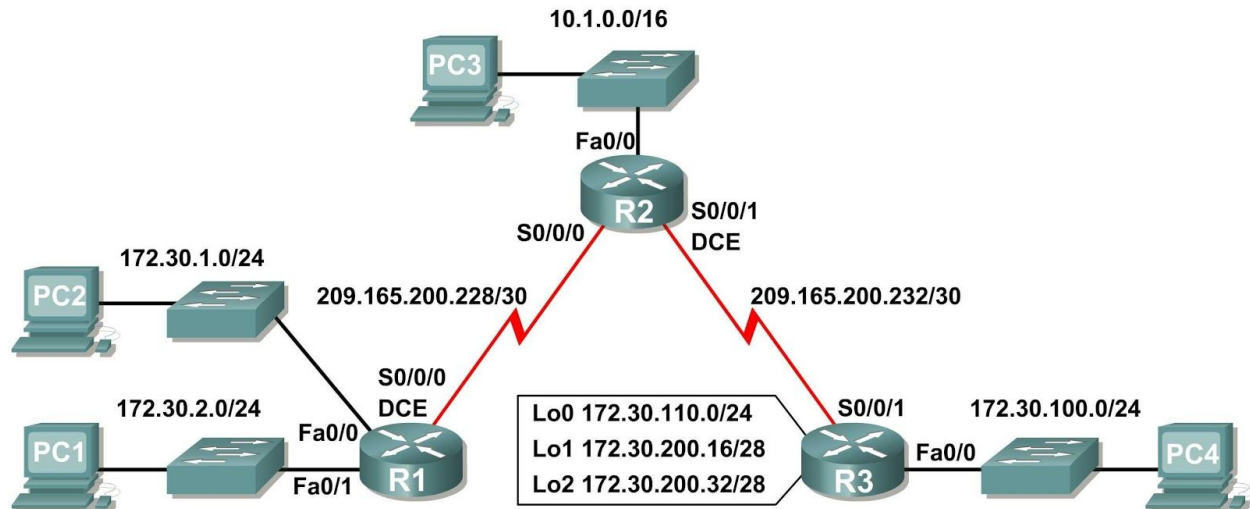


CEL 51, DCCN, Monsoon 2020

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.

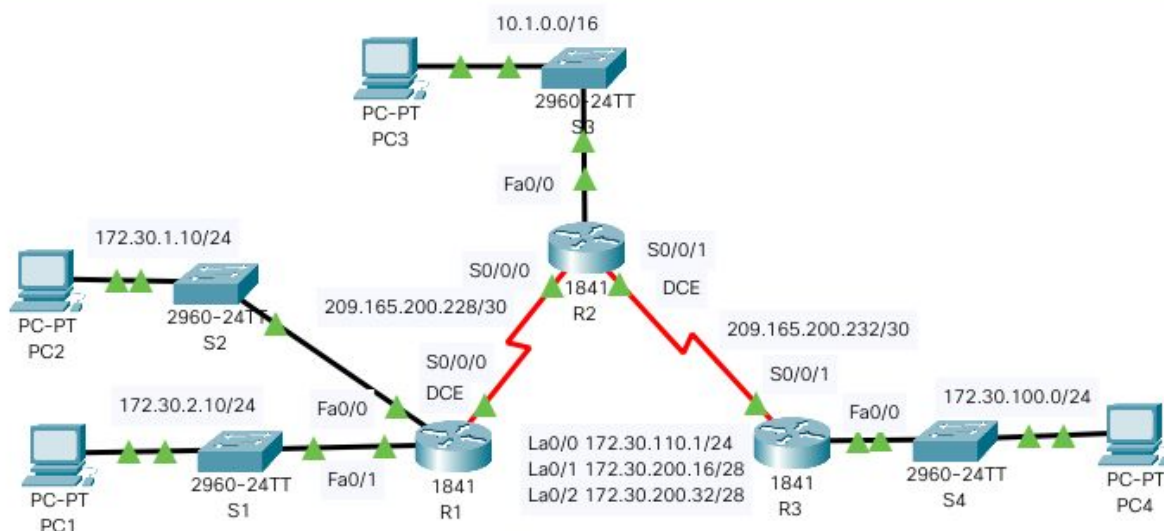
Scenario

The network shown in the Topology Diagram contains a discontinuous 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.

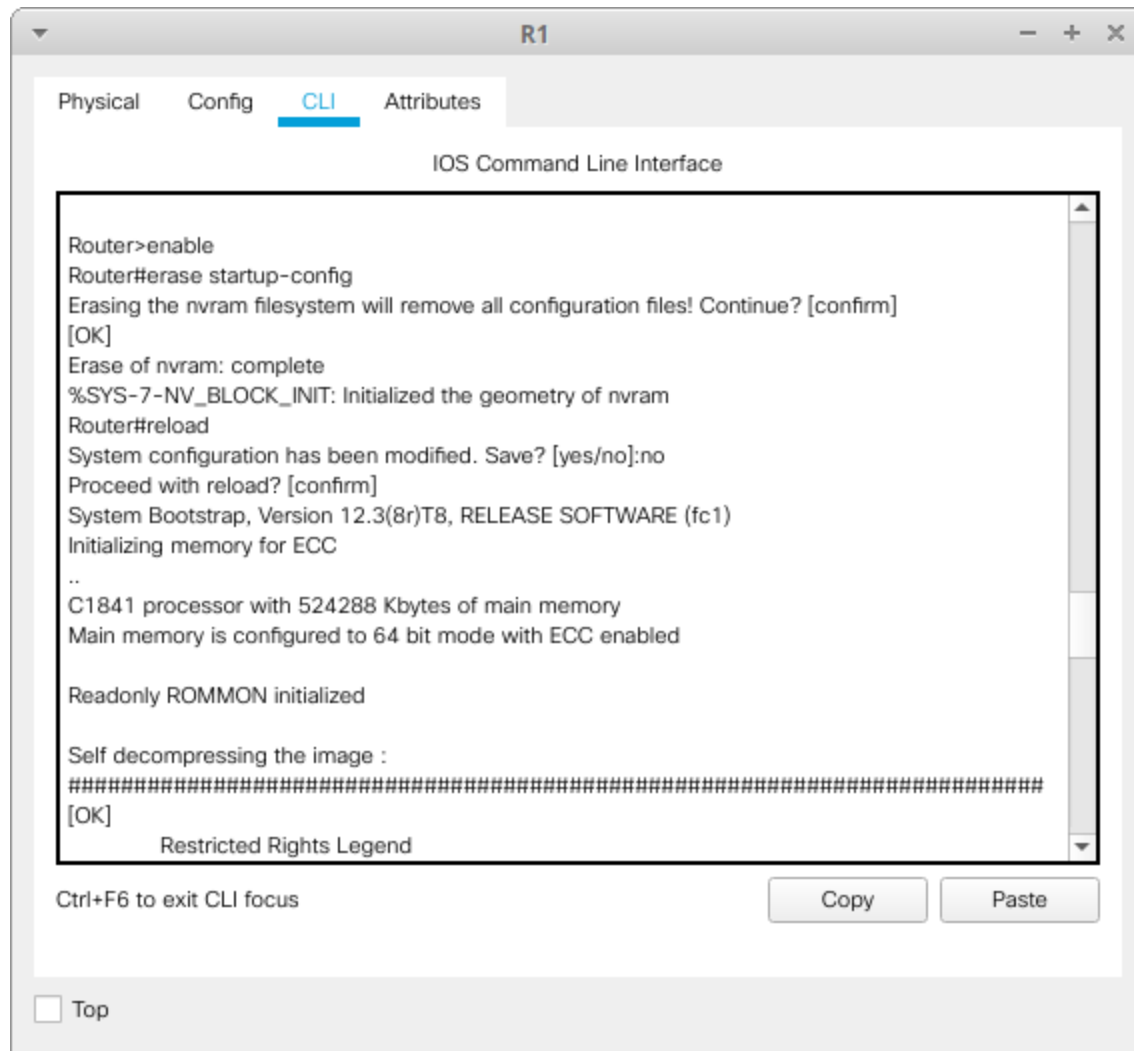
Step 1: Cable a network.

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



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.



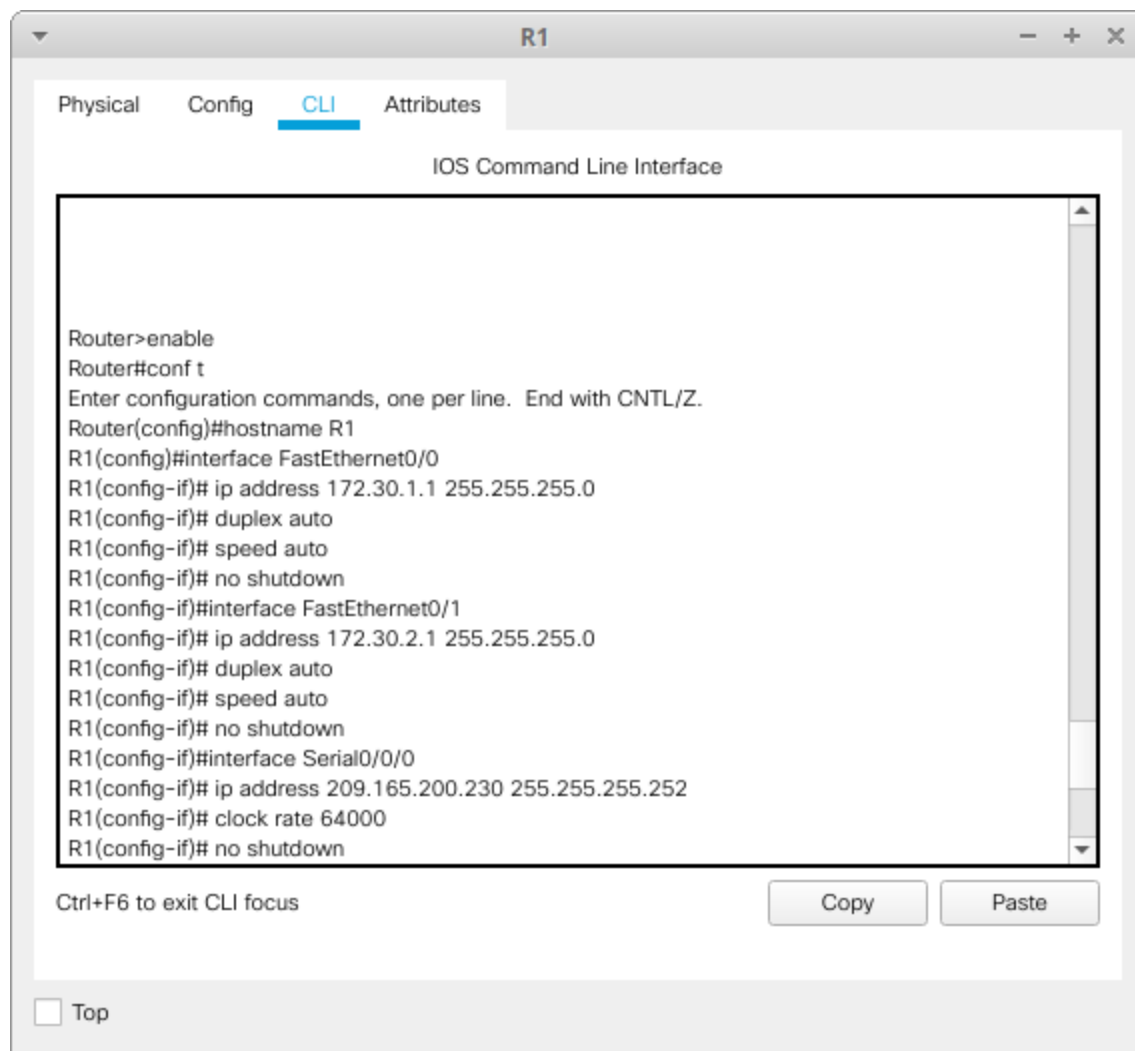
The above screenshot shows output when R1 configuration is cleared. Similar output is obtained for R2 and R3.

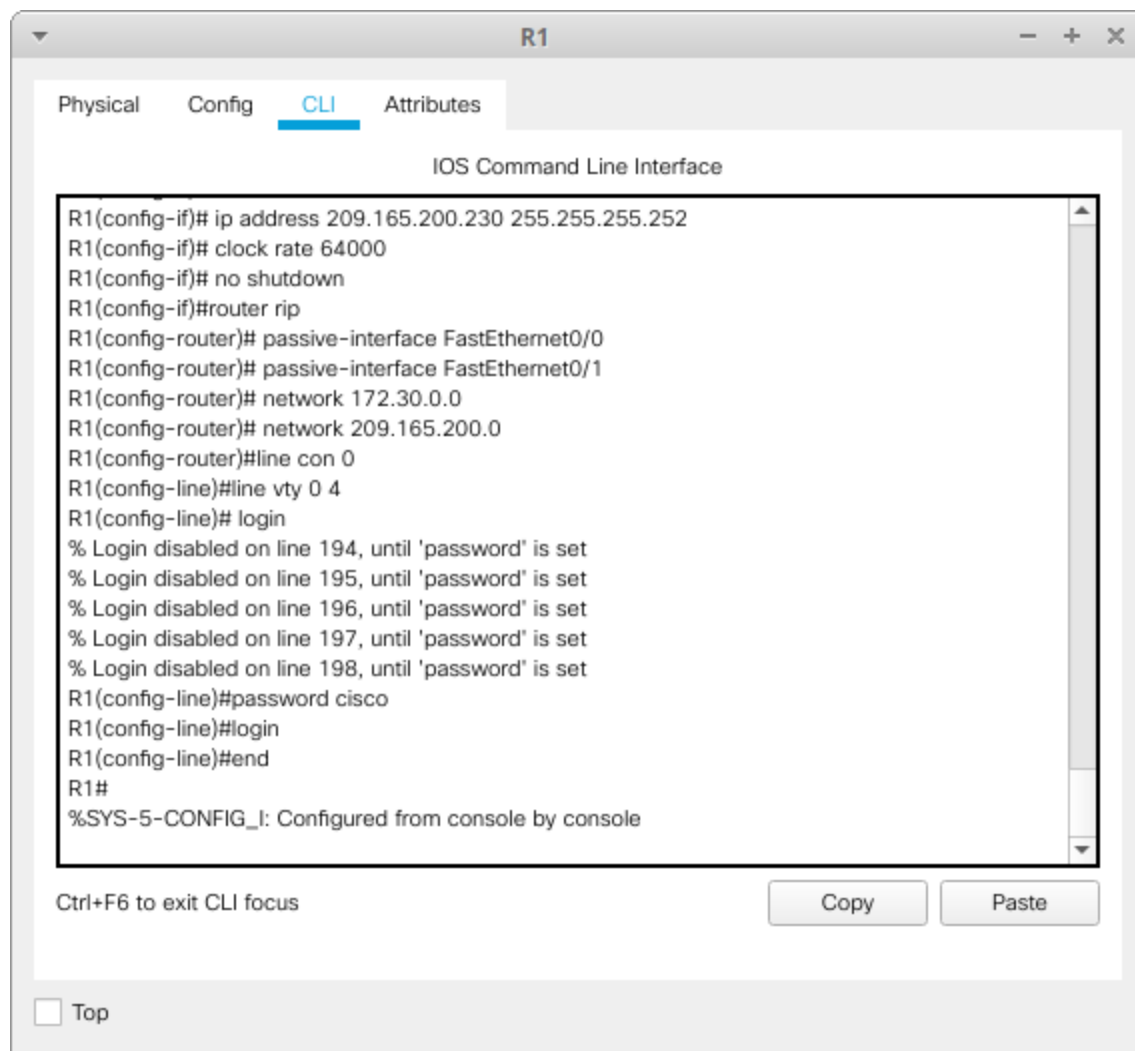
Task 2: Load Routers with the Supplied Scripts.

