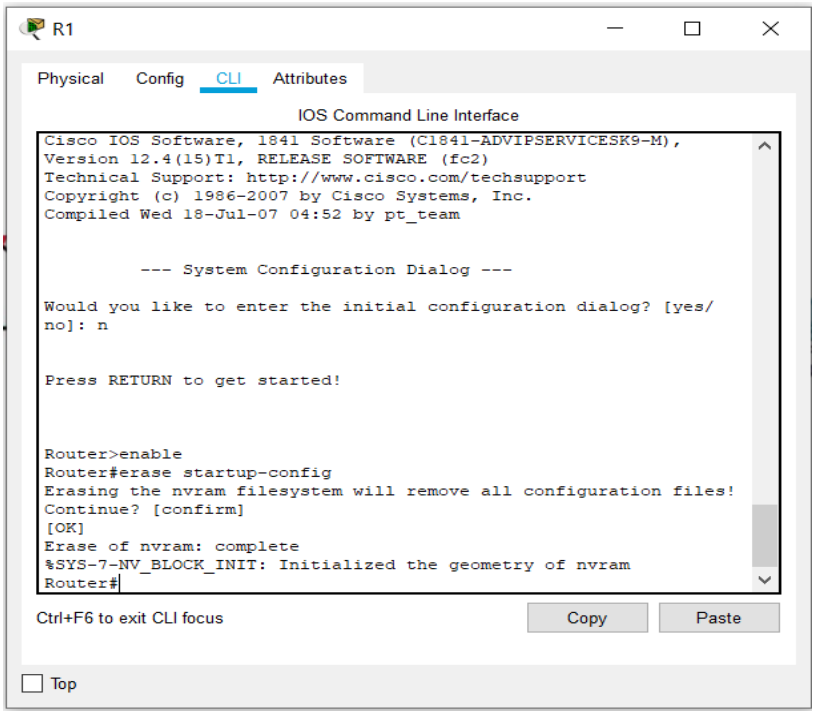




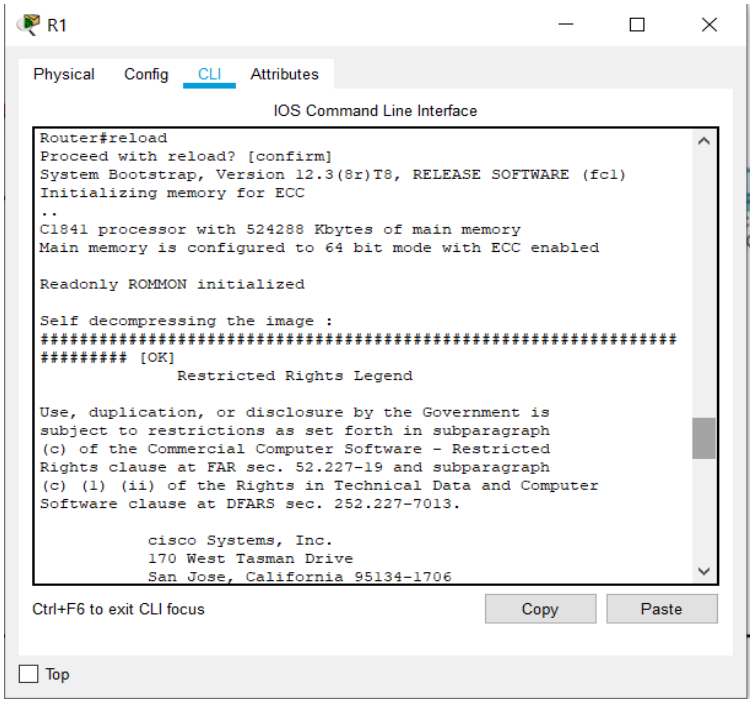
Step 2: Clear the configuration on each router.

Clear the configuration on each of routers using the **erase startup-config** command and then **reload** the routers. Answer **no** if asked to save changes.

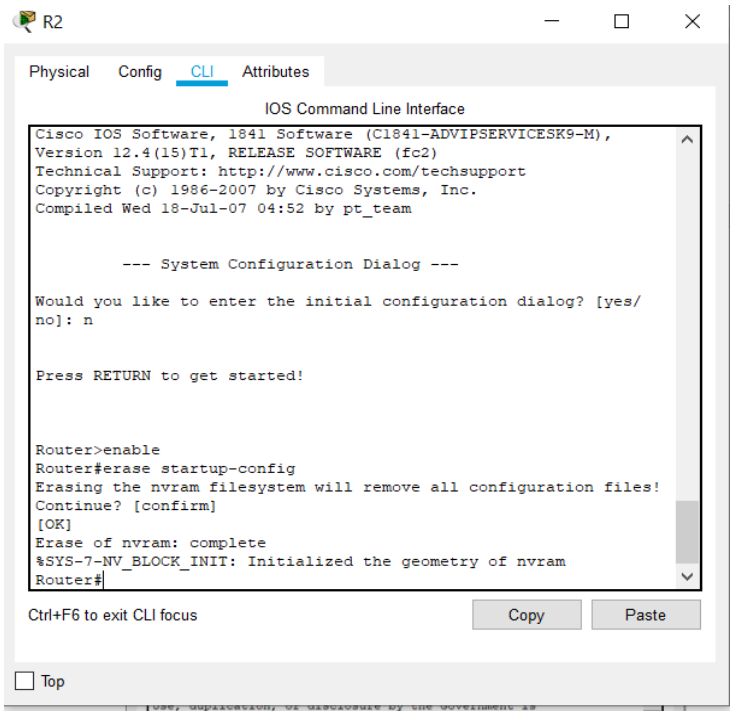
- Clearing configuration of R1:



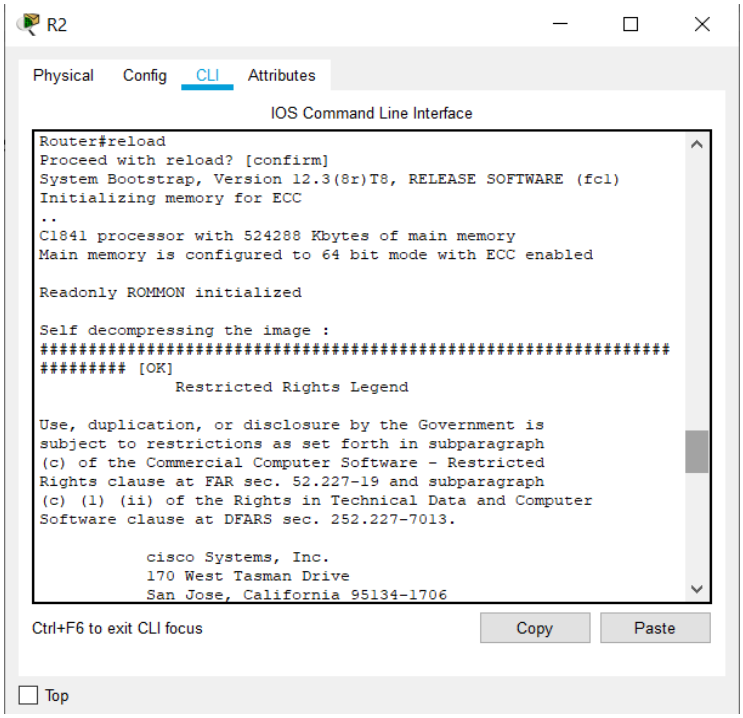
- Reloading R1:



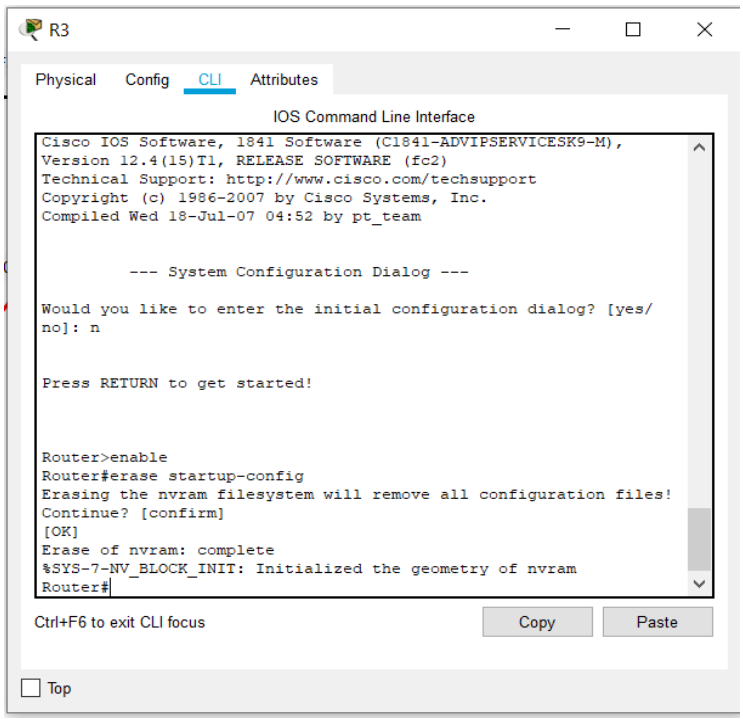
- Clearing configuration of R2:



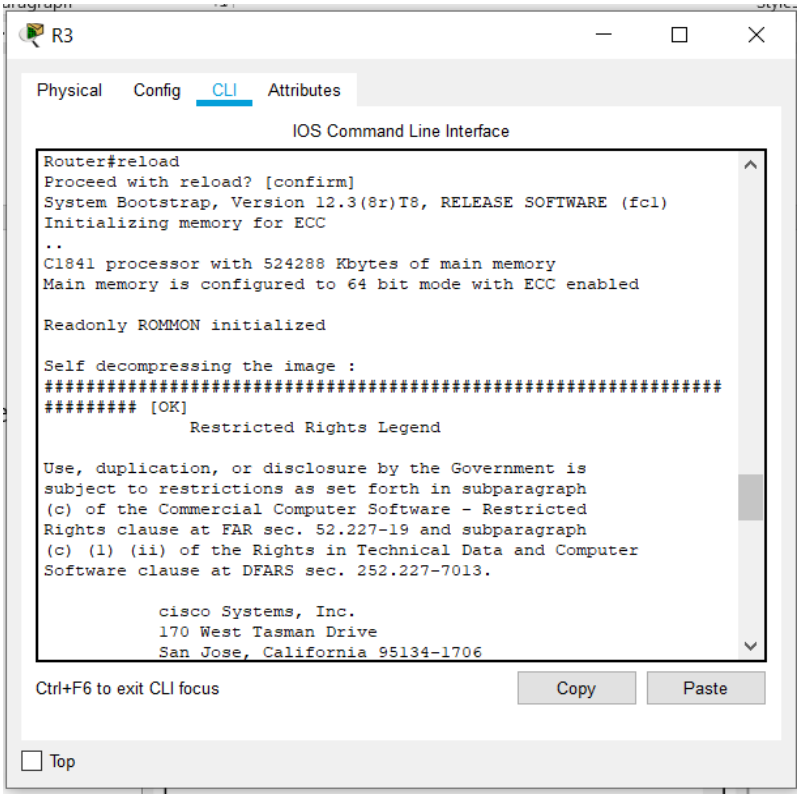
- Reloading R2:



- Clearing configuration of R3:



- Reloading R3:



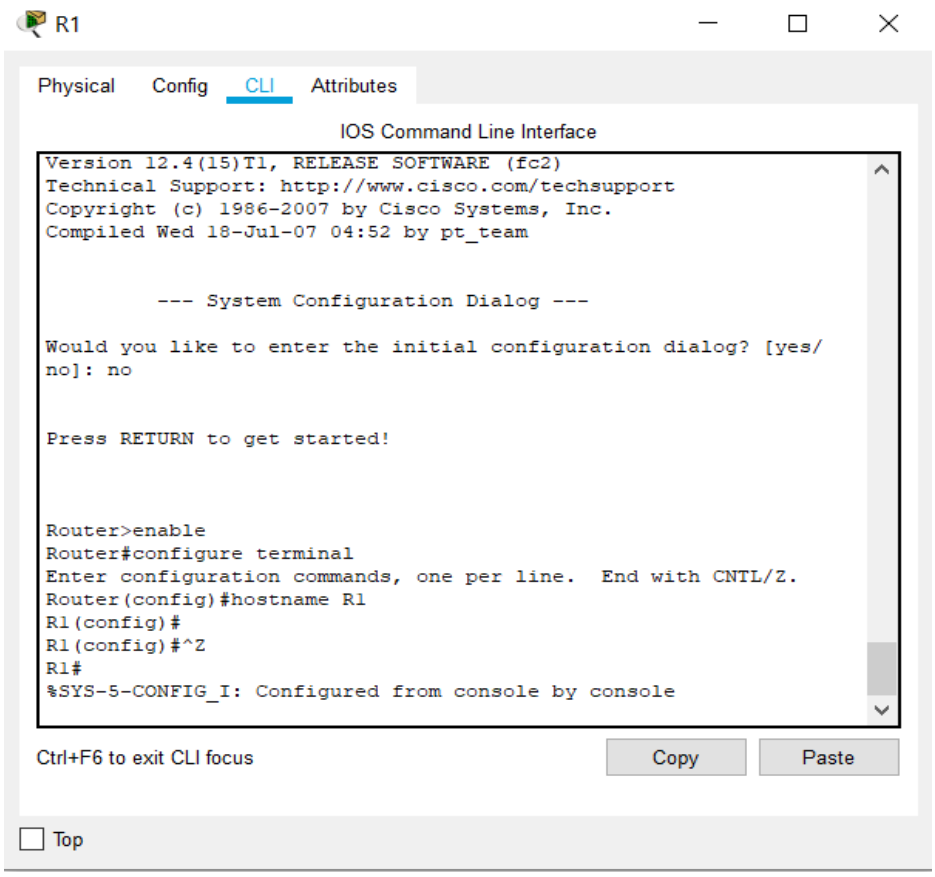
Task 2: Load Routers with the Supplied Scripts.

Step 1: Load the following script onto R1.

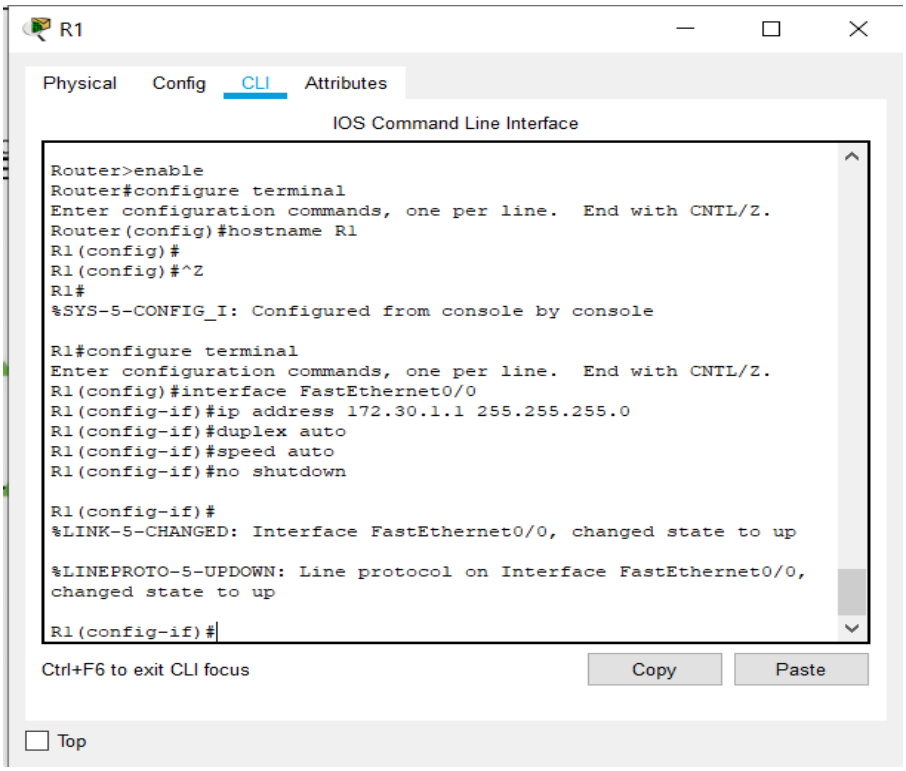
```
!
hostname R1
!
!
!
interface FastEthernet0/0
 ip address 172.30.1.1 255.255.255.0
 duplex auto
 speed auto
 no shutdown
!
interface FastEthernet0/1
 ip address 172.30.2.1 255.255.255.0
 duplex auto
 speed auto
```

```
 no shutdown
!
interface Serial0/0/0
 ip address 209.165.200.230 255.255.255.252
 clock rate 64000
 no shutdown
!
router rip
 passive-interface FastEthernet0/0
 passive-interface FastEthernet0/1
 network 172.30.0.0
 network 209.165.200.0
!
line con 0
line vty 0 4
 login
!
end
```

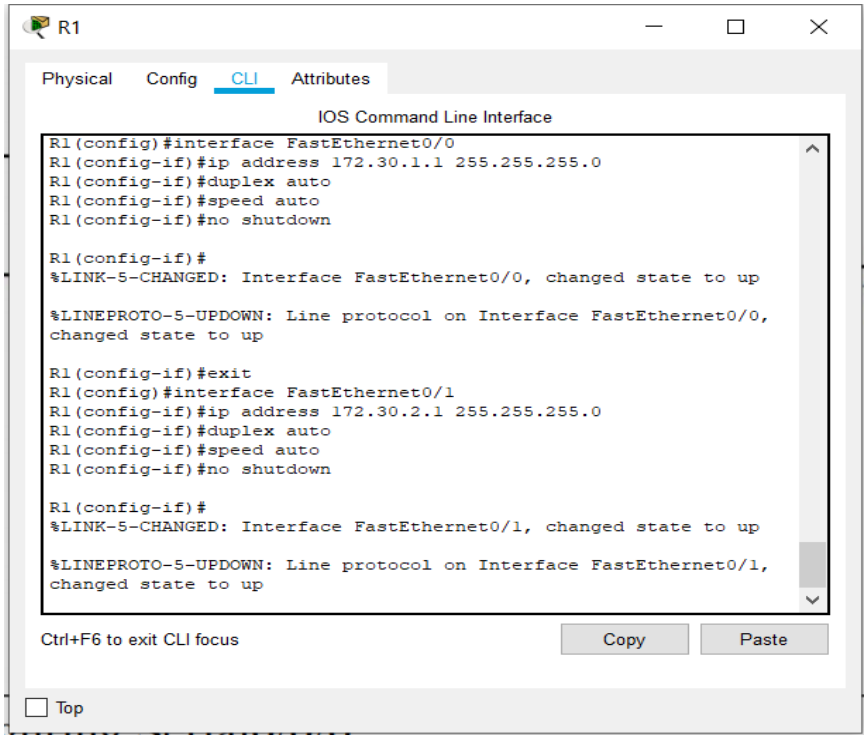
- Assigning hostname as R1:



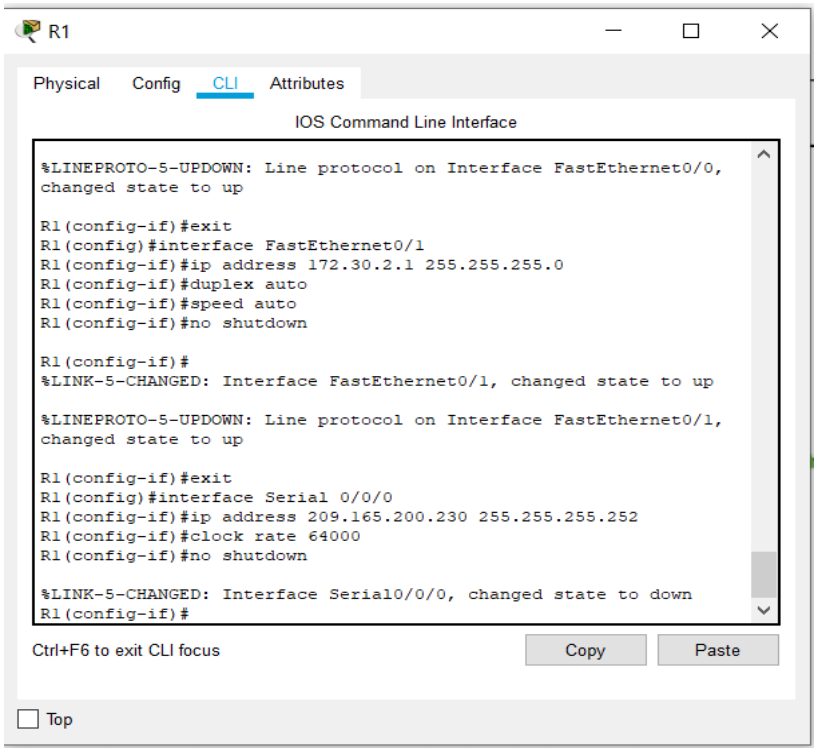
- Configuring FastEthernet0/0:



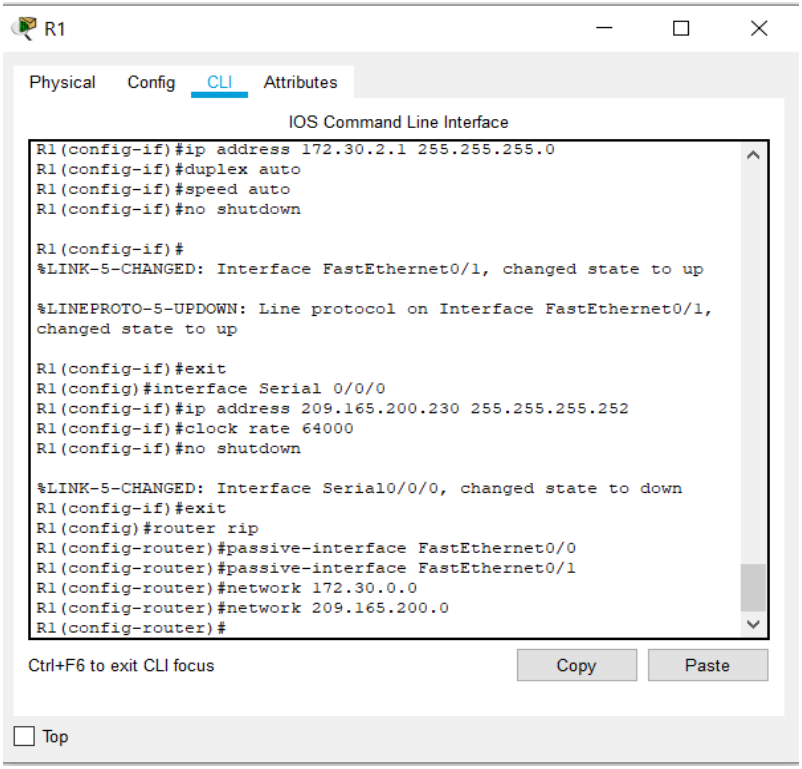
- Configuring FastEthernet0/1:



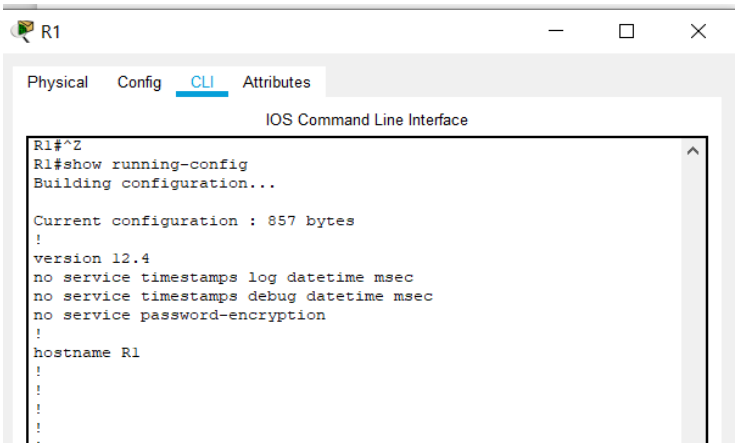
- Configuring Serial0/0/0:

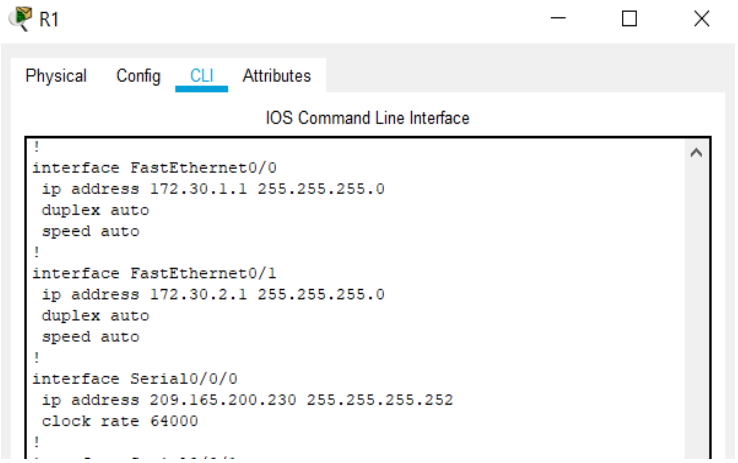


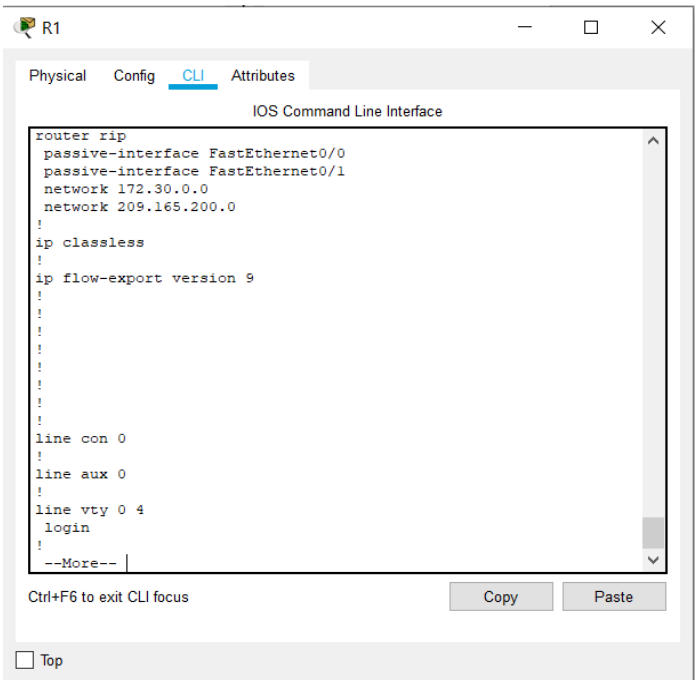
- Configuration of RIP:



- Running Config:



