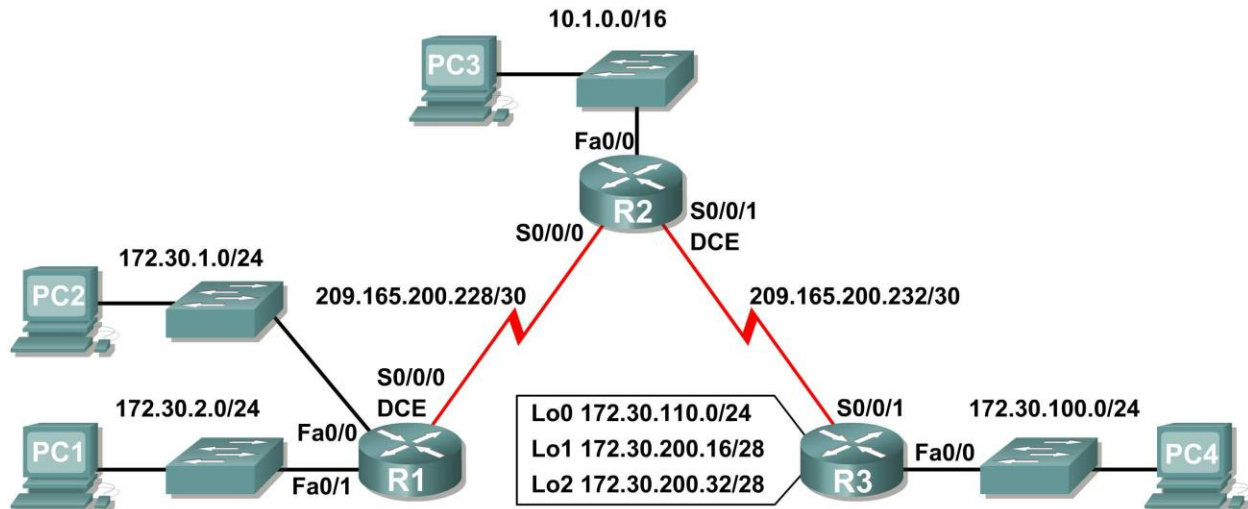


## CEL 51, DCCN, Monsoon 2020

### 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       | 172.30.1.10     | 255.255.255.0   | 172.30.2.1      |
| PC2    | NIC       | 172.30.2.10     | 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.

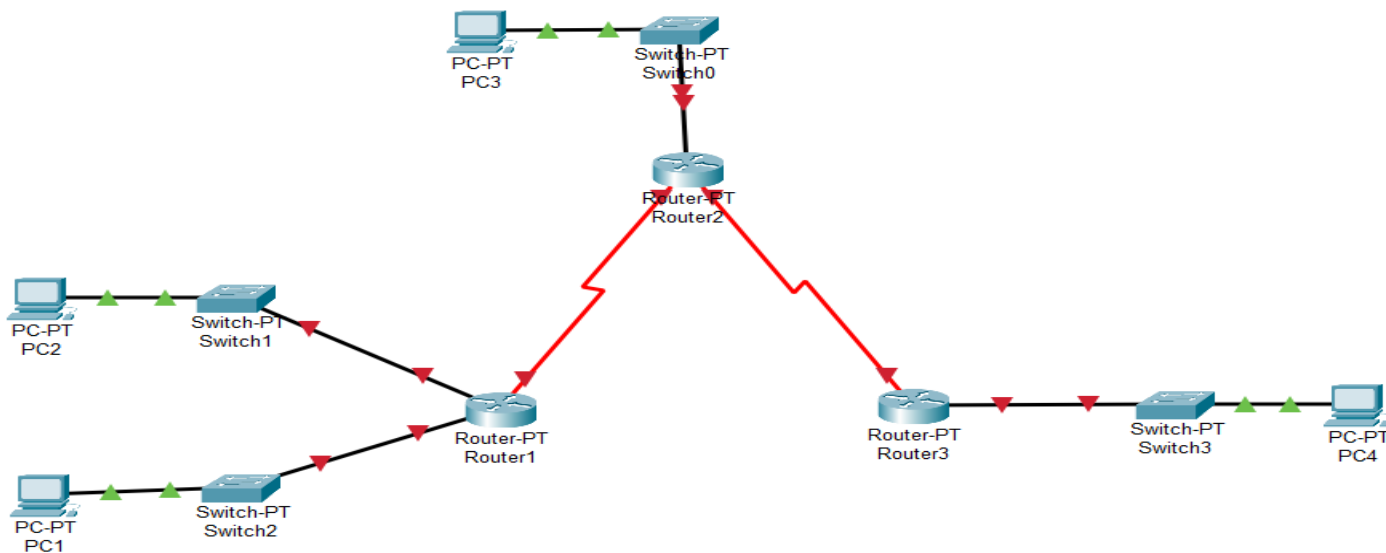
## Scenario

The network shown in the Topology Diagram contains a discontinuous network, 172.30.0.0. This network has been sub netted 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.

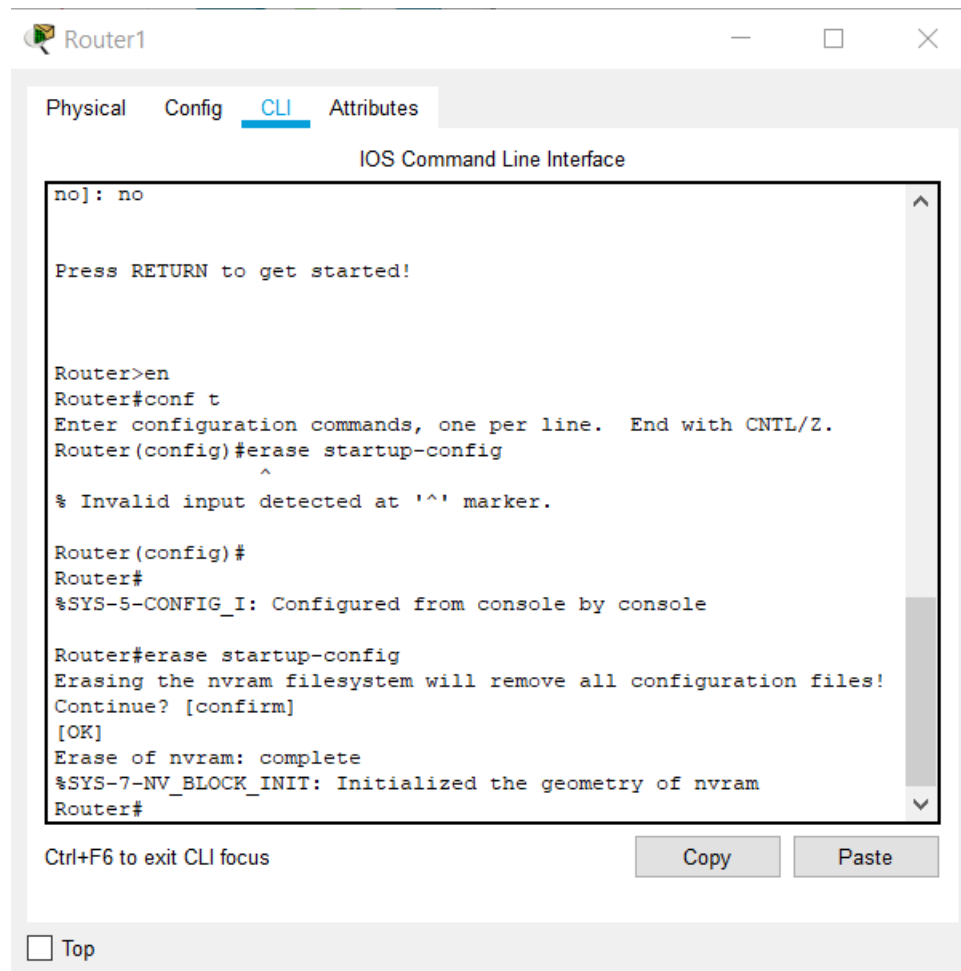
Cable a network that is similar to the one in the Topology Diagram.



## 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.

Router 1



The screenshot shows a web-based interface for Router1. At the top, there are tabs for 'Physical', 'Config', 'CLI' (which is selected), and 'Attributes'. Below the tabs is a terminal window titled 'IOS Command Line Interface'. The terminal shows the following sequence of commands and responses:

```
no]: no

Press RETURN to get started!

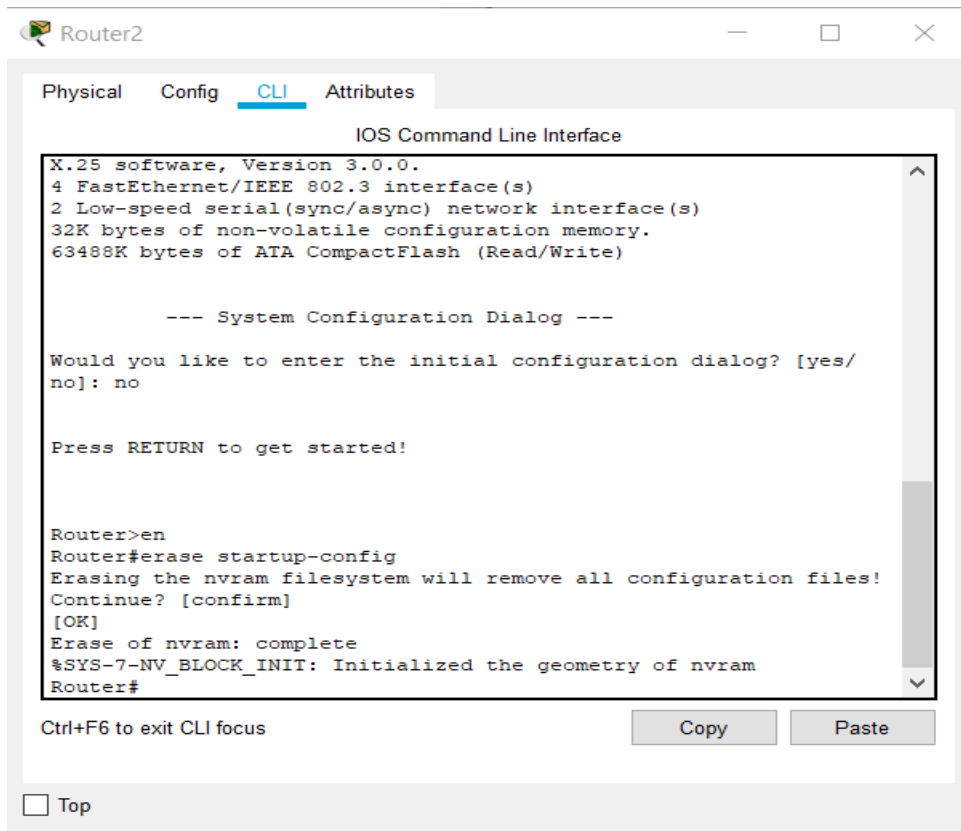
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#erase startup-config
      ^
% Invalid input detected at '^' marker.

Router(config)#
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#
```