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
```

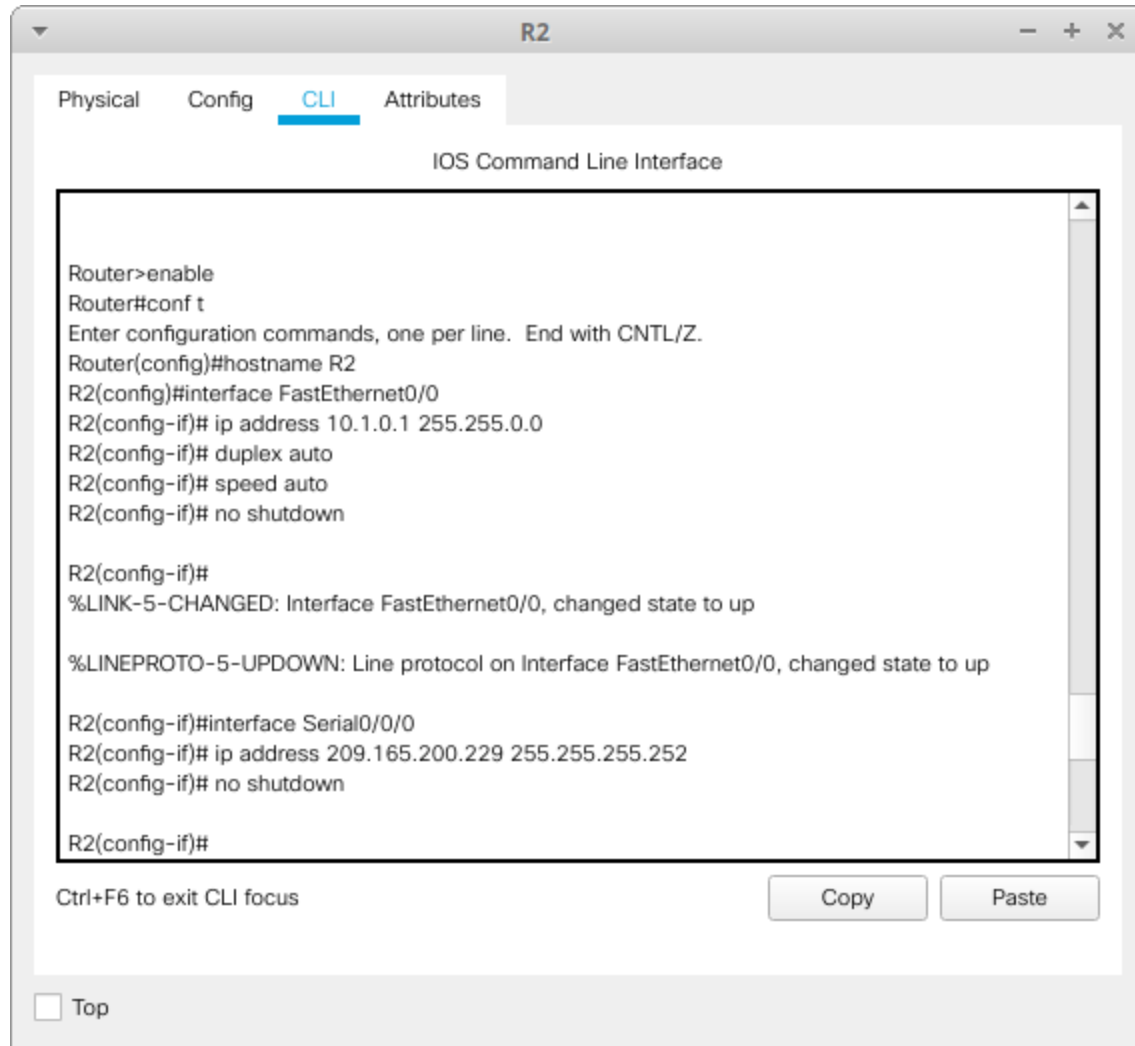


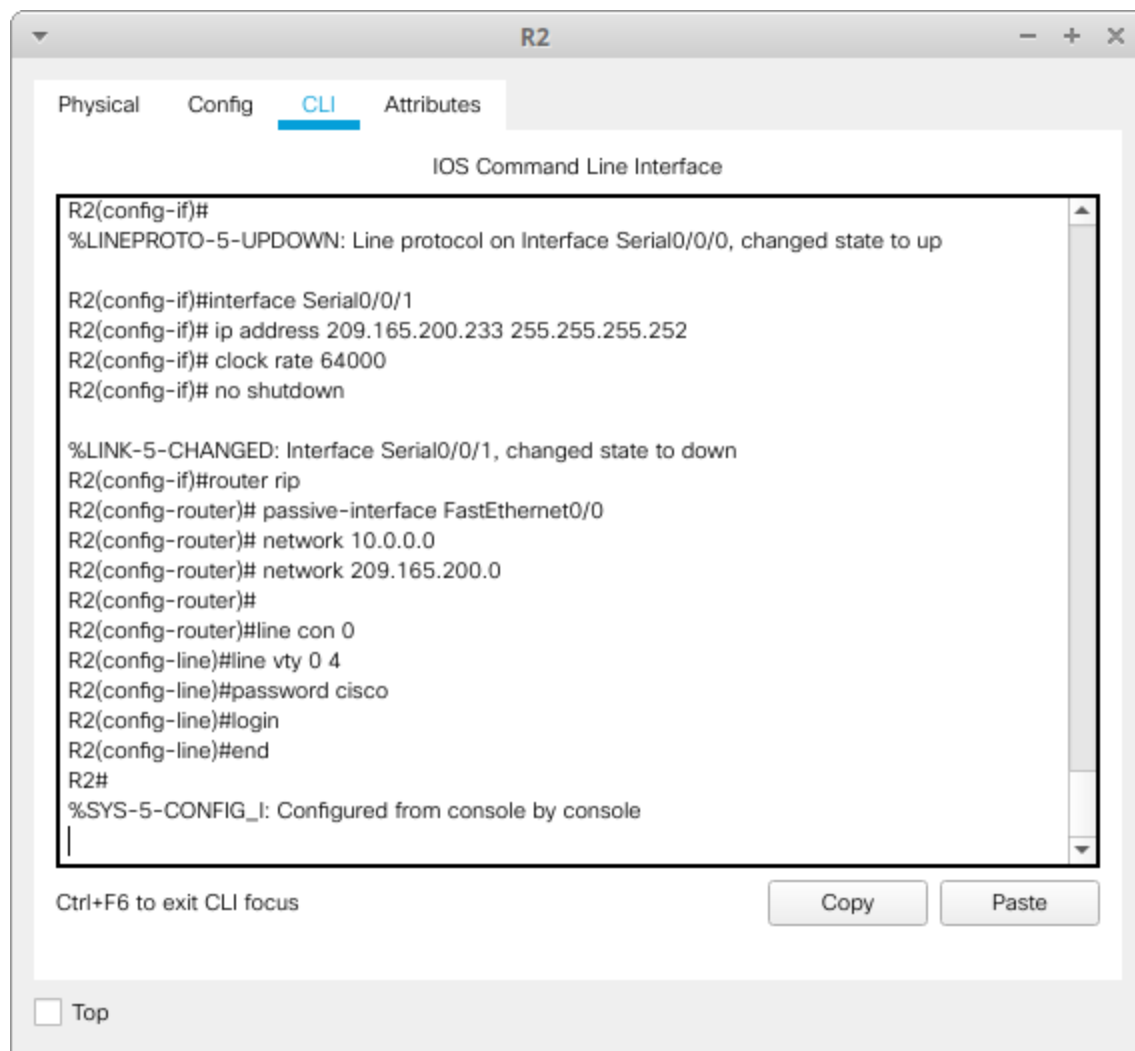


Step 2: Load the following script onto R2.

```
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
```

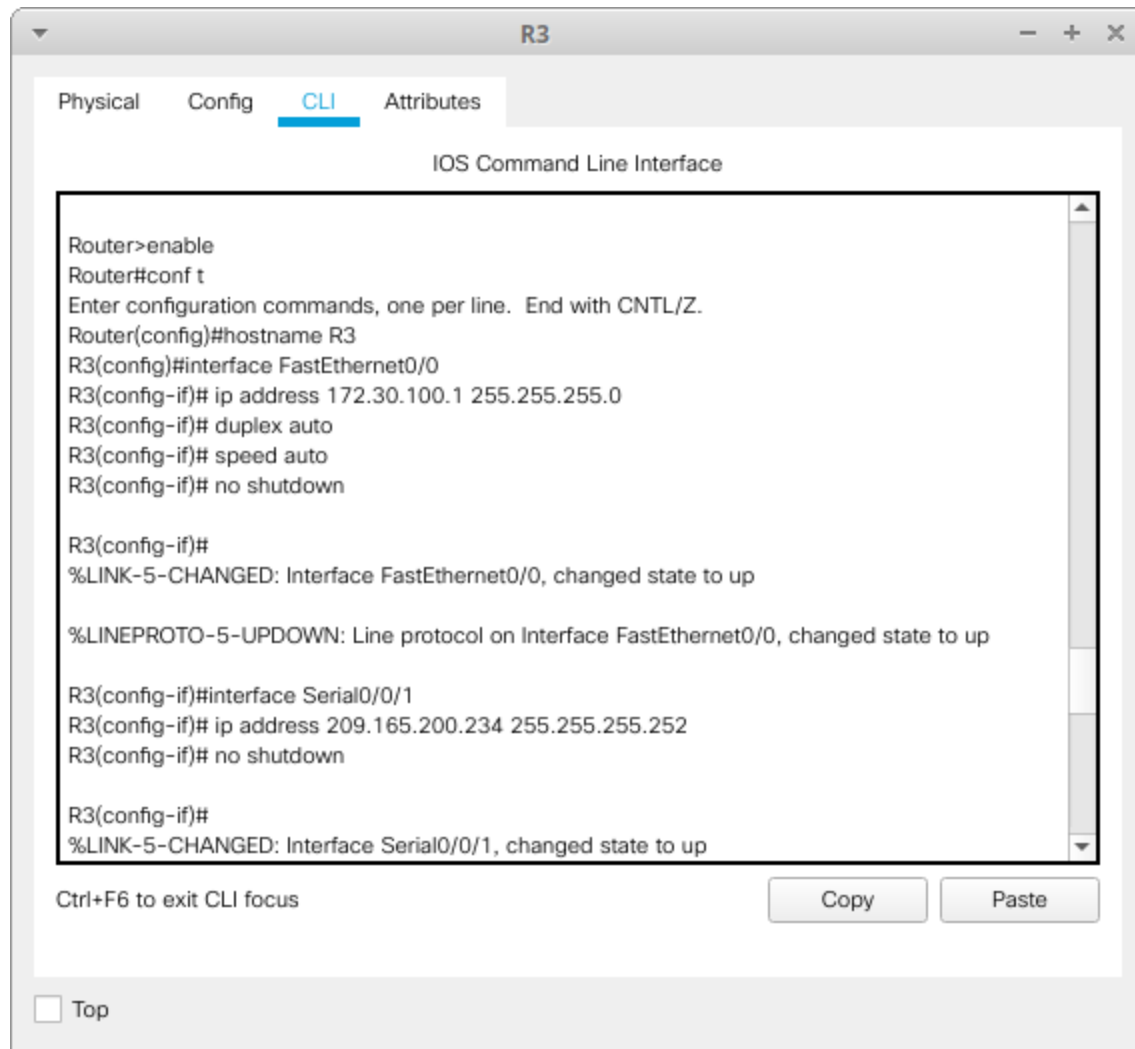


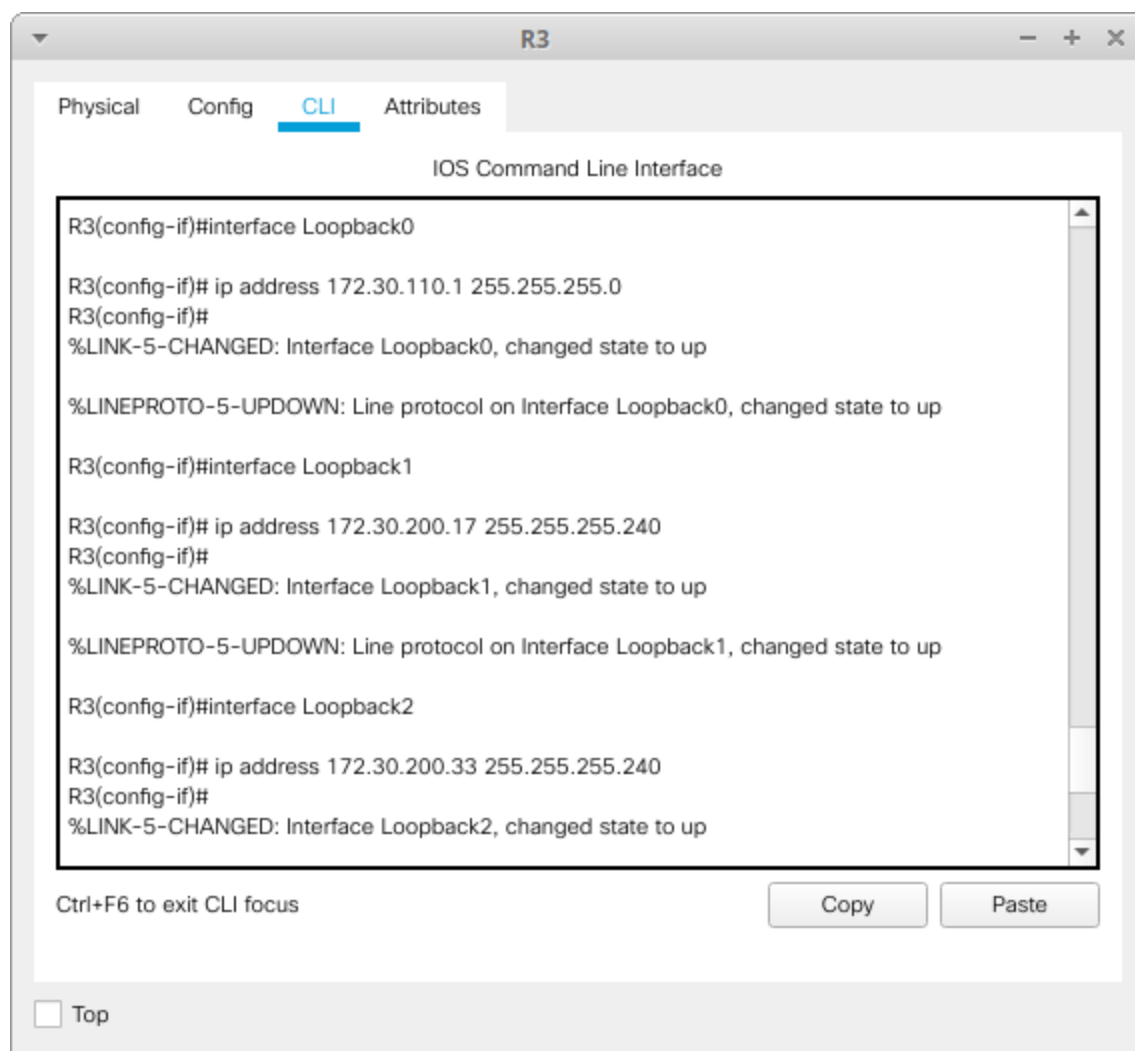


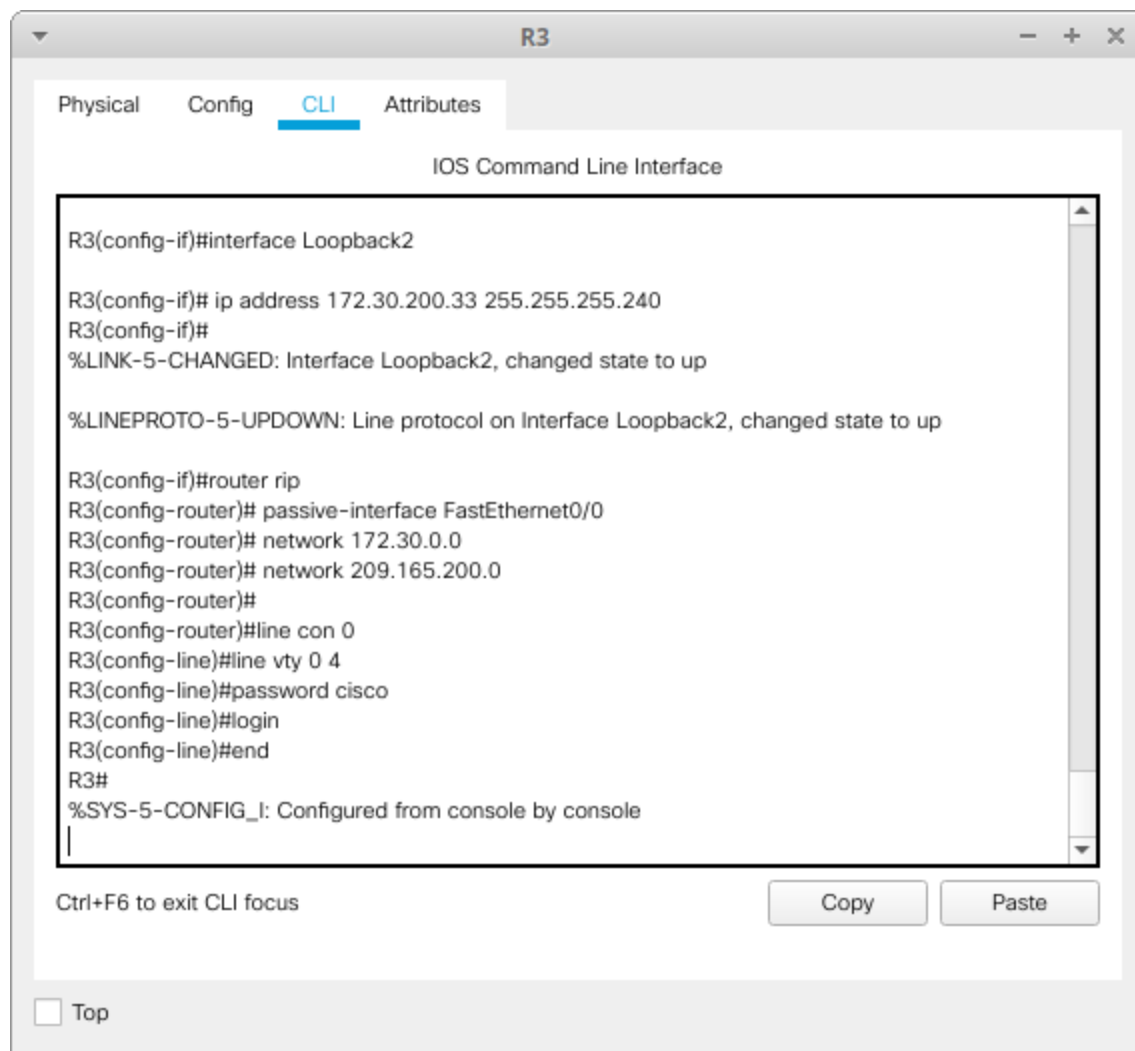
Step 3: Load the following script onto R3.