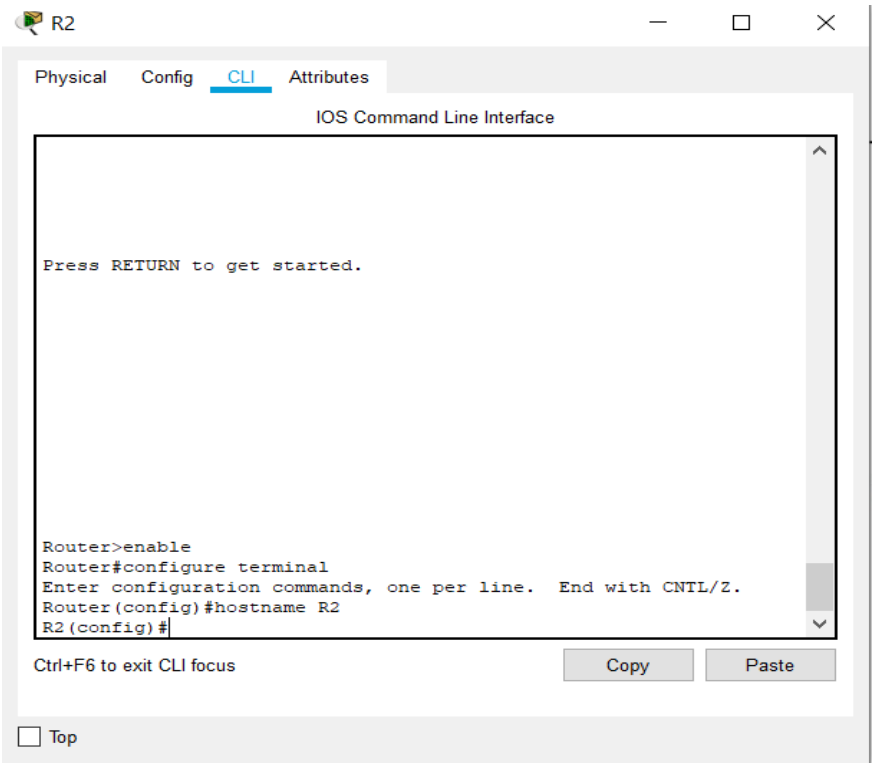




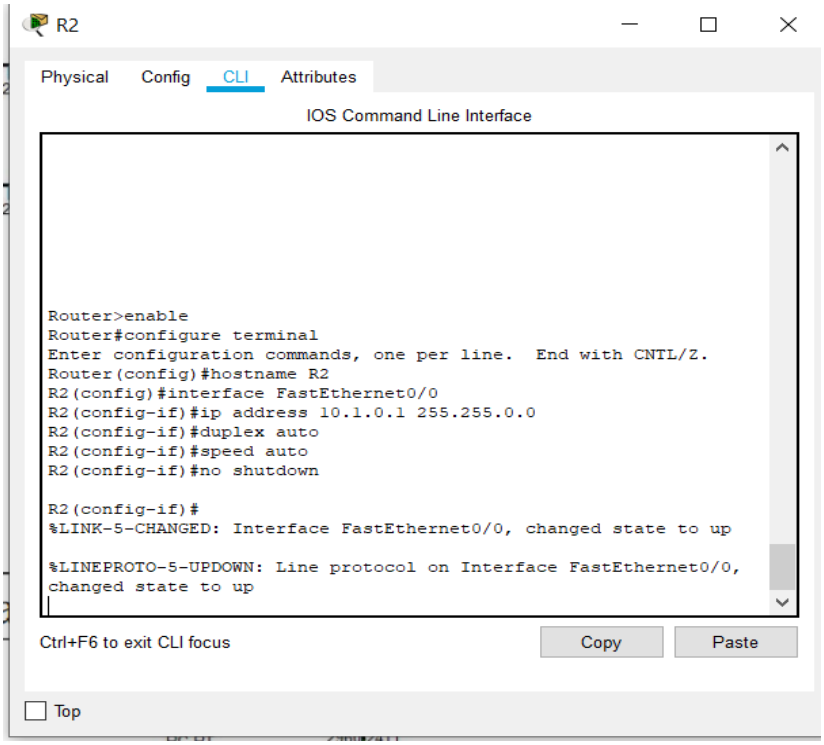
Step 2: Load the following script onto R2.

```
hostname R2
!
!
!
interface FastEthernet0/0
 ip address 10.1.0.1 255.255.0.0
 duplex auto
 speed auto
 no shutdown
!
interface Serial0/0/0
 ip address 209.165.200.229 255.255.255.252
 no shutdown
!
interface Serial0/0/1
 ip address 209.165.200.233 255.255.255.252
 clock rate 64000
 no shutdown
!
router rip
 passive-interface FastEthernet0/0
 network 10.0.0.0
 network 209.165.200.0
!
line con 0
line vty 0 4
 login
!
end
```

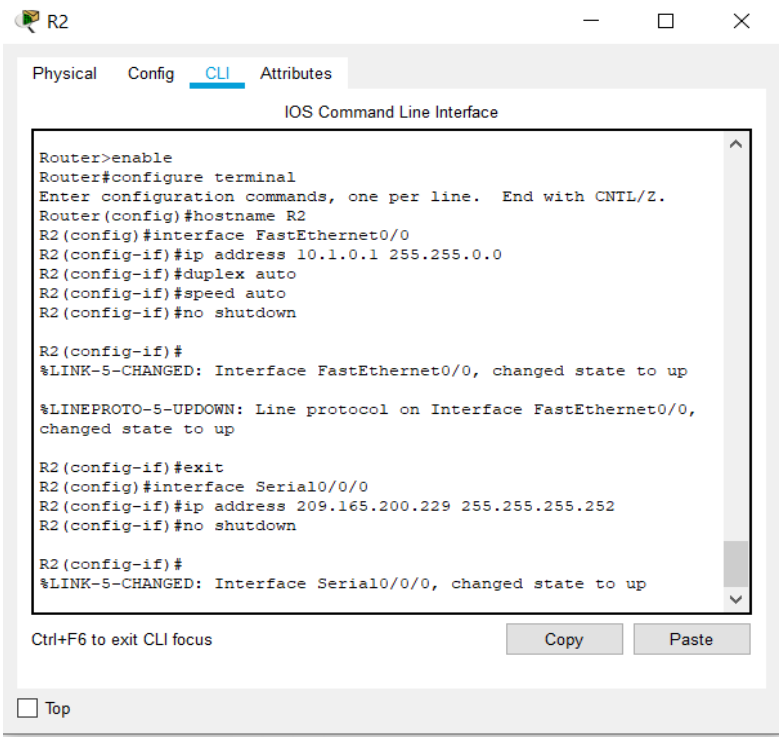
- Assigning hostname as R2:



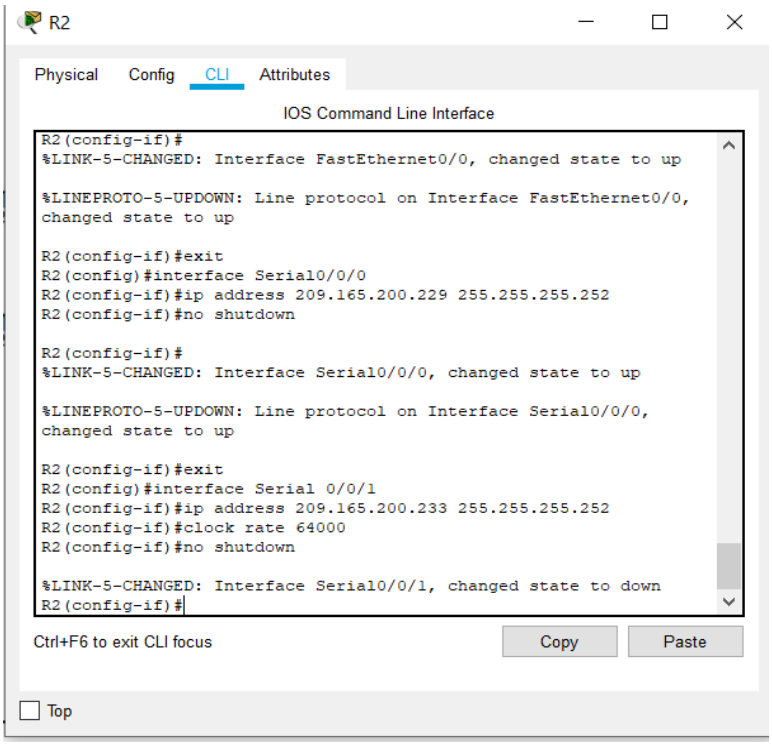
- Configuring FastEthernet0/0:



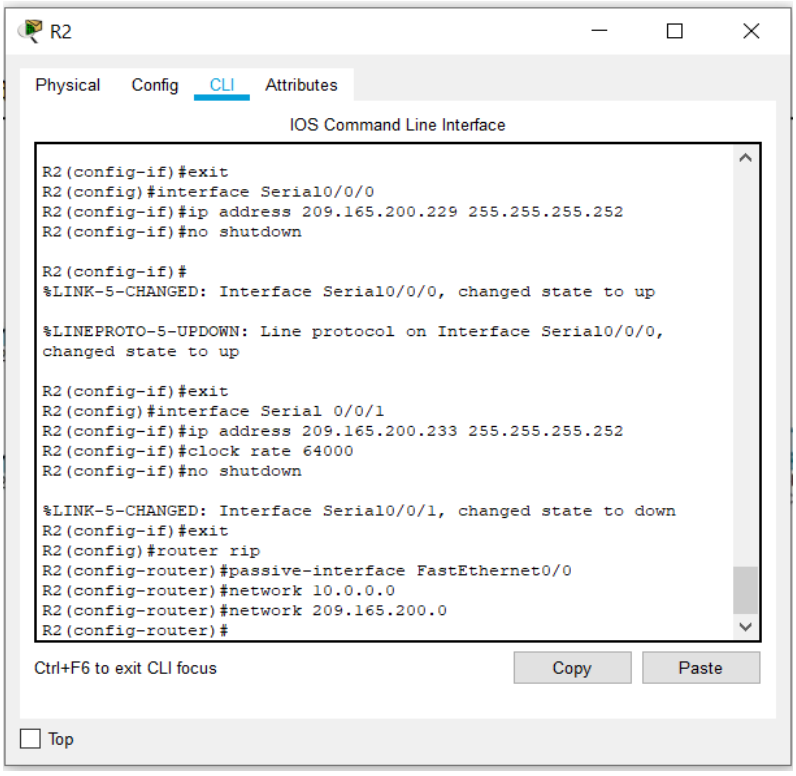
- Configuring Serial0/0/0:



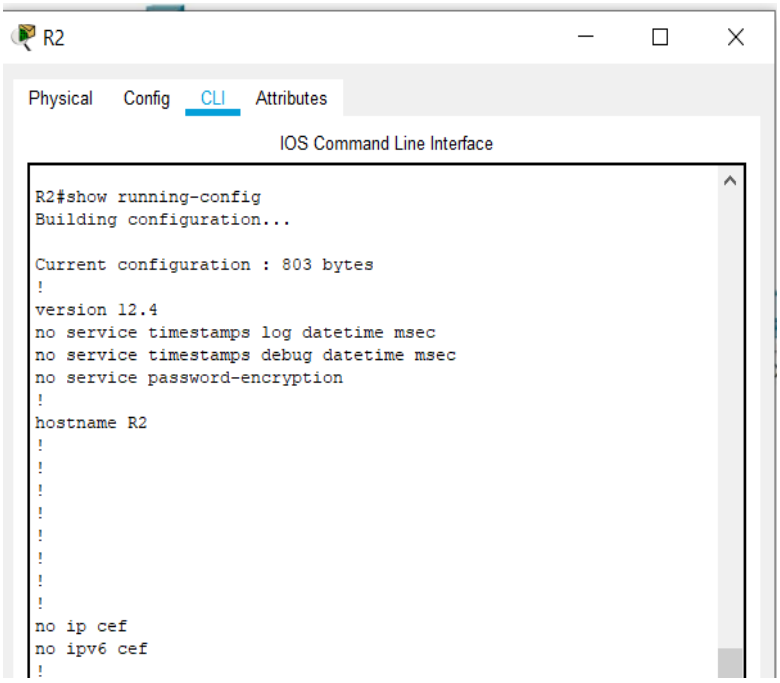
- Configuring Serial0/0/1:

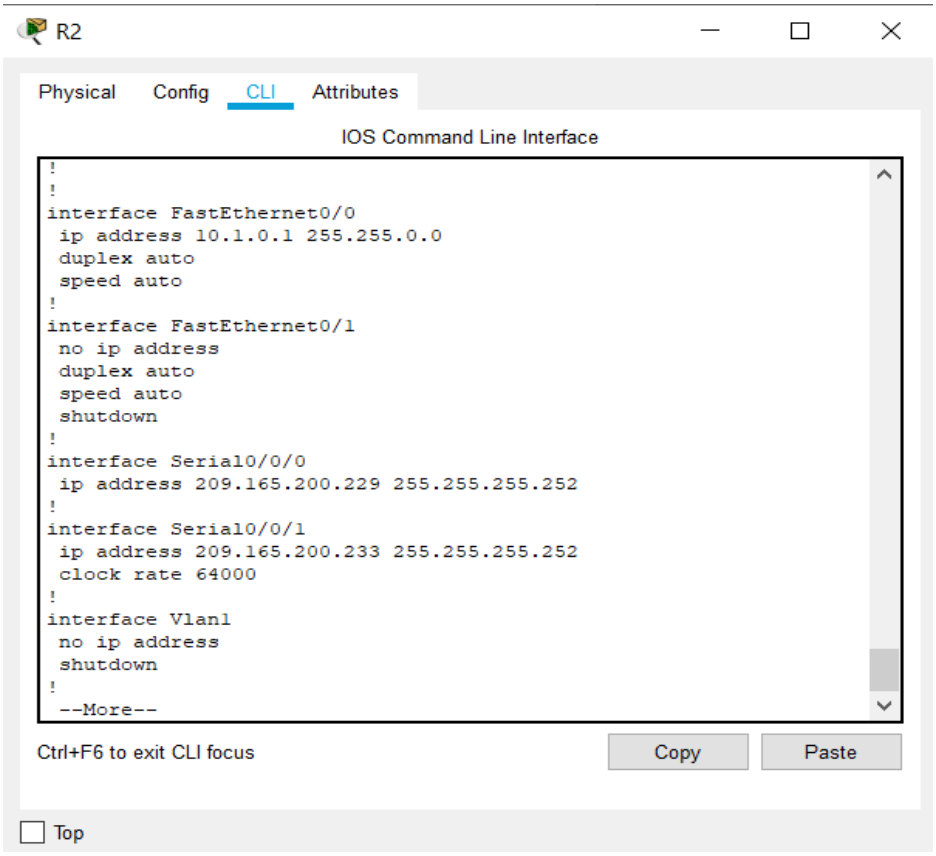


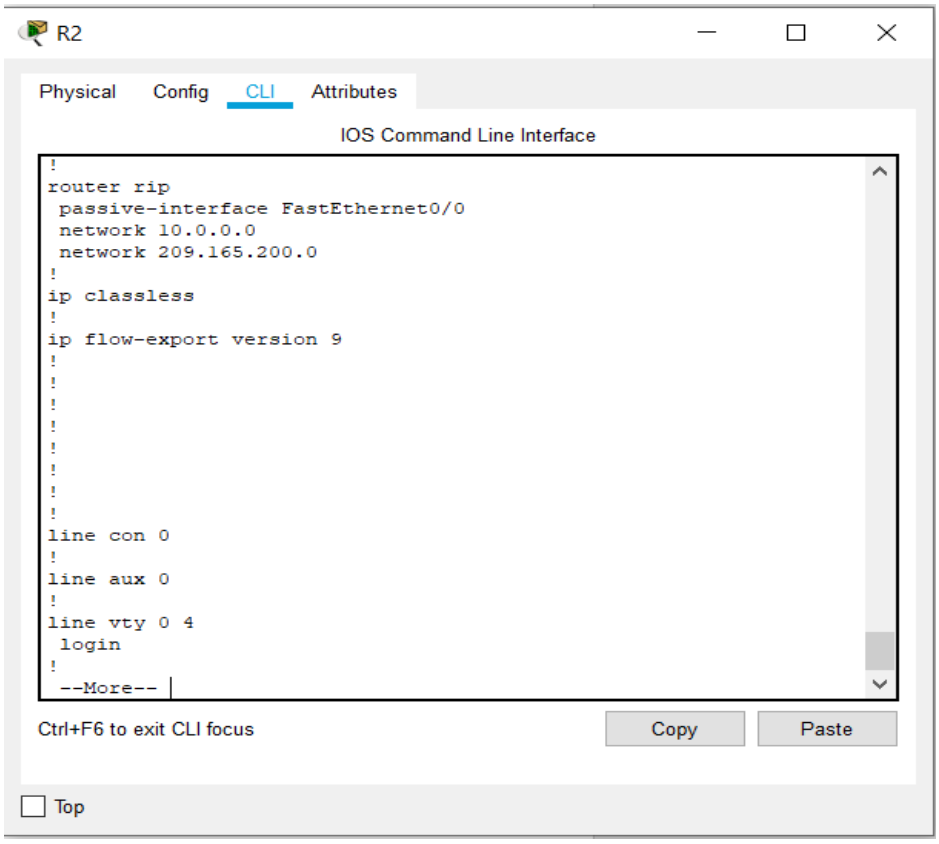
- Configuration of RIP:



- Running Config:



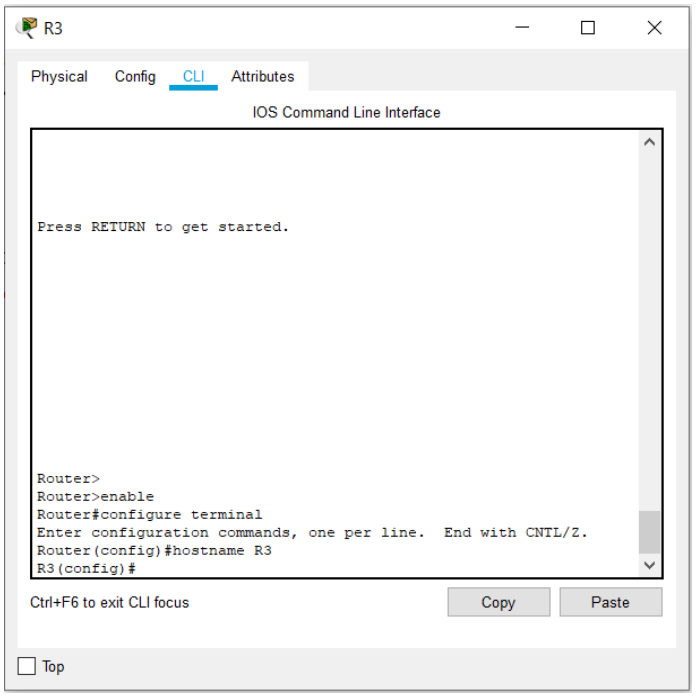

R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
!
interface FastEthernet0/0
 ip address 10.1.0.1 255.255.0.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 209.165.200.229 255.255.255.252
!
interface Serial0/0/1
 ip address 209.165.200.233 255.255.255.252
 clock rate 64000
!
interface Vlan1
 no ip address
 shutdown
!
 --More--
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
router rip
 passive-interface FastEthernet0/0
 network 10.0.0.0
 network 209.165.200.0
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
 --More--
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

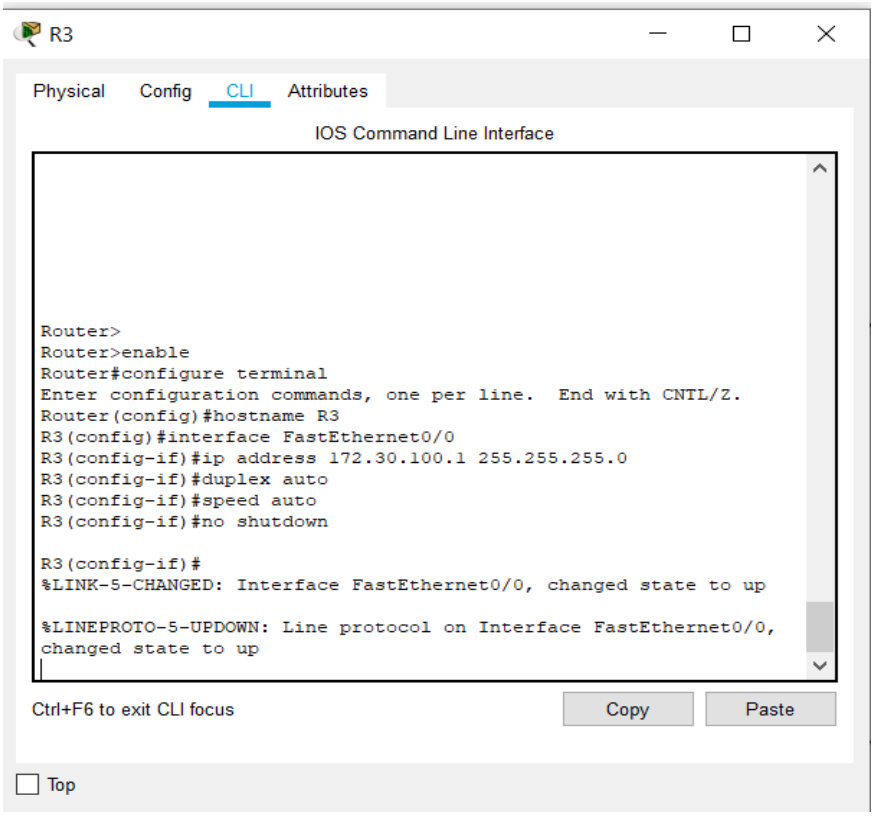
Step 3: Load the following script onto R3.

```
hostname R3
!
!
!
interface FastEthernet0/0
 ip address 172.30.100.1 255.255.255.0
 duplex auto
 speed auto
 no shutdown
!
interface Serial0/0/1
 ip address 209.165.200.234 255.255.255.252
 no shutdown
!
interface Loopback0
 ip address 172.30.110.1 255.255.255.0
!
interface Loopback1
 ip address 172.30.200.17 255.255.255.240
!
interface Loopback2
 ip address 172.30.200.33 255.255.255.240
!
router rip
 passive-interface FastEthernet0/0
 network 172.30.0.0
 network 209.165.200.0
!
line con 0
line vty 0 4
 login
!
end
```

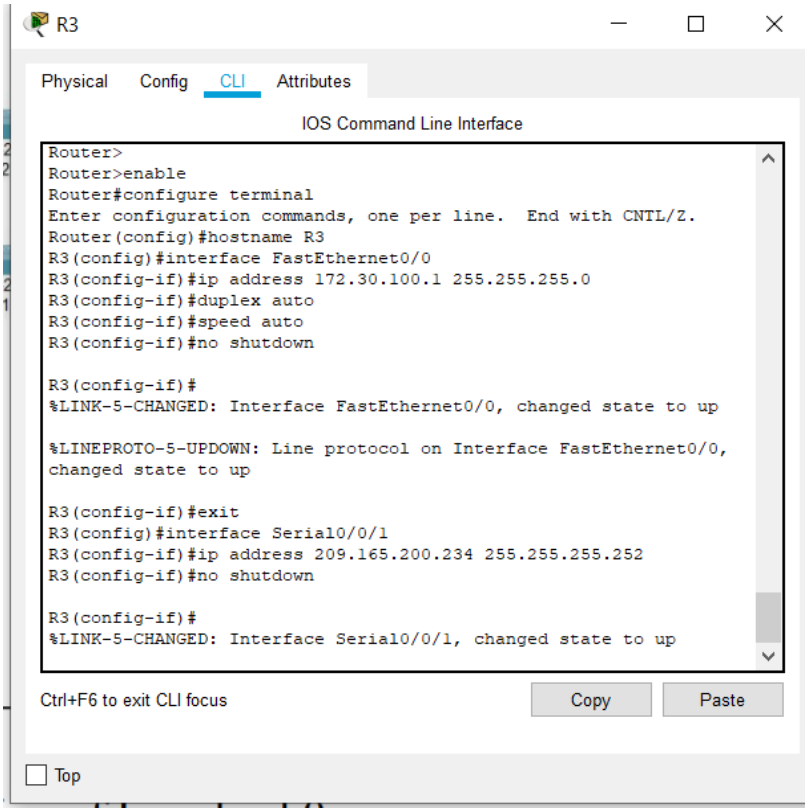
- Assigning hostname as R3:



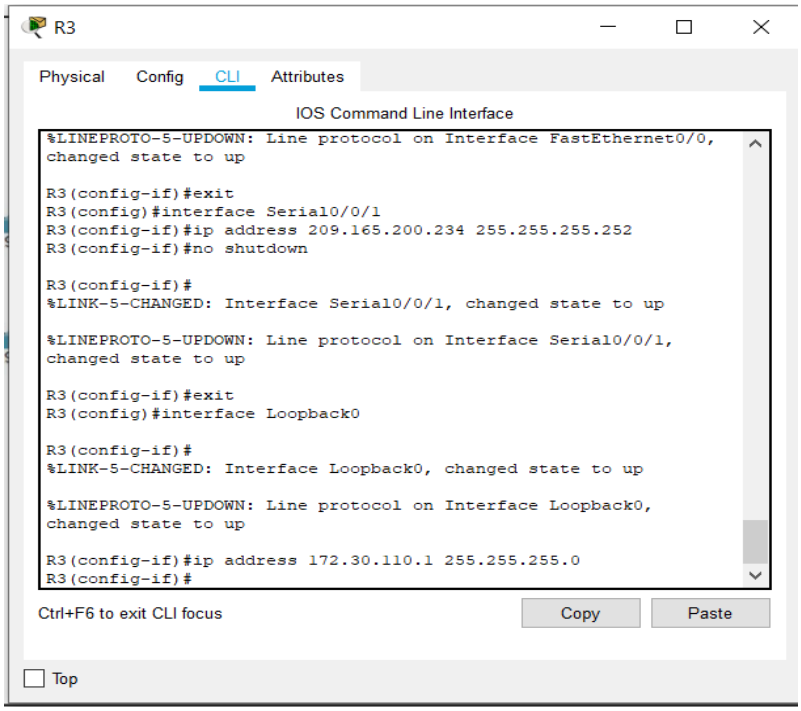
- Configuration of FastEthernet0/0:



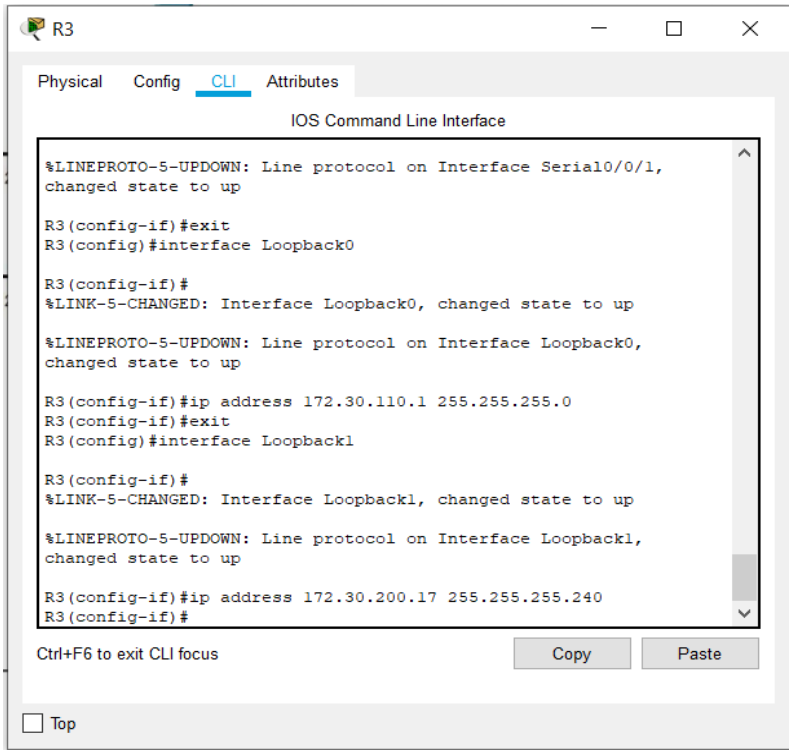
- Configuration of Serial0/0/1:



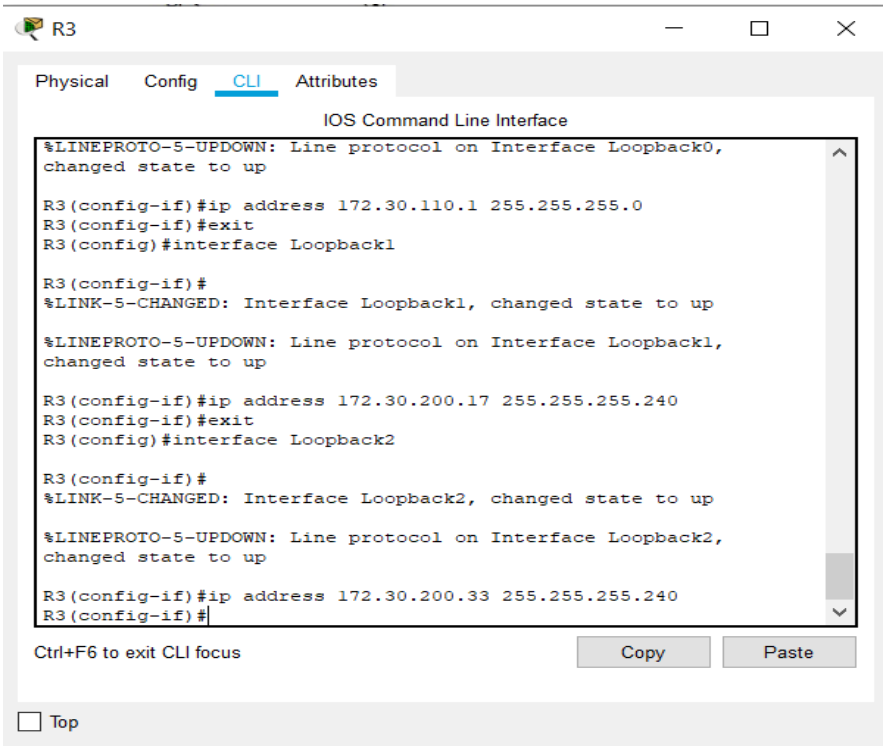
- Configuration of Loopback0:



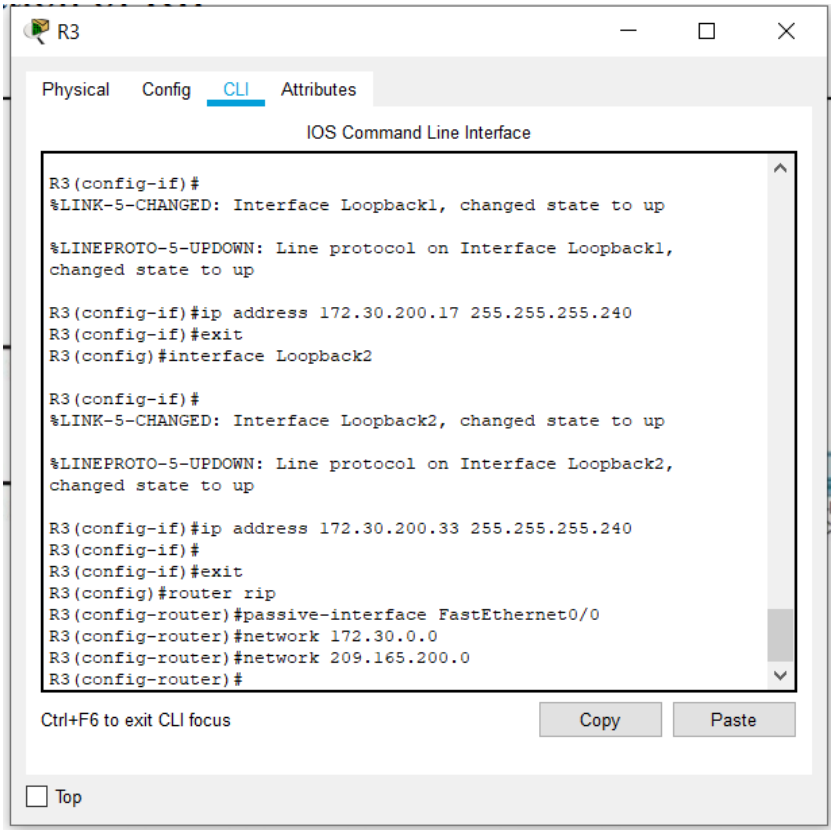
- Configuration of Loopback1:



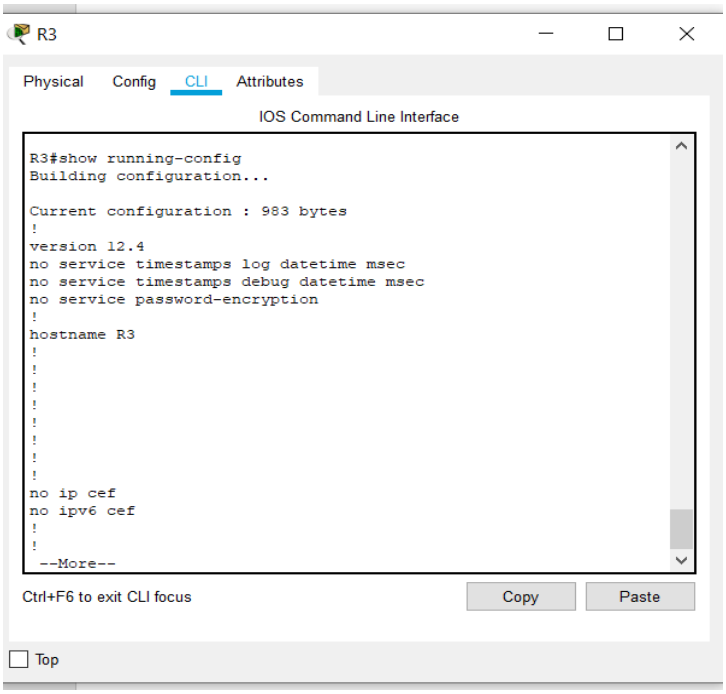
- Configuration of Loopback2:

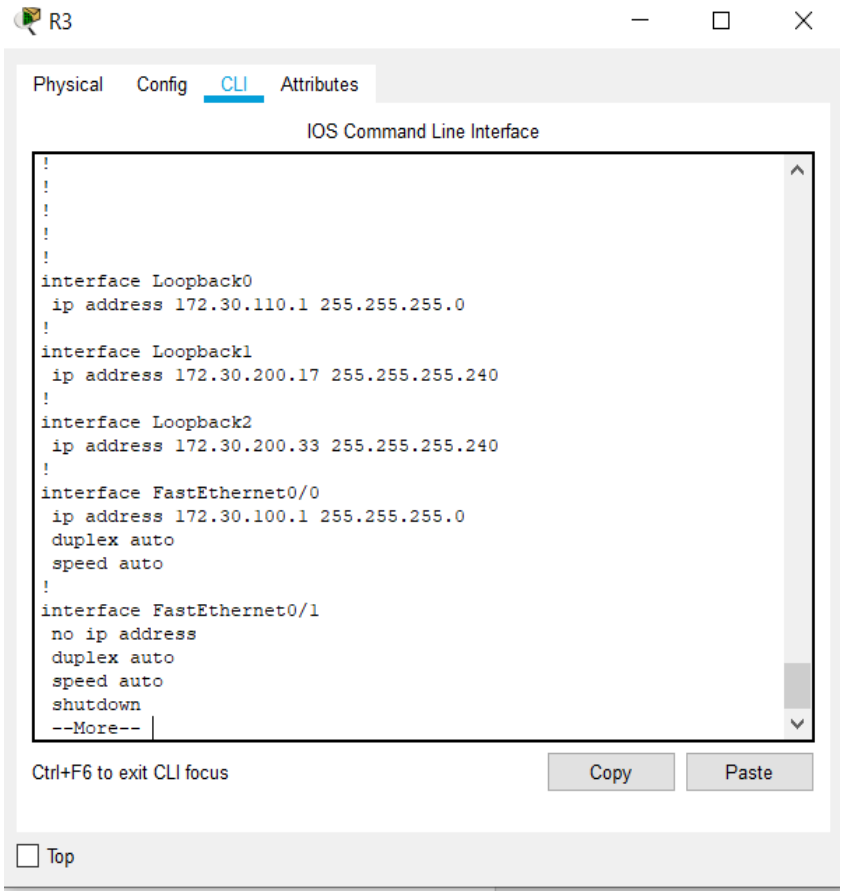


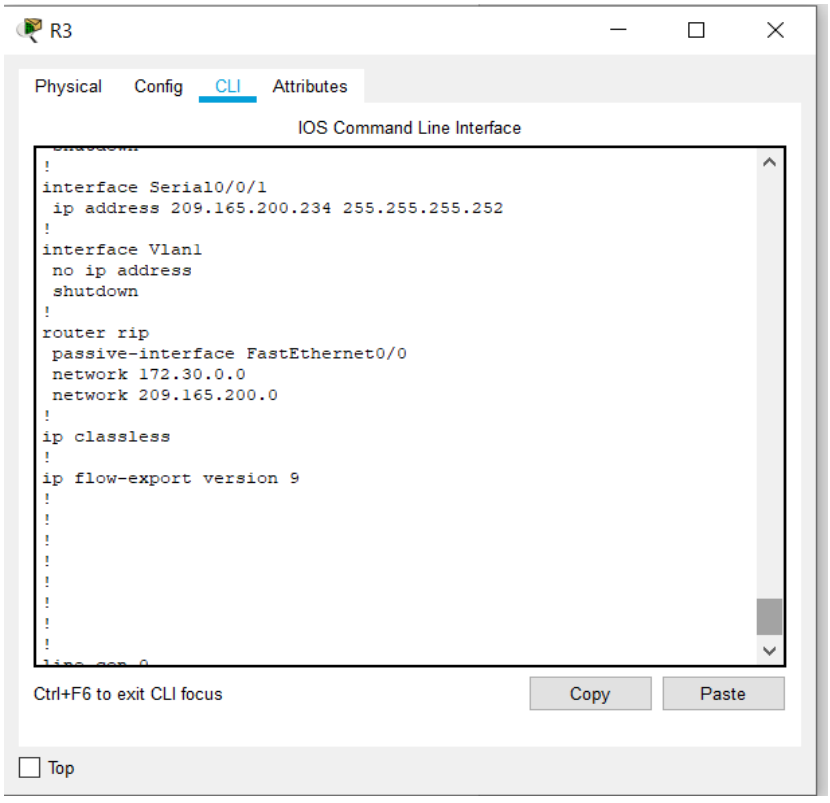
- Configuration of RIP:



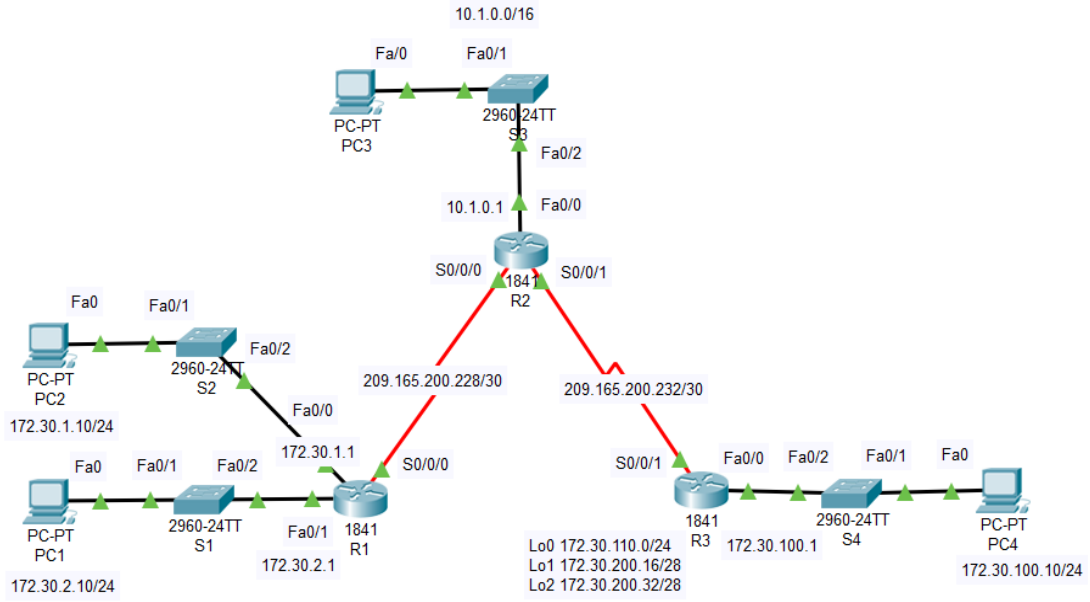
- Running Configuration:




R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
!
!
!
!
interface Loopback0
 ip address 172.30.110.1 255.255.255.0
!
interface Loopback1
 ip address 172.30.200.17 255.255.255.240
!
interface Loopback2
 ip address 172.30.200.33 255.255.255.240
!
interface FastEthernet0/0
 ip address 172.30.100.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
 --More--
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
interface Serial0/0/1
 ip address 209.165.200.234 255.255.255.252
!
interface Vlan1
 no ip address
 shutdown
!
router rip
 passive-interface FastEthernet0/0
 network 172.30.0.0
 network 209.165.200.0
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

Final Topology:



Task 3: Examine the Current Status of the Network.

Step 1: Verify that both serial links are up.

The two serial links can quickly be verified using the **show ip interface brief** command on R2.

R2#**show ip interface brief**

```
R2>enable
R2#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        10.1.0.1        YES manual up                    up
FastEthernet0/1        unassigned      YES NVRAM  administratively down down
Serial0/0/0            209.165.200.229 YES manual up                    up
Serial0/0/1            209.165.200.233 YES manual up                    up
Vlan1                  unassigned      YES NVRAM  administratively down down
R2#
```

Ctrl+F6 to exit CLI focus

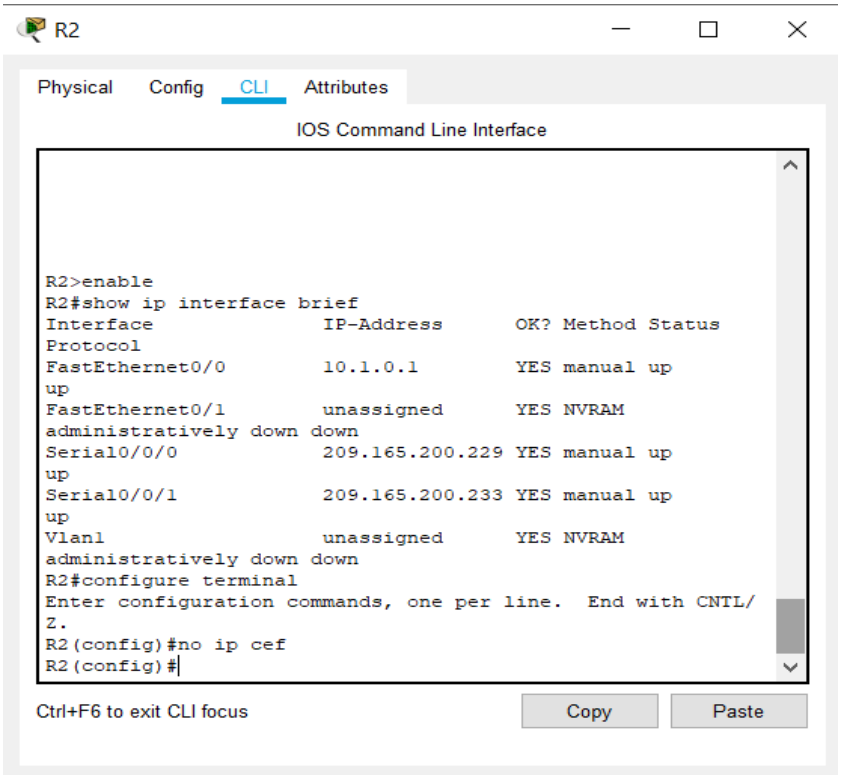
Copy Paste

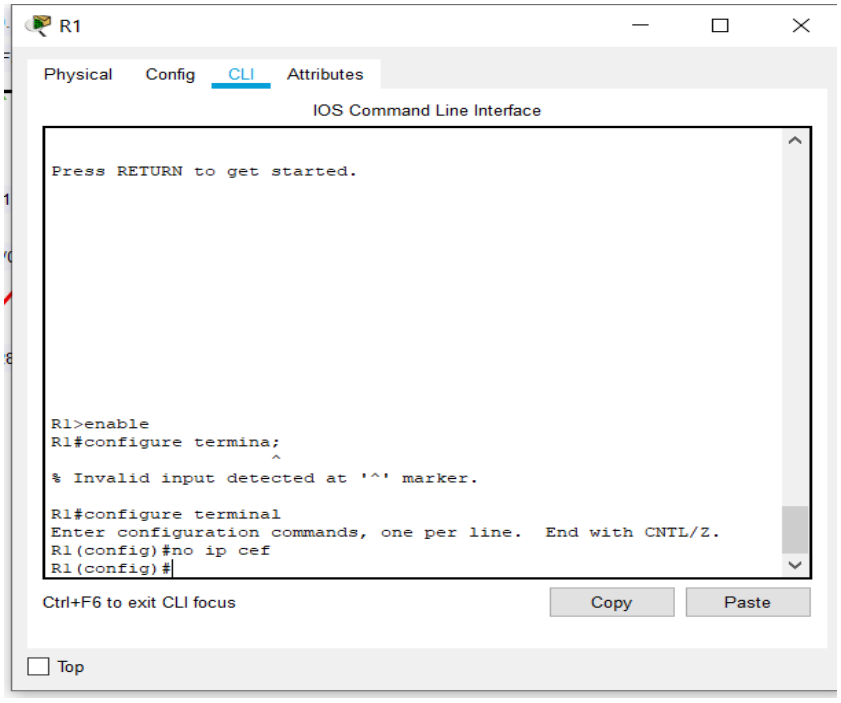
Top

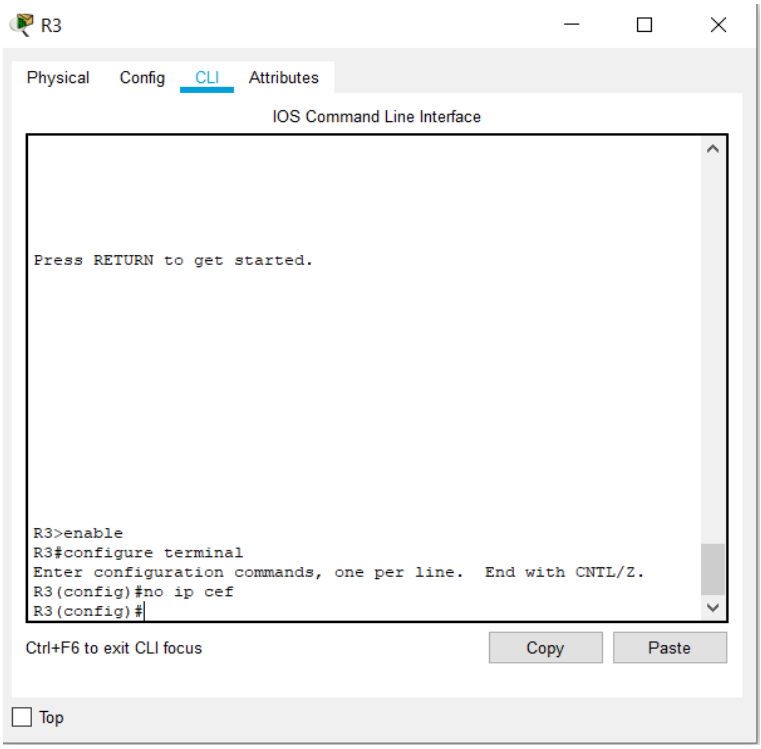
Step 2: Check the connectivity from R2 to the hosts on the R1 and R3 LANs.

Note: For the 1841 router, you will need to disable IP CEF to obtain the correct output from the **ping** command. Although a discussion of IP CEF is beyond the scope of this course, you may disable IP CEF by using the following command in global configuration mode:

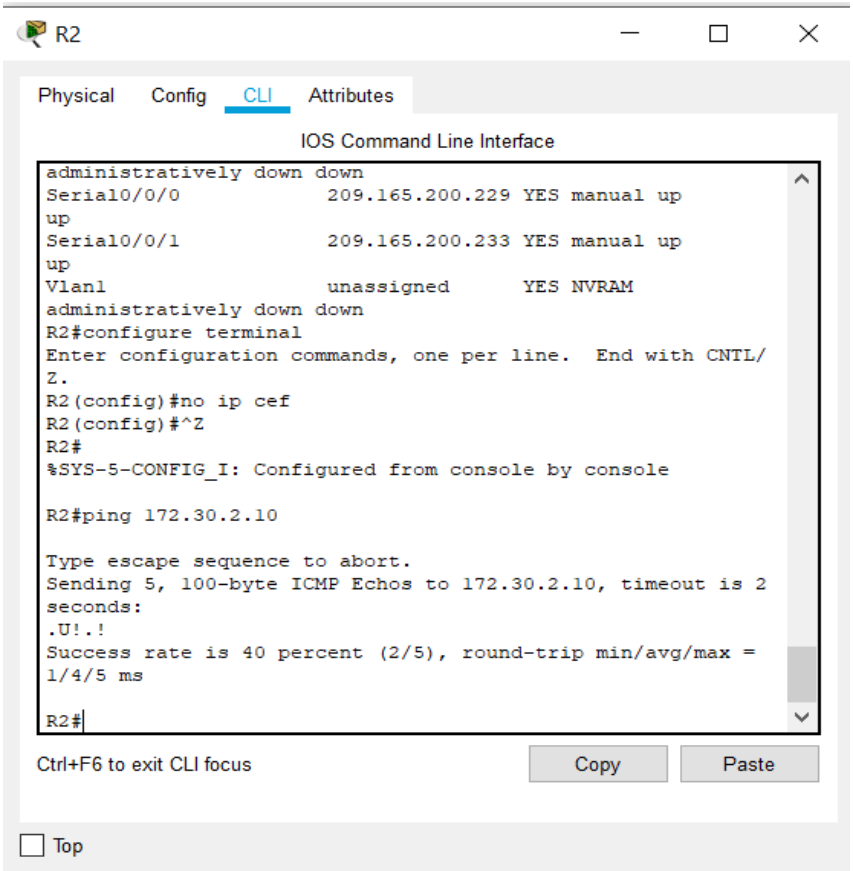
R2(config)#**no ip cef**







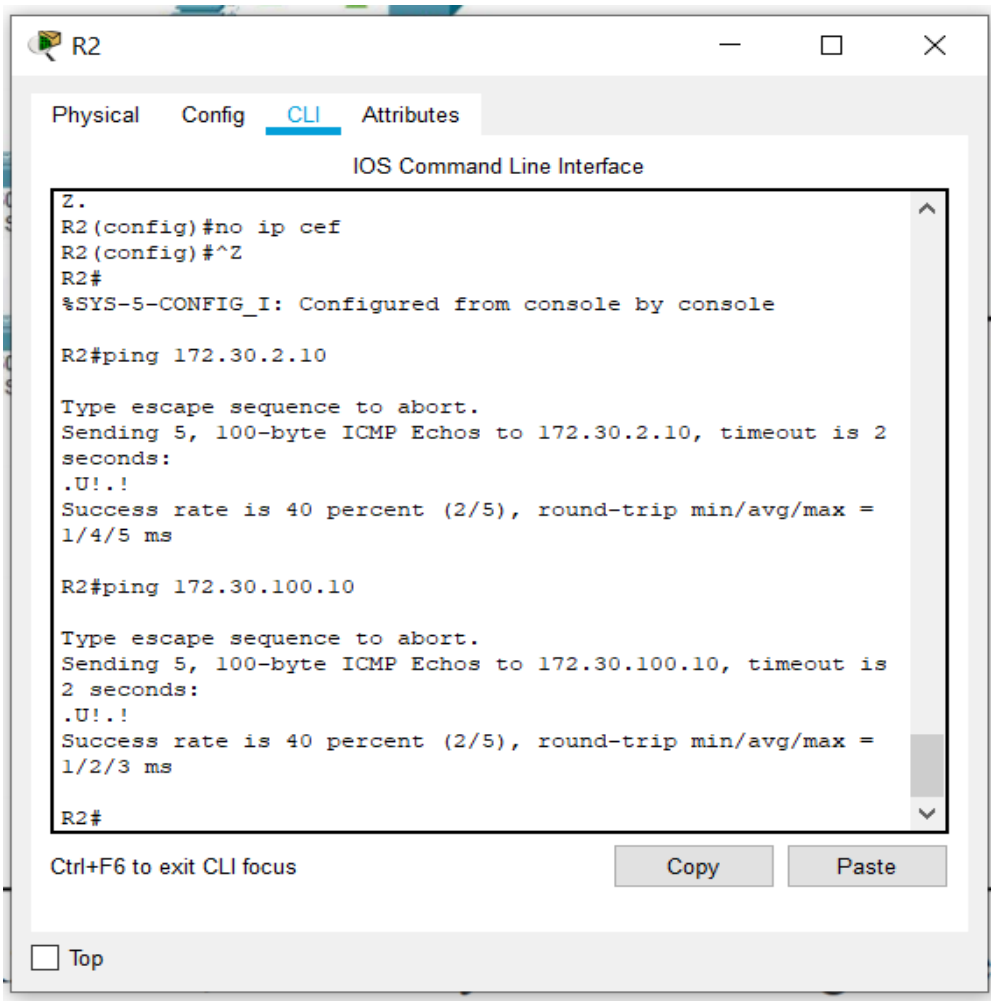
- Ping PC1 from R2:



From the R2 router, how many ICMP messages are successful when pinging PC1?