Below the terminal window, there is a text label 'Ctrl+F6 to exit CLI focus' and two buttons: 'Copy' and 'Paste'. At the bottom left of the interface, there is a checkbox labeled 'Top'.

## Router 2



The screenshot shows the Router2 CLI window with the 'CLI' tab selected. The interface displays system information, a configuration dialog, and the execution of the 'erase startup-config' command. The command output indicates that the nvram filesystem has been successfully erased and the geometry has been initialized. Below the CLI window, there are buttons for 'Copy' and 'Paste', and a 'Top' link.

Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
X.25 software, Version 3.0.0.
4 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
32K bytes of non-volatile configuration memory.
63488K bytes of ATA CompactFlash (Read/Write)

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

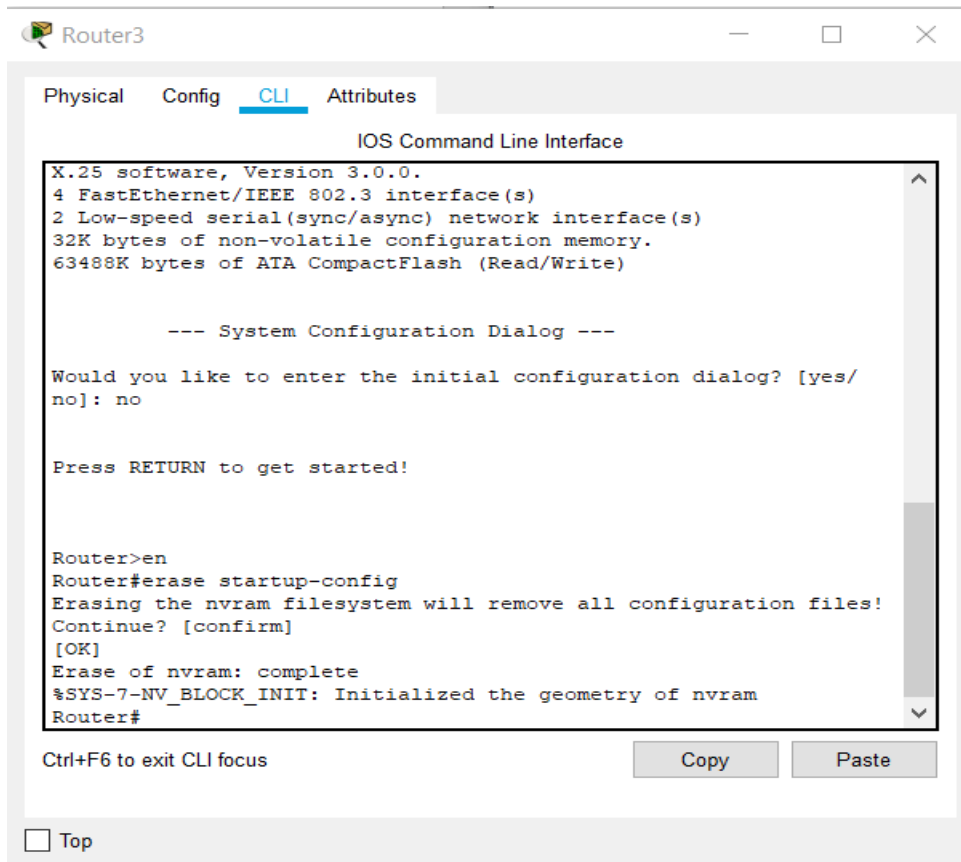
Router>en
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

## Router 3



The screenshot shows the Router3 CLI window with the 'CLI' tab selected. The interface displays system information, a configuration dialog, and the execution of the 'erase startup-config' command. The command output indicates that the nvram filesystem has been successfully erased and the geometry has been initialized. Below the CLI window, there are buttons for 'Copy' and 'Paste', and a 'Top' link.

Router3

Physical Config **CLI** Attributes

IOS Command Line Interface

```
X.25 software, Version 3.0.0.
4 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
32K bytes of non-volatile configuration memory.
63488K bytes of ATA CompactFlash (Read/Write)

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>en
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

## 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
```

Router1

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

FastEthernet0/0

Port Status

☒ On

Bandwidth

☐ 100 Mbps☐ 10 Mbps

☒ Auto

Duplex

☐ Half Duplex☐ Full Duplex

☒ Auto

MAC Address

000B.BE51.A5B4

IP Configuration

IP Address

172.30.1.1

Subnet Mask

255.255.255.0

Tx Ring Limit

10

Equivalent IOS Commands

R1(config)#interface FastEthernet0/0

R1(config-if)#ip address 172.30.1.1 255.255.0.0

R1(config-if)#no ip address

R1(config-if)#ip address 172.30.1.1 255.255.0.0

R1(config-if)#ip address 172.30.1.1 255.255.255.0

R1(config-if)#no shutdown

R1(config-if)#

☐ Top

Router1

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

FastEthernet1/0

Port Status

☒ On

Bandwidth

☐ 100 Mbps☐ 10 Mbps

☒ Auto

Duplex

☐ Half Duplex☐ Full Duplex

☒ Auto

MAC Address

0000.0C61.53D2

IP Configuration

IP Address

172.30.2.1

Subnet Mask

255.255.255.0

Tx Ring Limit

10

Equivalent IOS Commands

R1(config-if)#no shutdown

R1(config-if)#

%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up

☐ Top

| Serial2/0        |  |
|------------------|--|
| Port Status      | <input checked="" type="checkbox"/> On |
| Duplex           | <input type="radio"/> Full Duplex      |
| Clock Rate       | 4800                                   |
| IP Configuration |  |
| IP Address       | 209.165.200.230                        |
| Subnet Mask      | 255.255.255.252                        |
| Tx Ring Limit    | 10                                     |

## Equivalent IOS Commands

```
R1(config-if)#  
R1(config-if)#exit  
R1(config)#interface Serial2/0  
R1(config-if)#tx-ring-limit 6400  
R1(config-if)#tx-ring-limit 10  
R1(config-if)#clock rate 4800  
R1(config-if)#
```

☐ Top

## IOS Command Line Interface

```
R1(config)#int Serial0/0/0  
^  
% Invalid input detected at '^' marker.  
  
R1(config)#int Serial2/0  
R1(config-if)#clock rate 6400  
Unknown clock rate  
R1(config-if)#  
R1(config-if)#exit  
R1(config)#interface Serial2/0  
R1(config-if)#tx-ring-limit 6400  
R1(config-if)#tx-ring-limit 10  
R1(config-if)#clock rate 4800  
R1(config-if)#  
R1(config-if)#exit  
R1(config)#router rip  
R1(config-router)#passive-interface FastEthernet0/0  
R1(config-router)#passive-interface FastEthernet0/1  
%Invalid interface type and number  
R1(config-router)#  
R1(config-router)#end  
R1#configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
R1(config)#interface Serial2/0
```