```
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
```







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#
```

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
```

From the R2 router, how many ICMP messages are successful when pinging PC1? 60% (3/5)

```
R2#ping 172.30.2.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.2.10, timeout is 2 seconds:
!U!
Success rate is 60 percent (3/5), round-trip min/avg/max = 1/16/31 ms
```

From the R2 router, how many ICMP messages are successful when pinging PC4? 60% (3/5)

```
R2#ping 172.30.100.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.100.10, timeout is 2 seconds:
!U!
Success rate is 60 percent (3/5), round-trip min/avg/max = 1/1/2 ms
```

Step 3: Check the connectivity between the PCs.

From the PC1, is it possible to ping PC2? Yes

What is the success rate? 100%

```
C:\>ping 172.30.1.10

Pinging 172.30.1.10 with 32 bytes of data:

Reply from 172.30.1.10: bytes=32 time=1ms TTL=127
Reply from 172.30.1.10: bytes=32 time<1ms TTL=127
Reply from 172.30.1.10: bytes=32 time<1ms TTL=127
Reply from 172.30.1.10: bytes=32 time<1ms TTL=127

Ping statistics for 172.30.1.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

From the PC1, is it possible to ping PC3? Yes

What is the success rate? 50%

```
C:\>ping 10.1.0.10

Pinging 10.1.0.10 with 32 bytes of data:

Request timed out.
Reply from 10.1.0.10: bytes=32 time=2ms TTL=126
Request timed out.
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126

Ping statistics for 10.1.0.10:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

From the PC1, is it possible to ping PC4? **No**

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

```
C:\>ping 172.30.100.10

Pinging 172.30.100.10 with 32 bytes of data:

Reply from 172.30.2.1: Destination host unreachable.
Reply from 172.30.2.1: Destination host unreachable.
Reply from 172.30.2.1: Destination host unreachable.
Reply from 172.30.2.1: Destination host unreachable.

Ping statistics for 172.30.100.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

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

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

```
Packet Tracer PC Command Line 1.0
C:\>ping 172.30.1.10

Pinging 172.30.1.10 with 32 bytes of data:

Reply from 172.30.100.1: Destination host unreachable.
Request timed out.
Reply from 172.30.100.1: Destination host unreachable.
Reply from 172.30.100.1: Destination host unreachable.

Ping statistics for 172.30.1.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

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

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

```
C:\>ping 10.1.0.10

Pinging 10.1.0.10 with 32 bytes of data:

Reply from 10.1.0.10: bytes=32 time=1ms TTL=126
Request timed out.
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126
Request timed out.

Ping statistics for 10.1.0.10:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

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
```

The screenshot shows a window titled 'R2' with tabs for Physical, Config, CLI, and Attributes. The CLI tab is active, displaying the 'IOS Command Line Interface'. The command 'show ip route' has been entered, and the output is displayed. The output includes a legend for route codes, a message about the gateway of last resort, and a list of routes. The routes shown are 10.0.0.0/16 (subnetted, 1 subnet) and 172.30.0.0/16 (two entries, each via a different serial interface). The window also has a 'Ctrl+F6 to exit CLI focus' message and 'Copy' and 'Paste' buttons.

```
R2>enable
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

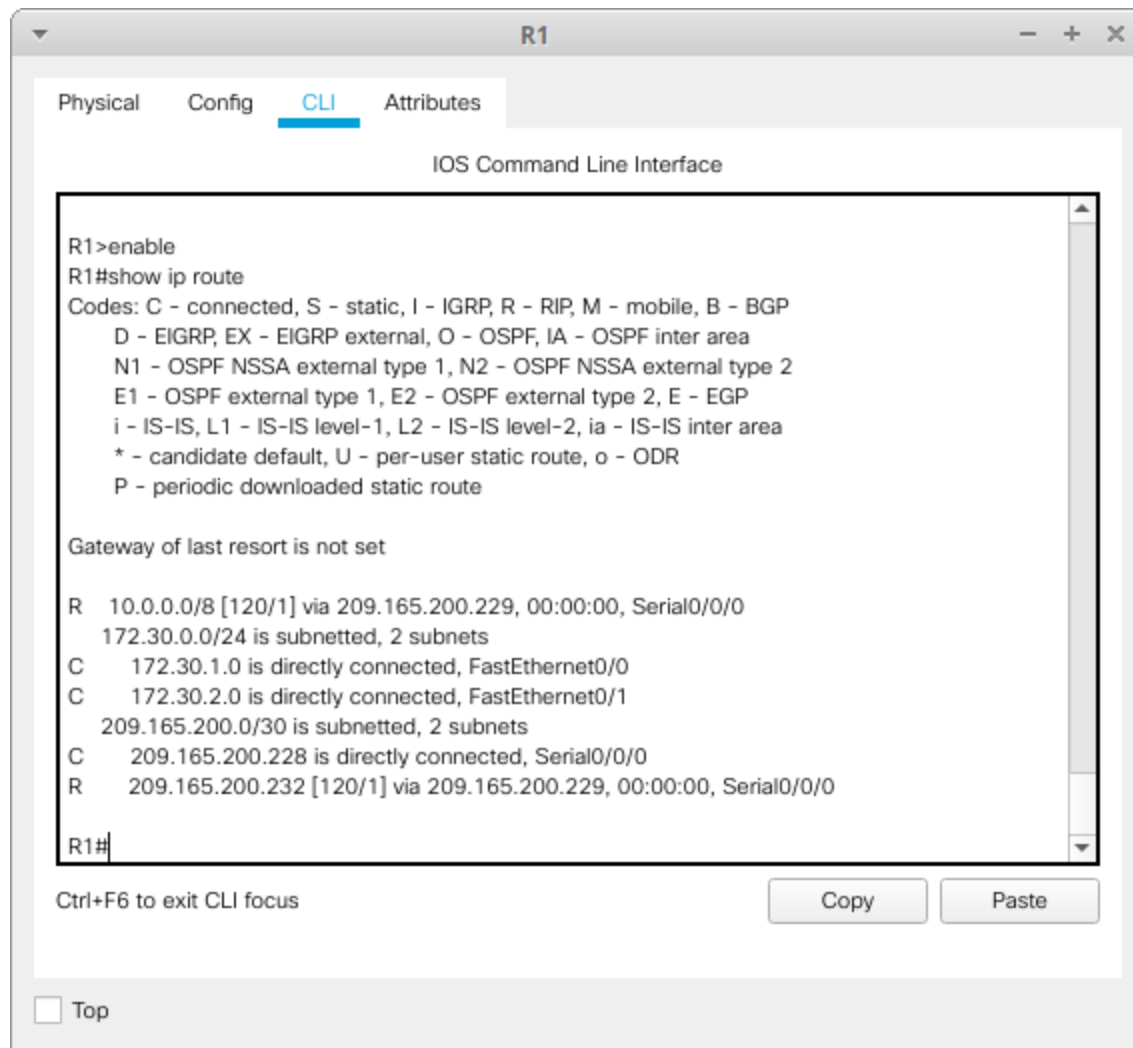
 10.0.0.0/16 is subnetted, 1 subnets
 C    10.1.0.0 is directly connected, FastEthernet0/0
 R    172.30.0.0/16 [120/1] via 209.165.200.230, 00:00:15, Serial0/0/0
      [120/1] via 209.165.200.234, 00:00:02, Serial0/0/1
 209.165.200.0/30 is subnetted, 2 subnets
 C    209.165.200.228 is directly connected, Serial0/0/0
 C    209.165.200.232 is directly connected, Serial0/0/1