Ans: **2 ICMP messages are successful.**

- Ping PC4 from R2:

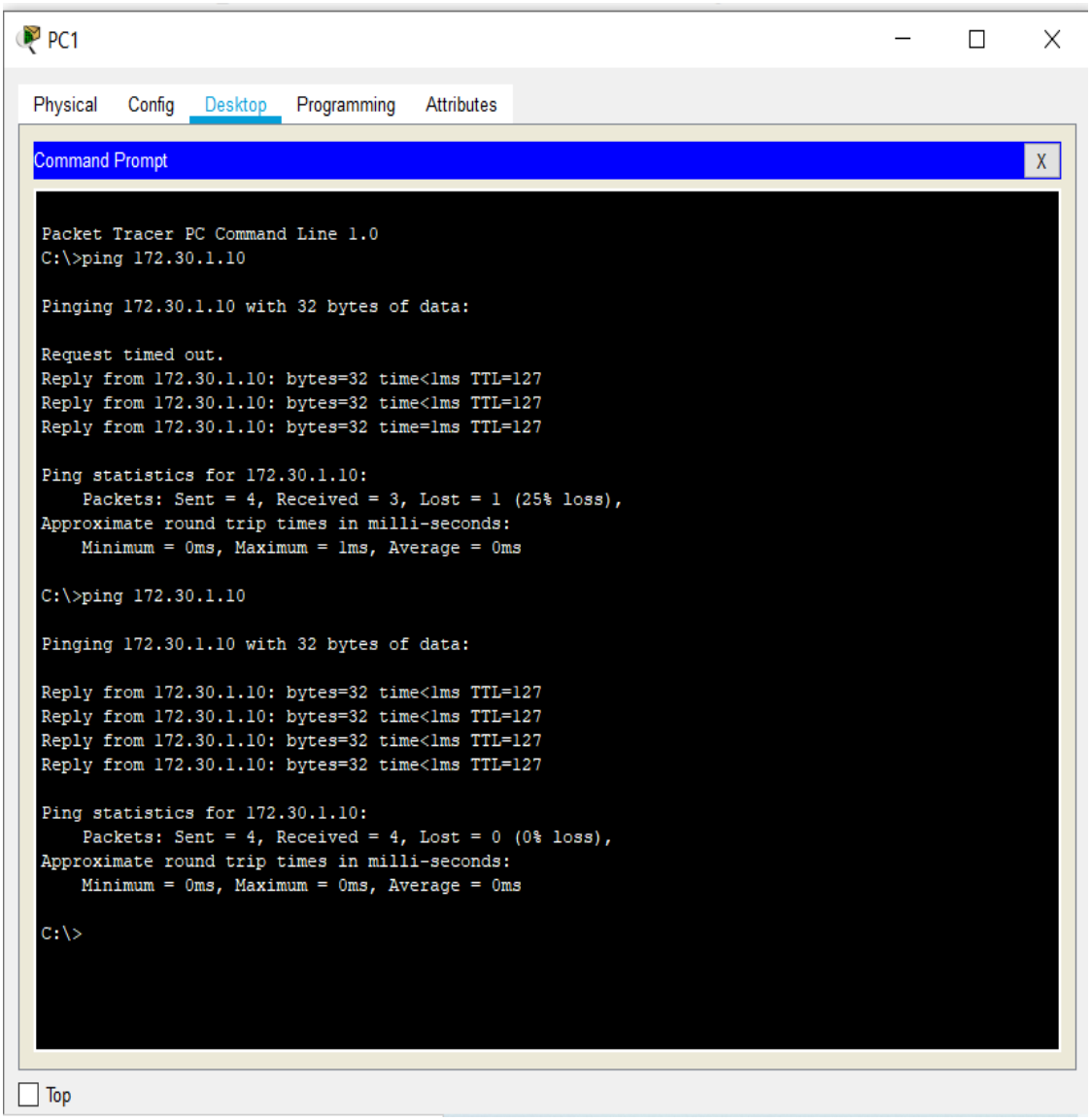


From the R2 router, how many ICMP messages are successful when pinging PC4?

Ans: **2 ICMP messages are successful.**

Step 3: Check the connectivity between the PCs.

- Ping PC2 from PC1:



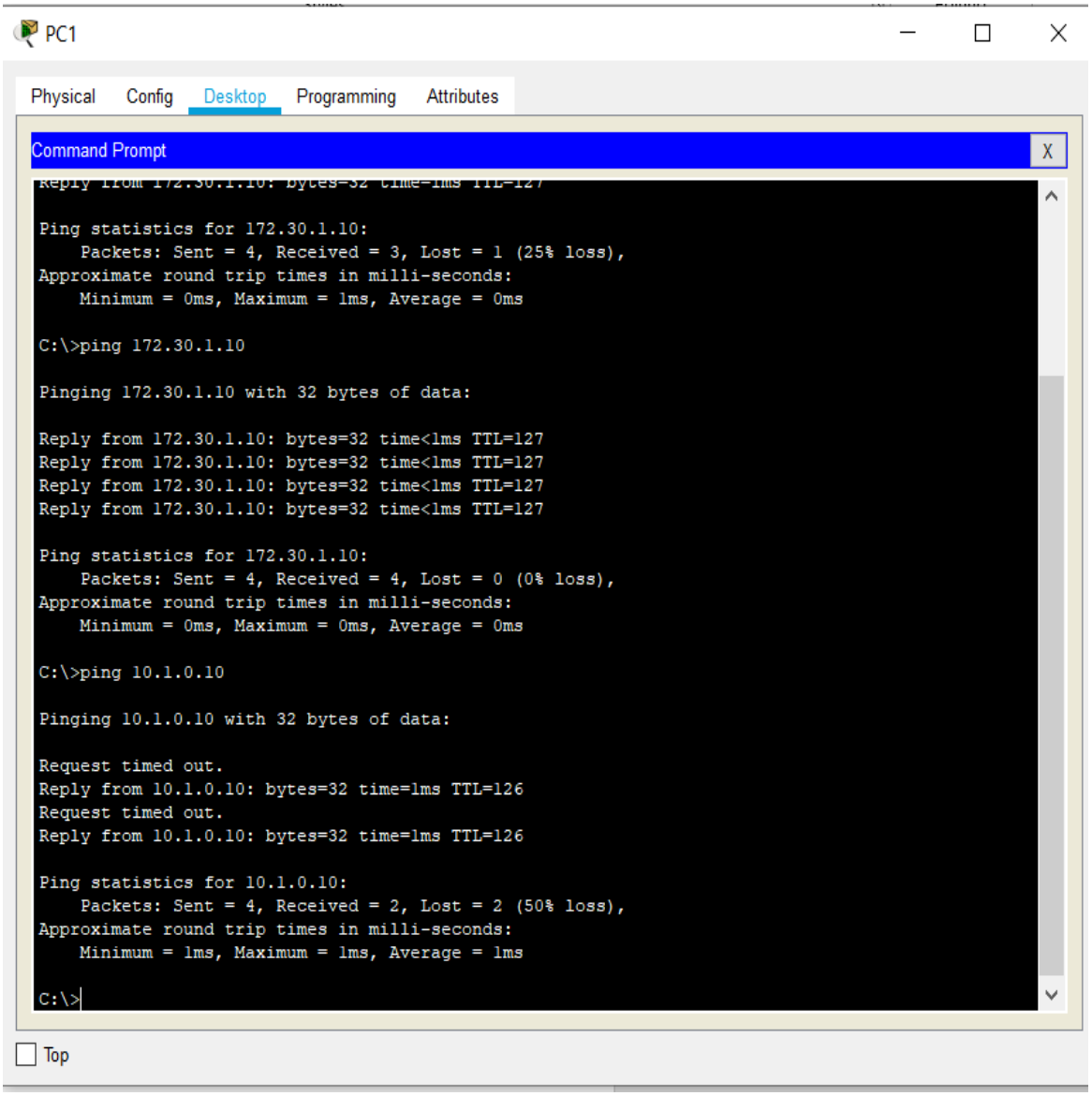
From the PC1, is it possible to ping PC2?

=> **Yes.**

What is the success rate?

=> **100%**

- Ping PC3 from PC1:



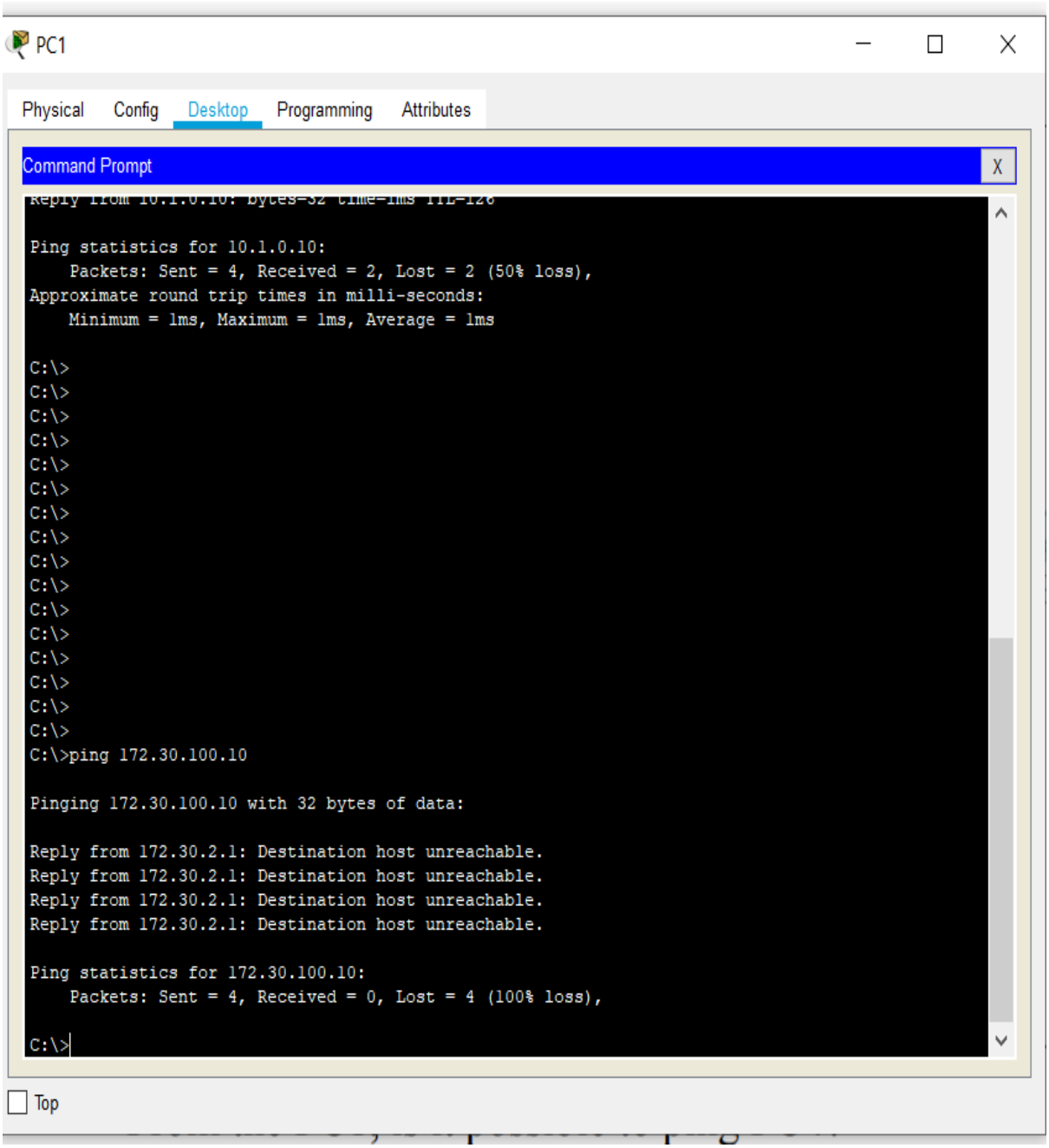
From the PC1, is it possible to ping PC3?

=> **Yes**

What is the success rate?

=> **50%**

- Ping PC4 from PC1:



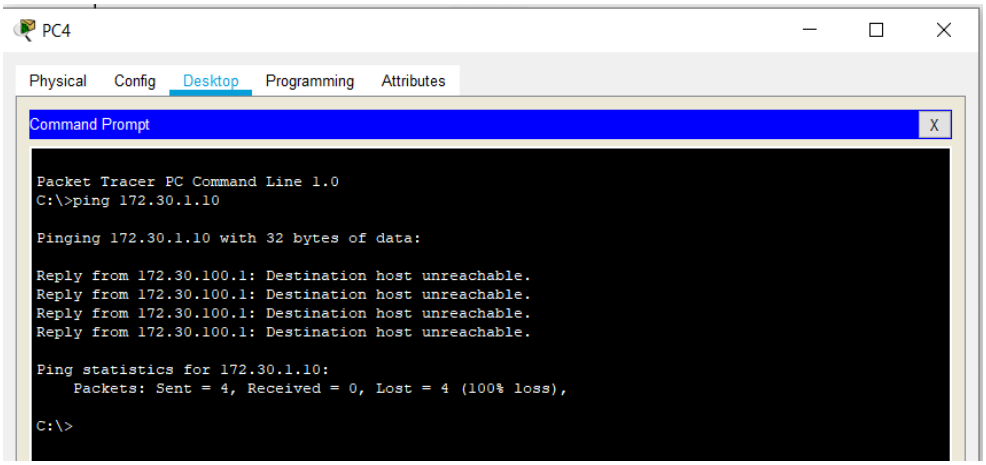
From the PC1, is it possible to ping PC4?

=> **No**

What is the success rate?

=> **0%**

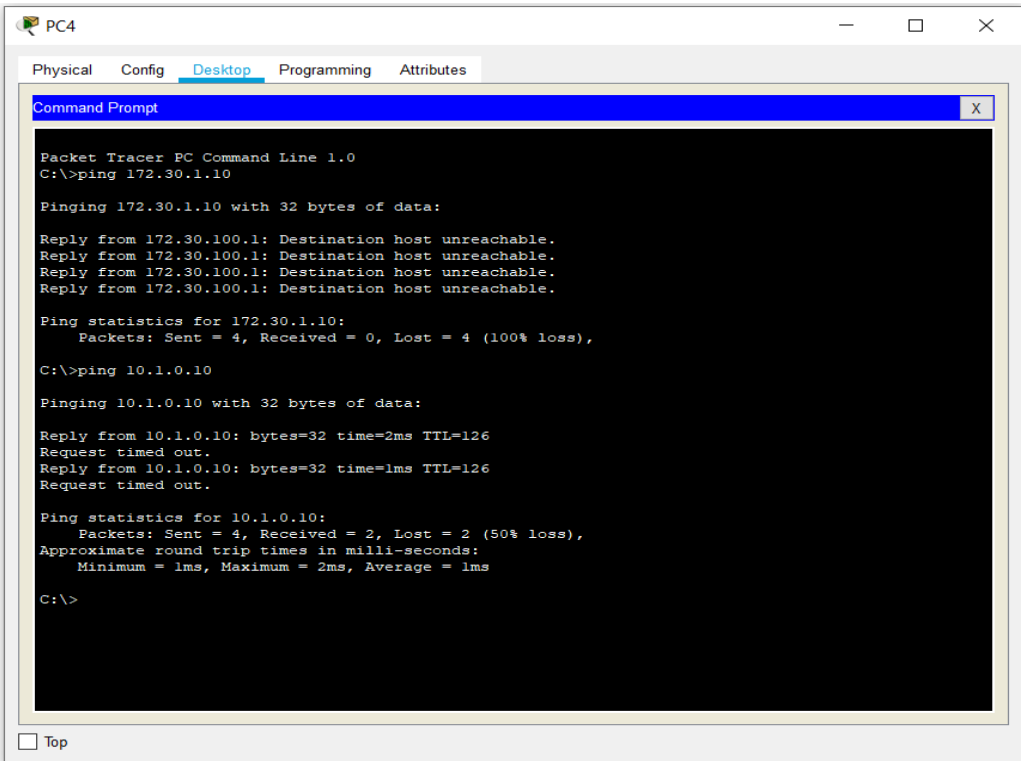
- Ping PC2 from PC4:



From the PC4, is it possible to ping PC2? => **No**

What is the success rate? => **0%**

- Ping PC3 from PC4:



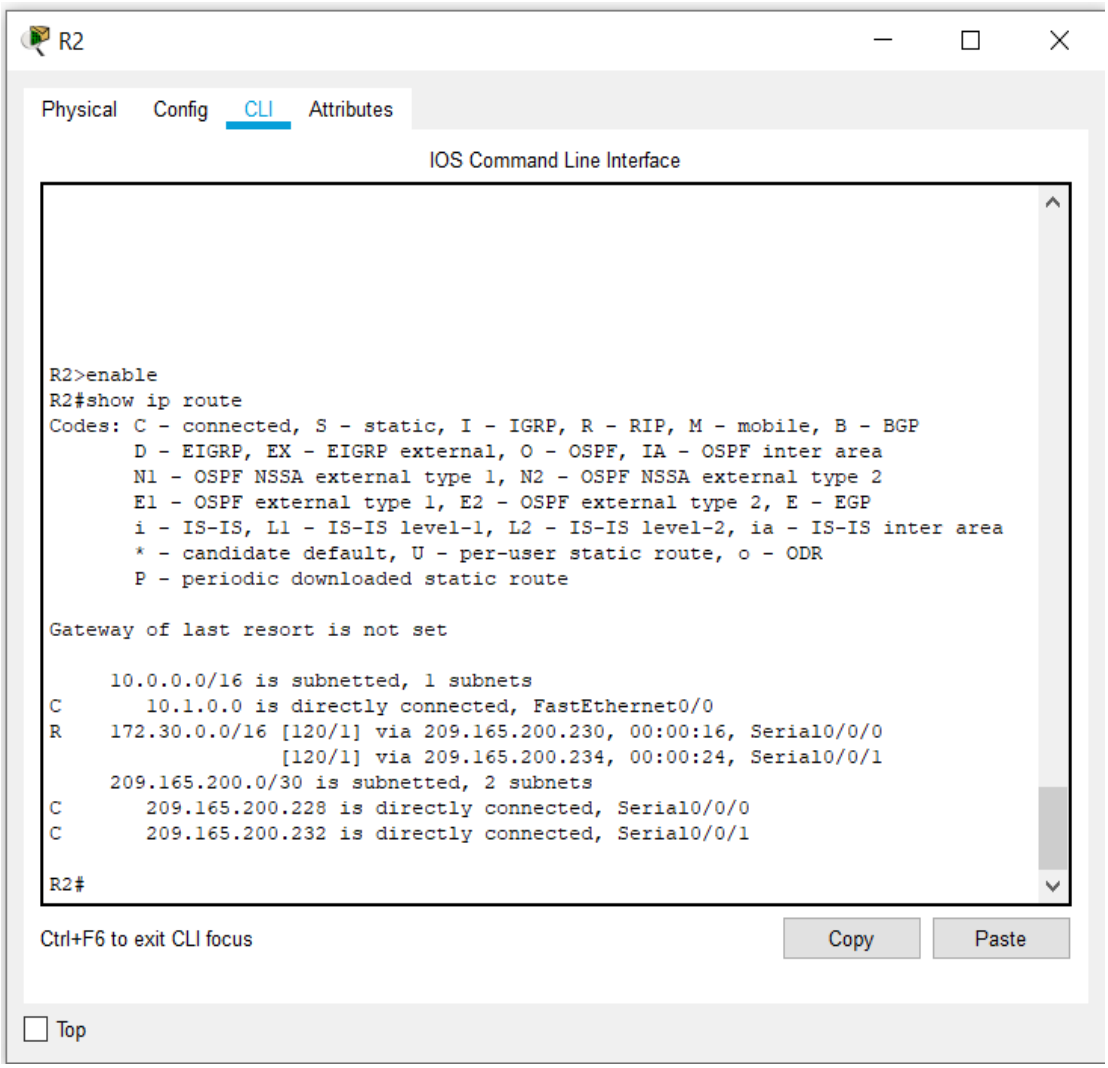
From the PC4, is it possible to ping PC3? => **Yes**.

What is the success rate? => **50%**

Step 4: View the routing table on R2.

Both the R1 and R3 are advertising routes to the 172.30.0.0/16 network; therefore, there are two entries for this network in the R2 routing table. The R2 routing table only shows the major classful network address of 172.30.0.0—it does not show any of the subnets for this network that are used on the LANs attached to R1 and R3. Because the routing metric is the same for both entries, the router alternates the routes that are used when forwarding packets that are destined for the 172.30.0.0/16 network.

R2#**show ip route**

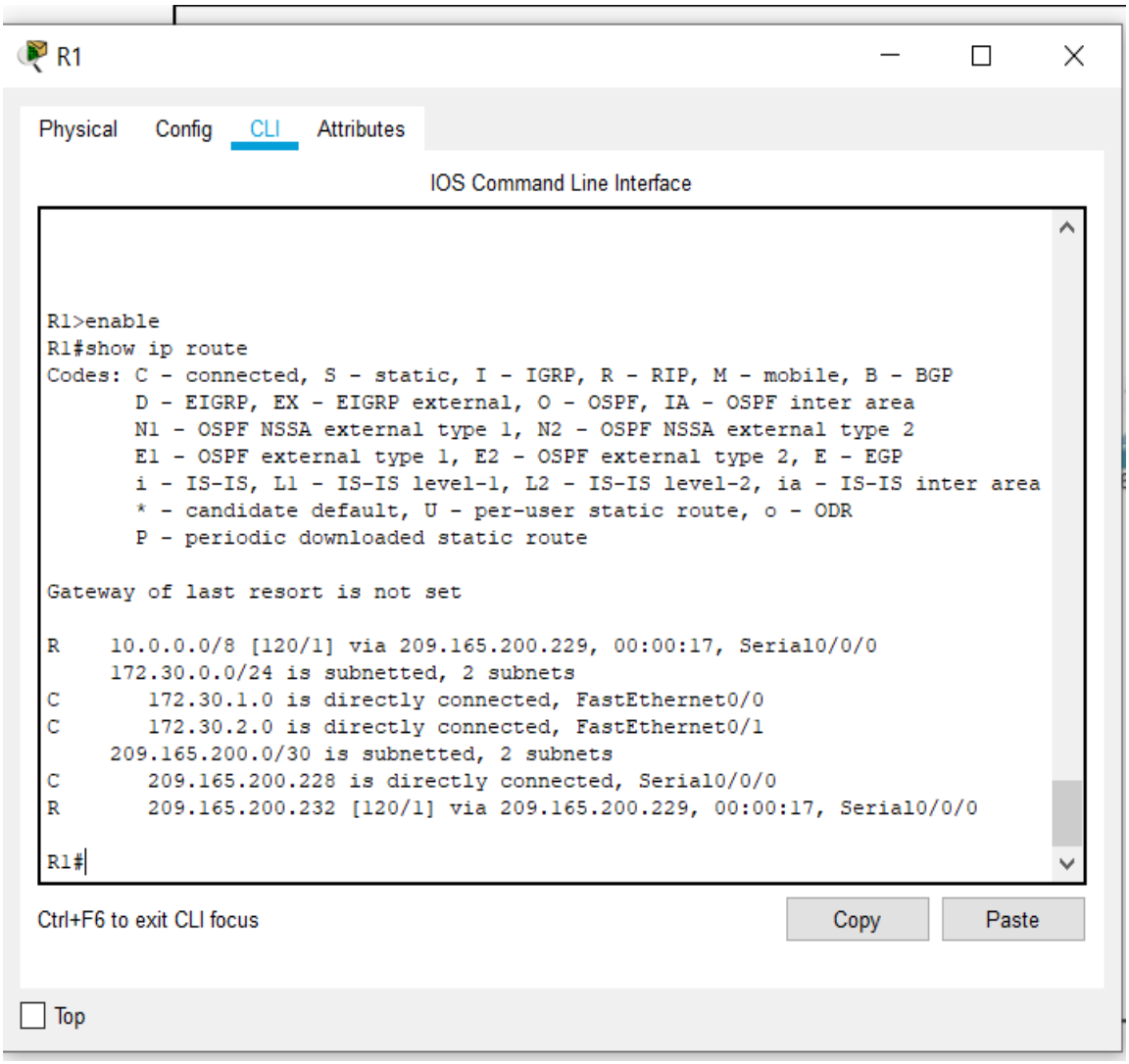


Step 5: Examine the routing table on the R1 router.

Both R1 and R3 are configured with interfaces on a discontiguous network, 172.30.0.0. The 172.30.0.0 subnets are physically and logically divided by at

least one other classful or major network—in this case, the two serial networks 209.165.200.228/30 and 209.165.200.232/30. Classful routing protocols like RIPv1 summarize networks at major network boundaries. Both R1 and R3 will be summarizing 172.30.0.0/24 subnets to 172.30.0.0/16. Because the route to 172.30.0.0/16 is directly connected, and because R1 does not have any specific routes for the 172.30.0.0 subnets on R3, packets destined for the R3 LANs will not be forwarded properly.

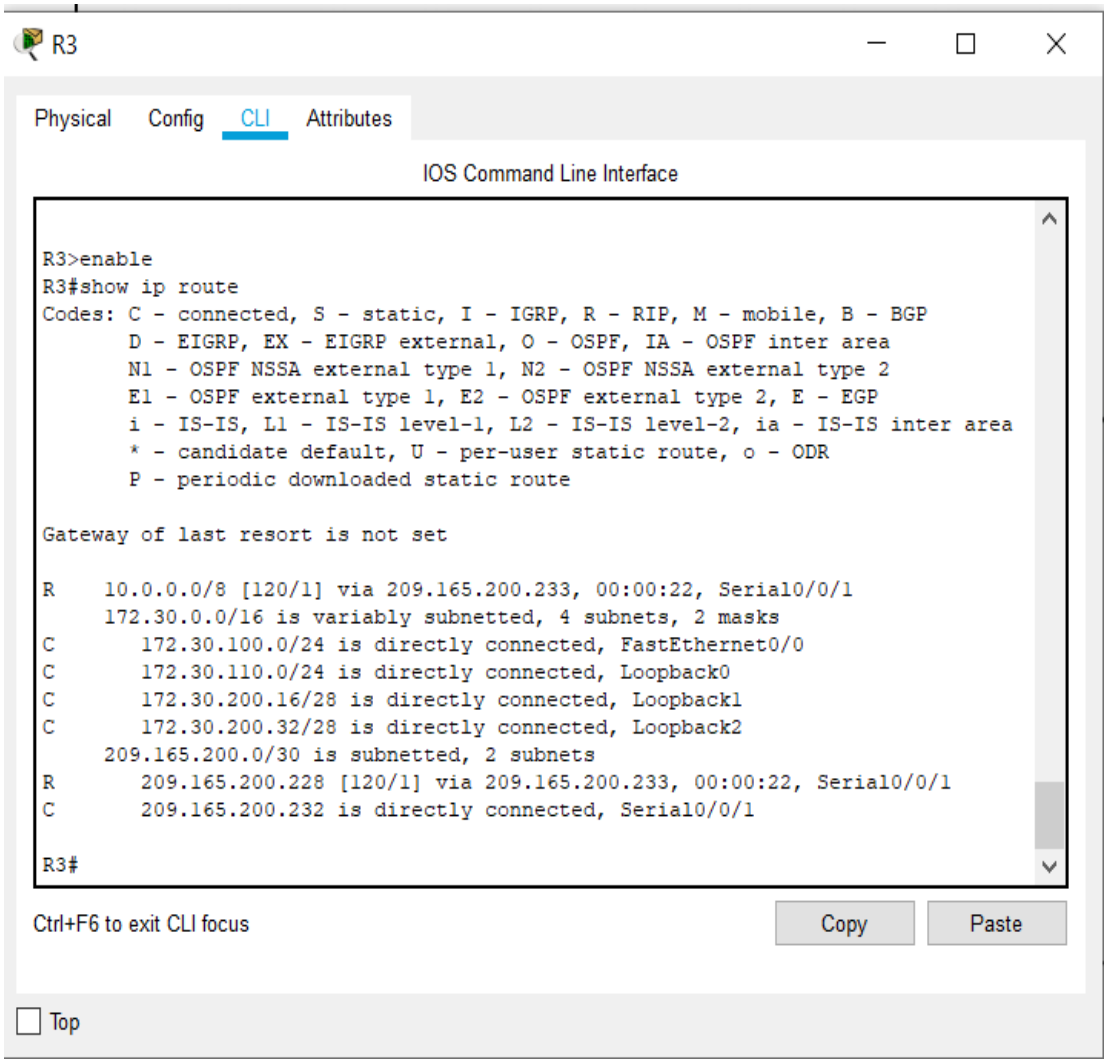
R1#**show ip route**



Step 6: Examine the routing table on the R3 router.