Ctrl+F6 to exit CLI focus

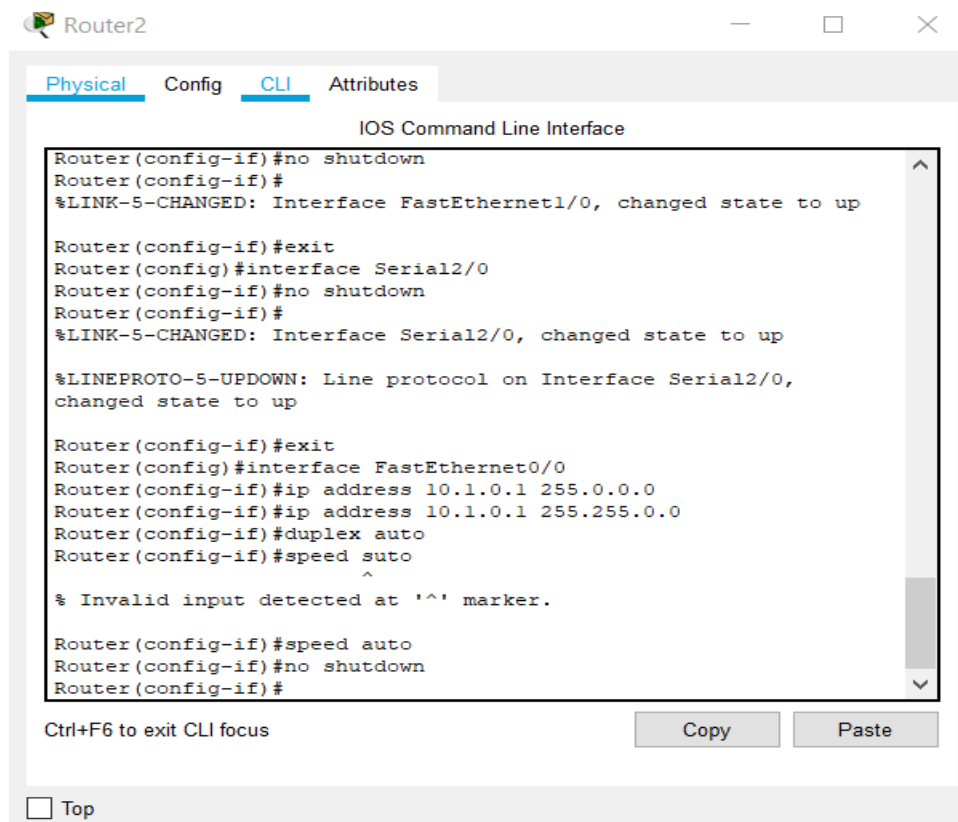
Copy

Paste

☐ Top

**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
```





Router2

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

Serial2/0

Port Status

☒ On

Duplex

☐ Full Duplex

Clock Rate

1200

IP Configuration

IP Address

209.165.200.233

Subnet Mask

255.255.255.252

Tx Ring Limit

10

Equivalent IOS Commands

changed state to up  
ip address 209.165.200.229 255.255.255.252  
Router(config-if)#ip address 209.165.200.229 255.255.255.252  
Router(config-if)#  
Router(config-if)#exit  
Router(config)#interface Serial2/0  
Router(config-if)#

☐ Top

Router2

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

Serial3/0

Port Status

☒ On

Duplex

☐ Full Duplex

Clock Rate

1200

IP Configuration

IP Address

209.165.200.229

Subnet Mask

255.255.255.252

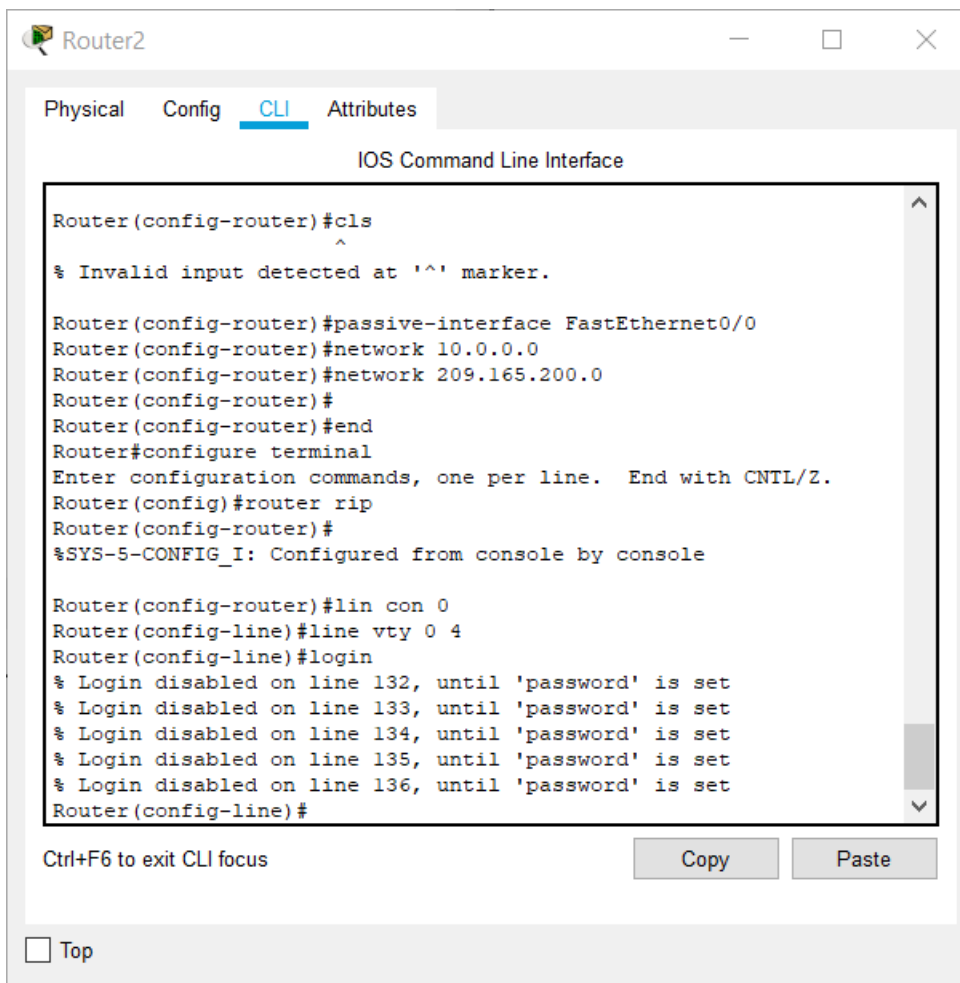
Tx Ring Limit

10

Equivalent IOS Commands

%LINK-5-CHANGED: Interface Serial3/0, changed state to up  
ip address 209.165.200.229 255.255.255.252  
Router(config-if)#  
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0,  
changed state to up  
ip address 209.165.200.229 255.255.255.252  
Router(config-if)#

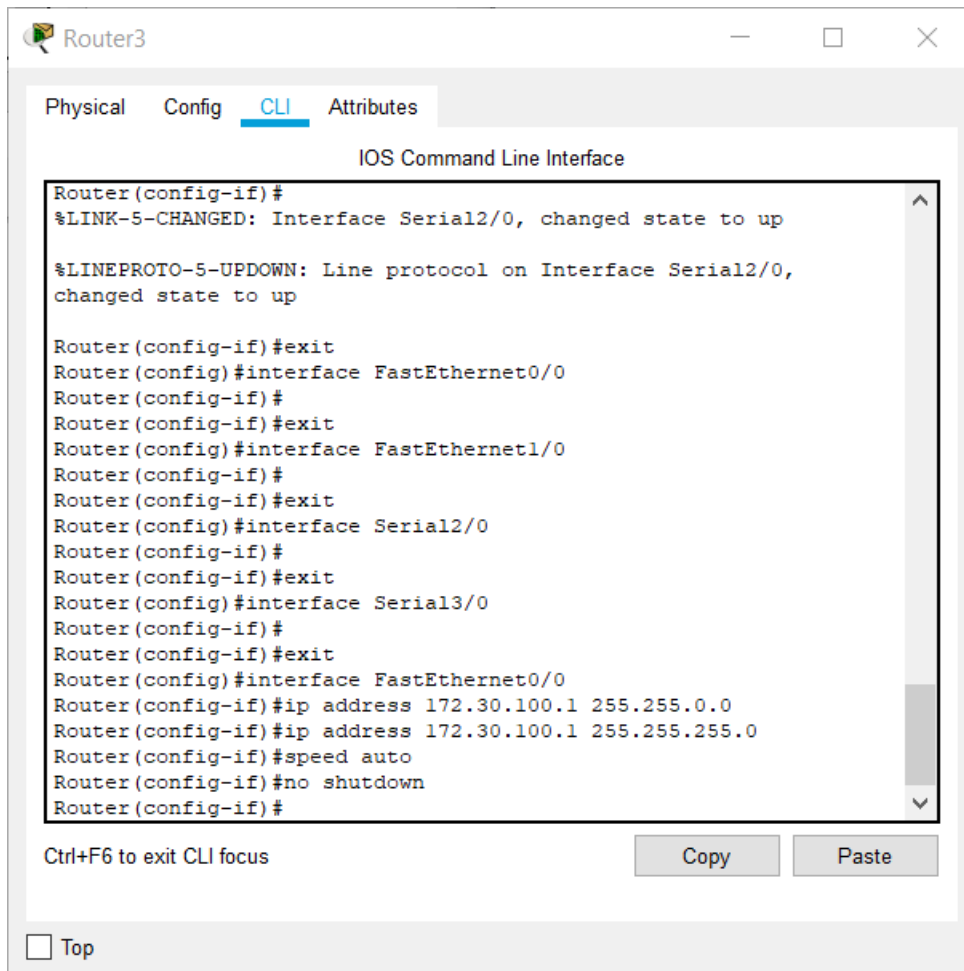
☐ Top

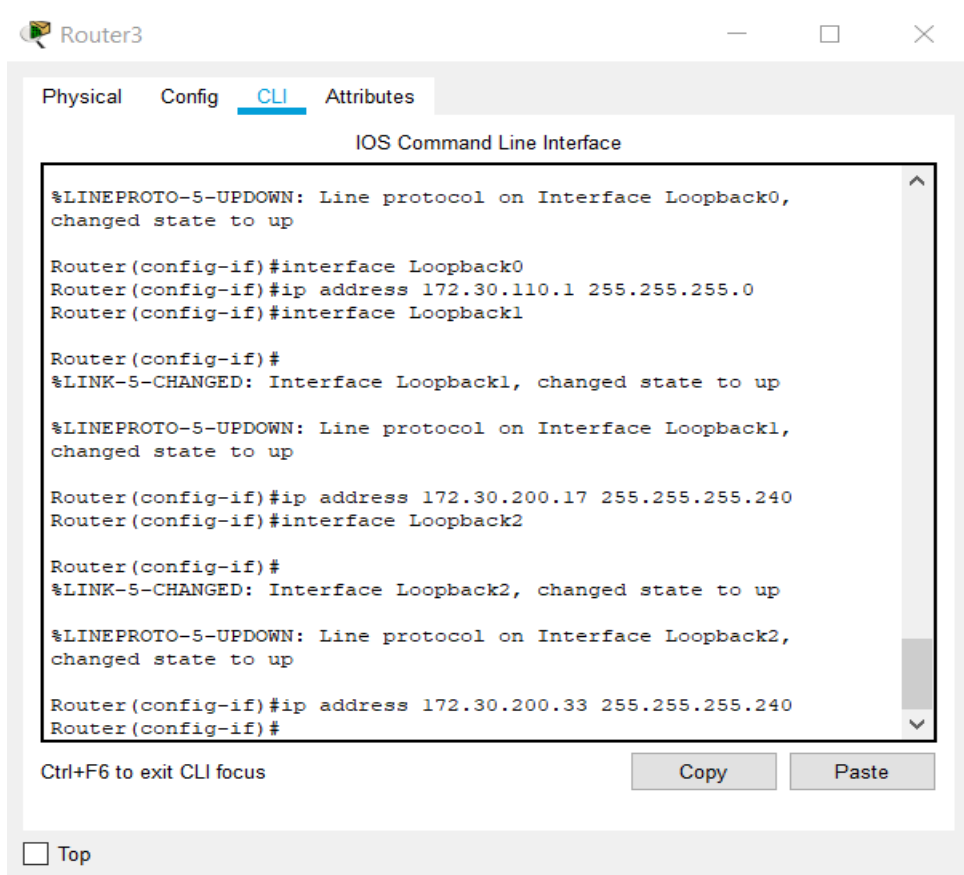
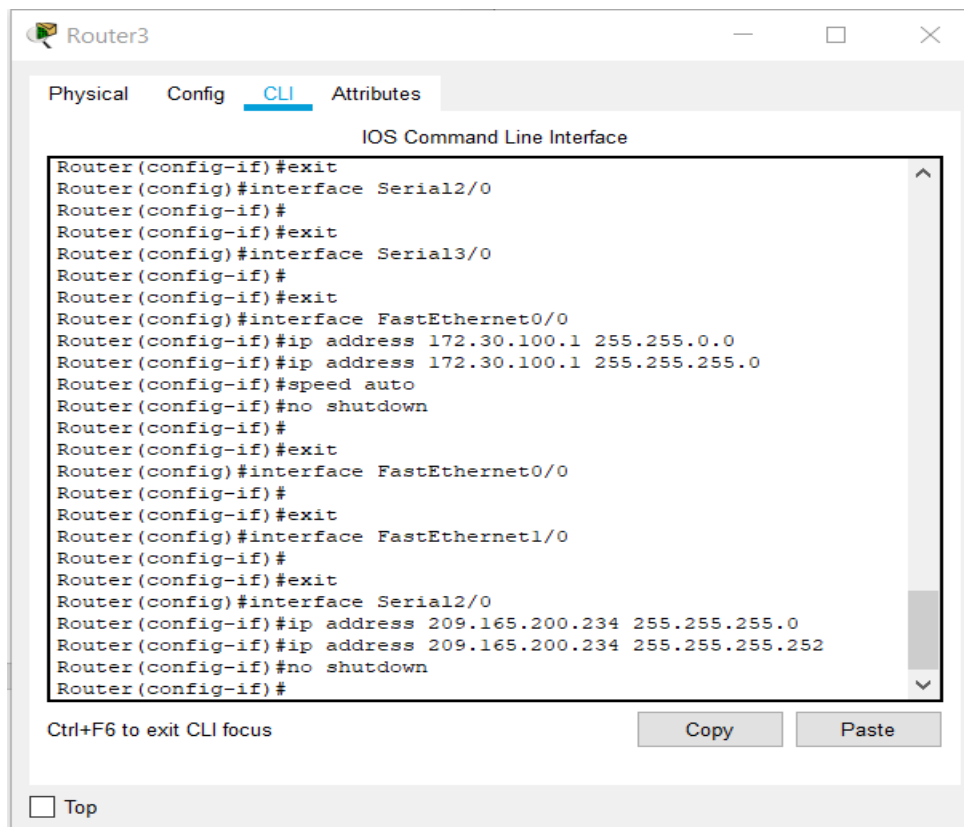


**Step 3: Load the following script onto R3.**