R2#
```

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

Both R1 and R3 are configured with interfaces on a discontinuous 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.

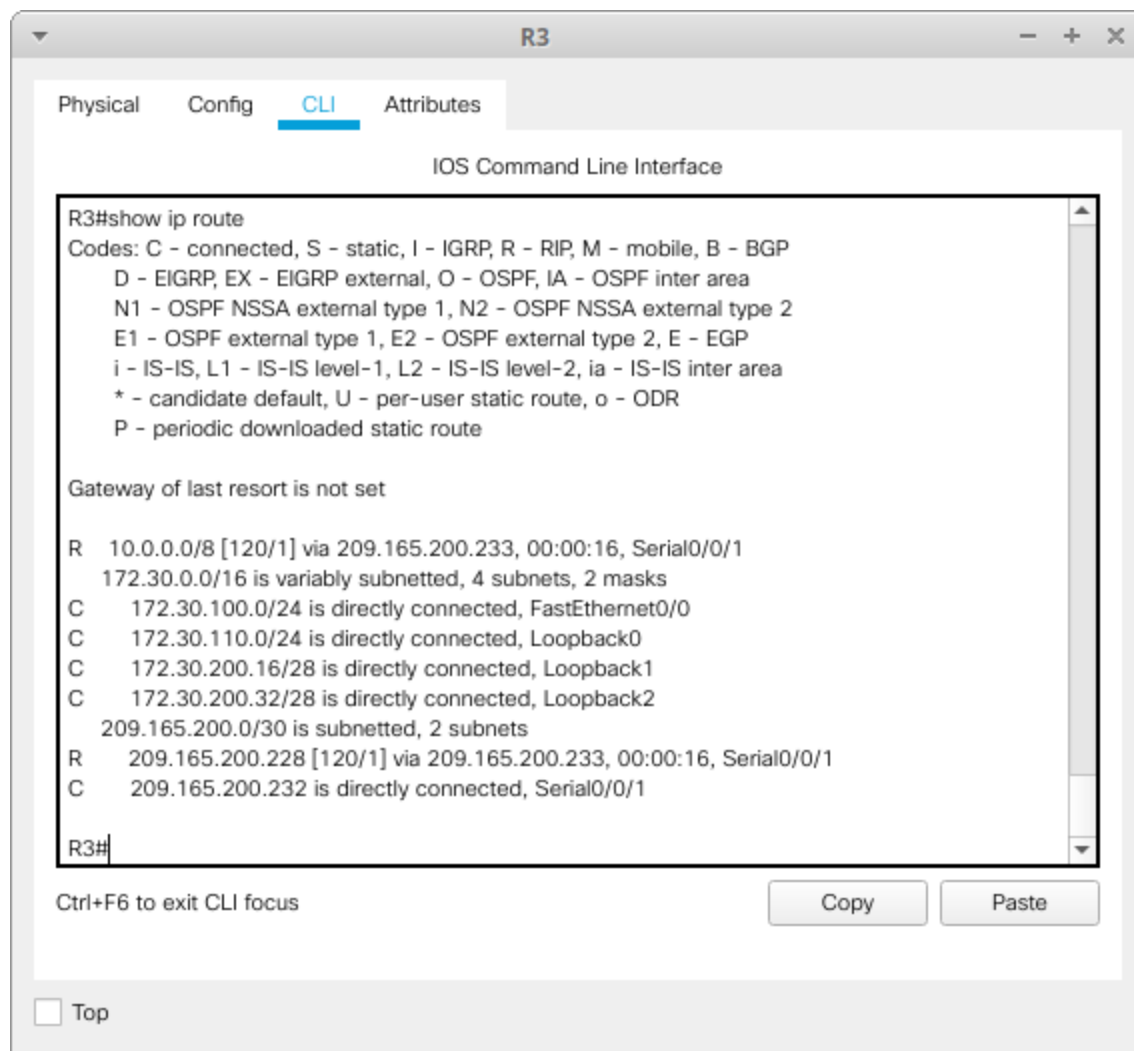
```
R1#show ip route
```



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.

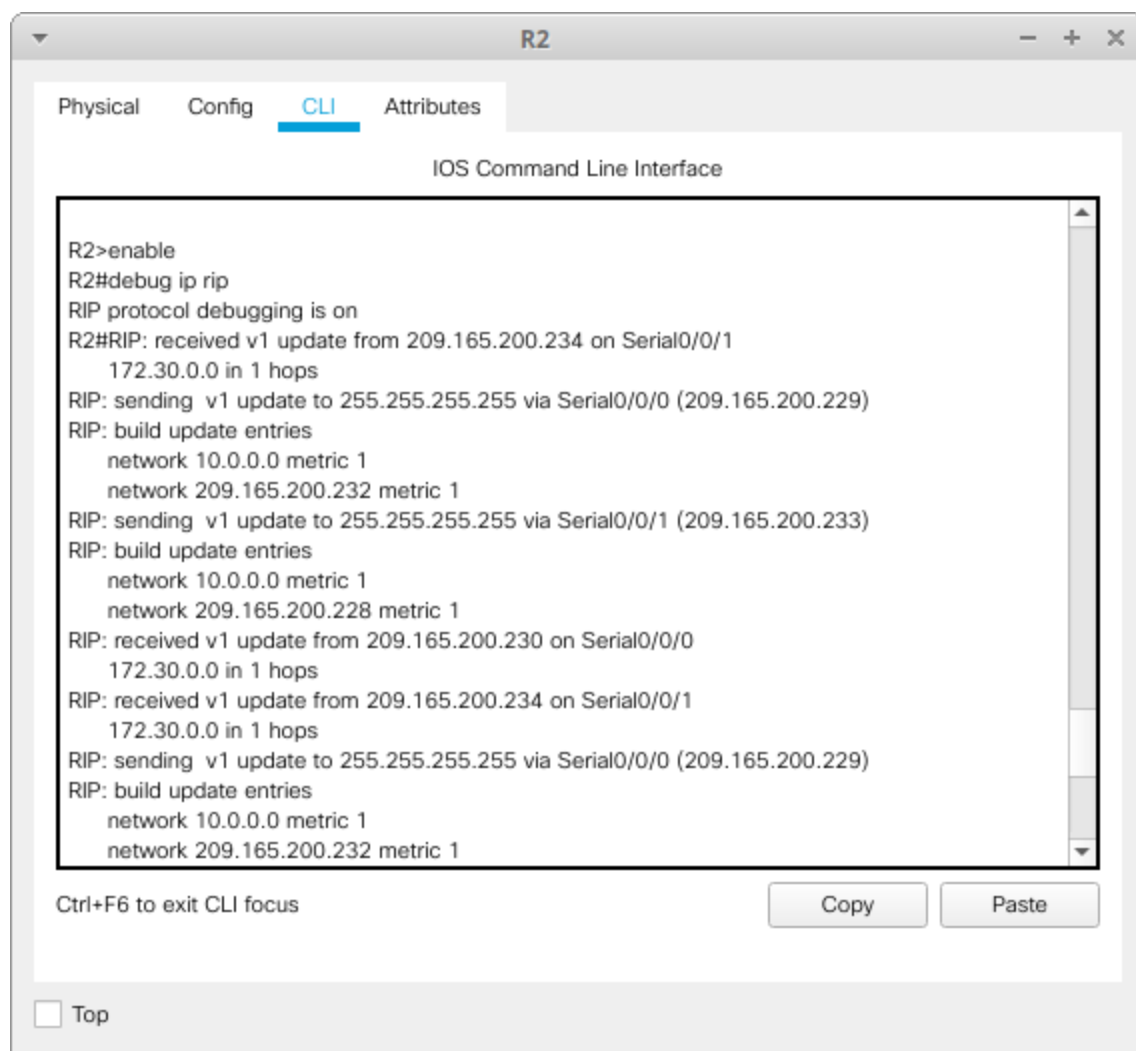
R2 is receiving the route 172.30.0.0, with 1 hop, from both R1 and R3. Because these are equal cost metrics, both routes are added to the R2 routing table. Because RIPv1 is a classful routing protocol, no subnet mask information is sent in the update.

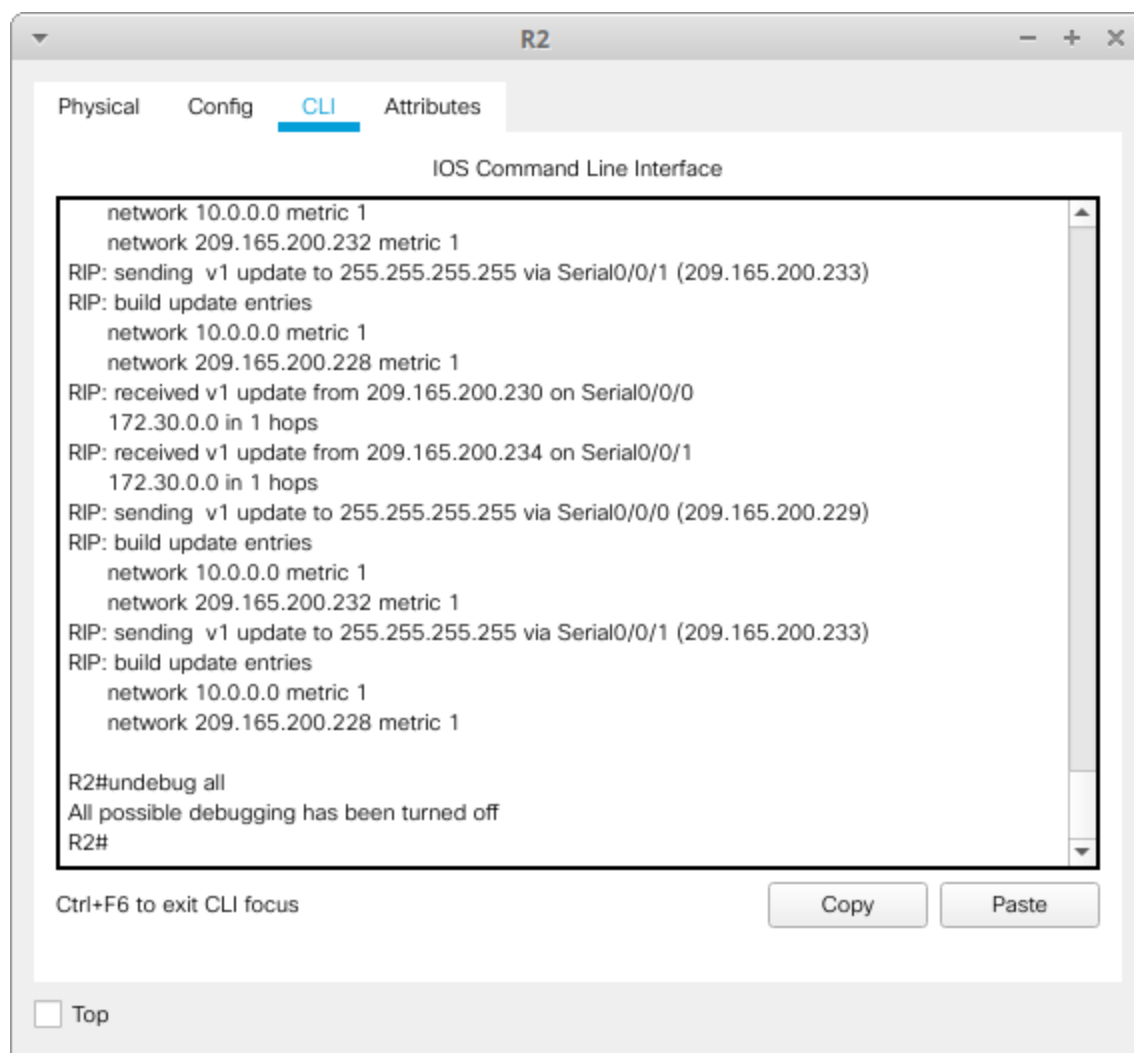
```
R2#debug ip rip
```

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
```

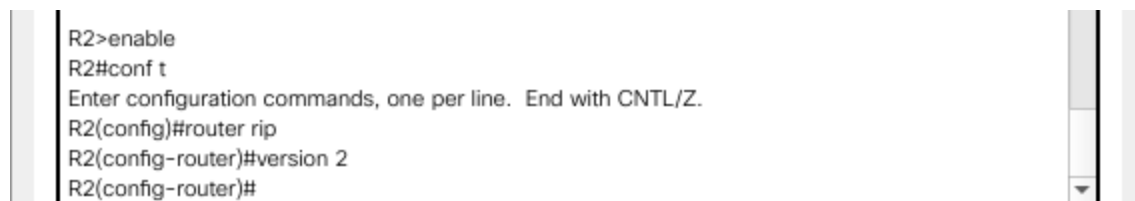




Task 4: Configure RIP Version 2.

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
```



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

```
R1>enable
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#
```

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

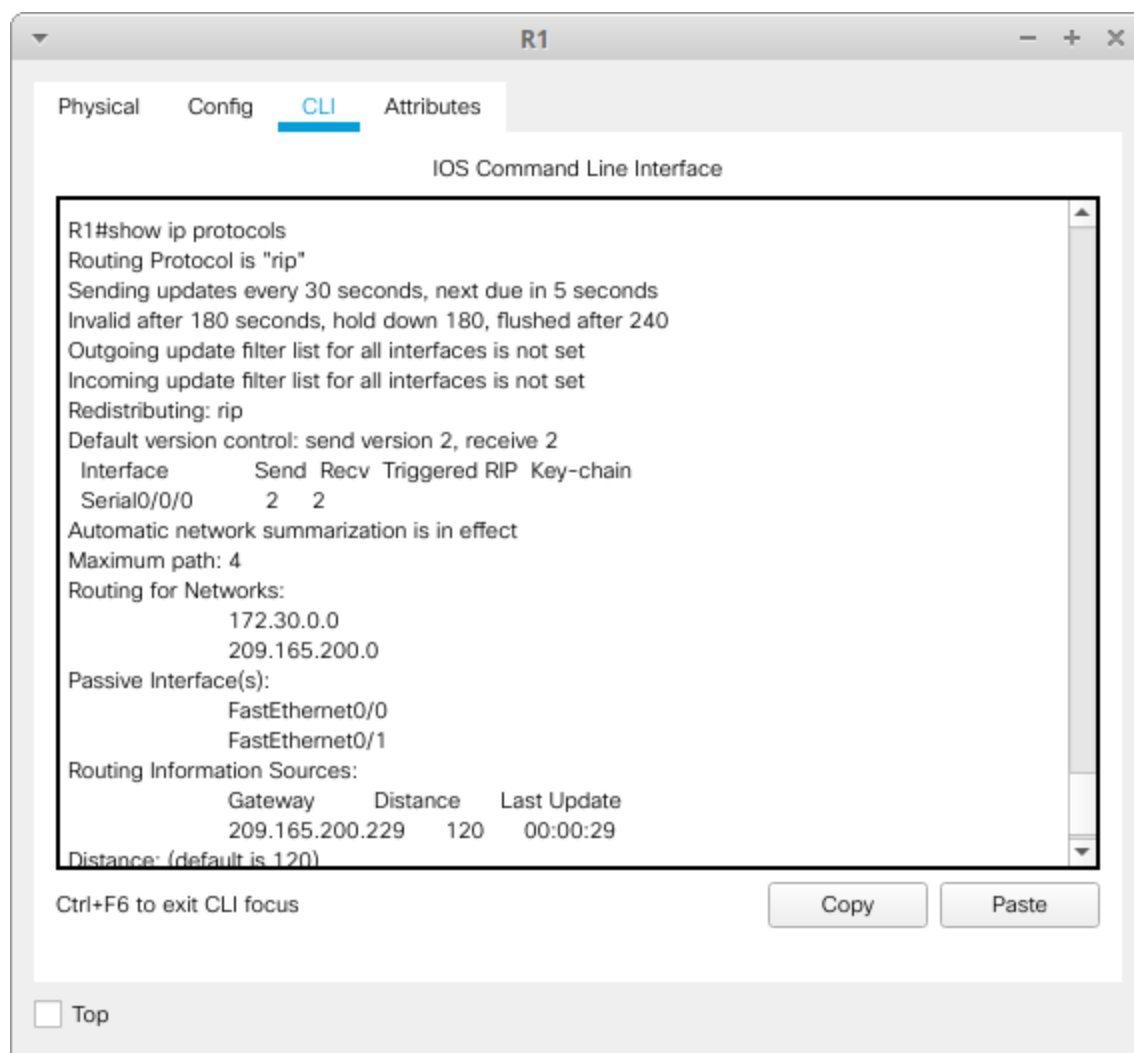
```
R3>enable
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router rip
R3(config-router)#version 2
R3(config-router)#
```

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.

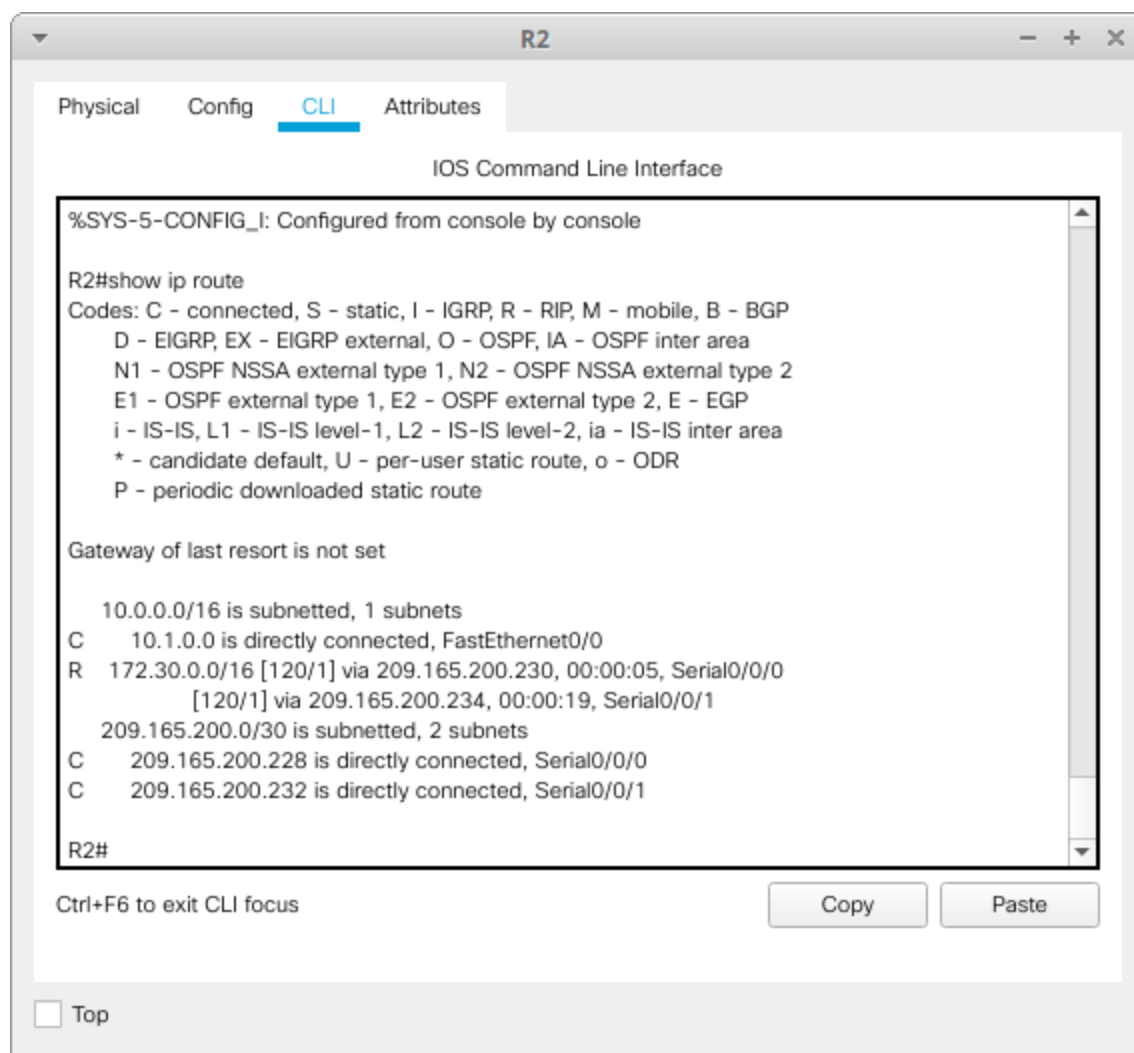
```
R1# show ip protocols
```



Task 5: Examine the Automatic Summarization of Routes.

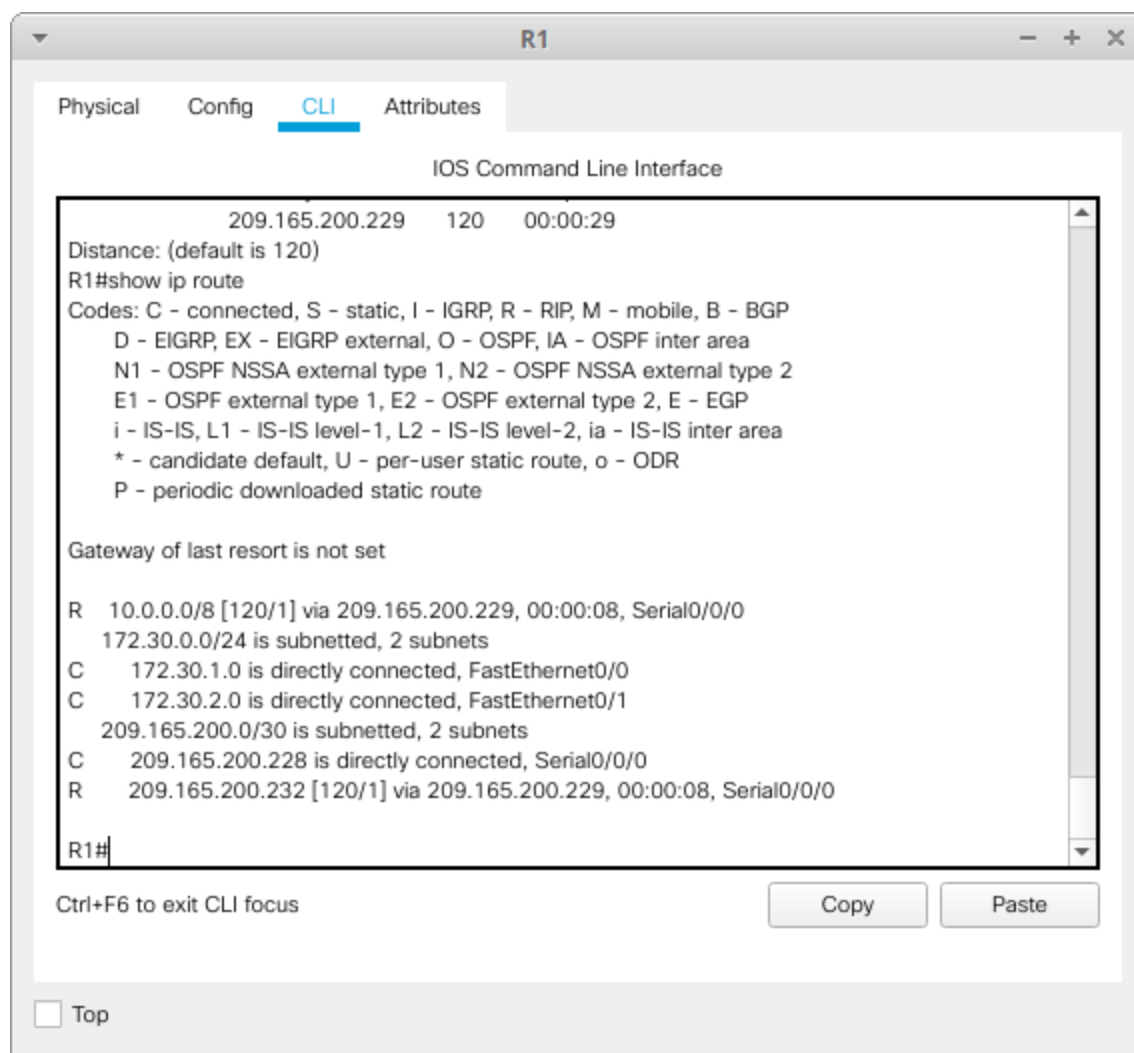
The LANs connected to R1 and R3 are still composed of discontinuous networks. R2 still shows two equal cost paths to the 172.30.0.0/16 network in the routing table. R2 still shows only the major classful network address of 172.30.0.0 and does not show any of the subnets for this network.