R3 only shows its own subnets for 172.30.0.0 network: 172.30.100/24, 172.30.110/24, 172.30.200.16/28, and 172.30.200.32/28. R3 does not have any routes for the 172.30.0.0 subnets on R1.

R3#**show ip route**

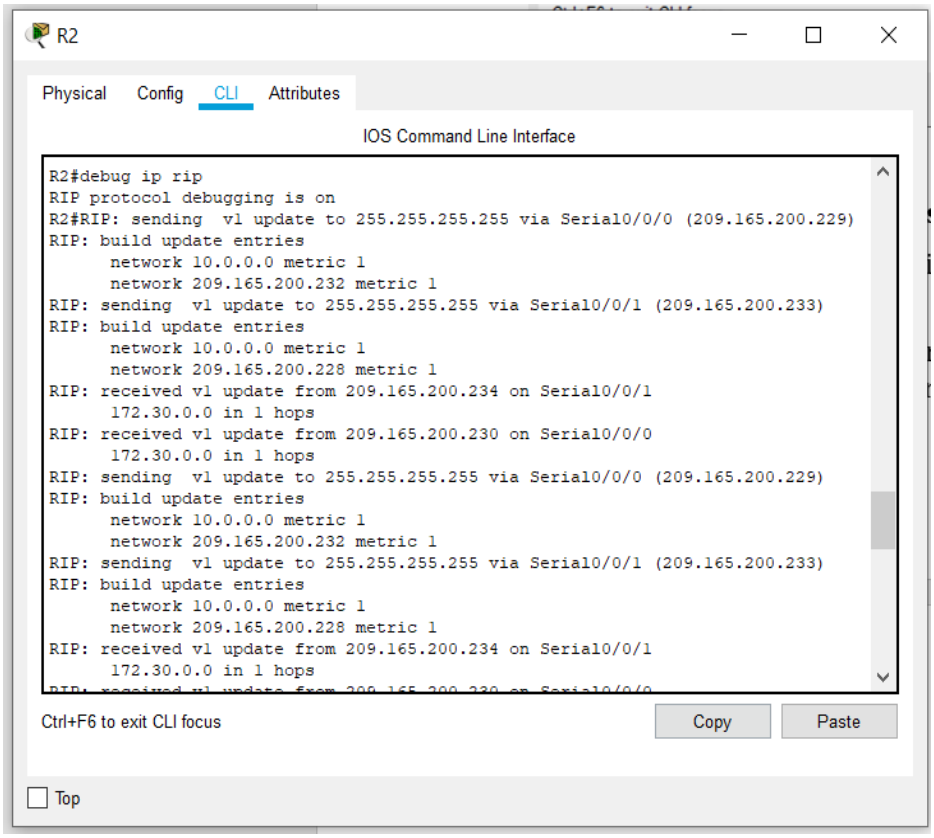


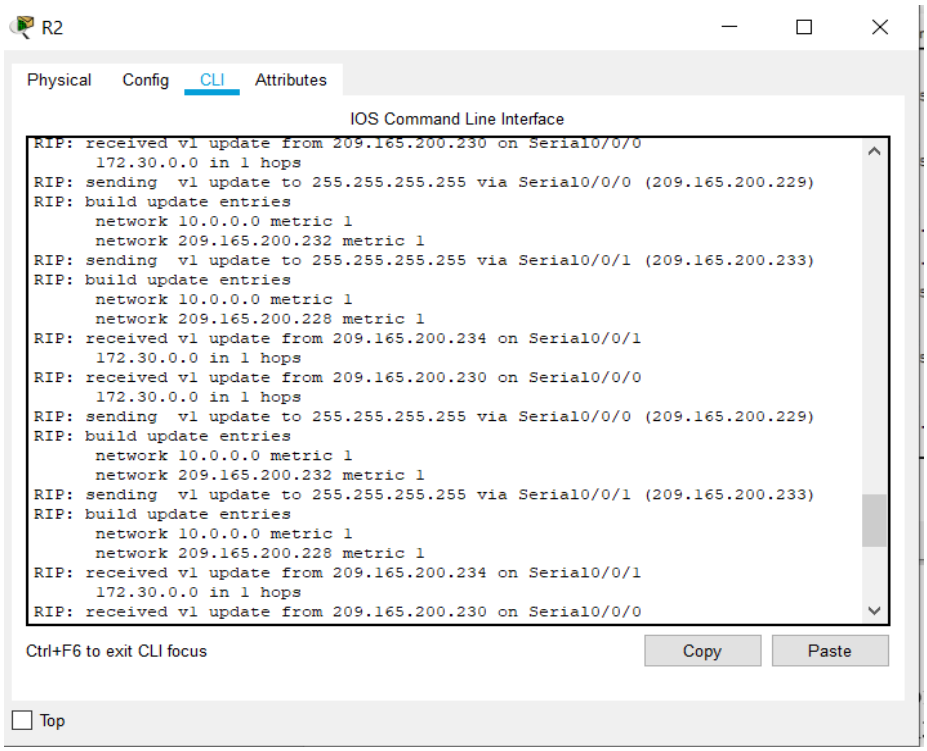
Step 7: Examine the RIPv1 packets that are being received by R2.

Use the **debug ip rip** command to display RIP routing updates.

R2 is receiving the route 172.30.0.0, with 1 hop, from both R1 and R3. Because these are equal cost metrics, both routes are added to the R2 routing table. Because RIPv1 is a classful routing protocol, no subnet mask information is sent in the update.

R2#**debug ip rip**

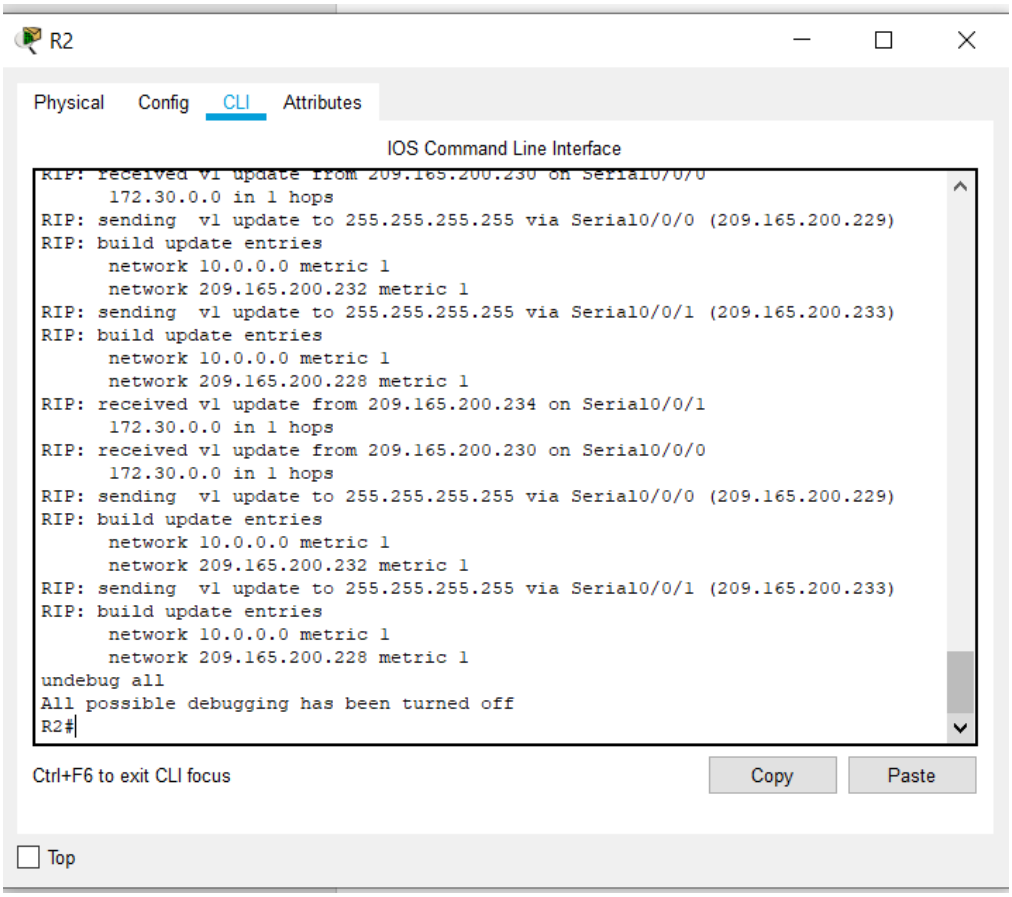




R2 is sending only the routes for the 10.0.0.0 LAN and the two serial connections to R1 and R3. R1 and R3 are not receiving any information about the 172.30.0.0 subnet routes.

When you are finished, turn off the debugging.

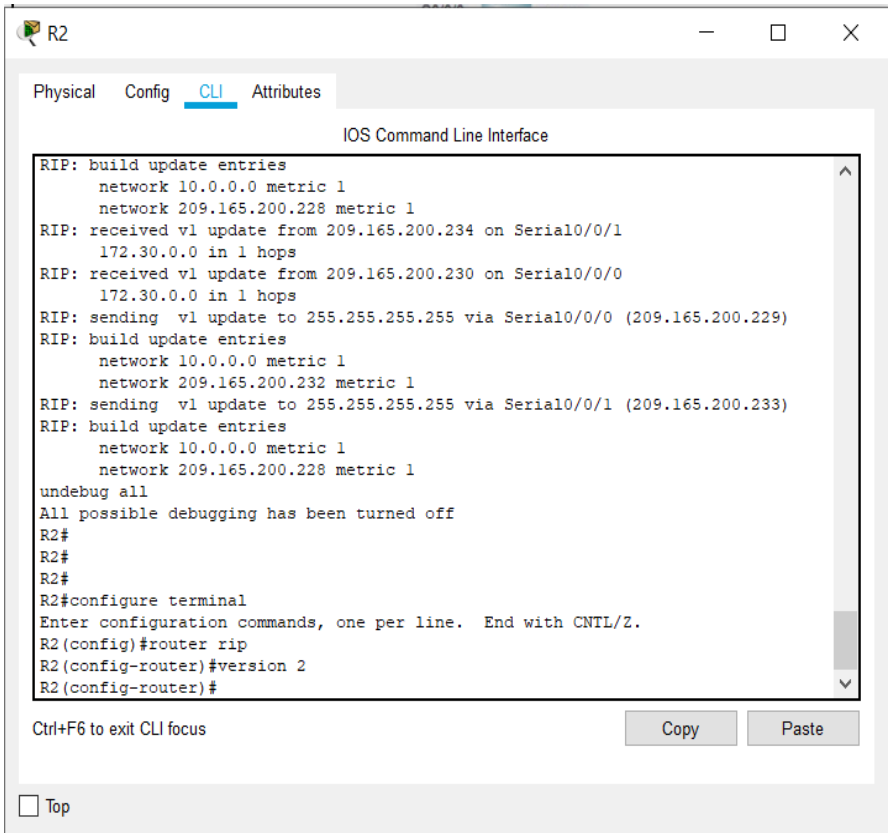
R2#**undebug all**

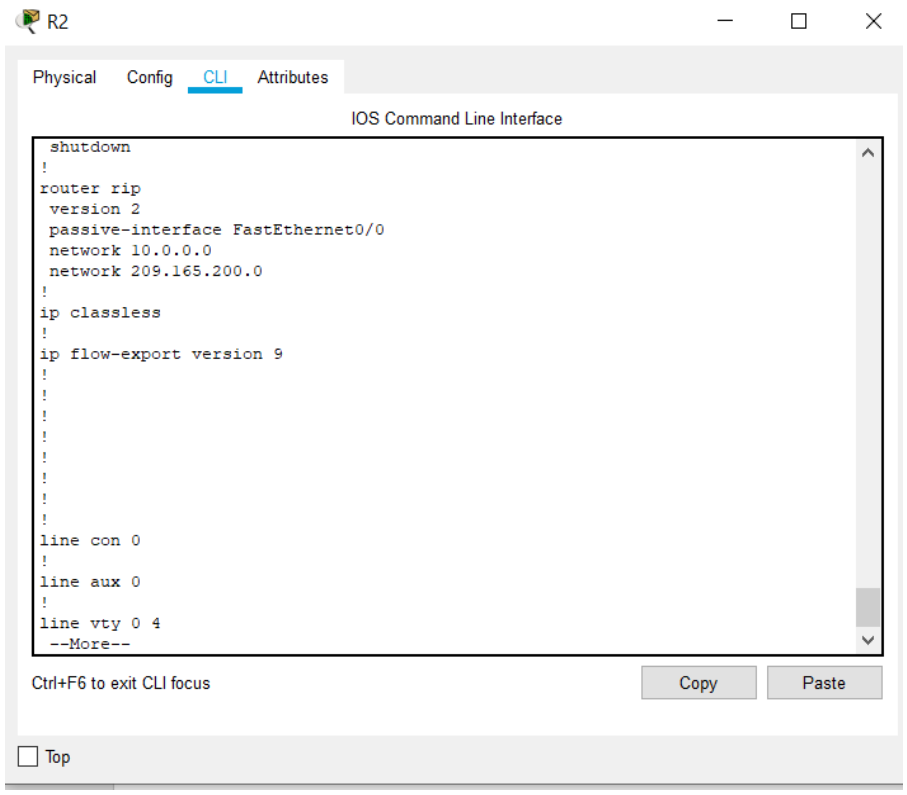


Task 4: Configure RIP Version 2.

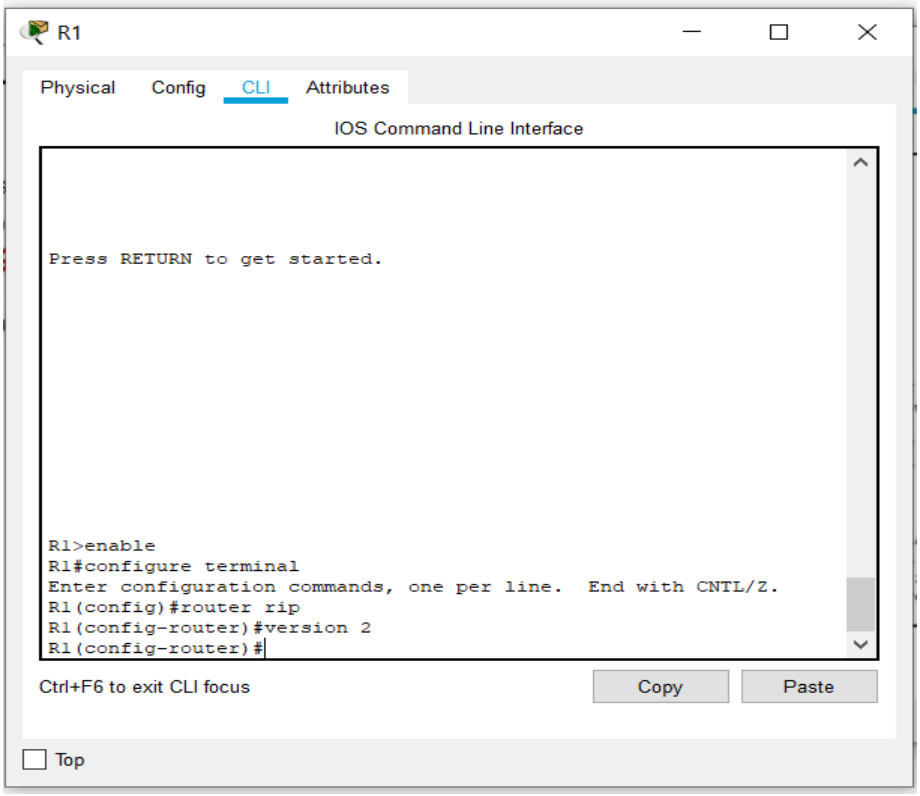
Step 1: Use the version 2 command to enable RIP version 2 on each of the routers.

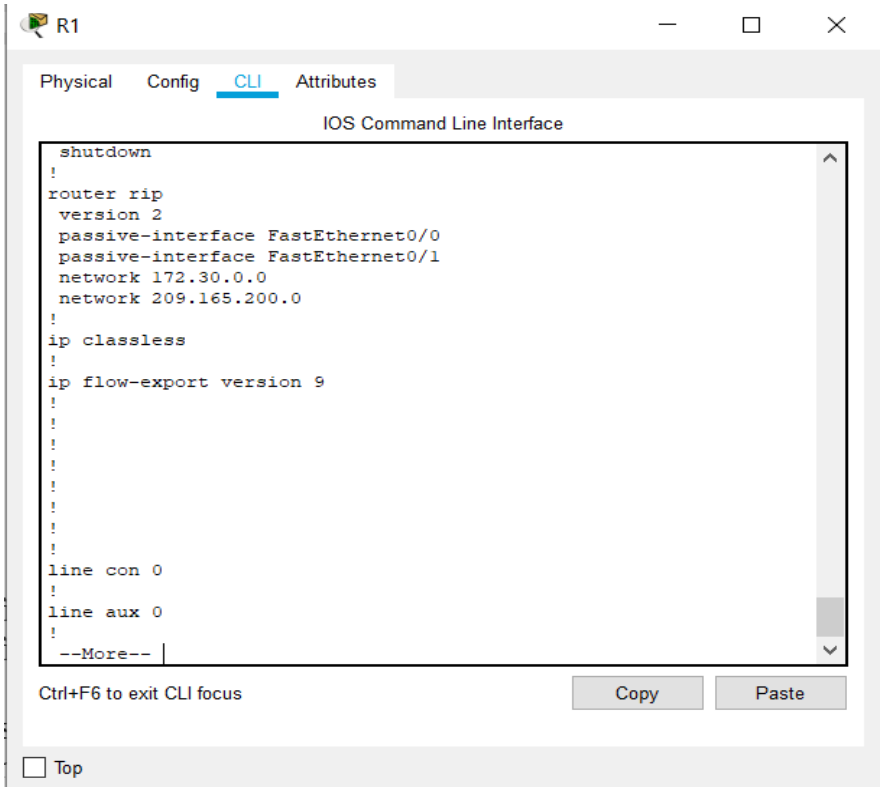
R2(config)#**router rip**
R2(config-router)#**version 2**


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
RIP: build update entries
network 10.0.0.0 metric 1
network 209.165.200.228 metric 1
RIP: received v1 update from 209.165.200.234 on Serial0/0/1
172.30.0.0 in 1 hops
RIP: received v1 update from 209.165.200.230 on Serial0/0/0
172.30.0.0 in 1 hops
RIP: sending v1 update to 255.255.255.255 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
network 10.0.0.0 metric 1
network 209.165.200.232 metric 1
RIP: sending v1 update to 255.255.255.255 via Serial0/0/1 (209.165.200.233)
RIP: build update entries
network 10.0.0.0 metric 1
network 209.165.200.228 metric 1
undebug all
All possible debugging has been turned off
R2#
R2#
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)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

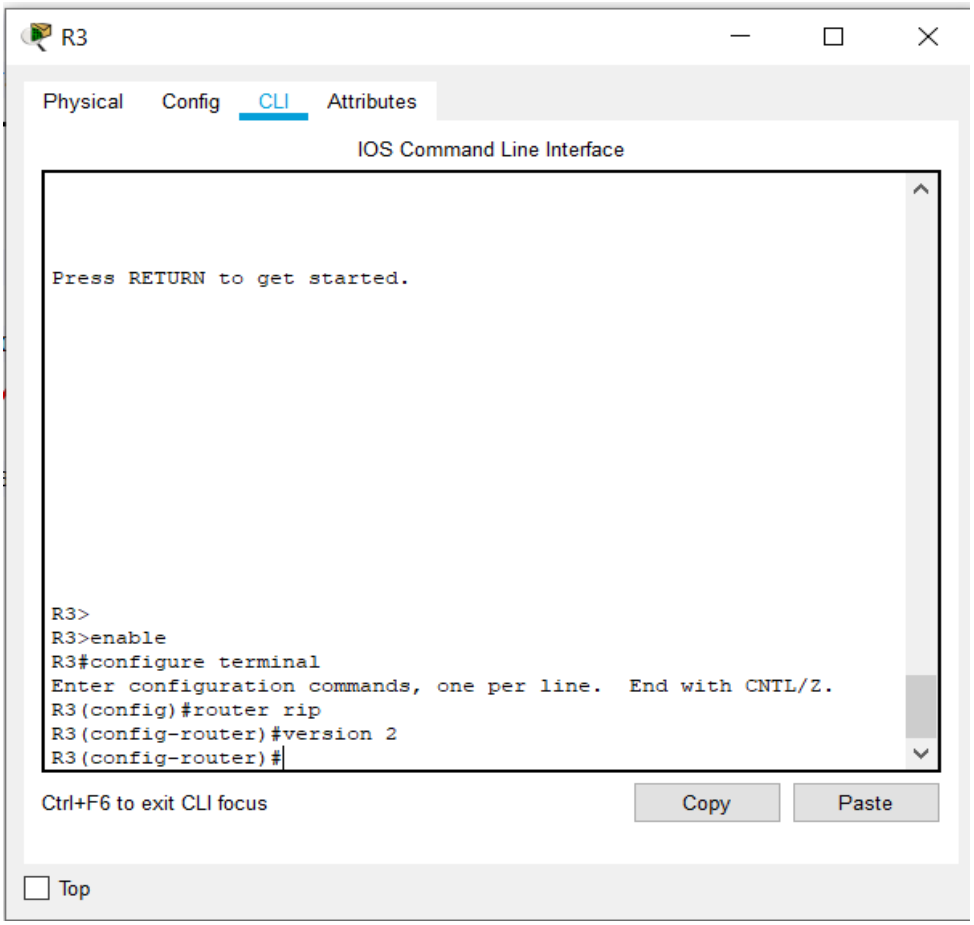

R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
shutdown
!
router rip
version 2
passive-interface FastEthernet0/0
network 10.0.0.0
network 209.165.200.0
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
--More--
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

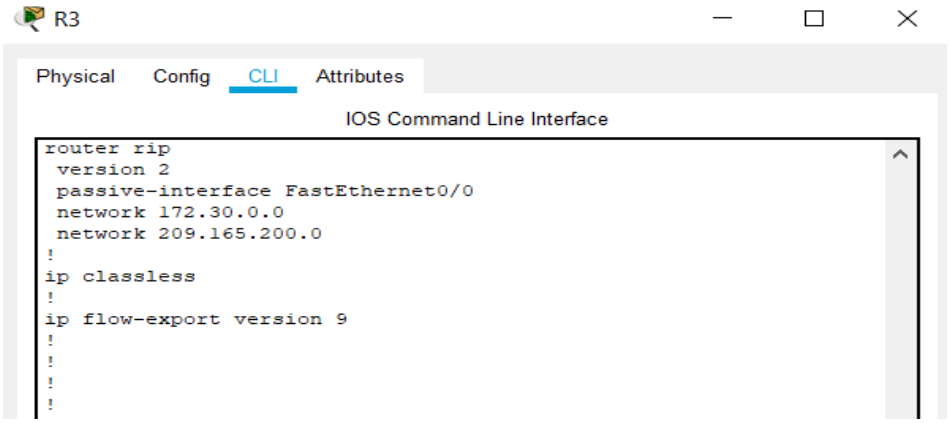
R1(config)#**router rip**
R1(config-router)#**version 2**





R3(config)#**router rip**
R3(config-router)#**version 2**



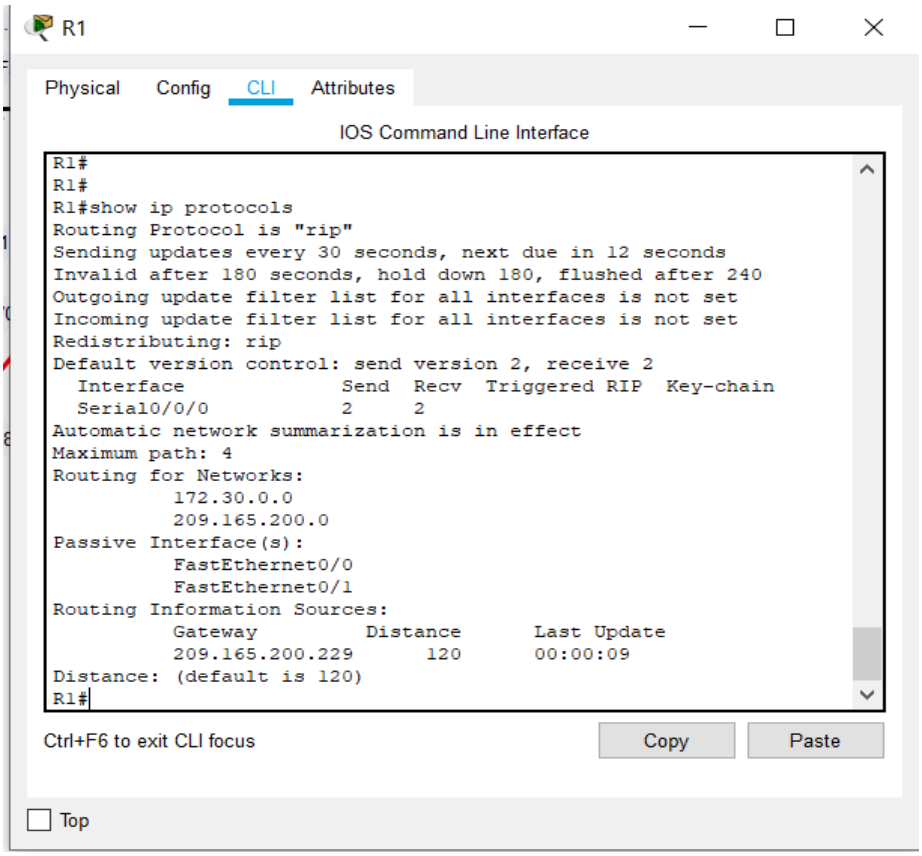


RIPv2 messages include the subnet mask in a field in the routing updates. This allows subnets and their masks to be included in the routing updates. However, by default RIPv2 summarizes networks at major network boundaries, just like RIPv1, except that the subnet mask is included in the update.

Step 2: Verify that RIPv2 is running on the routers.

The **debug ip rip**, **show ip protocols**, and **show run** commands can all be used to confirm that RIPv2 is running. The output of the **show ip protocols** command for R1 is shown below.