```
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
```





Router3

Physical Config CLI Attributes

IOS Command Line Interface

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback2,
changed state to up

Router(config-if)#ip address 172.30.200.33 255.255.255.240
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#passive-interface FastEthernet0/0
Router(config-router)#network 172.30.0.0
Router(config-router)#network 209.165.200.0
Router(config-router)#
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial2/0
Router(config-if)#
%SYS-5-CONFIG_I: Configured from console by console

Router(config-if)#exit
Router(config)#router rip
Router(config-router)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

Router3

Physical Config CLI Attributes

IOS Command Line Interface

```
Router(config-router)#network 172.30.0.0
Router(config-router)#network 209.165.200.0
Router(config-router)#
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial2/0
Router(config-if)#
%SYS-5-CONFIG_I: Configured from console by console

Router(config-if)#exit
Router(config)#router rip
Router(config-router)#line con 0
Router(config-line)#line vty 0 4
Router(config-line)#login
% Login disabled on line 132, until 'password' is set
% Login disabled on line 133, until 'password' is set
% Login disabled on line 134, until 'password' is set
% Login disabled on line 135, until 'password' is set
% Login disabled on line 136, until 'password' is set
Router(config-line)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

Ctrl+F6 to exit CLI focus

Copy Paste

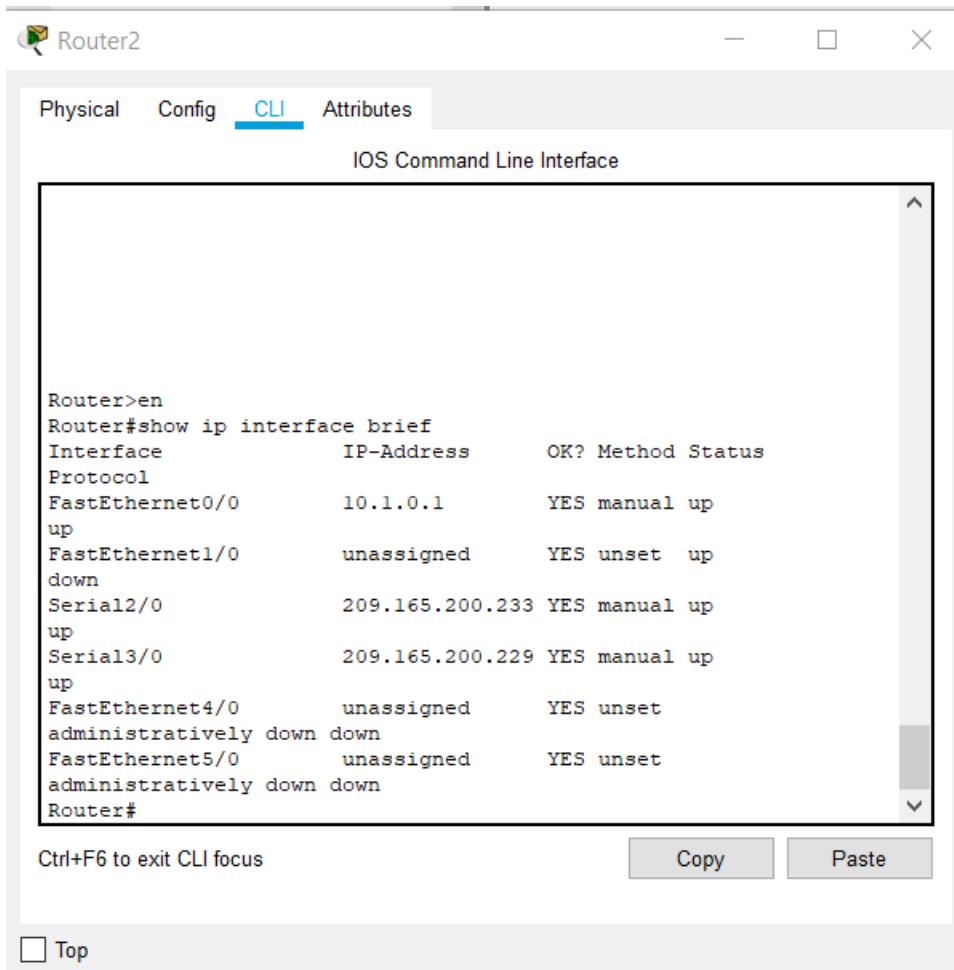
☐ Top

### 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.

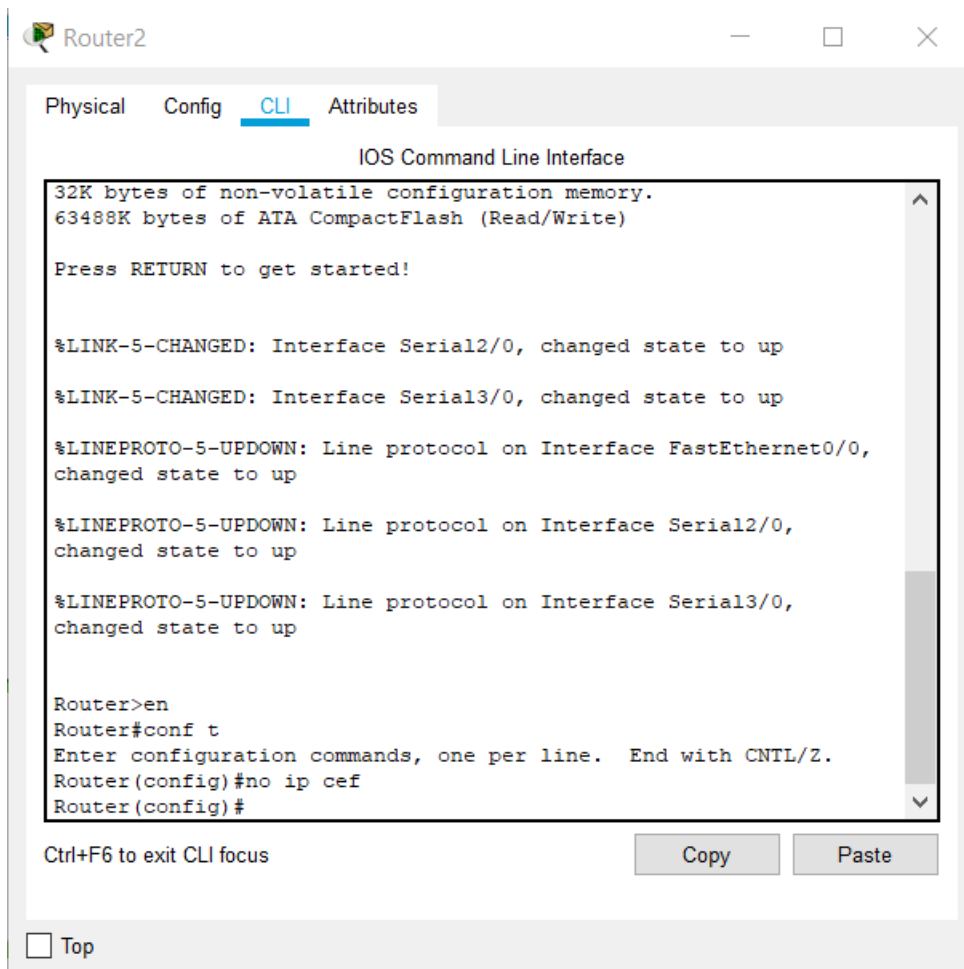
```
R2#show ip interface brief
```



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

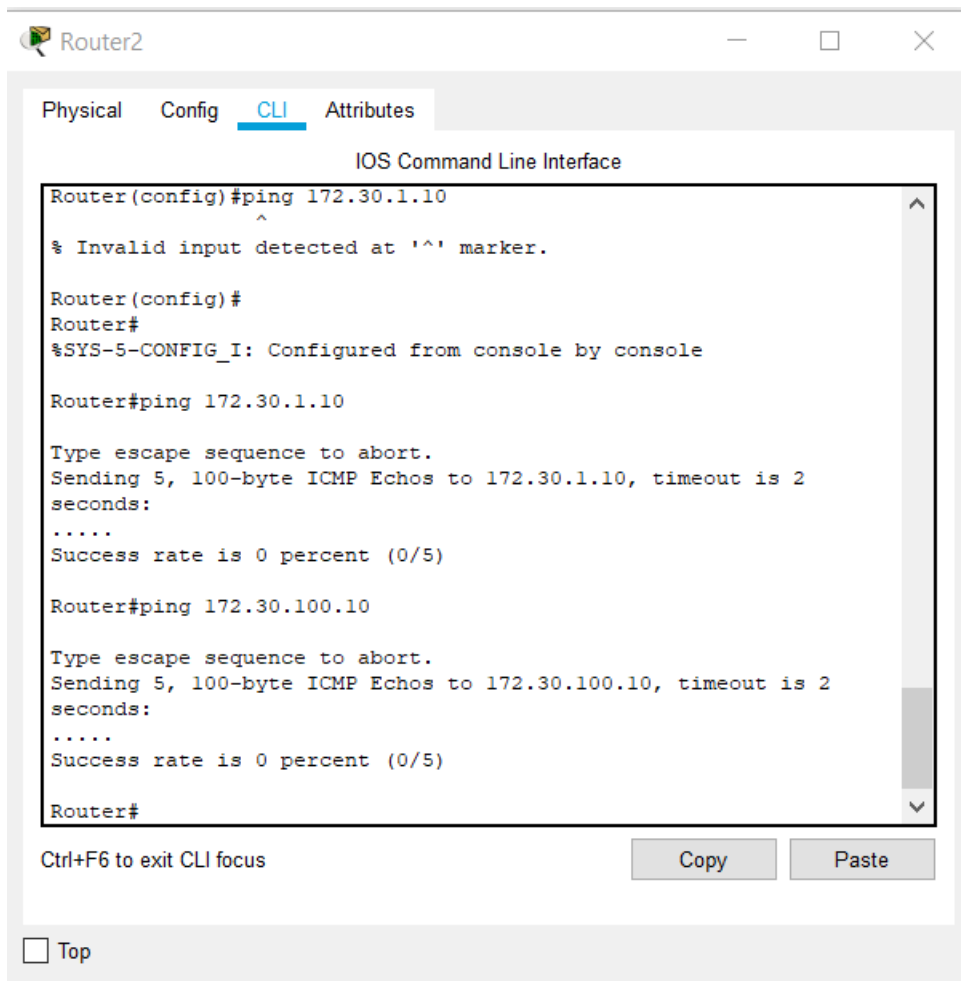
Note: For the 1841 router, you will need to disable IP CEF to obtain the correct output from the `ping` command. Although a discussion of IP CEF is beyond the scope of this course, you may disable IP CEF by using the following command in global configuration mode:

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



From the R2 router, how many ICMP messages are successful when pinging PC1? 0

From the R2 router, how many ICMP messages are successful when pinging PC4? 0



### Step 3: Check the connectivity between the PCs.

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

What is the success rate? 3/4

From the PC1, is it possible to ping PC3? No

What is the success rate? 0/4

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

What is the success rate? 0/4

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

What is the success rate? 0/4

From the PC4, is it possible to ping PC3? No

What is the success rate? 0/4

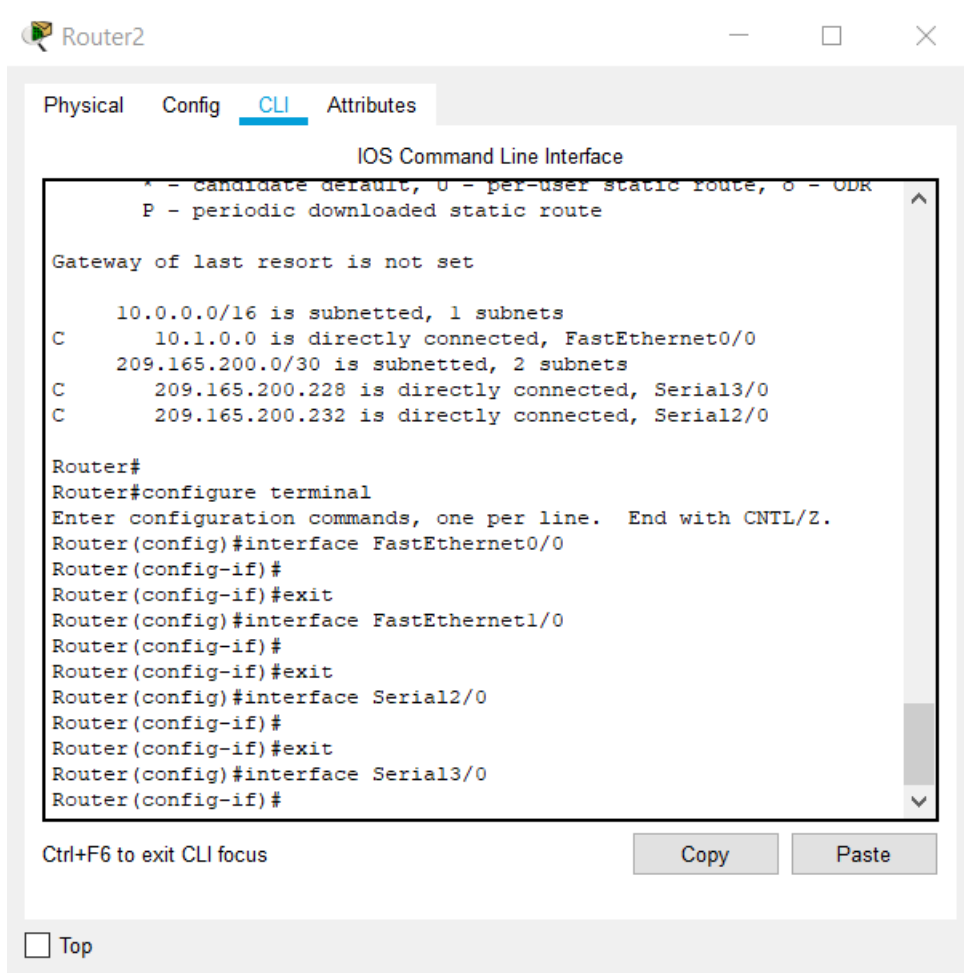
### Step 4: View the routing table on R2.

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.