```
R2#show ip route
```



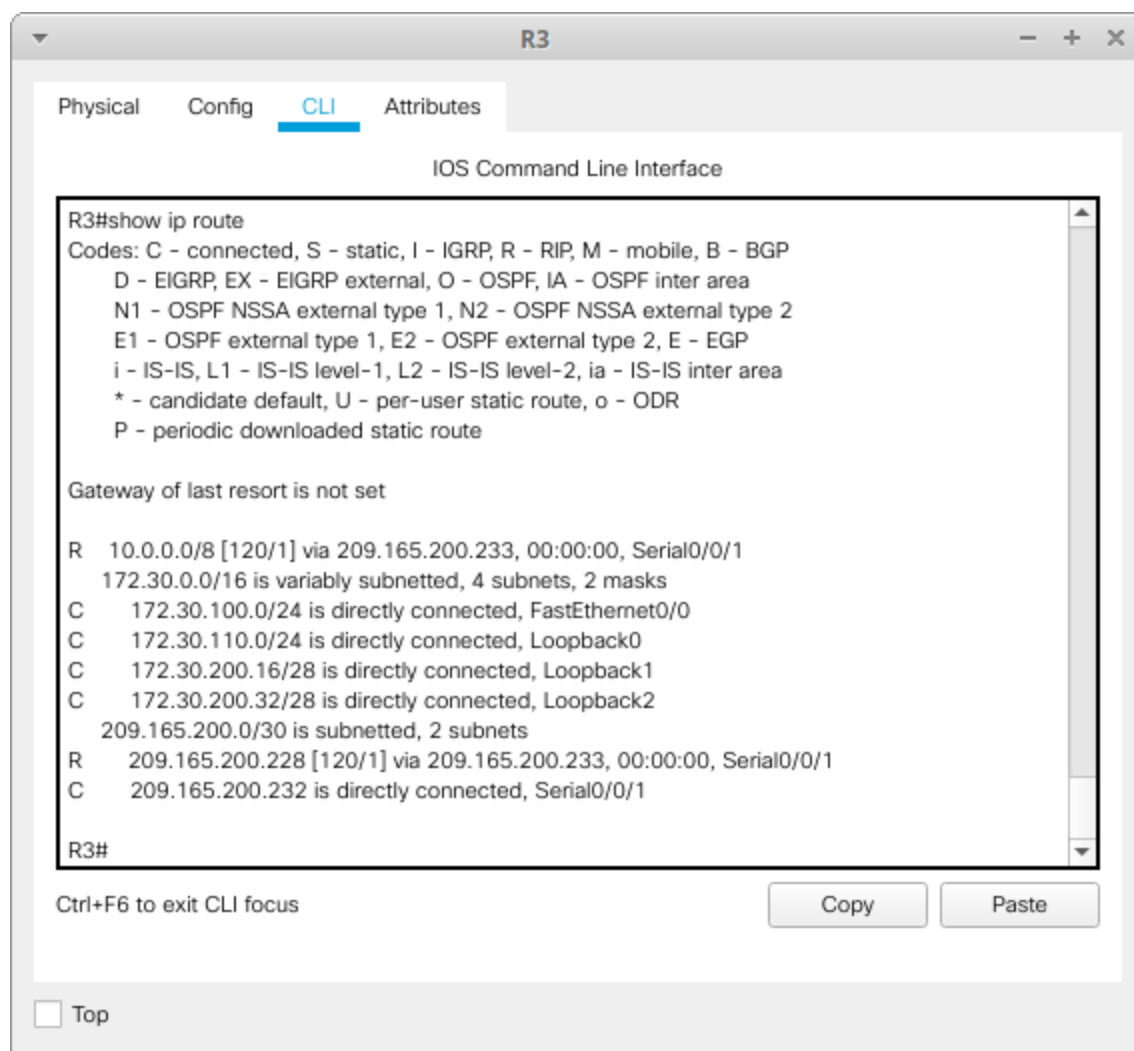
R1 still shows only its own subnets for the 172.30.0.0 network. R1 still does not have any routes for the 172.30.0.0 subnets on R3.

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:

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

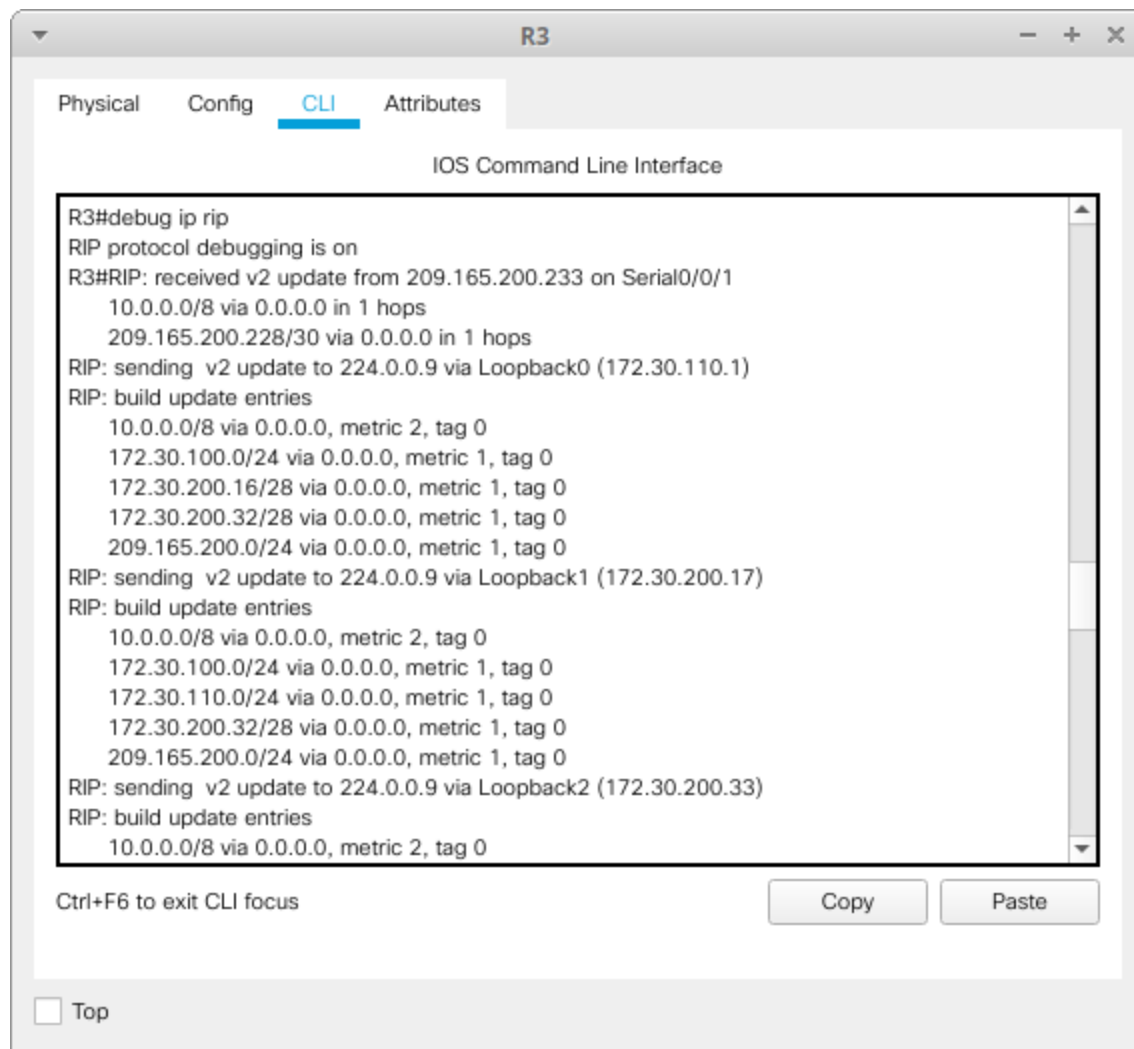
10.0.0.0/8

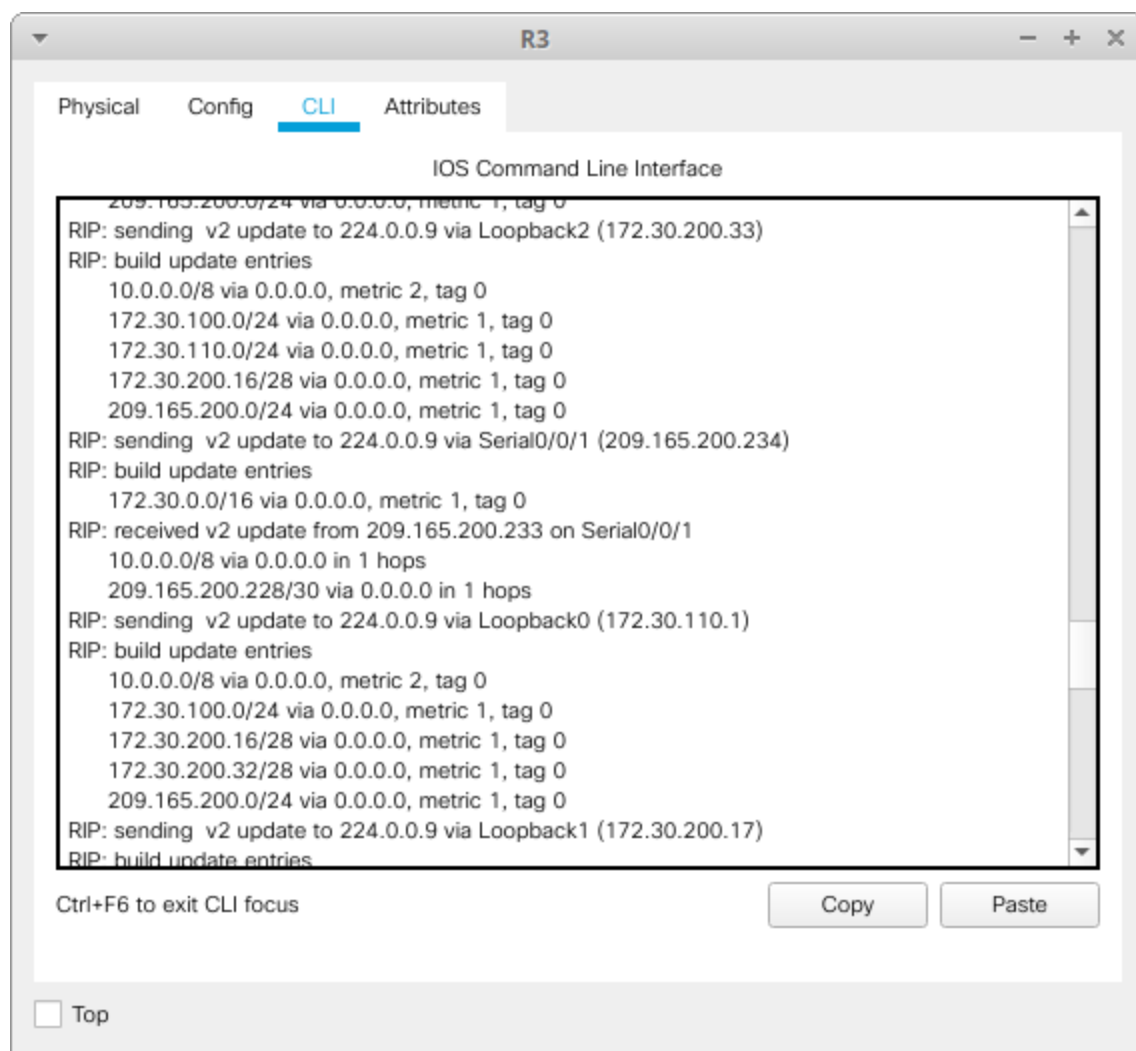
172.30.100.0/24

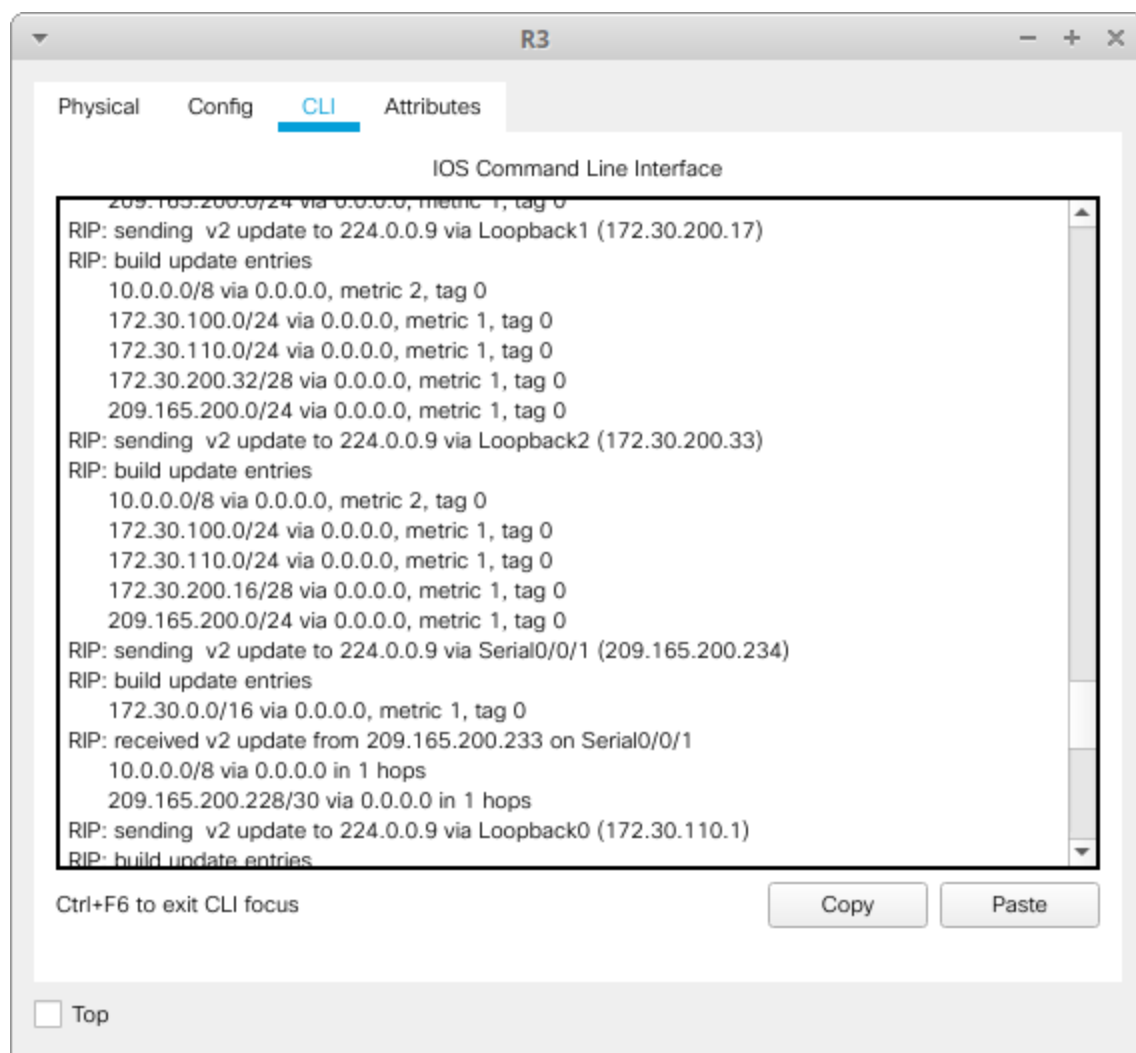
172.30.110.0/24

172.30.200.16/28

209.165.200.0/24

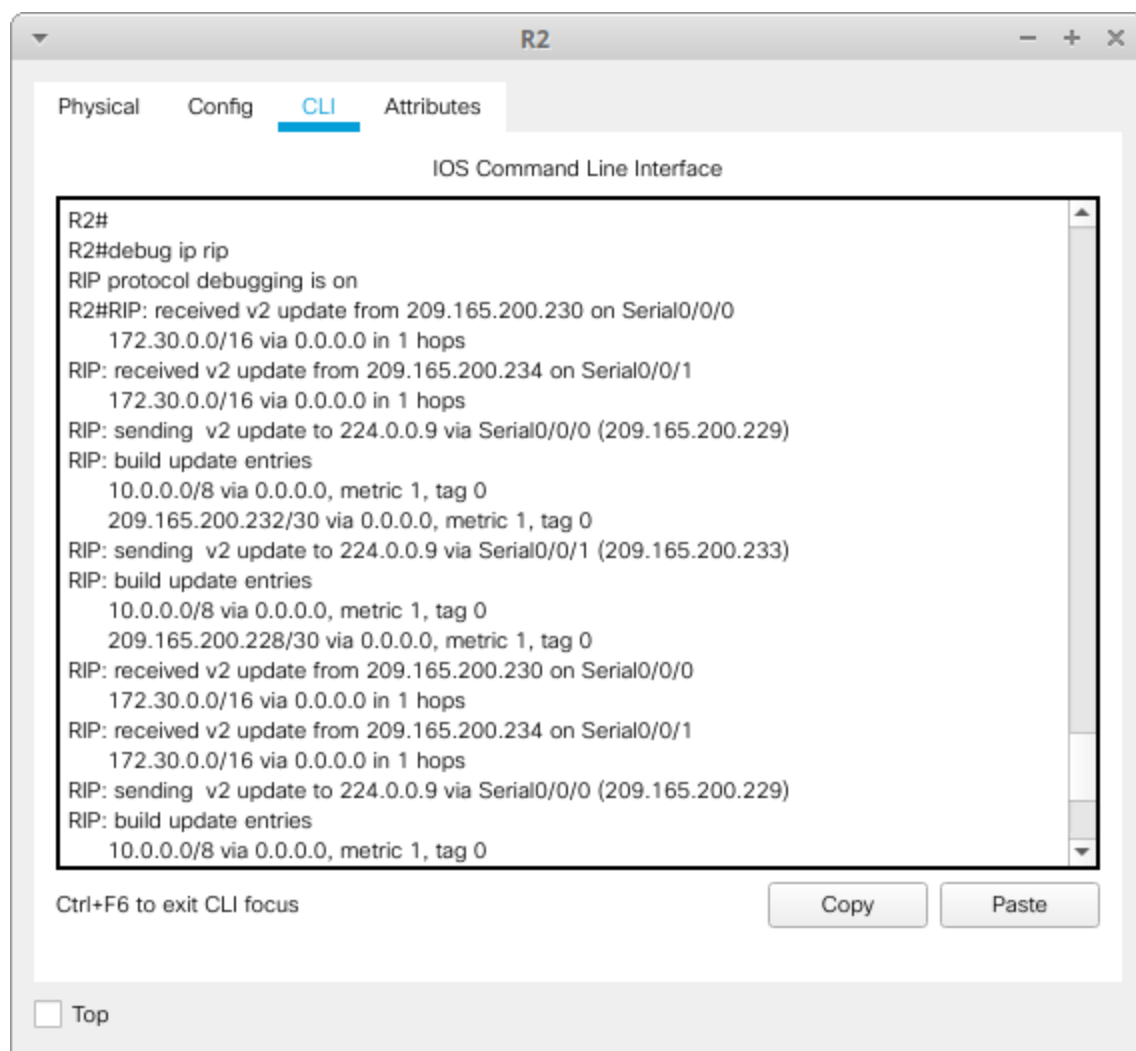


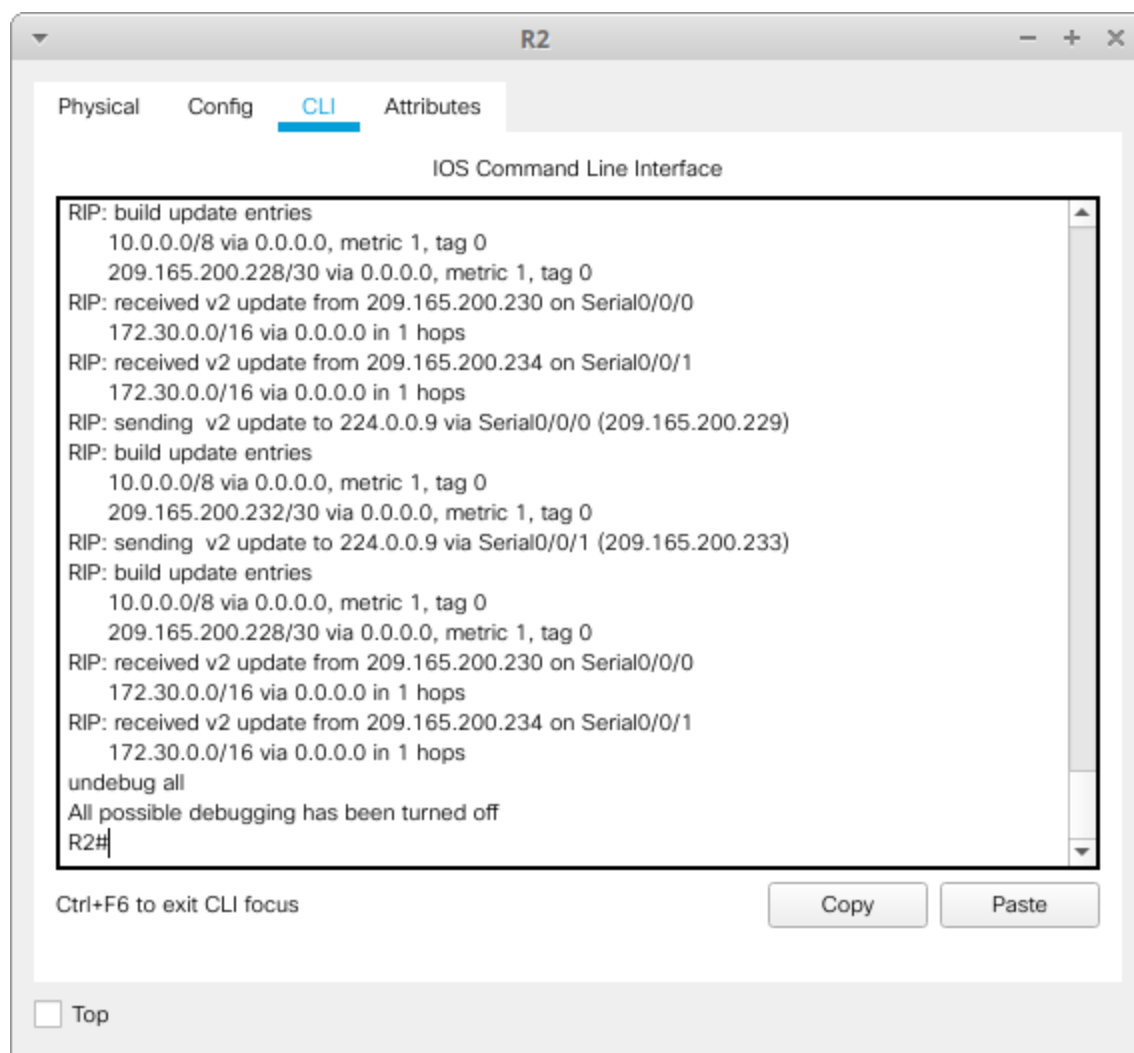




On R2, what routes are in the RIP updates that are received from R3?

172.30.0.0/16



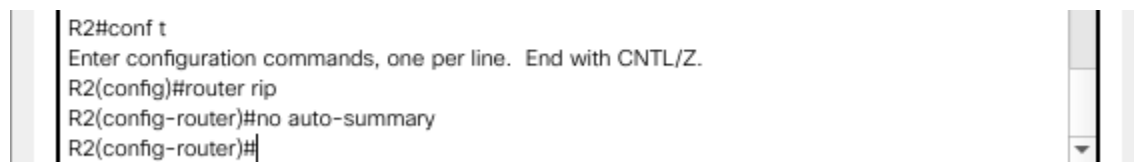


R3 is not sending any of the 172.30.0.0 subnets—only the summarized route of 172.30.0.0/16, including the subnet mask. This is why R2 and R1 are not seeing the 172.30.0.0 subnets on R3.

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
```