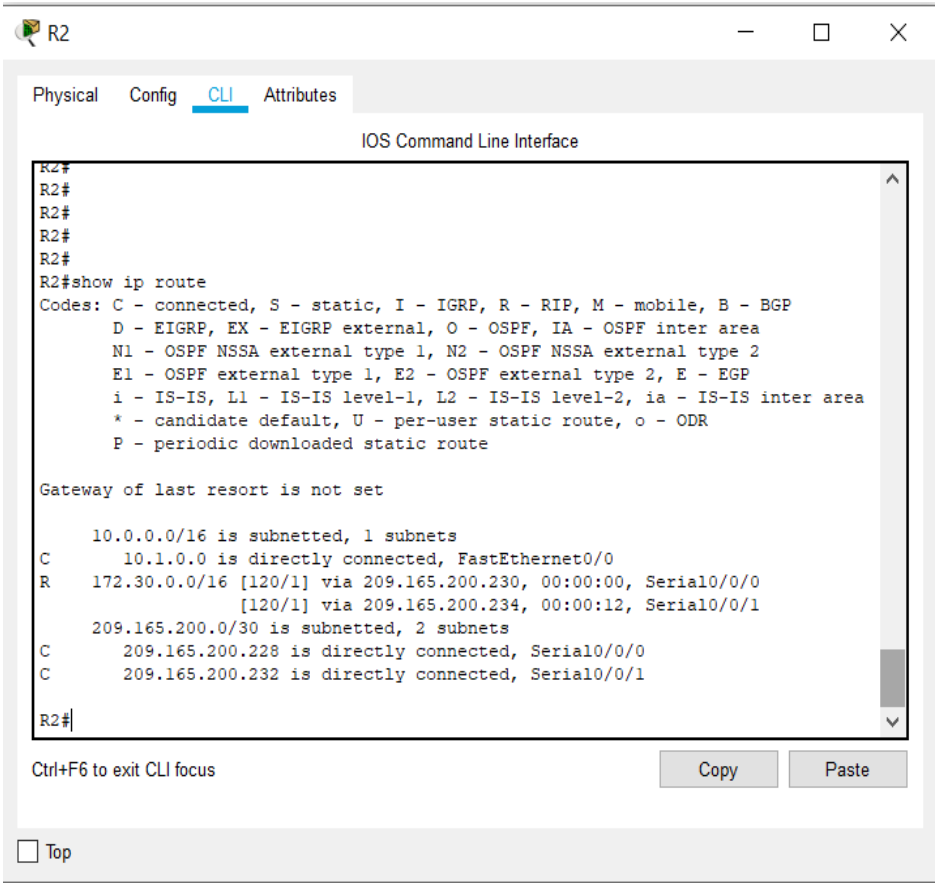
R1# **show ip protocols**



Task 5: Examine the Automatic Summarization of Routes.

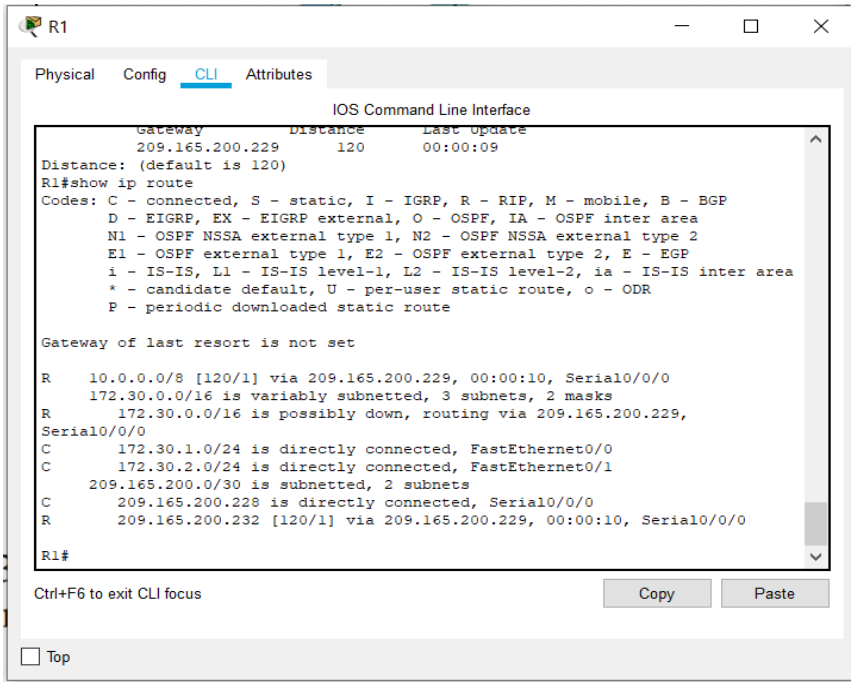
The LANs connected to R1 and R3 are still composed of discontiguous networks. R2 still shows two equal cost paths to the 172.30.0.0/16 network in the routing table. R2 still shows only the major classful network address of 172.30.0.0 and does not show any of the subnets for this network.

R2#**show ip route**



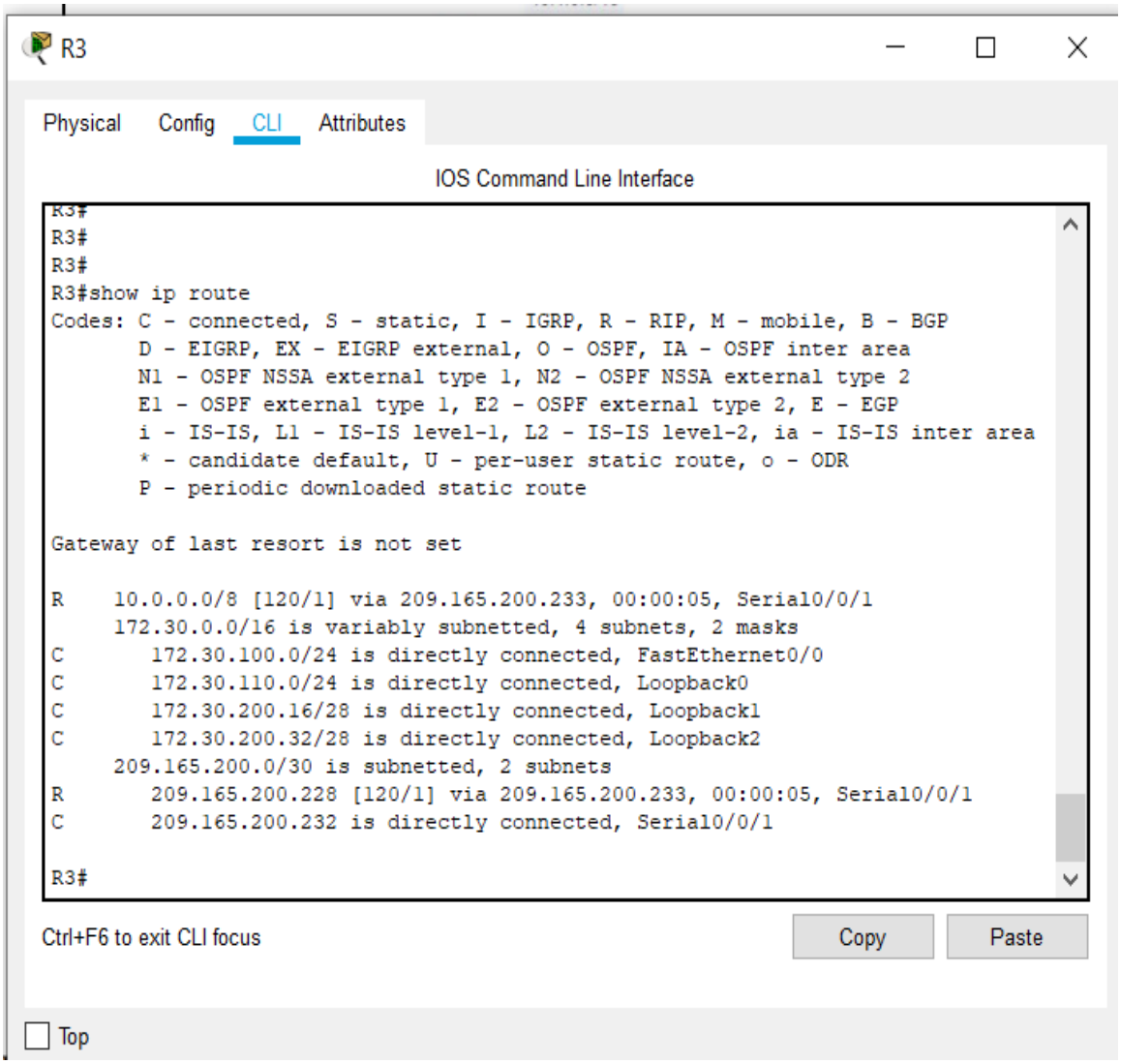
R1 still shows only its own subnets for the 172.30.0.0 network. R1 still does not have any routes for the 172.30.0.0 subnets on R3.

R1#**show ip route**



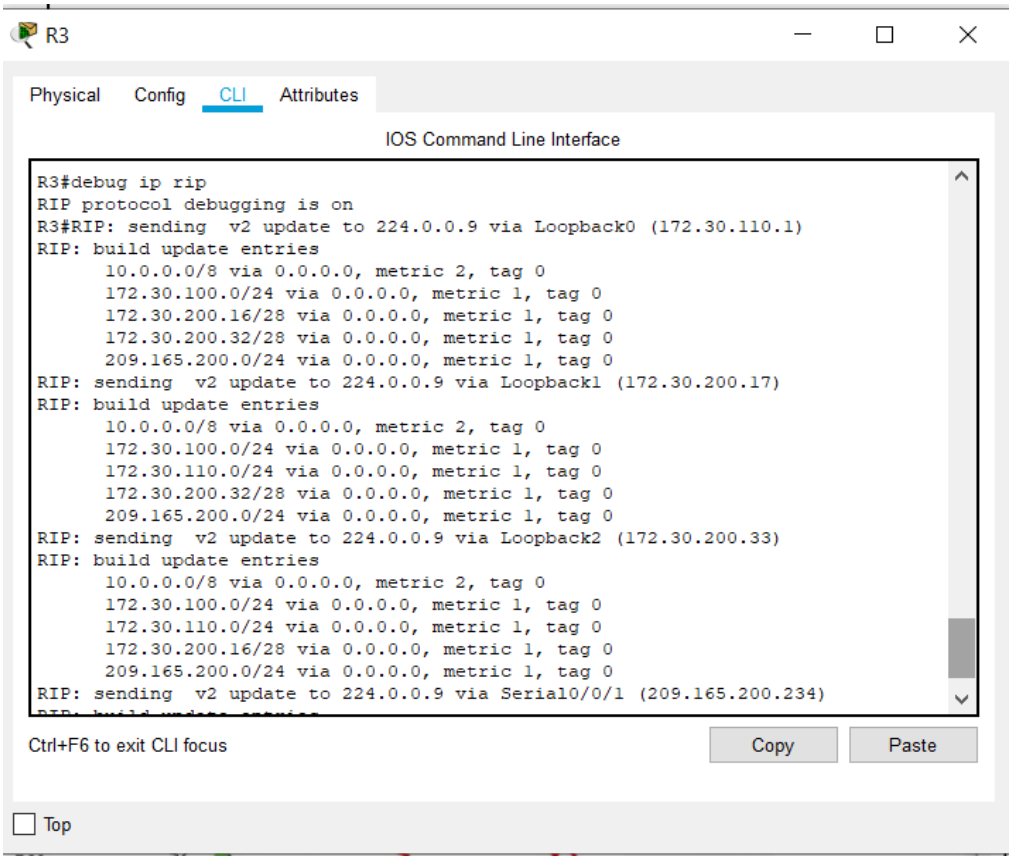
R3 still only shows its own subnets for the 172.30.0.0 network. R3 still does not have any routes for the 172.30.0.0 subnets on R1.

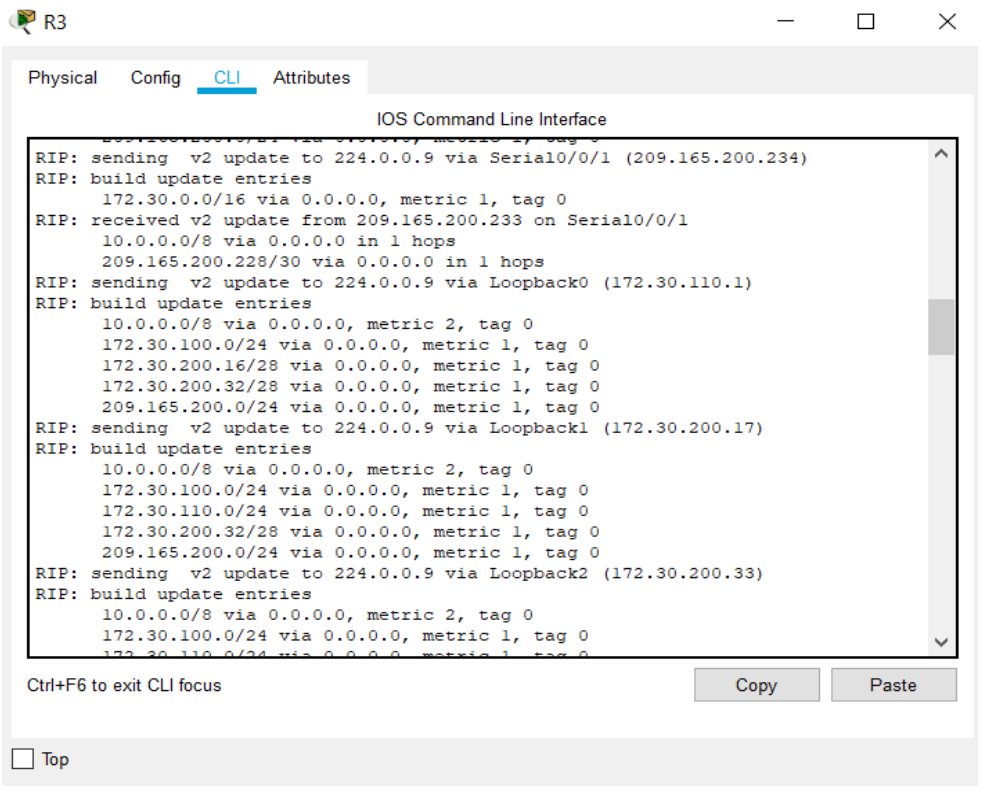
R3#**show ip route**

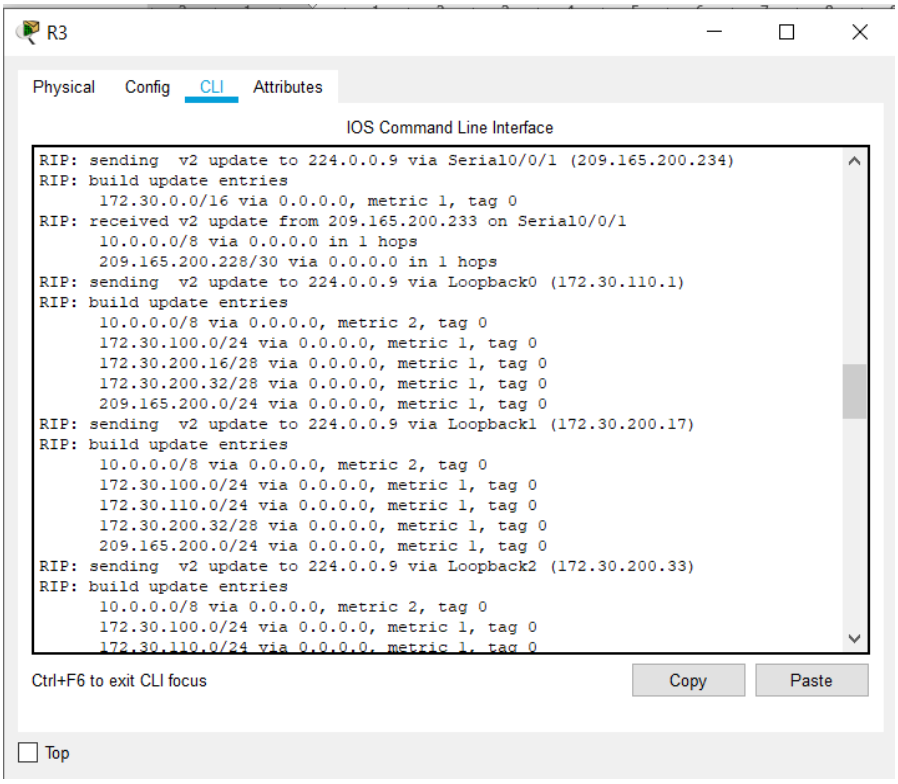


Use the output of the **debug ip rip** command to answer the following questions:

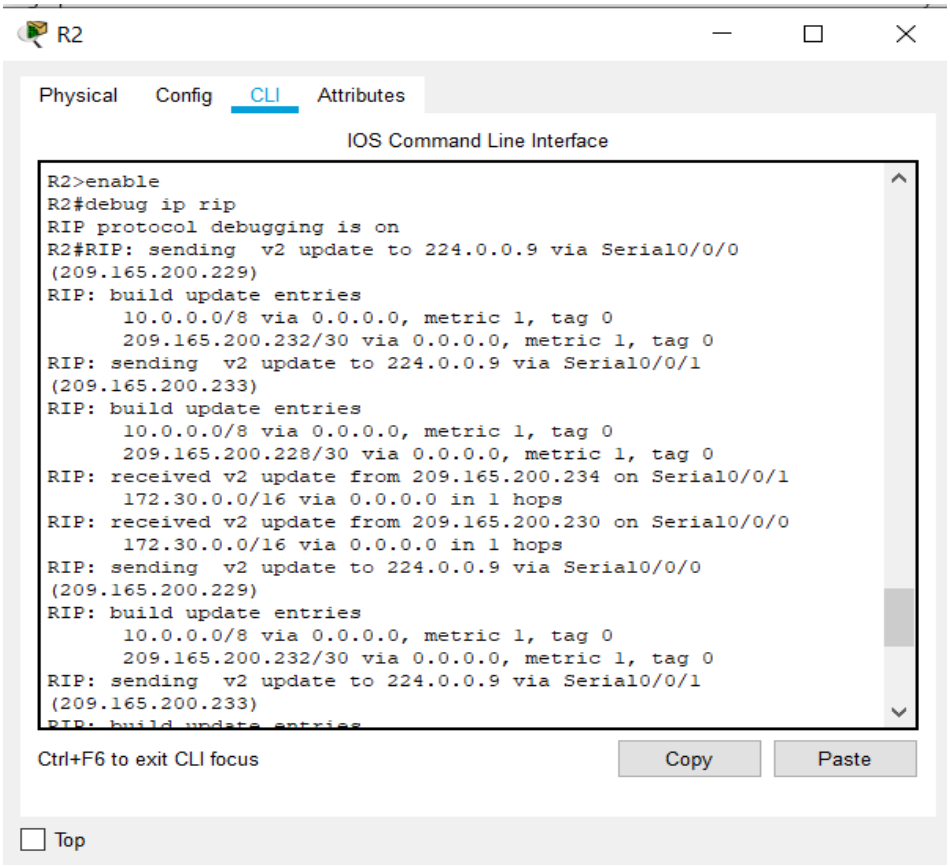
- For R3:

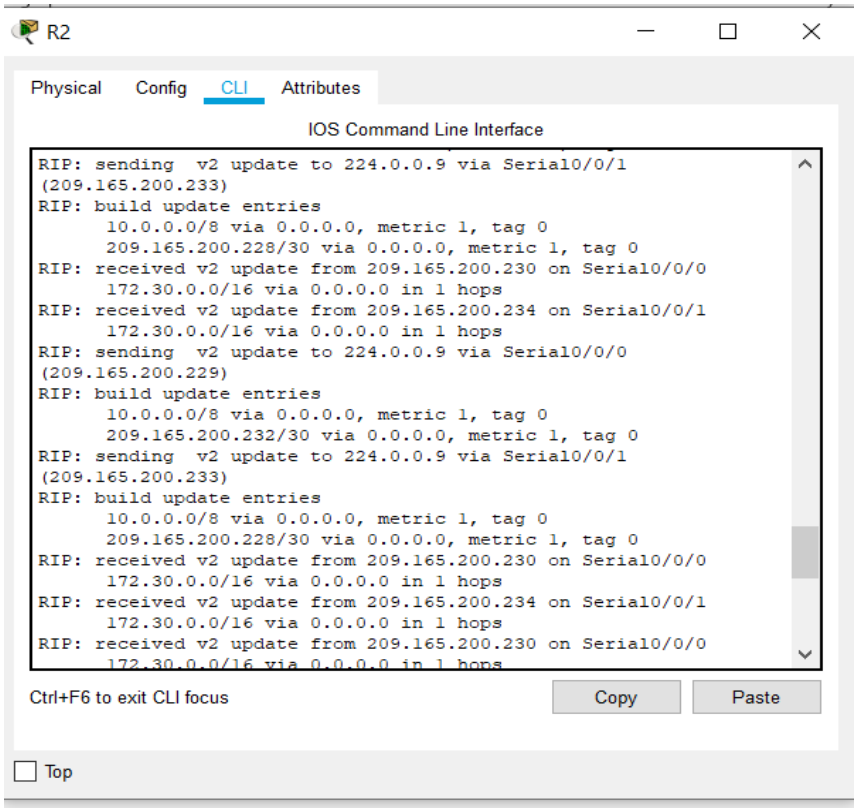


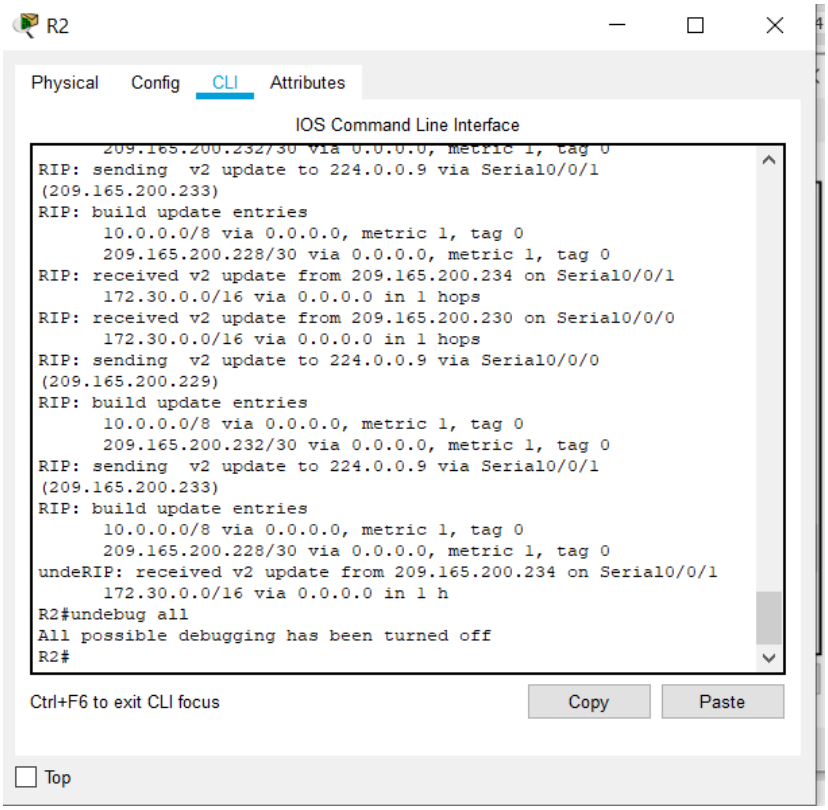

R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1 (209.165.200.234)
RIP: build update entries
172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.233 on Serial0/0/1
10.0.0.0/8 via 0.0.0.0 in 1 hops
209.165.200.228/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Loopback0 (172.30.110.1)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
172.30.200.16/28 via 0.0.0.0, metric 1, tag 0
172.30.200.32/28 via 0.0.0.0, metric 1, tag 0
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Loopback1 (172.30.200.17)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
172.30.110.0/24 via 0.0.0.0, metric 1, tag 0
172.30.200.32/28 via 0.0.0.0, metric 1, tag 0
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Loopback2 (172.30.200.33)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1 (209.165.200.234)
RIP: build update entries
172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.233 on Serial0/0/1
10.0.0.0/8 via 0.0.0.0 in 1 hops
209.165.200.228/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Loopback0 (172.30.110.1)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
172.30.200.16/28 via 0.0.0.0, metric 1, tag 0
172.30.200.32/28 via 0.0.0.0, metric 1, tag 0
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Loopback1 (172.30.200.17)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
172.30.110.0/24 via 0.0.0.0, metric 1, tag 0
172.30.200.32/28 via 0.0.0.0, metric 1, tag 0
209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Loopback2 (172.30.200.33)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 2, tag 0
172.30.100.0/24 via 0.0.0.0, metric 1, tag 0
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

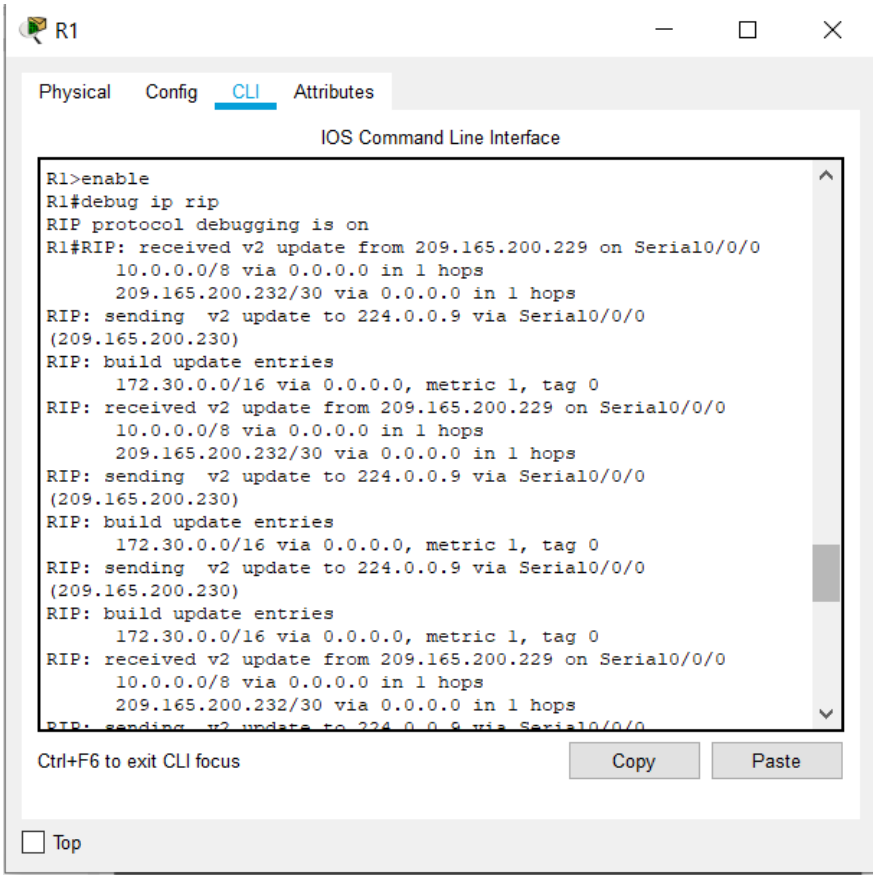
- For R2:

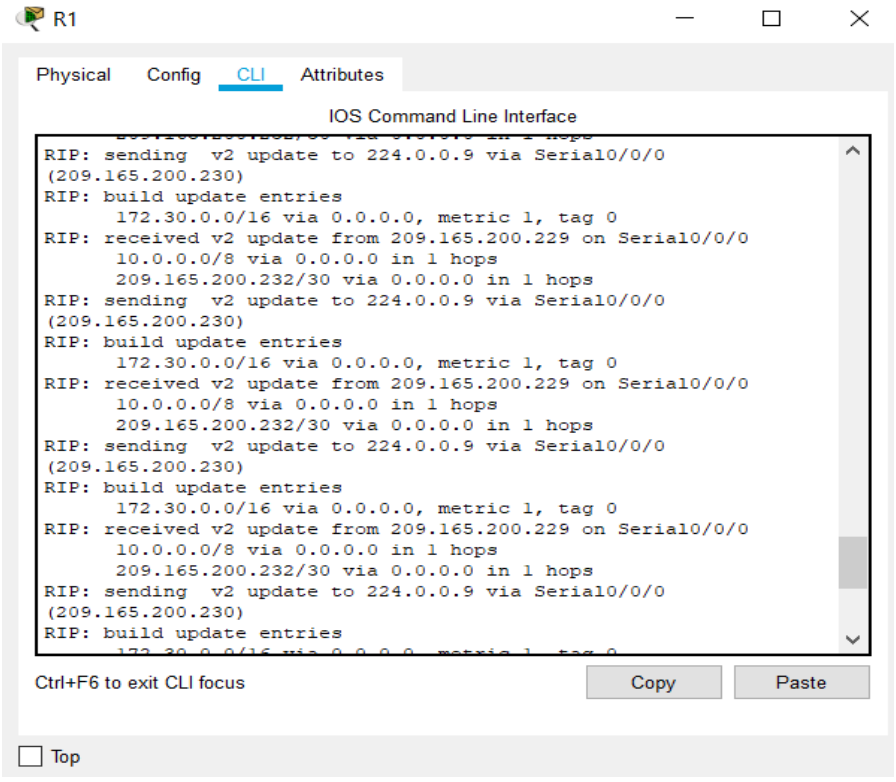

R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
R2>enable
R2#debug ip rip
RIP protocol debugging is on
R2#RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.229)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1
(209.165.200.233)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.228/30 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.234 on Serial0/0/1
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.229)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1
(209.165.200.233)
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1
(209.165.200.233)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.228/30 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.234 on Serial0/0/1
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.229)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1
(209.165.200.233)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.228/30 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.234 on Serial0/0/1
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1
(209.165.200.233)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.228/30 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.234 on Serial0/0/1
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
172.30.0.0/16 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.229)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1
(209.165.200.233)
RIP: build update entries
10.0.0.0/8 via 0.0.0.0, metric 1, tag 0
209.165.200.228/30 via 0.0.0.0, metric 1, tag 0
undeRIP: received v2 update from 209.165.200.234 on Serial0/0/1
172.30.0.0/16 via 0.0.0.0 in 1 h
R2#undebug all
All possible debugging has been turned off
R2#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

- For R1:





What entries are included in the RIP updates sent out from R3?