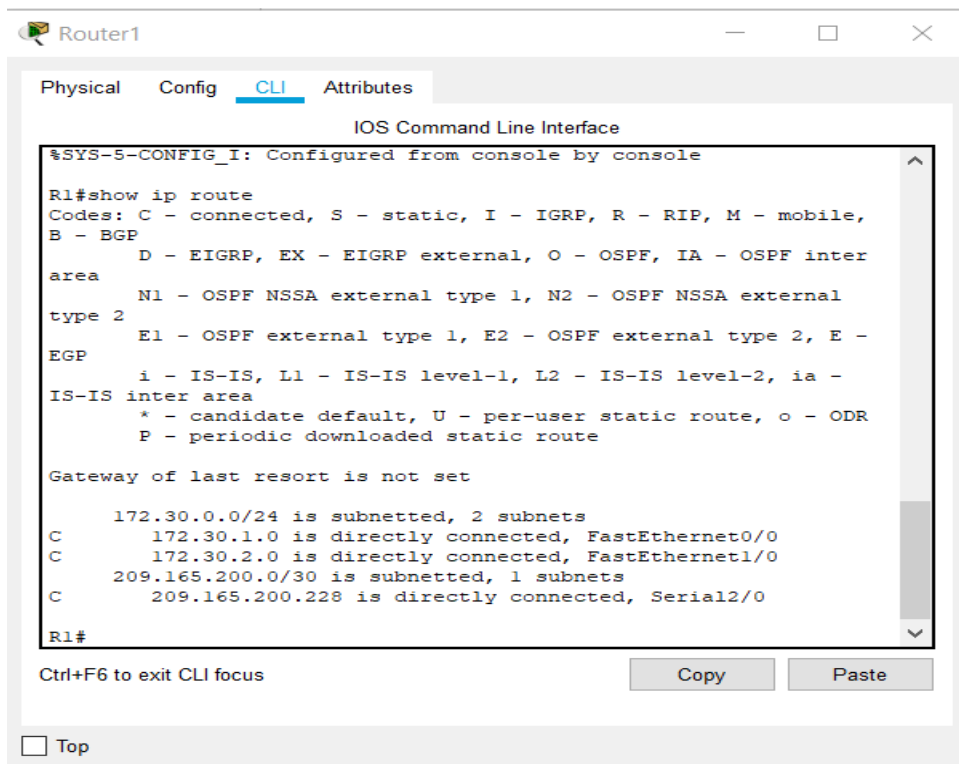
```
R2#show ip route
```



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

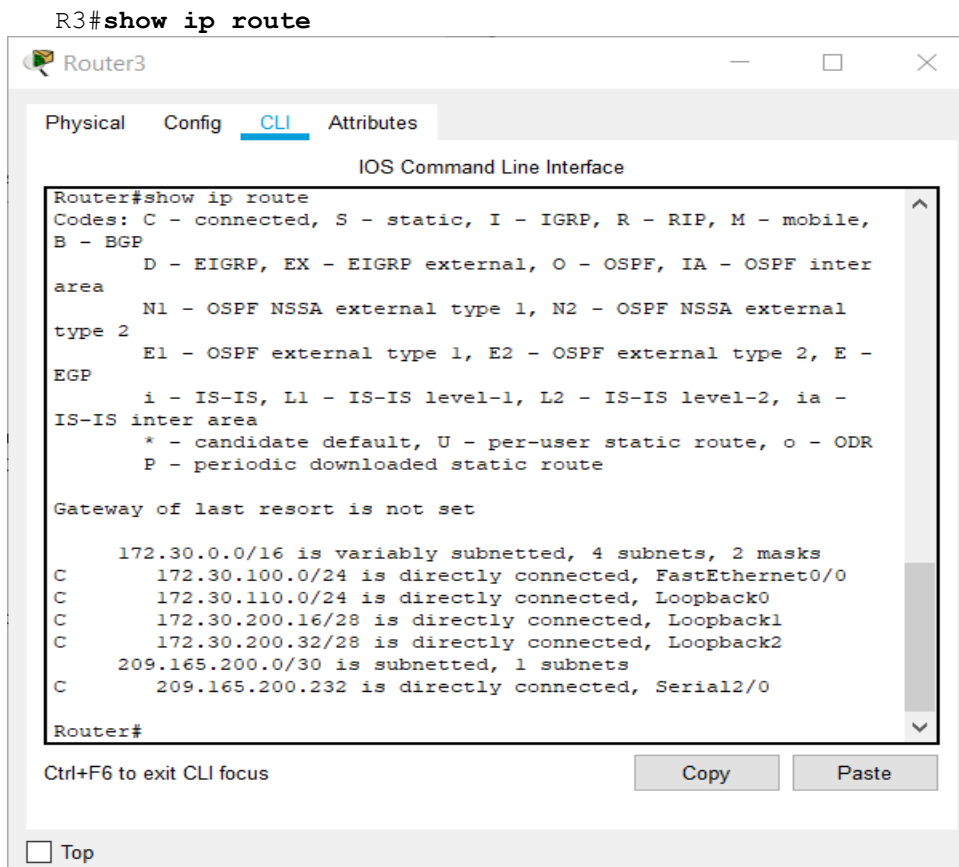
Both R1 and R3 are configured with interfaces on a discontinuous network, 172.30.0.0. The 172.30.0.0 subnets are physically and logically divided by at least one other classful or major network—in this case, the two serial networks 209.165.200.228/30 and 209.165.200.232/30. Classful routing protocols 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.

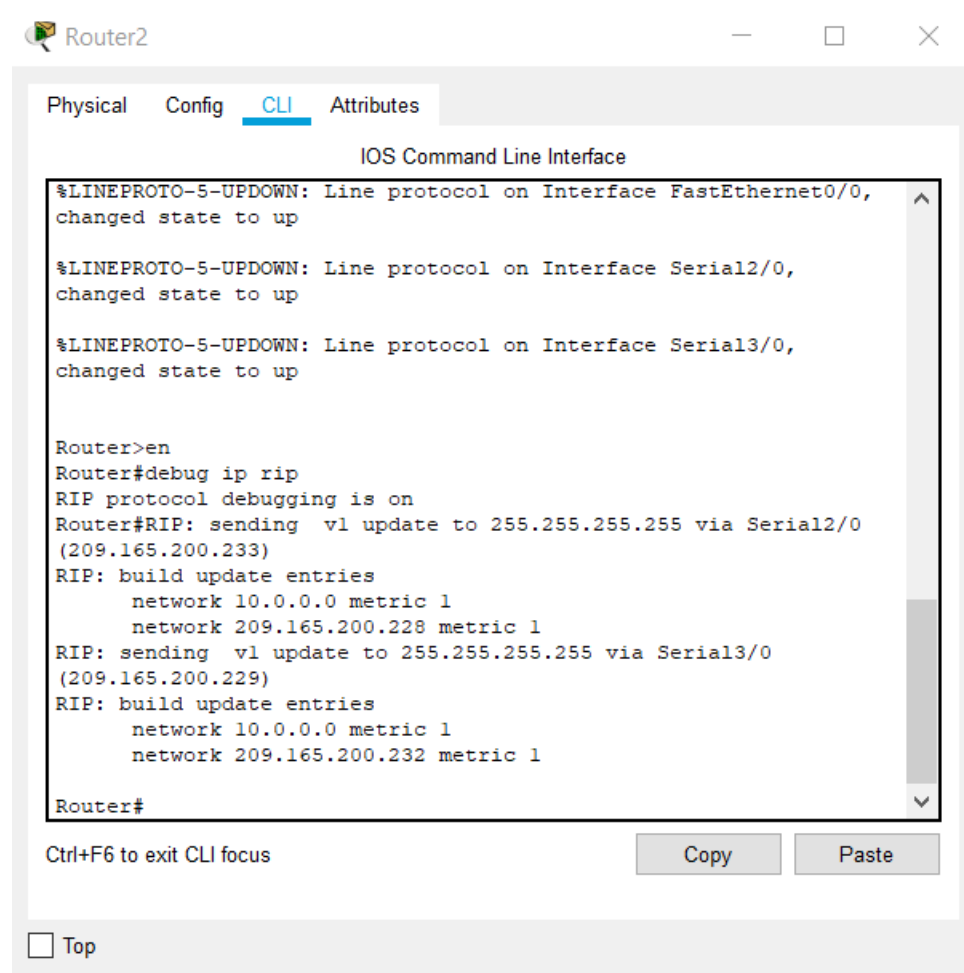


### Step 7: Examine the RIPv1 packets that are being received by R2.

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.