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

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

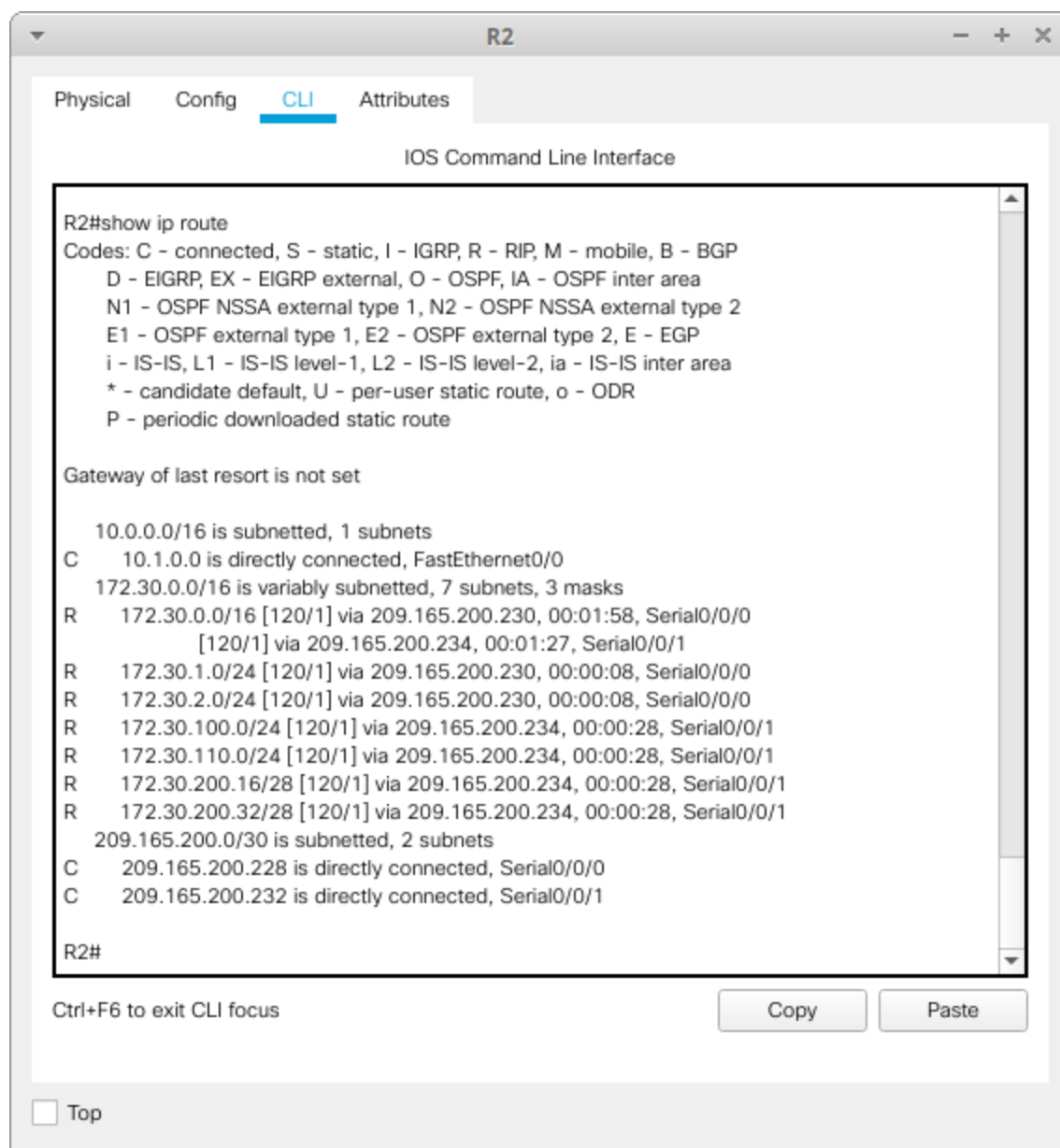
```
R3(config)#router rip
R3(config-router)#no auto-summary
R3(config-router)#
```