=>

1. **10.0.0.0/8**
2. **172.30.100.0/24**
3. **172.30.110.0/24**
4. **172.30.200.16/24**
5. **209.165.200.0/24**

On R2, what routes are in the RIP updates that are received from R3?

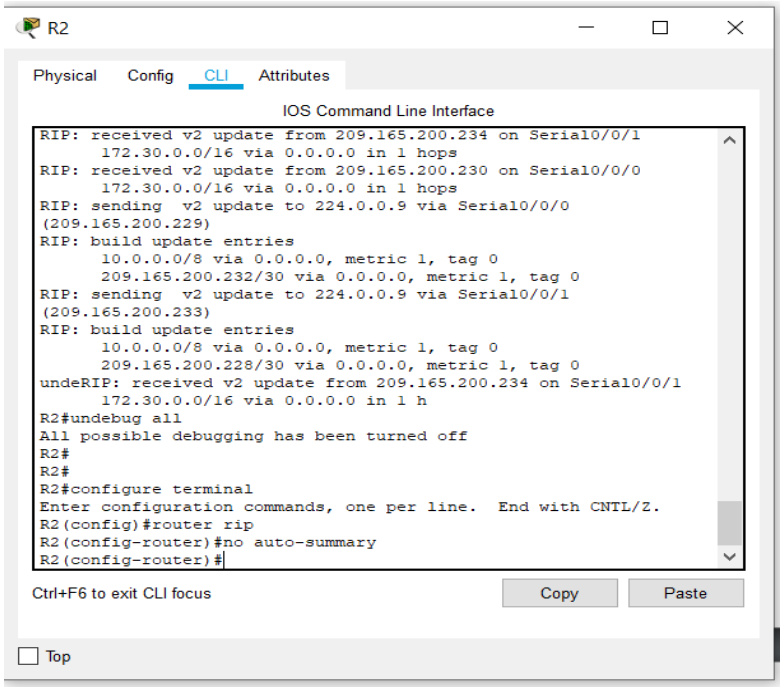
Ans: **172.30.0.0/16**

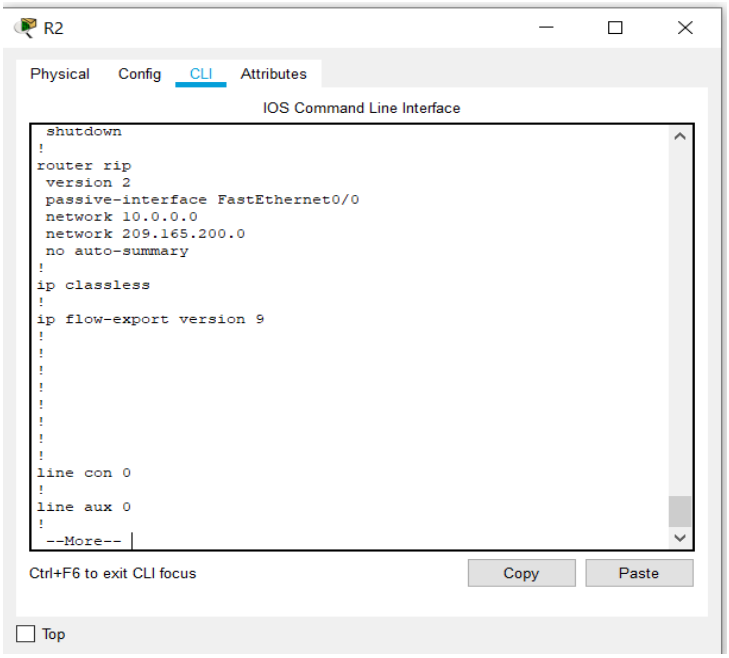
R3 is not sending any of the 172.30.0.0 subnets—only the summarized route of 172.30.0.0/16, including the subnet mask. This is why R2 and R1 are not seeing the 172.30.0.0 subnets on R3.

Task 6: Disable Automatic Summarization.

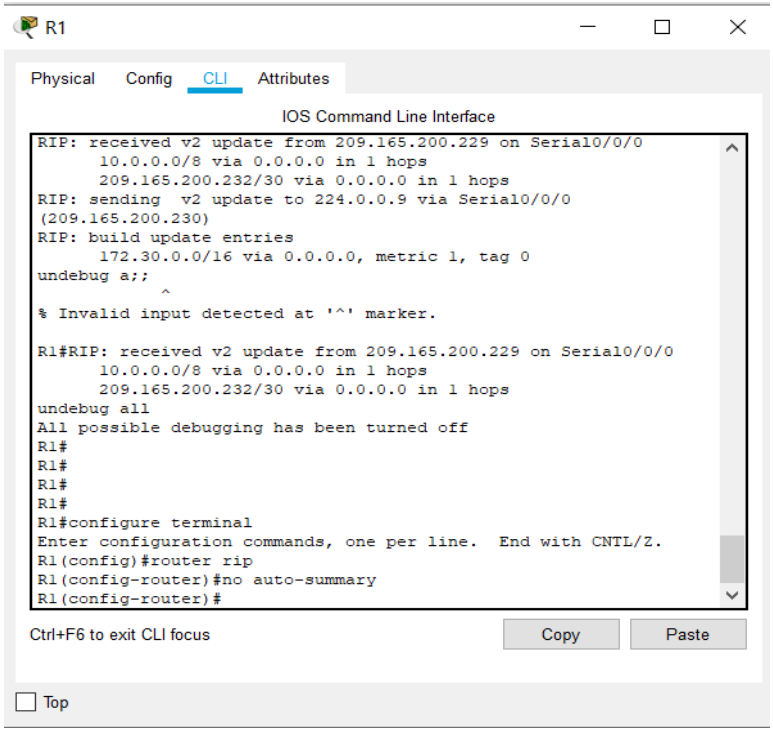
The **no auto-summary** command is used to turn off automatic summarization in RIPv2. Disable auto summarization on all routers. The routers will no longer summarize routes at major network boundaries.

R2(config)#**router rip**
R2(config-router)#**no auto-summary**

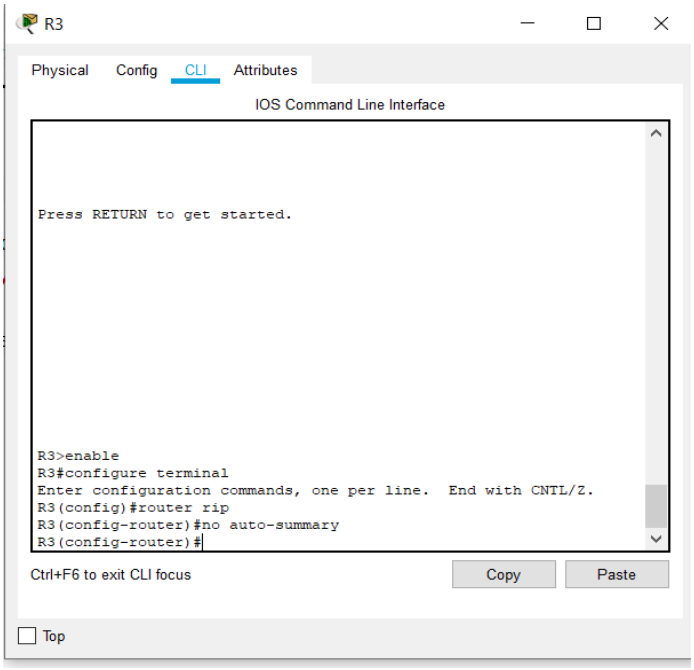




R1(config)#**router rip**
R1(config-router)#**no auto-summary**



R3(config)#**router rip**
R3(config-router)#**no auto-summary**

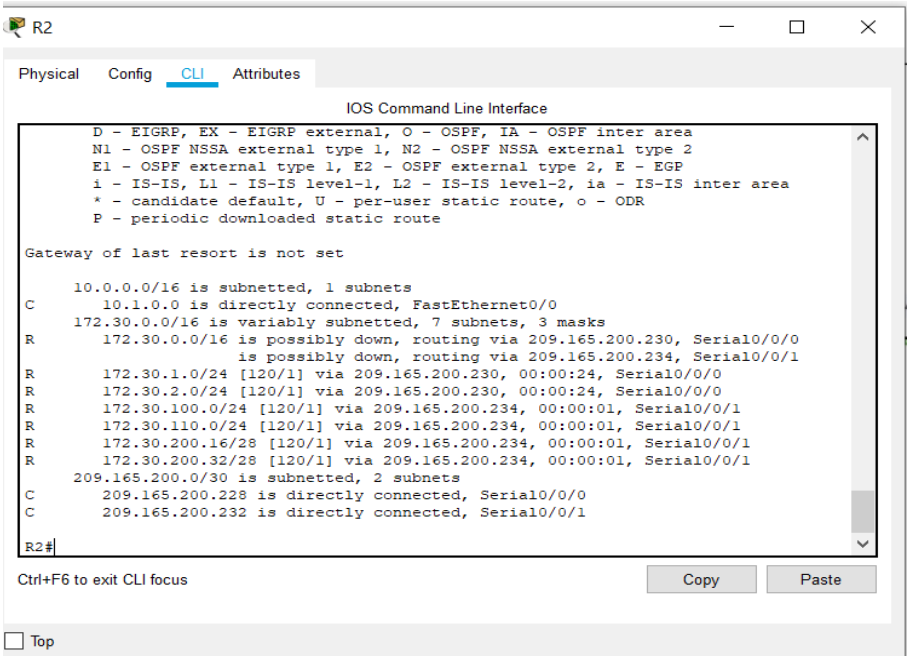


The **show ip route** and **ping** commands can be used to verify that automatic summarization is off.

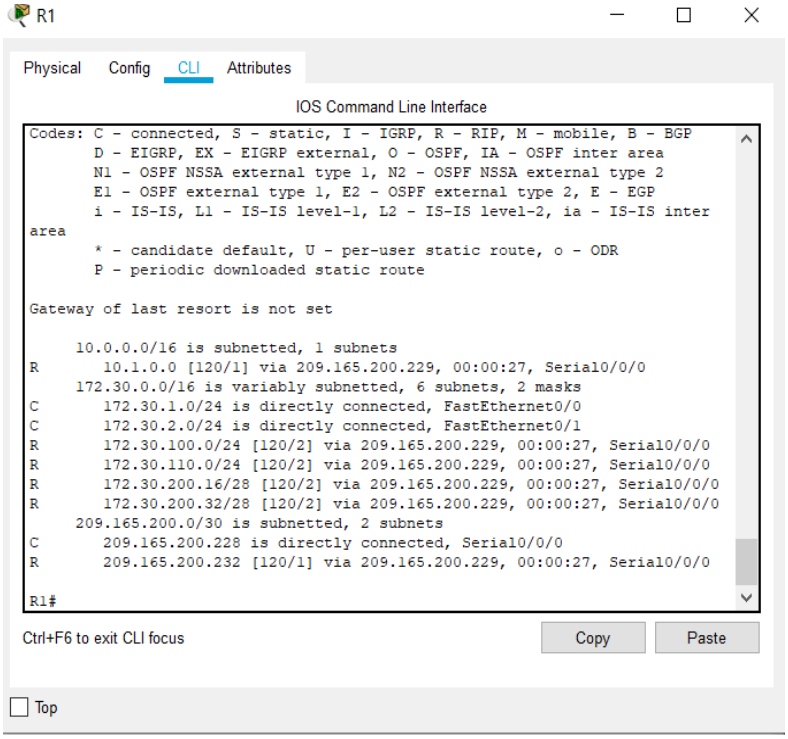
Task 7: Examine the Routing Tables.

The LANs connected to R1 and R3 should now be included in all three routing tables.

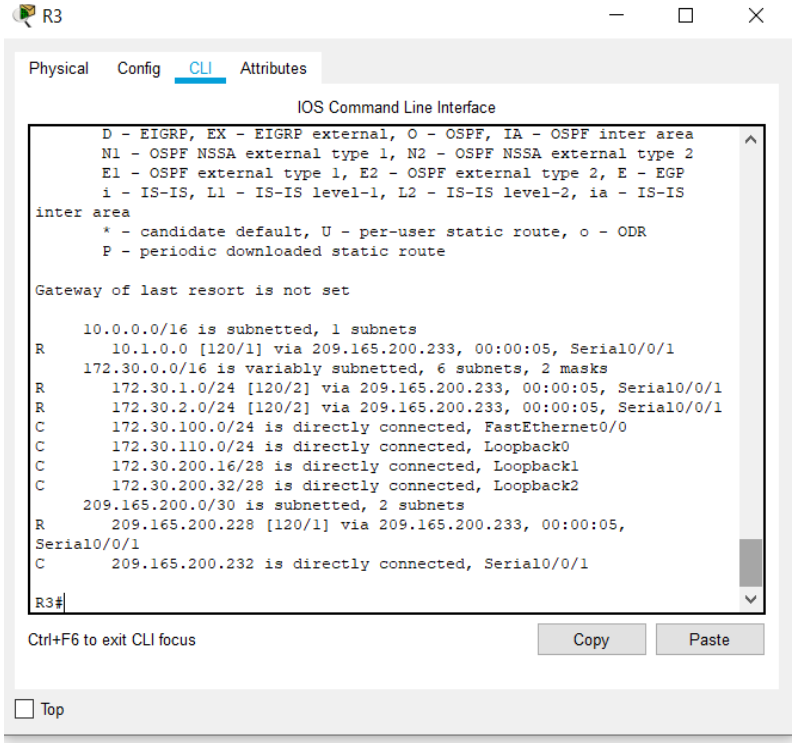
R2#**show ip route**



R1#**show ip route**

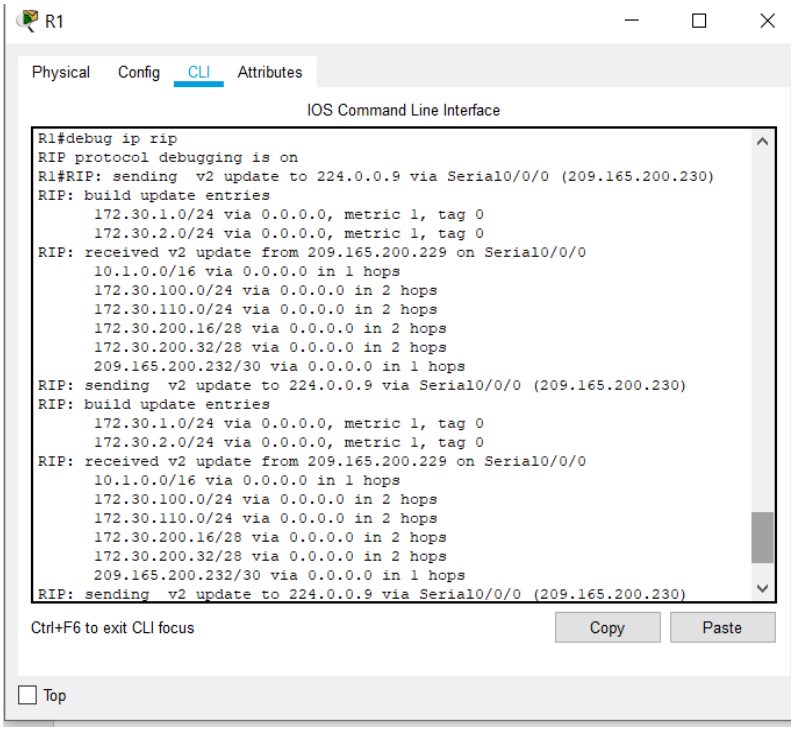


R3#**show ip route**



Use the output of the **debug ip rip** command to answer the following questions:

- For R1:

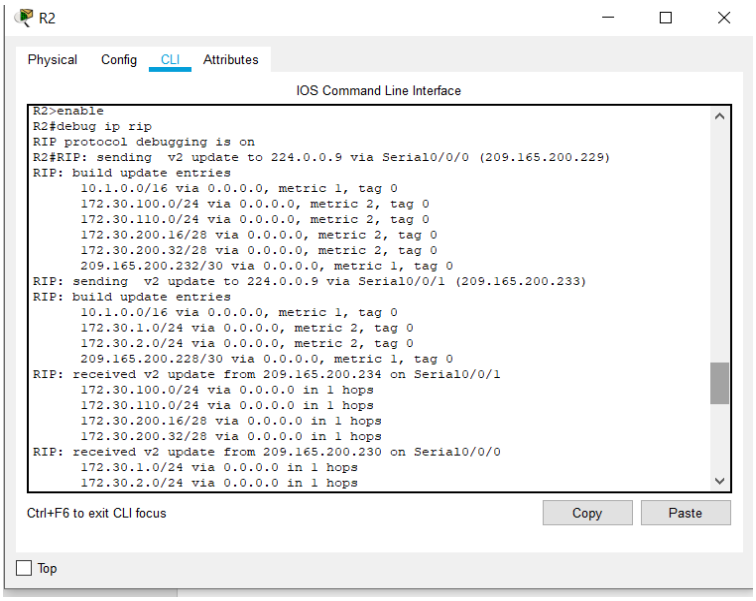


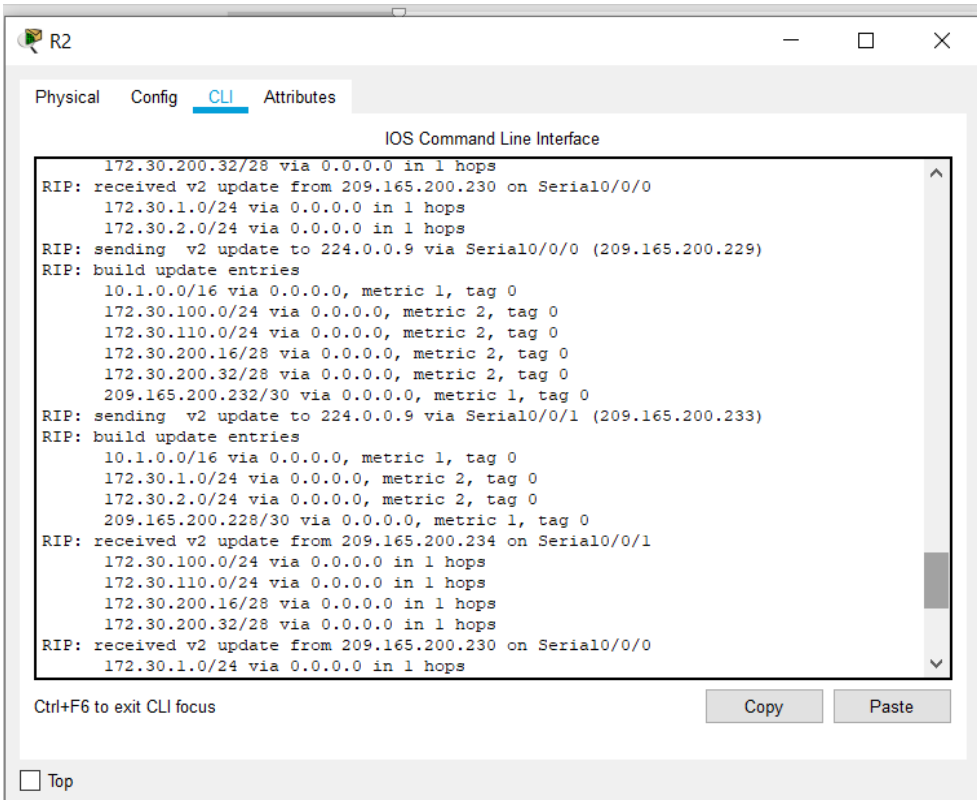
What entries are included in the RIP updates sent out from R1?

Ans:

1. **172.30.1.0/24**
2. **172.30.2.0/24**

- On R2:





On R2, what routes are in the RIP updates that are received from R1?

Ans:

1. **172.30.1.0/24**
2. **172.30.2.0/24**

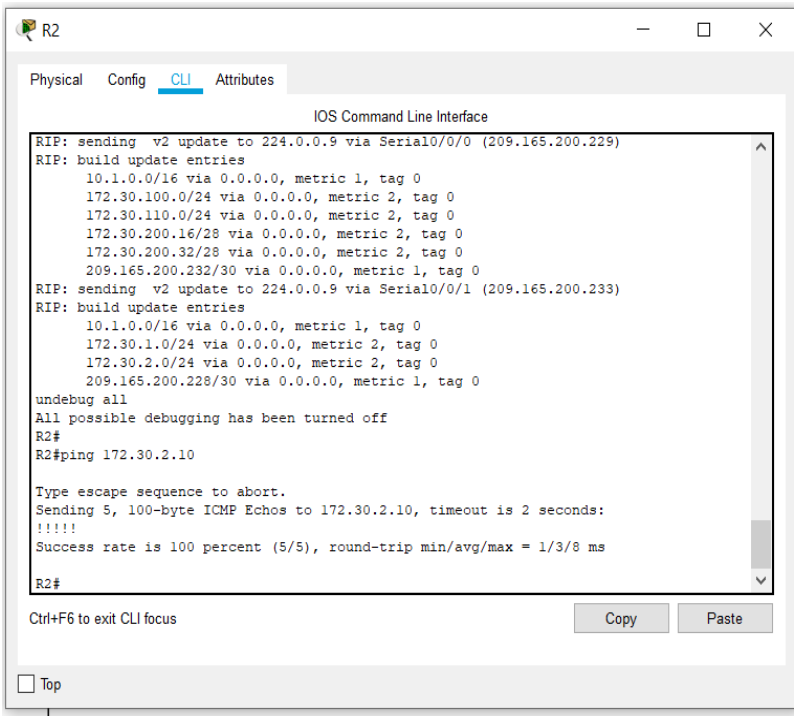
Are the subnet masks now included in the routing updates?

Ans: **Yes.**

Task 8: Verify Network Connectivity.

Step 1: Check connectivity between R2 router and PCs.

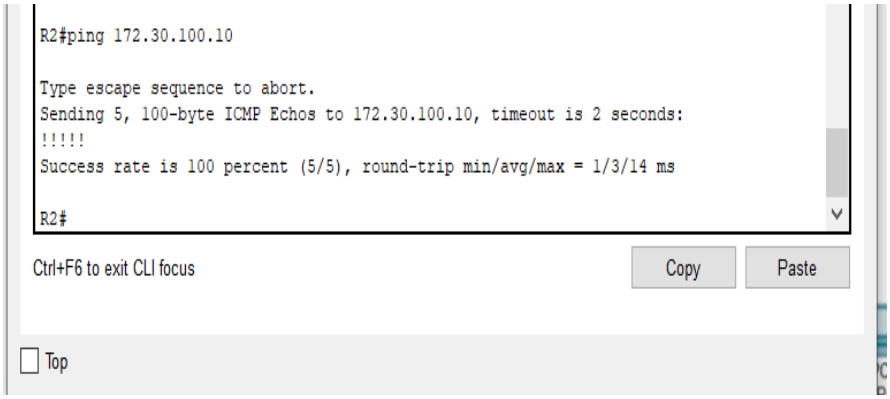
- Ping PC1 from R2.



From R2, how many ICMP messages are successful when pinging PC1?

Ans: **5 ICMP messages are successful.**

- Ping PC4 from R2

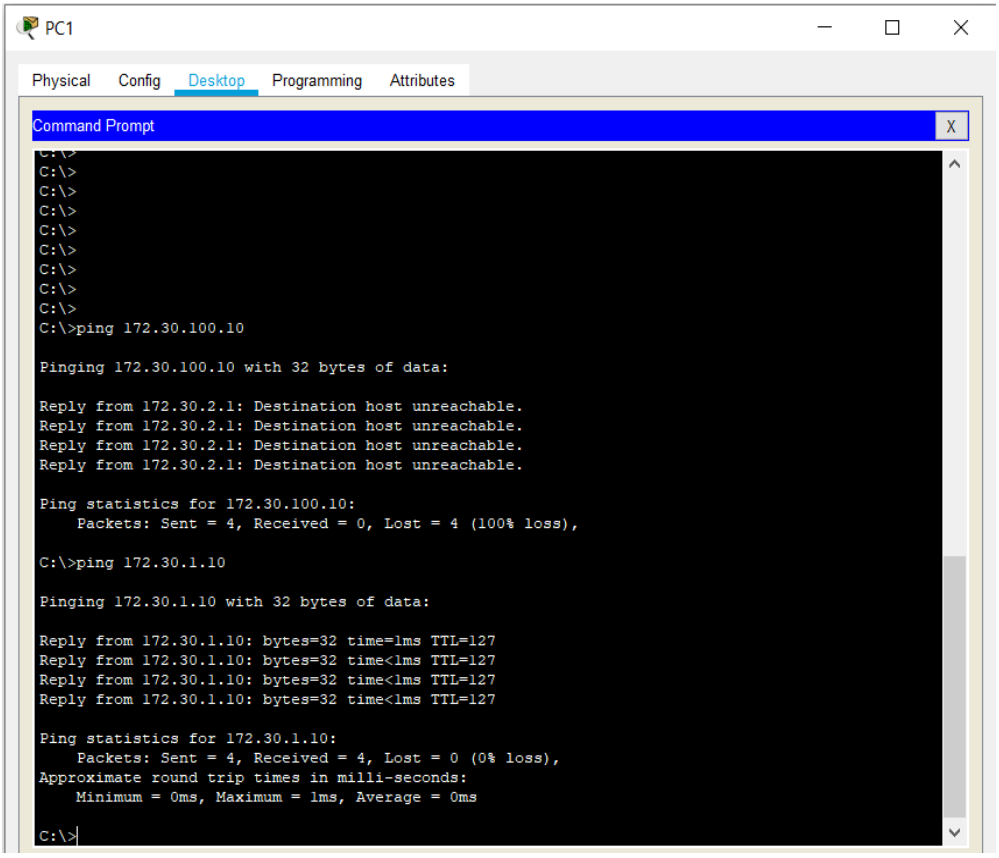


From R2, how many ICMP messages are successful when pinging PC4?