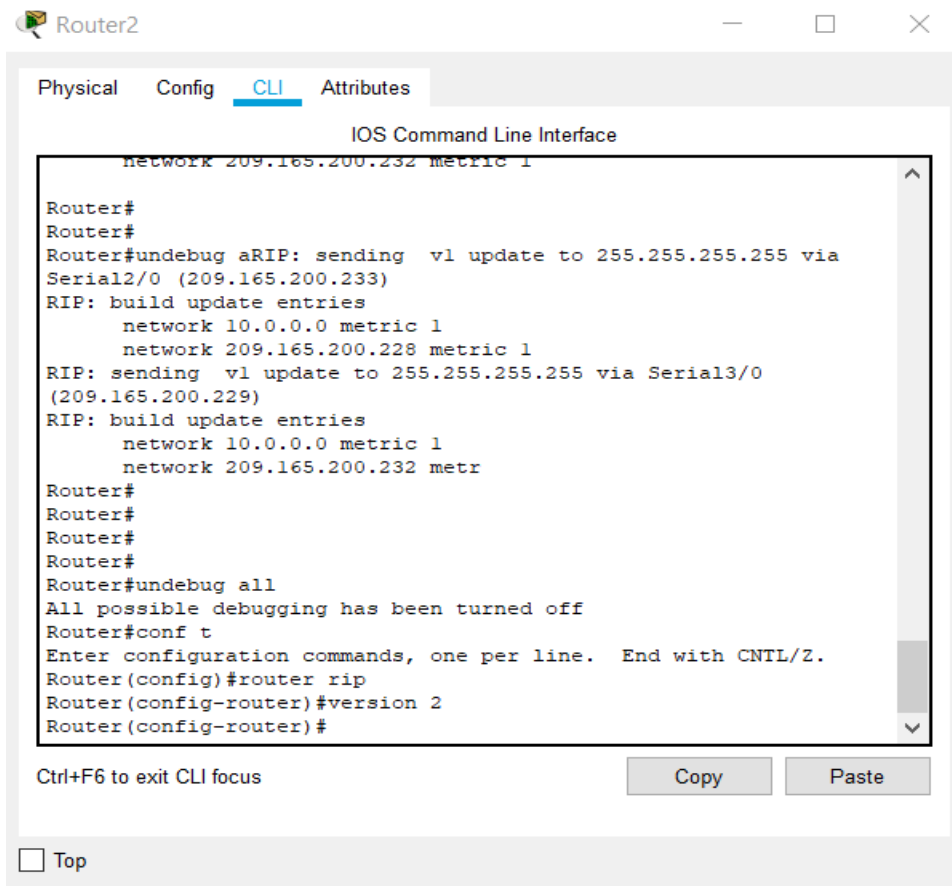
```
R2#undebug all
```

### 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**



Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
network 209.165.200.232 metric 1
Router#
Router#
Router#undebg aRIP: sending v1 update to 255.255.255.255 via
Serial2/0 (209.165.200.233)
RIP: build update entries
    network 10.0.0.0 metric 1
    network 209.165.200.228 metric 1
RIP: sending v1 update to 255.255.255.255 via Serial3/0
(209.165.200.229)
RIP: build update entries
    network 10.0.0.0 metric 1
    network 209.165.200.232 metr
Router#
Router#
Router#
Router#
Router#undebg all
All possible debugging has been turned off
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#
```

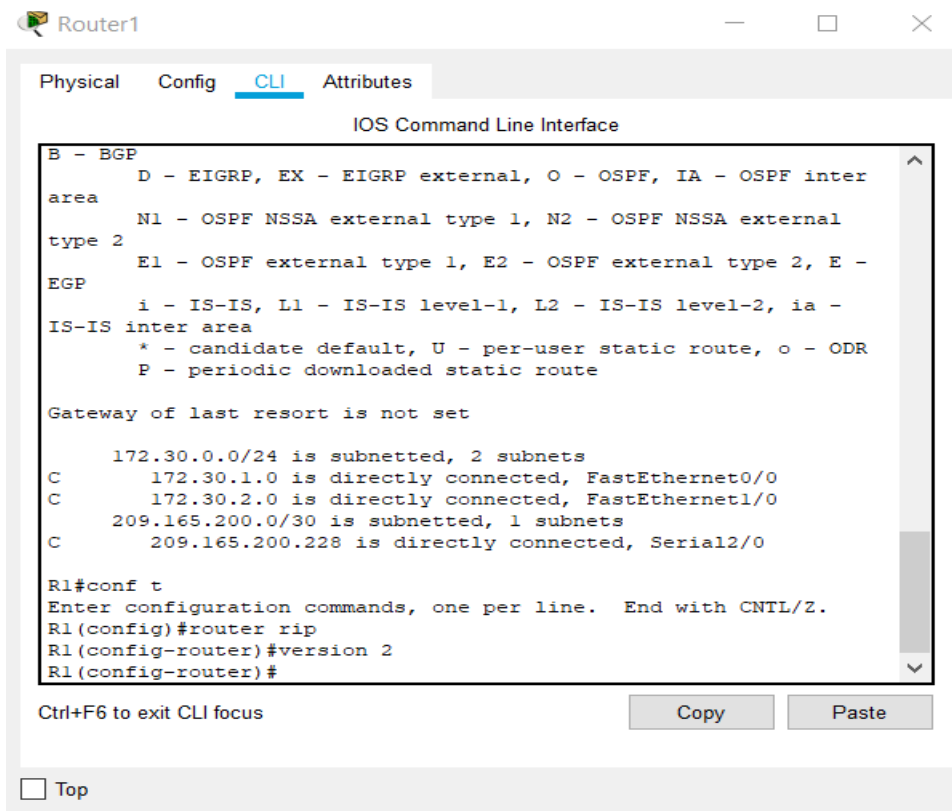
Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

R1(config)#**router rip**

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



Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
B - BGP
    D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter
area
    N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external
type 2
    E1 - OSPF external type 1, E2 - OSPF external type 2, E -
EGP
    i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia -
IS-IS inter area
    * - candidate default, U - per-user static route, o - ODR