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

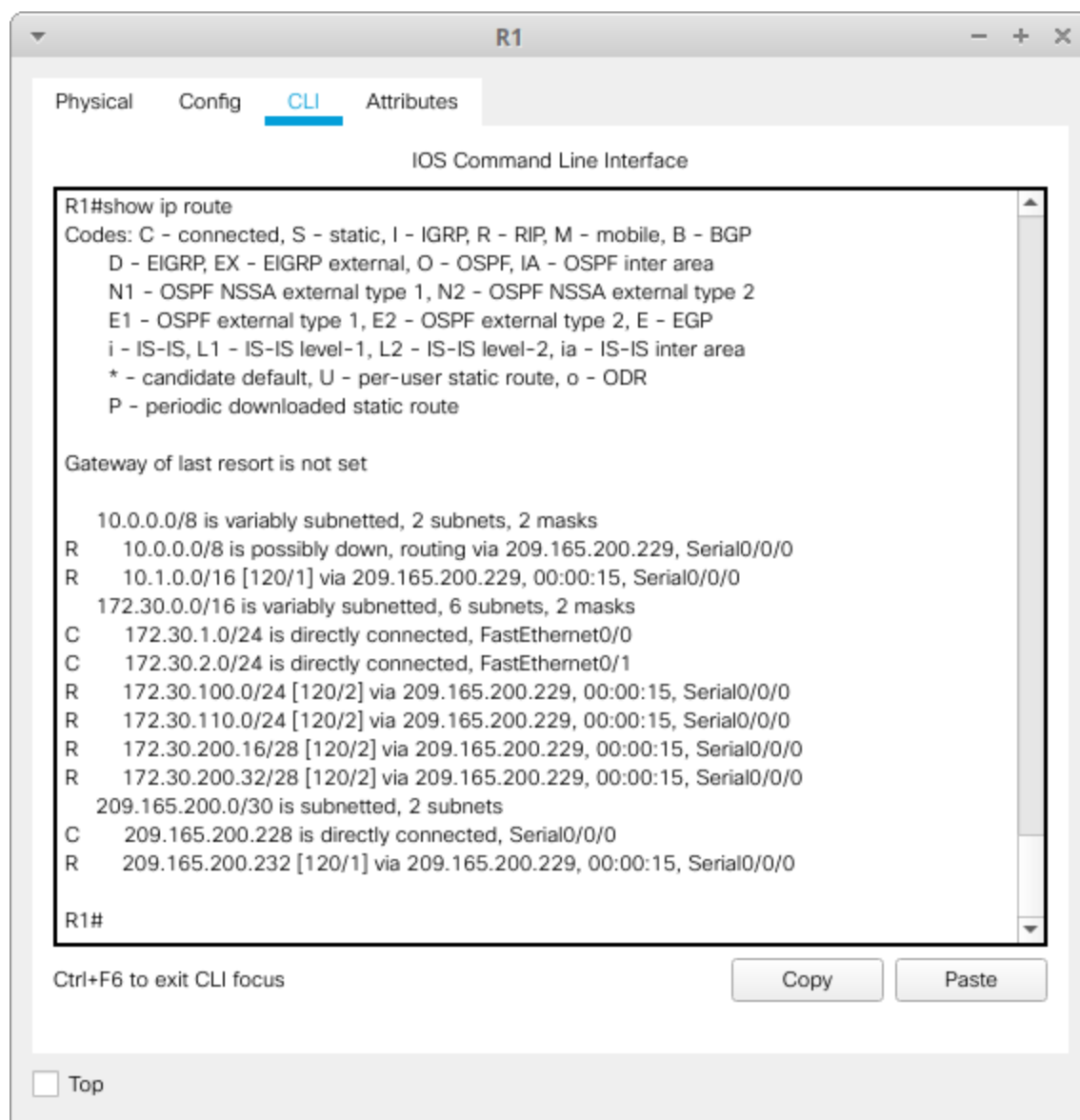
Task 7: Examine the Routing Tables.

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

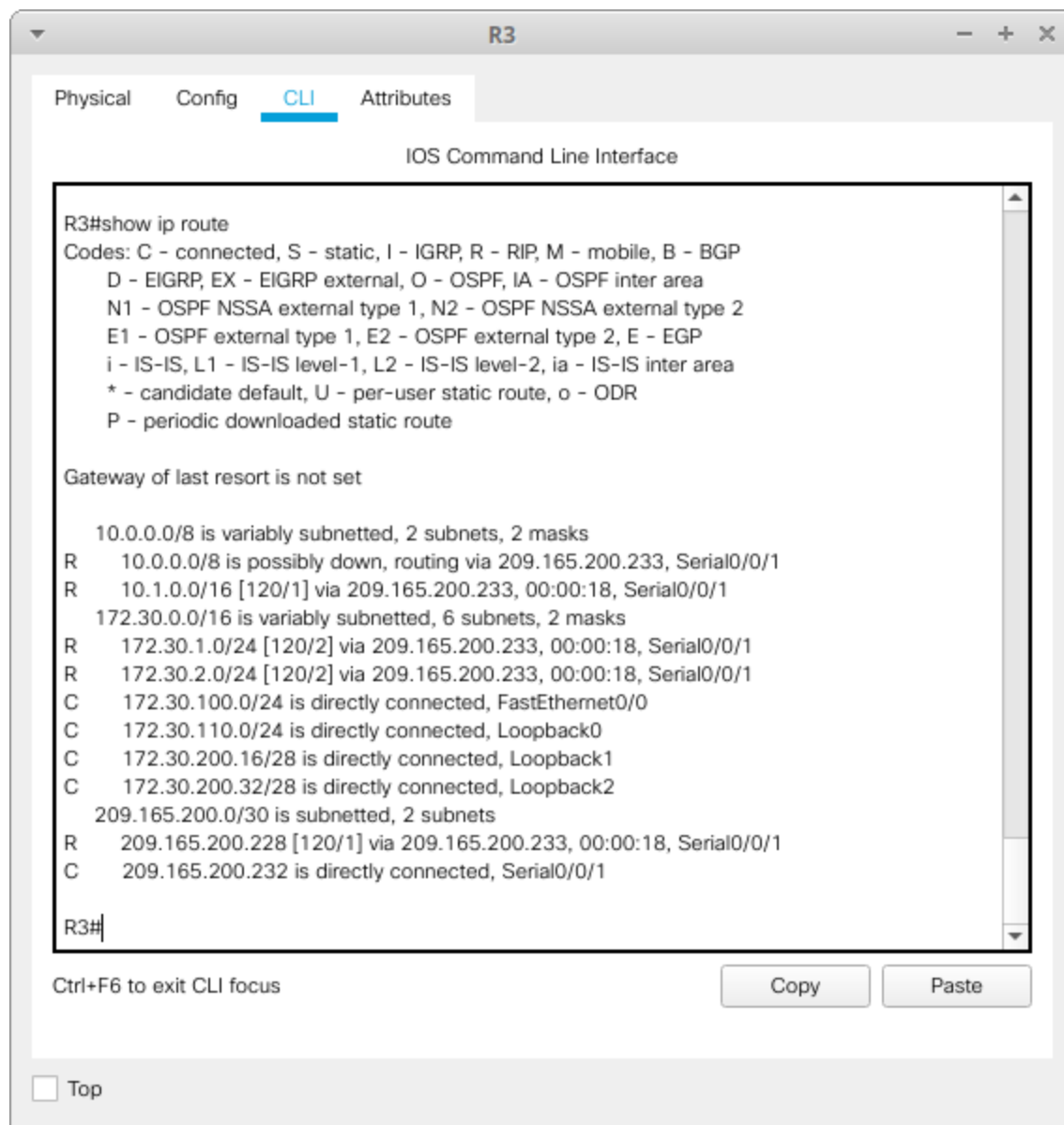
```
R2#show ip route
```



R1#show ip route



R3#show ip route

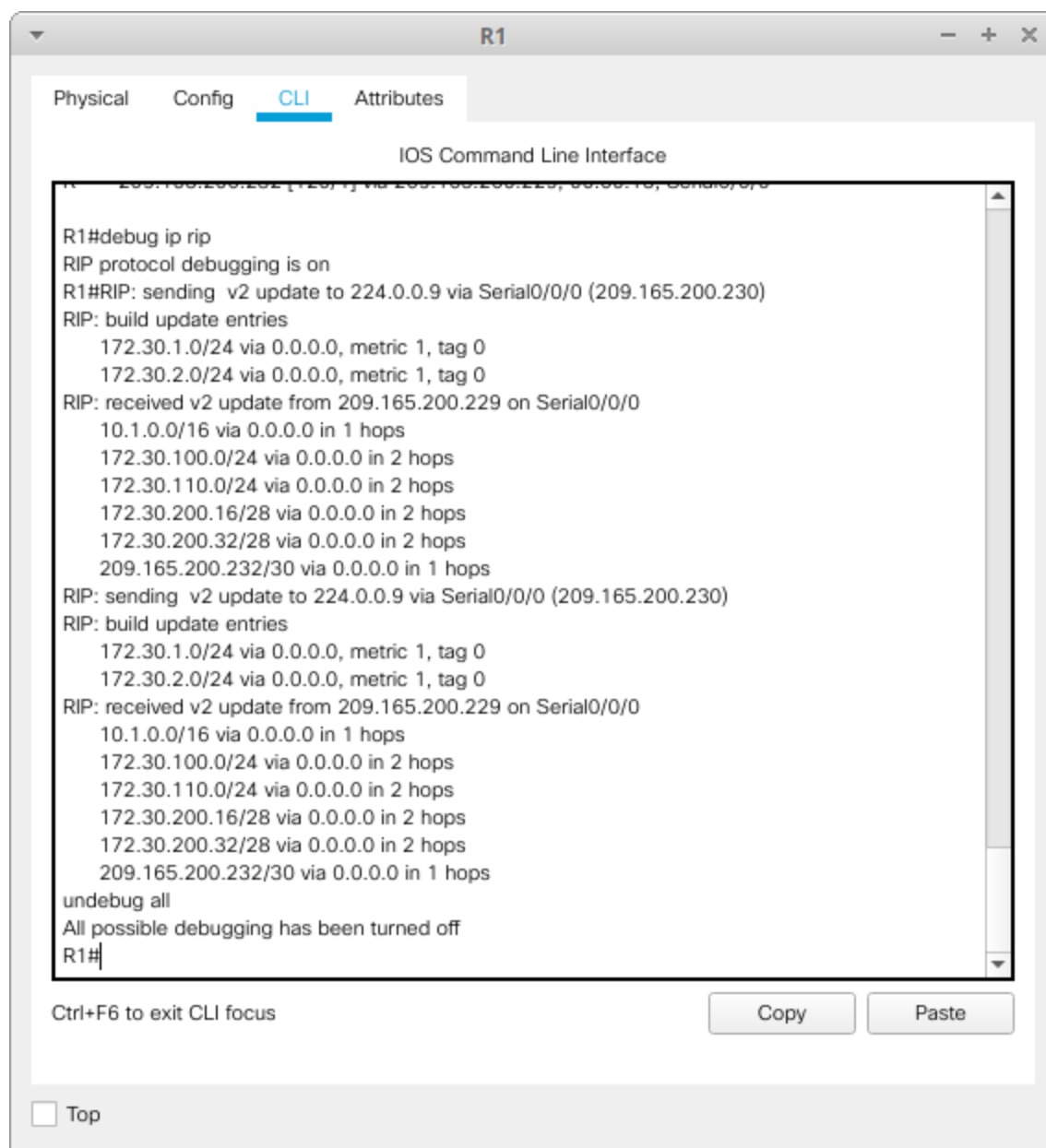


Use the output of the `debug ip rip` command to answer the following questions:

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

172.30.1.0/24

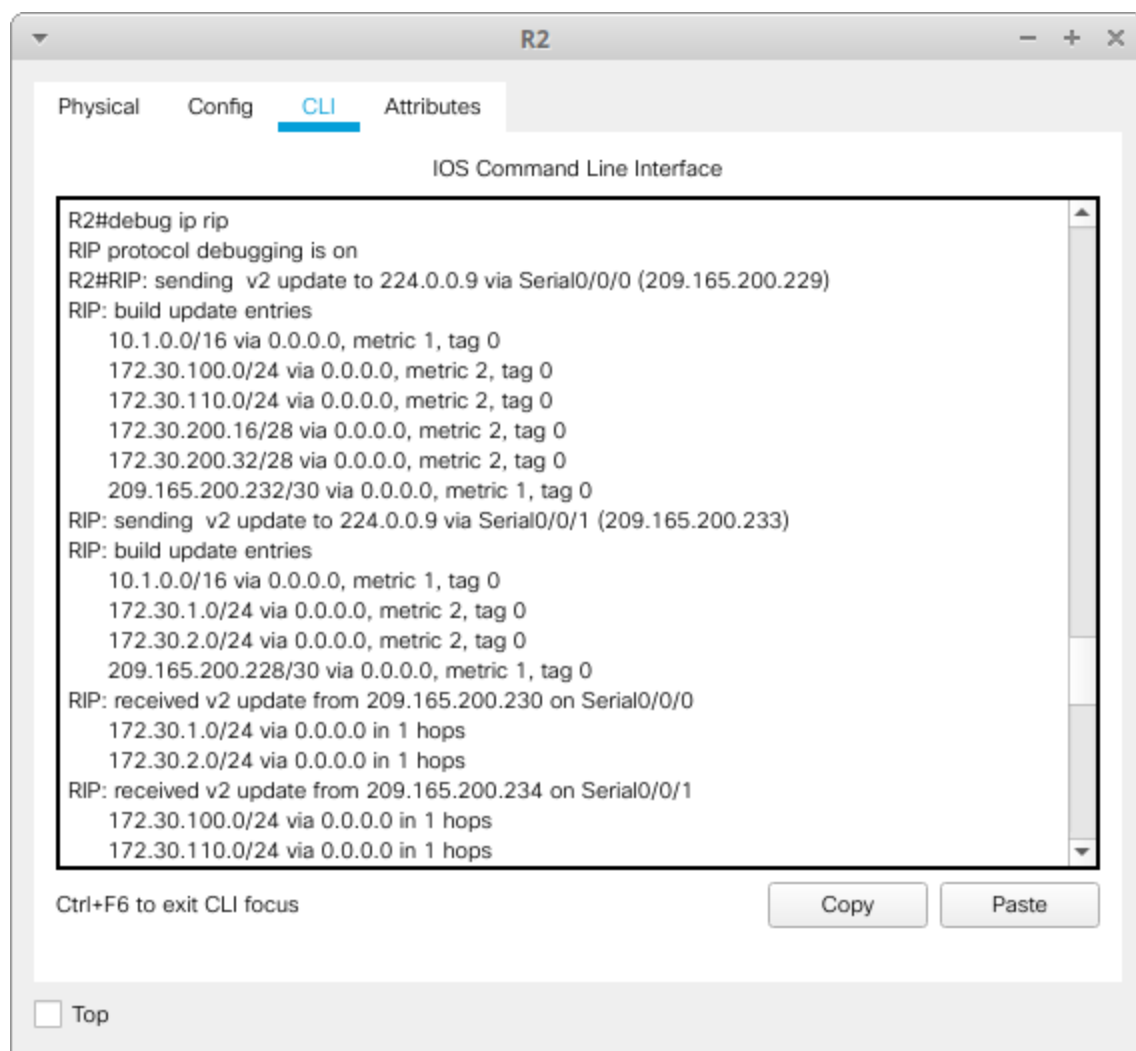
172.30.2.0/24

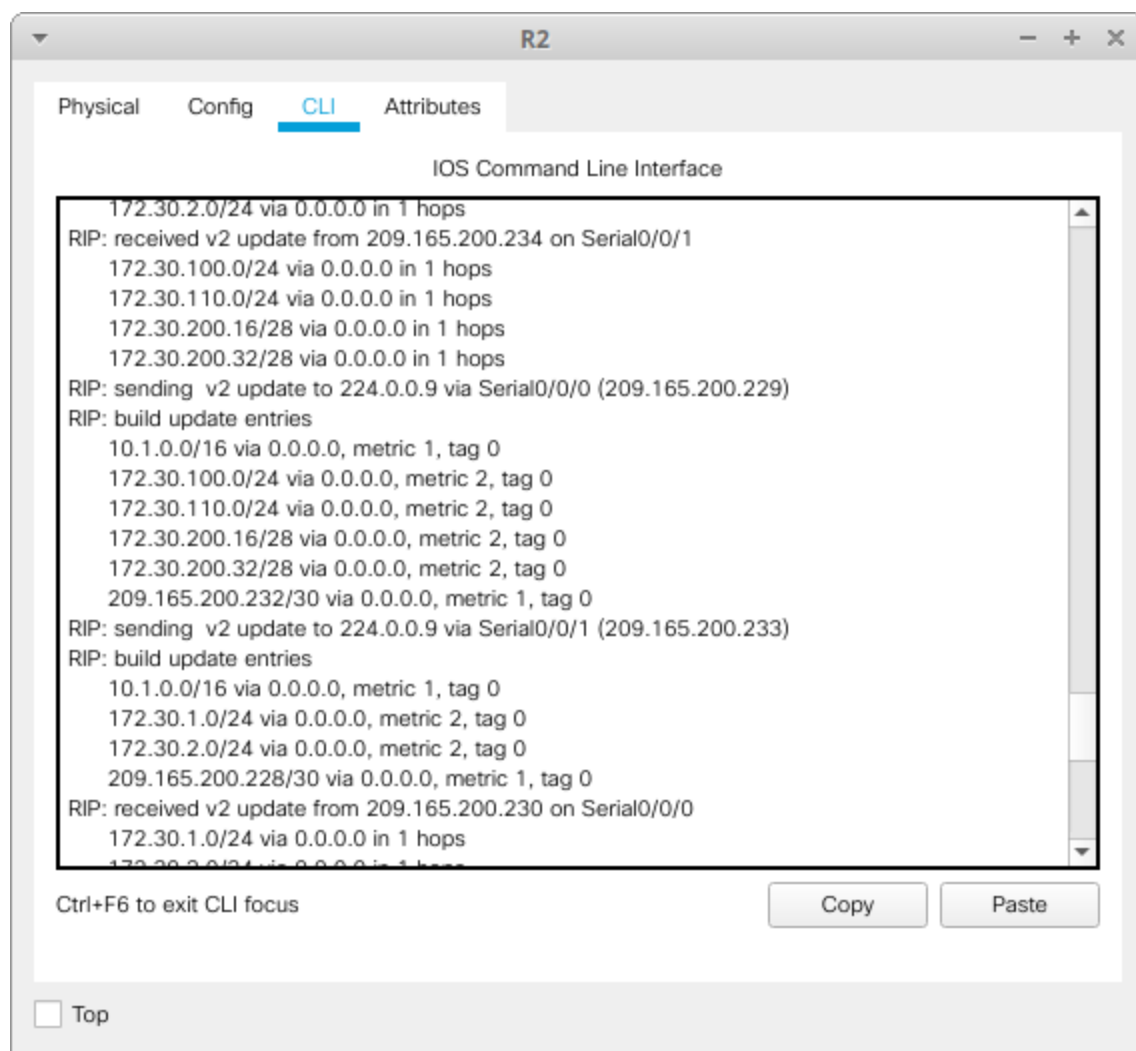


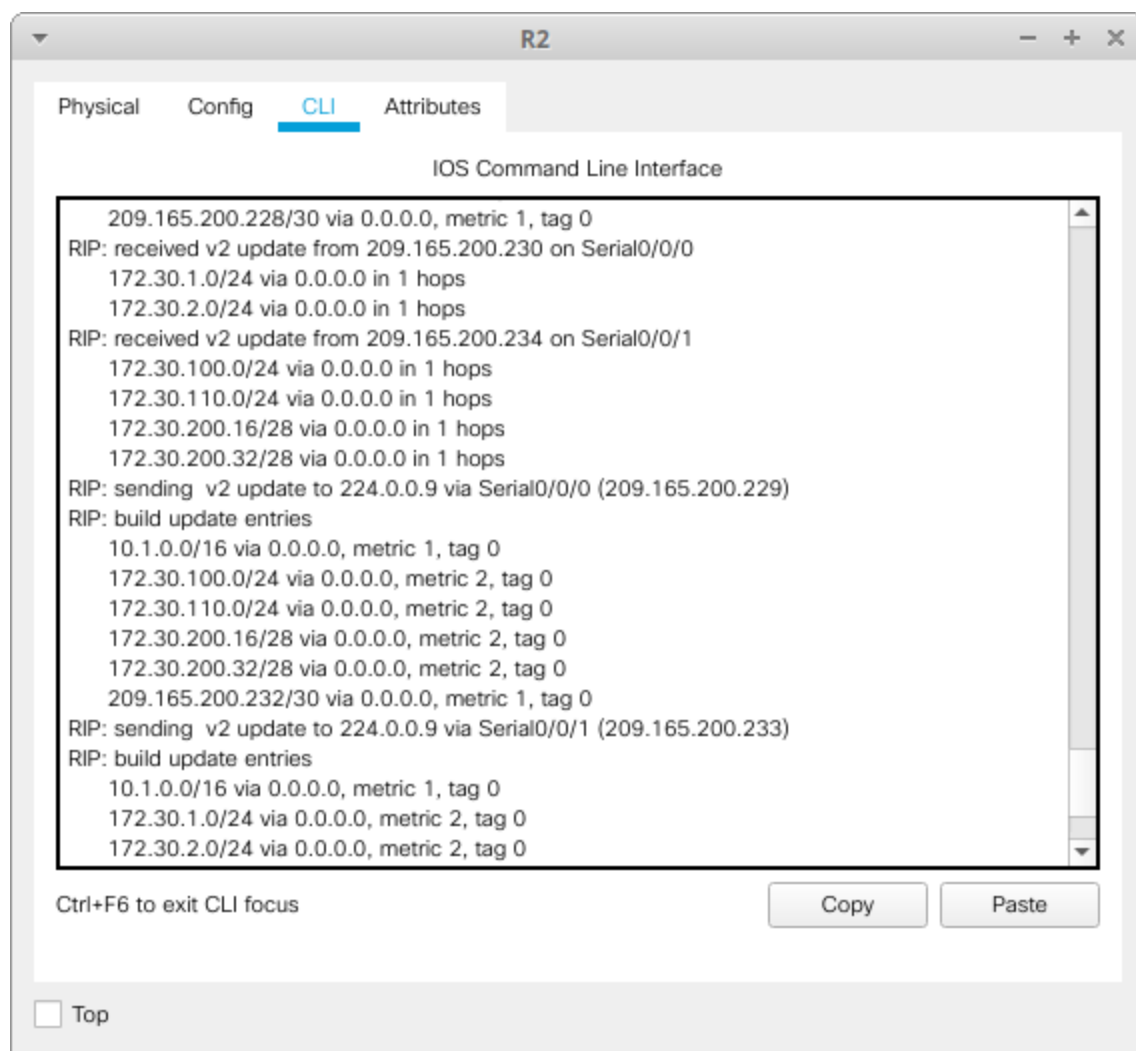
On R2, what routes are in the RIP updates that are received from R1?

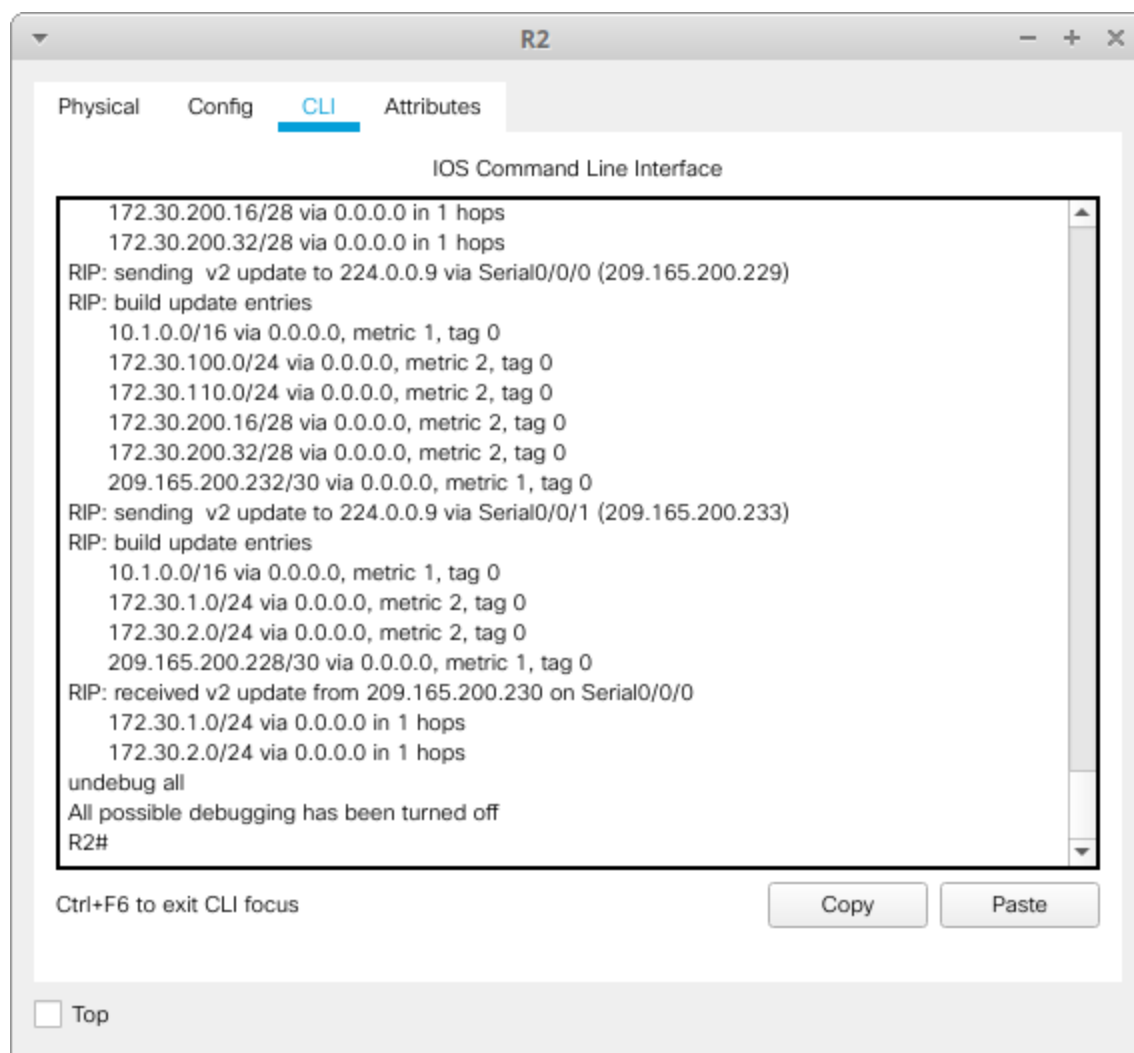
172.30.1.0/24

172.30.2.0/24









Are the subnet masks now included in the routing updates? **Yes**

Task 8: Verify Network Connectivity.

Step 1: Check connectivity between R2 router and PCs.

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

100 percent (5/5)



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

100 percent (5/5)

```
R2#ping 172.30.100.10
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 172.30.100.10, timeout is 2 seconds:
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/6/25 ms
```

Step 2: Check the connectivity between the PCs.

From PC1, is it possible to ping PC2? Yes

What is the success rate? 100%

```
C:\>ping 172.30.1.10
```

```
Pinging 172.30.1.10 with 32 bytes of data:
```

```
Reply from 172.30.1.10: bytes=32 time<1ms TTL=127
```

```
Reply from 172.30.1.10: bytes=32 time=1ms TTL=127
```

```
Reply from 172.30.1.10: bytes=32 time<1ms TTL=127
```

```
Reply from 172.30.1.10: bytes=32 time<1ms TTL=127
```

```
Ping statistics for 172.30.1.10:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

From PC1, is it possible to ping PC3? Yes

What is the success rate? 100%

```
C:\>ping 10.1.0.10
```

```
Pinging 10.1.0.10 with 32 bytes of data:
```

```
Reply from 10.1.0.10: bytes=32 time=2ms TTL=126
```

```
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126
```

```
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126
```

```
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126
```

```
Ping statistics for 10.1.0.10:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

From PC1, is it possible to ping PC4? Yes

What is the success rate? 100%

```
C:\>ping 172.30.100.10

Pinging 172.30.100.10 with 32 bytes of data:

Reply from 172.30.100.10: bytes=32 time=3ms TTL=125
Reply from 172.30.100.10: bytes=32 time=2ms TTL=125
Reply from 172.30.100.10: bytes=32 time=14ms TTL=125
Reply from 172.30.100.10: bytes=32 time=4ms TTL=125

Ping statistics for 172.30.100.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 14ms, Average = 5ms
```

From PC4, is it possible to ping PC2? Yes

What is the success rate? 100%

```
C:\>ping 172.30.1.10

Pinging 172.30.1.10 with 32 bytes of data:

Reply from 172.30.1.10: bytes=32 time=3ms TTL=125
Reply from 172.30.1.10: bytes=32 time=13ms TTL=125
Reply from 172.30.1.10: bytes=32 time=2ms TTL=125
Reply from 172.30.1.10: bytes=32 time=2ms TTL=125

Ping statistics for 172.30.1.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 13ms, Average = 5ms
```

From PC4, is it possible to ping PC3? Yes

What is the success rate? 100%

```
C:\>ping 10.1.0.10

Pinging 10.1.0.10 with 32 bytes of data:

Reply from 10.1.0.10: bytes=32 time=1ms TTL=126
Reply from 10.1.0.10: bytes=32 time=2ms TTL=126
Reply from 10.1.0.10: bytes=32 time=64ms TTL=126
Reply from 10.1.0.10: bytes=32 time=35ms TTL=126

Ping statistics for 10.1.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 64ms, Average = 25ms
```

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.

R1#show running-config

Building configuration...

Current configuration : 901 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
password cisco
login
!
!
!
end

```

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, 00:00:10, 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, 00:00:10, Serial0/0/0
R    172.30.110.0/24 [120/2] via 209.165.200.229, 00:00:10, Serial0/0/0
R    172.30.200.16/28 [120/2] via 209.165.200.229, 00:00:10, Serial0/0/0
R    172.30.200.32/28 [120/2] via 209.165.200.229, 00:00:10, 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, 00:00:10, Serial0/0/0

```

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	unset	administratively down	down

R1#show ip protocols

Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 2 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	00:00:01

Distance: (default is 120)

R2#show running-config

Building configuration...

Current configuration : 847 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
password cisco
login
!
!
!
end

```

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, 00:00:21, Serial0/0/0
R    172.30.2.0/24 [120/1] via 209.165.200.230, 00:00:21, 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#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	unset	administratively down	down

R2#show ip protocols

Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 23 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:

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	00:00:02
209.165.200.234	120	00:00:22

Distance: (default is 120)

R3#show running-config

Building configuration...

Current configuration : 1027 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
password cisco
login
!
!
!
end

```

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, 00:00:03, 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, 00:00:03, Serial0/0/1
R    172.30.2.0/24 [120/2] via 209.165.200.233, 00:00:03, 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, 00:00:03, Serial0/0/1
C    209.165.200.232 is directly connected, Serial0/0/1

```

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	unset	administratively down	down

R3#show ip protocols

Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 21 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	00:00:16

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.