Ans: **5 ICMP messages are successful.**

Step 2: Check the connectivity between the PCs.

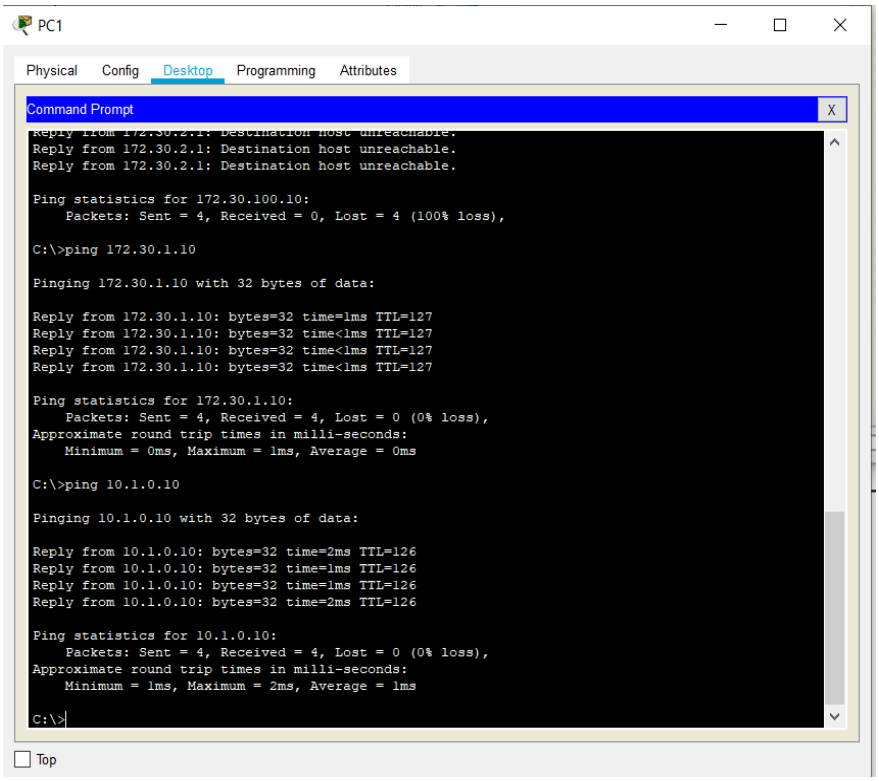
- Ping PC2 from PC1:



From PC1, is it possible to ping PC2? => Yes

What is the success rate? 100%

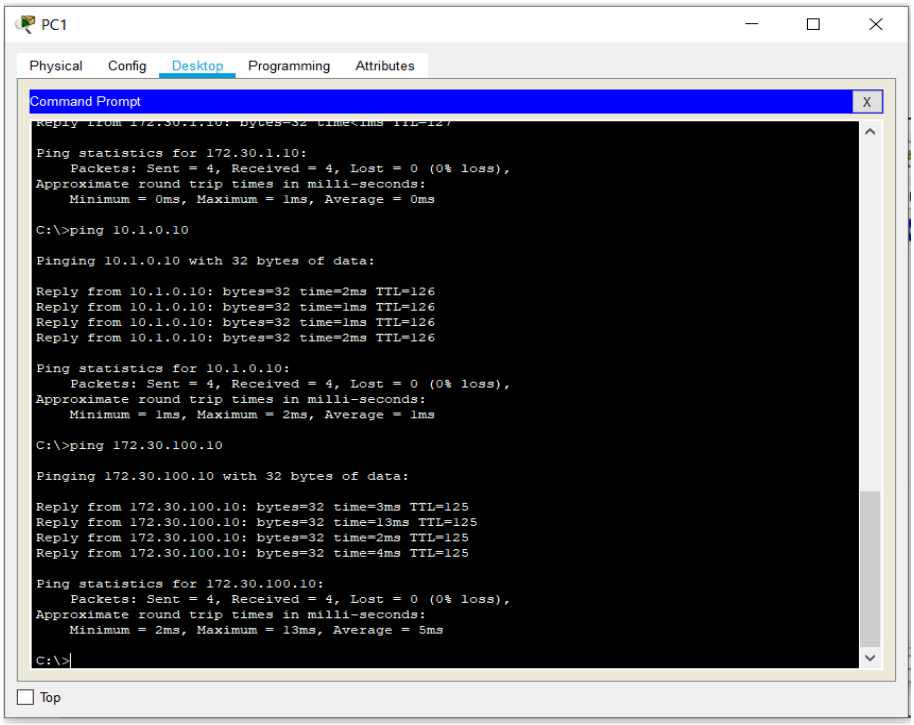
- Ping PC3 from PC1:



From PC1, is it possible to ping PC3? => Yes

What is the success rate? => 100%

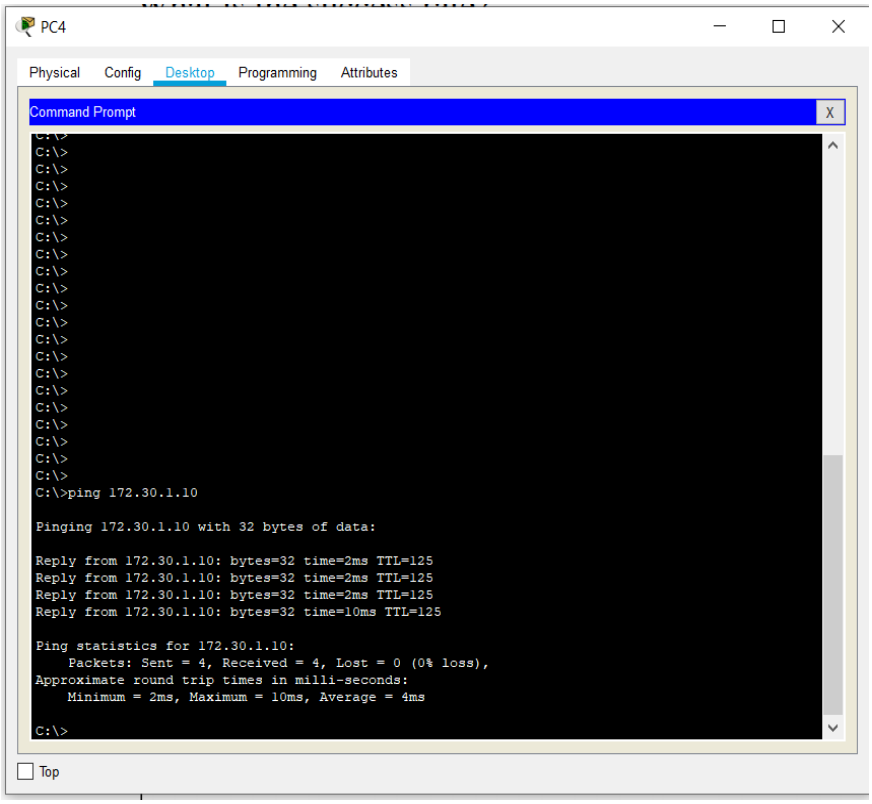
- Ping PC4 from PC1:



From PC1, is it possible to ping PC4? => Yes

What is the success rate? => 100%

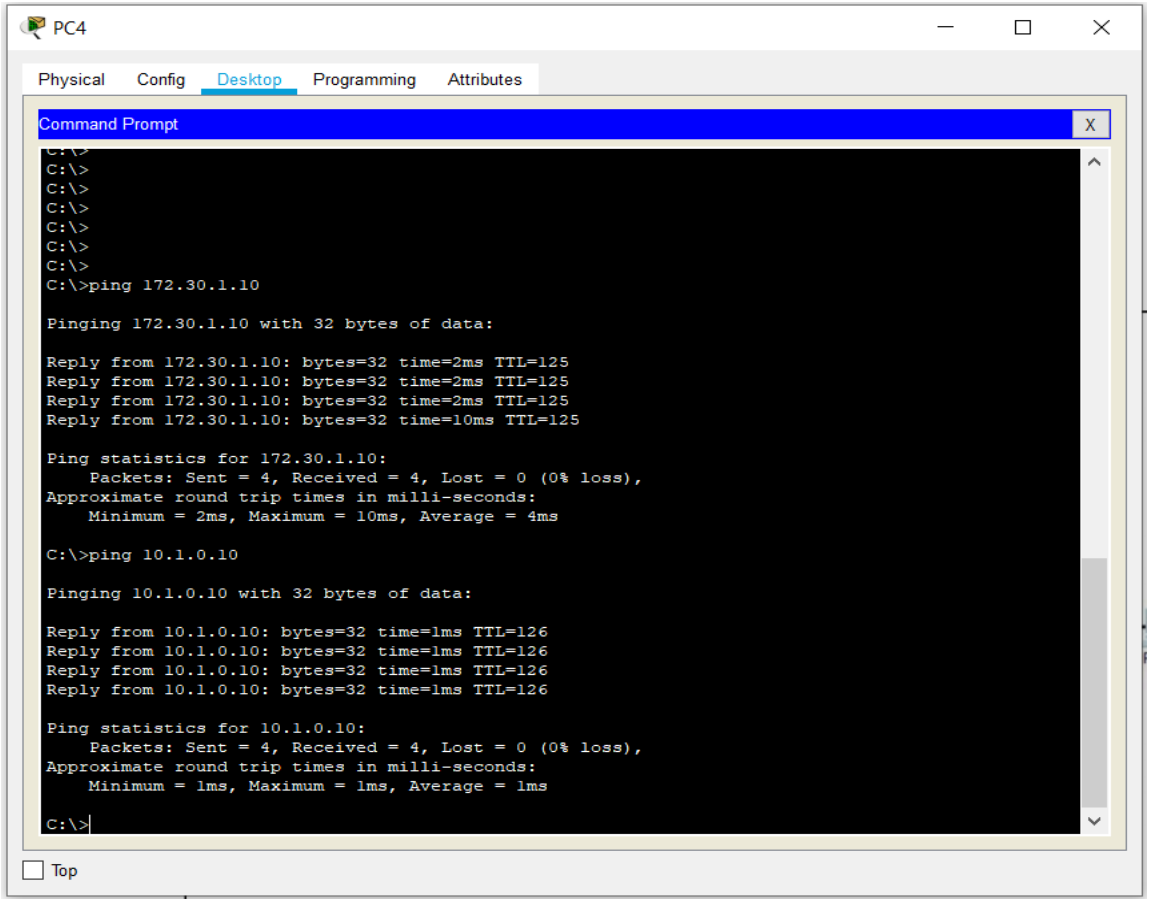
- Ping PC2 from PC4:



From PC4, is it possible to ping PC2? => Yes

What is the success rate? => 100%

- Ping PC3 from PC4:



From PC4, is it possible to ping PC3? =>Yes

What is the success rate? 100%

Task 9: Documentation

On each router, capture the following command output to a text (.txt) file and save for future reference.

- **show running-config**
- **show ip route**
- **show ip interface brief**
- **show ip protocols**

If you need to review the procedures for capturing command output, refer to Lab 1.5.1.

Txt file:

Show Running-config

R1:

R1#show running-config
Building configuration...

Current configuration : 885 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R1
!
!
!
!
!
!
!
!

```
no ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
!
interface FastEthernet0/0
 ip address 172.30.1.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 ip address 172.30.2.1 255.255.255.0
 duplex auto
 speed auto
```

```
!
interface Serial0/0/0
 ip address 209.165.200.230 255.255.255.252
 clock rate 64000
!
interface Serial0/0/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router rip
 version 2
 passive-interface FastEthernet0/0
 passive-interface FastEthernet0/1
 network 172.30.0.0
 network 209.165.200.0
 no auto-summary
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
```

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

R2:

```
R2#show running-config
Building configuration...

Current configuration : 831 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R2
!
!
!
```

```
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
!
interface FastEthernet0/0
 ip address 10.1.0.1 255.255.0.0
 duplex auto
 speed auto
```

```
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 209.165.200.229 255.255.255.252
!
interface Serial0/0/1
 ip address 209.165.200.233 255.255.255.252
 clock rate 64000
!
interface Vlan1
 no ip address
 shutdown
!
router rip
 version 2
 passive-interface FastEthernet0/0
 network 10.0.0.0
 network 209.165.200.0
 no auto-summary
!
ip classless
!
ip flow-export version 9
!
!
```

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

R3:

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

Current configuration : 1011 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R3
```

!
!
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
!
interface Loopback0

```
 ip address 172.30.110.1 255.255.255.0
!
interface Loopback1
 ip address 172.30.200.17 255.255.255.240
!
interface Loopback2
 ip address 172.30.200.33 255.255.255.240
!
interface FastEthernet0/0
 ip address 172.30.100.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/0/1
 ip address 209.165.200.234 255.255.255.252
!
interface Vlan1
 no ip address
 shutdown
```

```
!
router rip
 version 2
 passive-interface FastEthernet0/0
 network 172.30.0.0
 network 209.165.200.0
 no auto-summary
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
```

Show ip route:

R1:

```
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

     10.0.0.0/16 is subnetted, 1 subnets
R       10.1.0.0 [120/1] via 209.165.200.229, 00:00:30, Serial0/0/0
     172.30.0.0/16 is variably subnetted, 6 subnets, 2 masks
C       172.30.1.0/24 is directly connected, FastEthernet0/0
C       172.30.2.0/24 is directly connected, FastEthernet0/1
R       172.30.100.0/24 [120/2] via 209.165.200.229, 00:00:30, Serial0/0/0
R       172.30.110.0/24 [120/2] via 209.165.200.229, 00:00:30, Serial0/0/0
R       172.30.200.16/28 [120/2] via 209.165.200.229, 00:00:30, Serial0/0/0
R       172.30.200.32/28 [120/2] via 209.165.200.229, 00:00:30, Serial0/0/0
     209.165.200.0/30 is subnetted, 2 subnets
C       209.165.200.228 is directly connected, Serial0/0/0
R       209.165.200.232 [120/1] via 209.165.200.229, 00:00:30, Serial0/0/0
```

R2:

```
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

     10.0.0.0/16 is subnetted, 1 subnets
C       10.1.0.0 is directly connected, FastEthernet0/0
     172.30.0.0/16 is variably subnetted, 6 subnets, 2 masks
R       172.30.1.0/24 [120/1] via 209.165.200.230, 00:00:10, Serial0/0/0
R       172.30.2.0/24 [120/1] via 209.165.200.230, 00:00:10, Serial0/0/0
R       172.30.100.0/24 [120/1] via 209.165.200.234, 00:00:18, Serial0/0/1
R       172.30.110.0/24 [120/1] via 209.165.200.234, 00:00:18, Serial0/0/1
R       172.30.200.16/28 [120/1] via 209.165.200.234, 00:00:18, Serial0/0/1
R       172.30.200.32/28 [120/1] via 209.165.200.234, 00:00:18, Serial0/0/1
     209.165.200.0/30 is subnetted, 2 subnets
C       209.165.200.228 is directly connected, Serial0/0/0
C       209.165.200.232 is directly connected, Serial0/0/1

R2#
```

R3:

```
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

     10.0.0.0/16 is subnetted, 1 subnets
R       10.1.0.0 [120/1] via 209.165.200.233, 00:00:12, Serial0/0/1
     172.30.0.0/16 is variably subnetted, 6 subnets, 2 masks
R       172.30.1.0/24 [120/2] via 209.165.200.233, 00:00:12, Serial0/0/1
R       172.30.2.0/24 [120/2] via 209.165.200.233, 00:00:12, Serial0/0/1
C       172.30.100.0/24 is directly connected, FastEthernet0/0
C       172.30.110.0/24 is directly connected, Loopback0
C       172.30.200.16/28 is directly connected, Loopback1
C       172.30.200.32/28 is directly connected, Loopback2
     209.165.200.0/30 is subnetted, 2 subnets
R       209.165.200.228 [120/1] via 209.165.200.233, 00:00:12, Serial0/0/1
C       209.165.200.232 is directly connected, Serial0/0/1

R3#
```

Show ip interface brief:

R1:

R1#show ip interface brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/0 172.30.1.1 YES manual up up
FastEthernet0/1 172.30.2.1 YES manual up up
Serial0/0/0 209.165.200.230 YES manual up up
Serial0/0/1 unassigned YES NVRAM administratively down down
Vlan1 unassigned YES NVRAM administratively down down
R1#

R2:
R2#show ip interface brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/0 10.1.0.1 YES manual up up
FastEthernet0/1 unassigned YES NVRAM administratively down down
Serial0/0/0 209.165.200.229 YES manual up up
Serial0/0/1 209.165.200.233 YES manual up up
Vlan1 unassigned YES NVRAM administratively down down
R2#

R3:
R3#show ip interface brief
Interface IP-Address OK? Method Status Protocol

```
FastEthernet0/0       172.30.100.1    YES manual up                    up
FastEthernet0/1       unassigned      YES NVRAM  administratively down down
Serial0/0/0           unassigned      YES NVRAM  administratively down down
Serial0/0/1           209.165.200.234 YES manual up                    up
Loopback0             172.30.110.1    YES manual up                    up
Loopback1             172.30.200.17   YES manual up                    up
Loopback2             172.30.200.33   YES manual up                    up
Vlan1                 unassigned      YES NVRAM  administratively down down
R3#
```

Show ip protocols:

R1:

```
R1#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
  Serial0/0/0         2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
        172.30.0.0
```

209.165.200.0
Passive Interface(s):
FastEthernet0/0
FastEthernet0/1
Routing Information Sources:
Gateway Distance Last Update
209.165.200.229 120 00:00:03
Distance: (default is 120)
R1#

R2:

R2#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 14 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
Serial0/0/1 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
10.0.0.0
209.165.200.0

Passive Interface(s):

FastEthernet0/0

Routing Information Sources:

Gateway	Distance	Last Update
209.165.200.230	120	00:00:27
209.165.200.234	120	00:00:10

Distance: (default is 120)

R2#

R3:

R3#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
Loopback0	2	2		
Loopback1	2	2		
Loopback2	2	2		
Serial0/0/1	2	2		

Automatic network summarization is not in effect

Maximum path: 4

Routing for Networks:

172.30.0.0

209.165.200.0

Passive Interface(s):

FastEthernet0/0

Routing Information Sources:

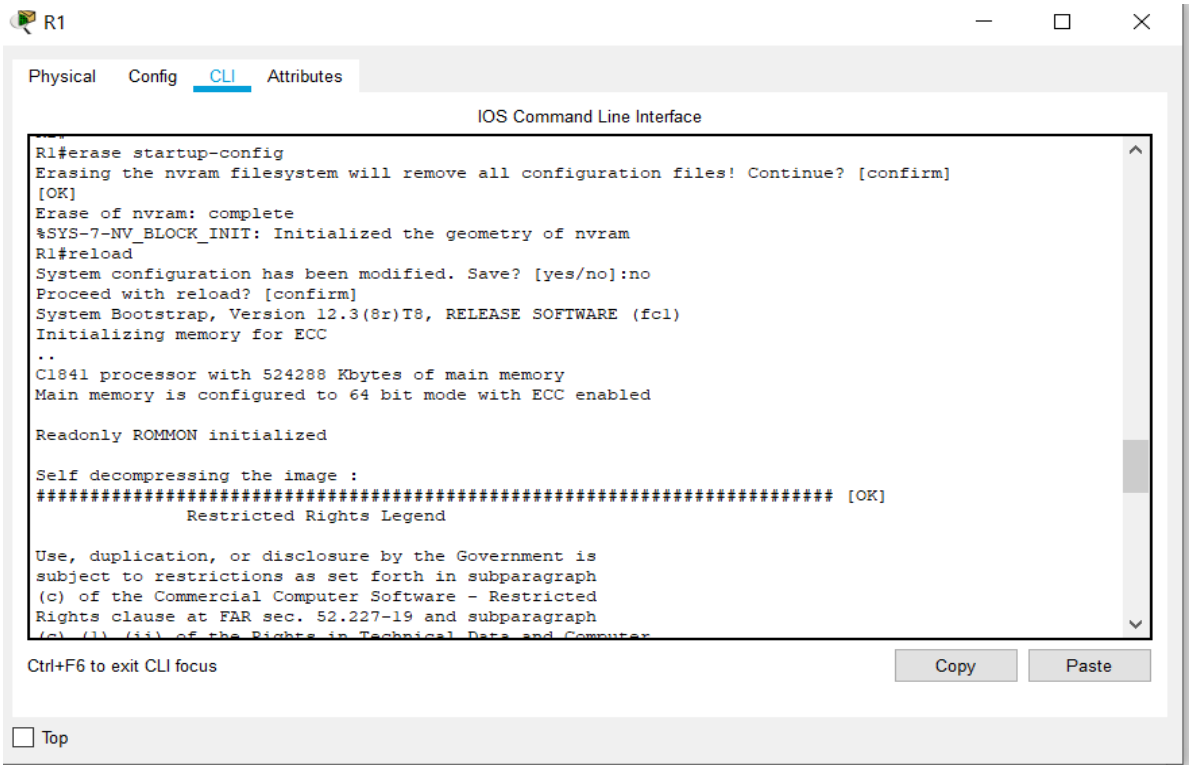
Gateway	Distance	Last Update
209.165.200.233	120	00:00:21

Distance: (default is 120)

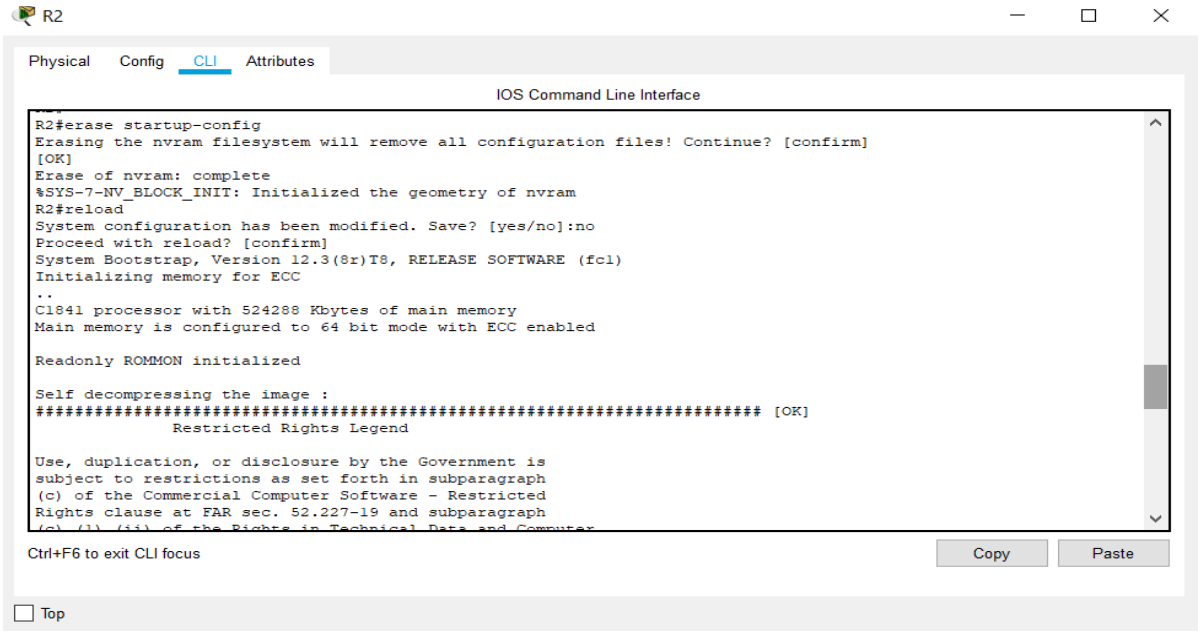
Task 10: Clean Up

Erase the configurations and reload the routers. Disconnect and store the cabling. For PC hosts that are normally connected to other networks (such as the school LAN or to the Internet), reconnect the appropriate cabling and restore the TCP/IP settings.

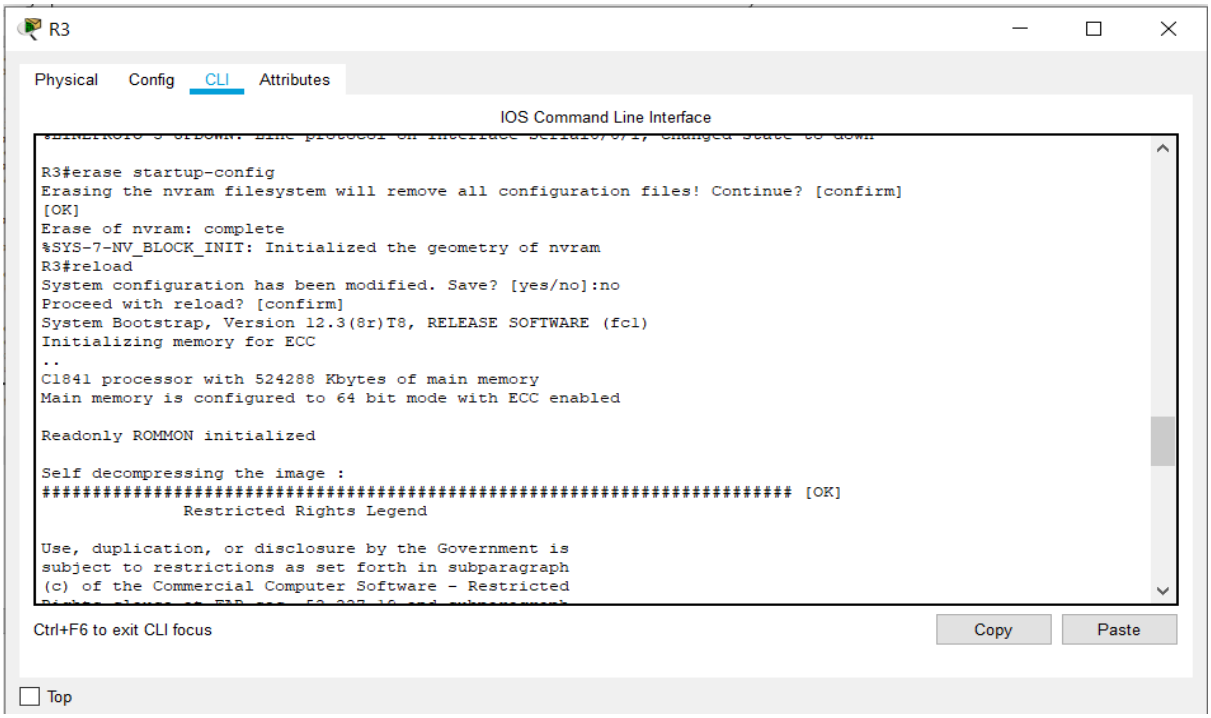
- Erase configuration for R1 and reload:



- Erase configuration for R2 and reload:



- Erase configuration for R3 and reload:



Conclusion:

1. In this experiment, I learned about the routing protocols
2. I implemented RIPv2 on the given topology and documented the results.