    P - periodic downloaded static route
Gateway of last resort is not set

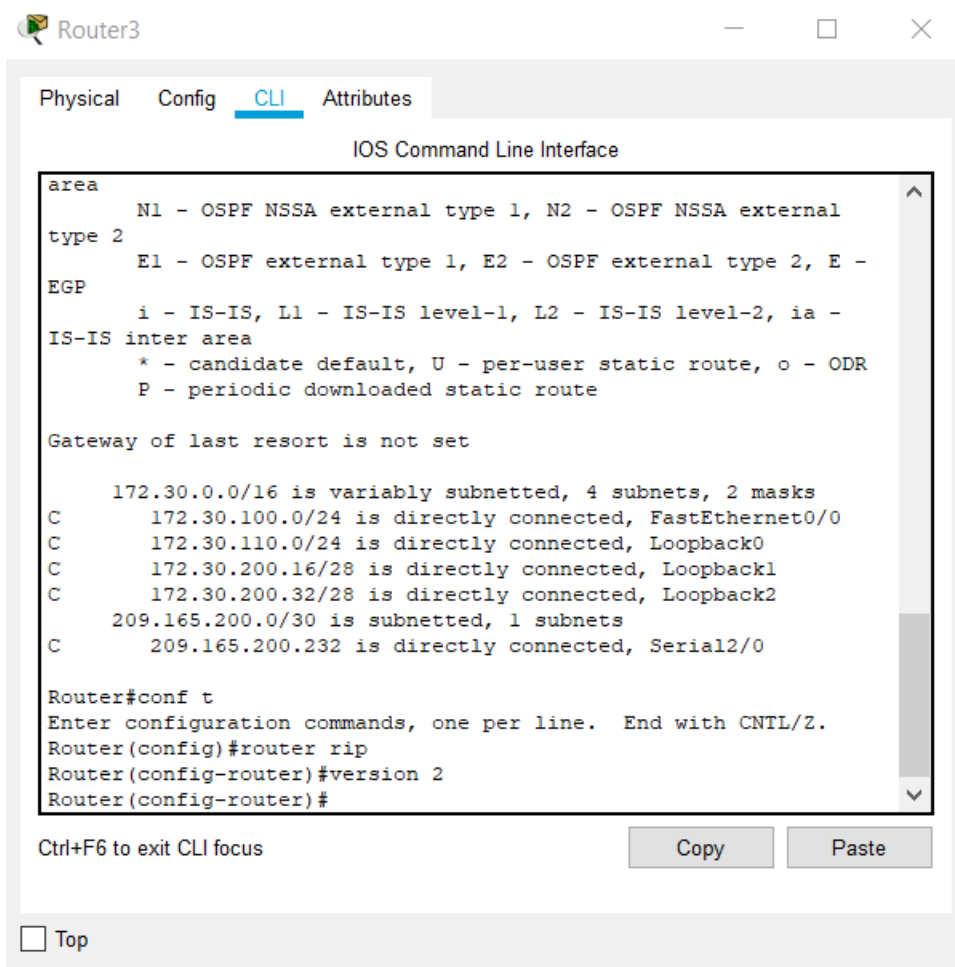
    172.30.0.0/24 is subnetted, 2 subnets
C      172.30.1.0 is directly connected, FastEthernet0/0
C      172.30.2.0 is directly connected, FastEthernet1/0
    209.165.200.0/30 is subnetted, 1 subnets
C      209.165.200.228 is directly connected, Serial2/0
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

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

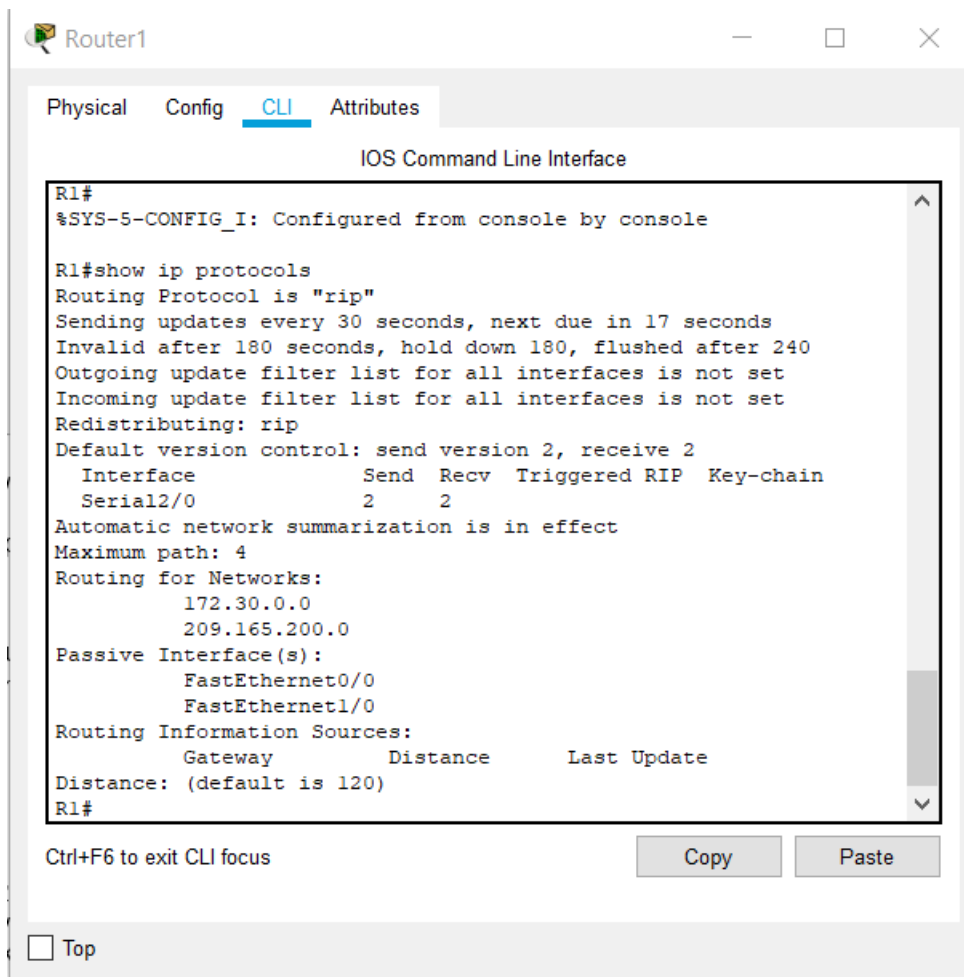


RIPv2 messages include the subnet mask in a field in the routing updates. This allows subnets and their masks to be included in the routing updates. However, by default RIPv2 summarizes networks at major network boundaries, just like RIPv1, except that the subnet mask is included in the update.

## 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.

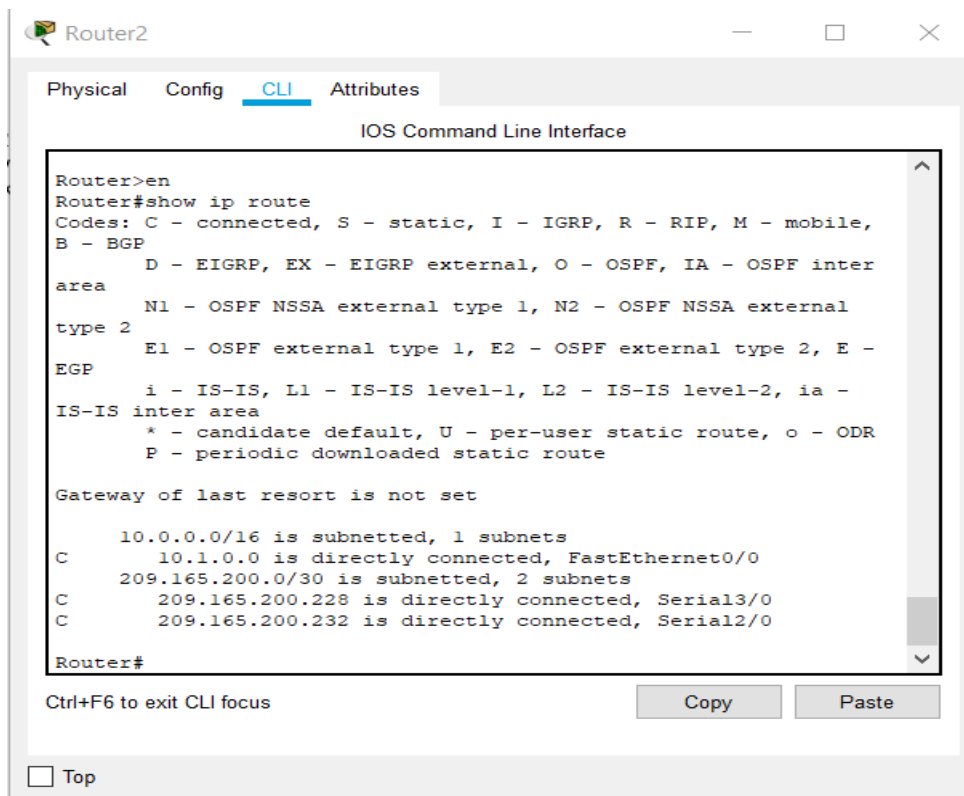
```
R1# show ip protocols
```



### Task 5: Examine the Automatic Summarization of Routes.

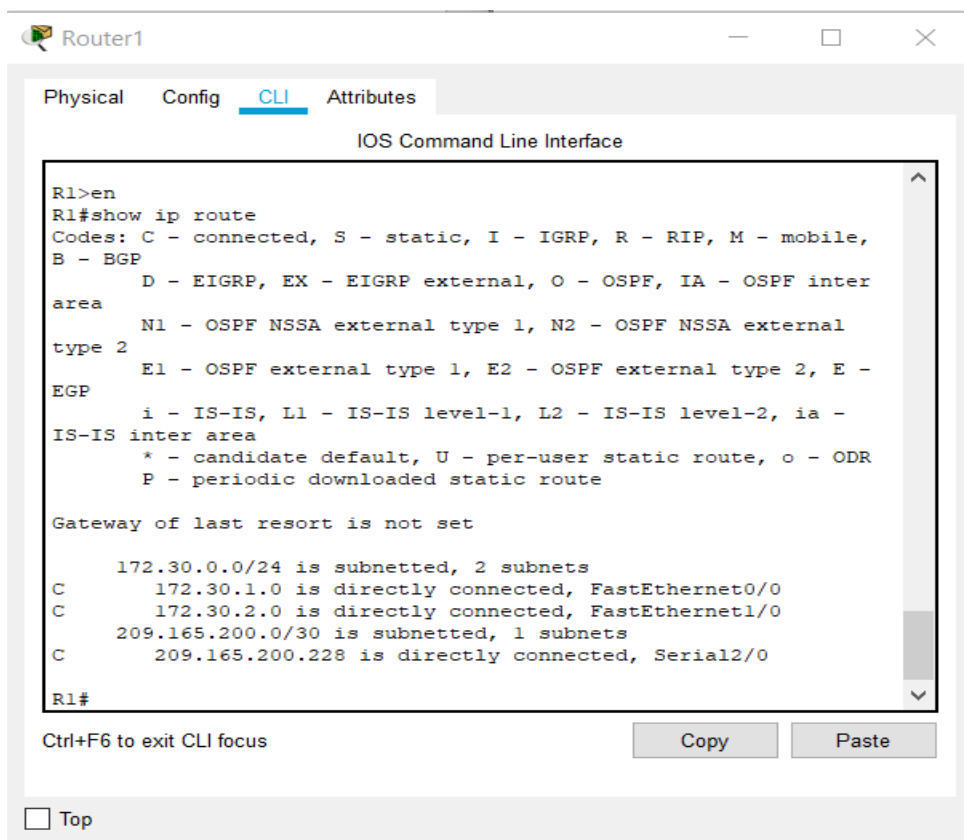
The LANs connected to R1 and R3 are still composed of discontinuous networks. R2 still shows two equal cost paths to the 172.30.0.0/16 network in the routing table. R2 still shows only the major classful network address of 172.30.0.0 and does not show any of the subnets for this network.

```
R2#show ip route
```



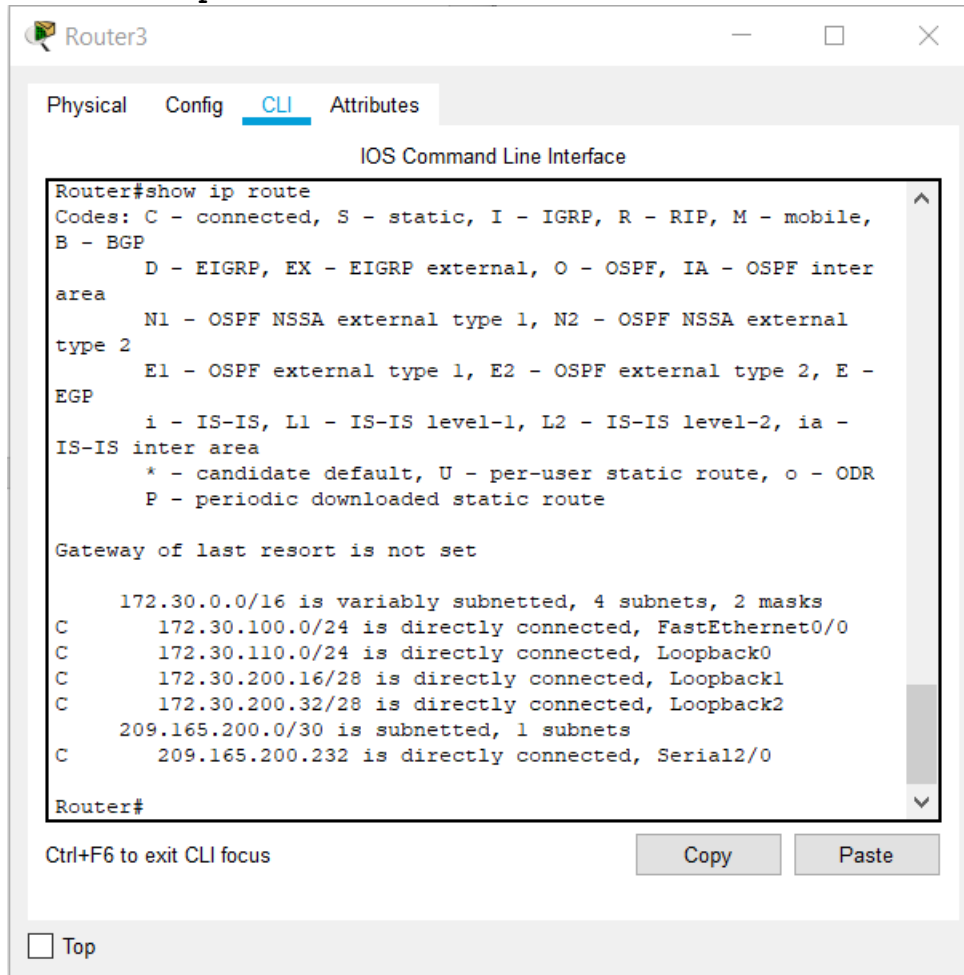
R1 still shows only its own subnets for the 172.30.0.0 network. R1 still does not have any routes for the 172.30.0.0 subnets on R3.

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**



The screenshot shows a window titled "Router3" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The command "Router#show ip route" has been entered, and the output is shown in a scrollable text area. The output lists various route codes and their meanings, followed by the specific routes known to Router3. The routes listed are:

- 172.30.0.0/16 is variably subnetted, 4 subnets, 2 masks
- 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, 1 subnets
- C 209.165.200.232 is directly connected, Serial2/0

The prompt "Router#" is visible at the bottom of the text area. Below the text area, there is a "Ctrl+F6 to exit CLI focus" label and "Copy" and "Paste" buttons. At the bottom left of the window, there is a "Top" button.



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?

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

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

(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

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.

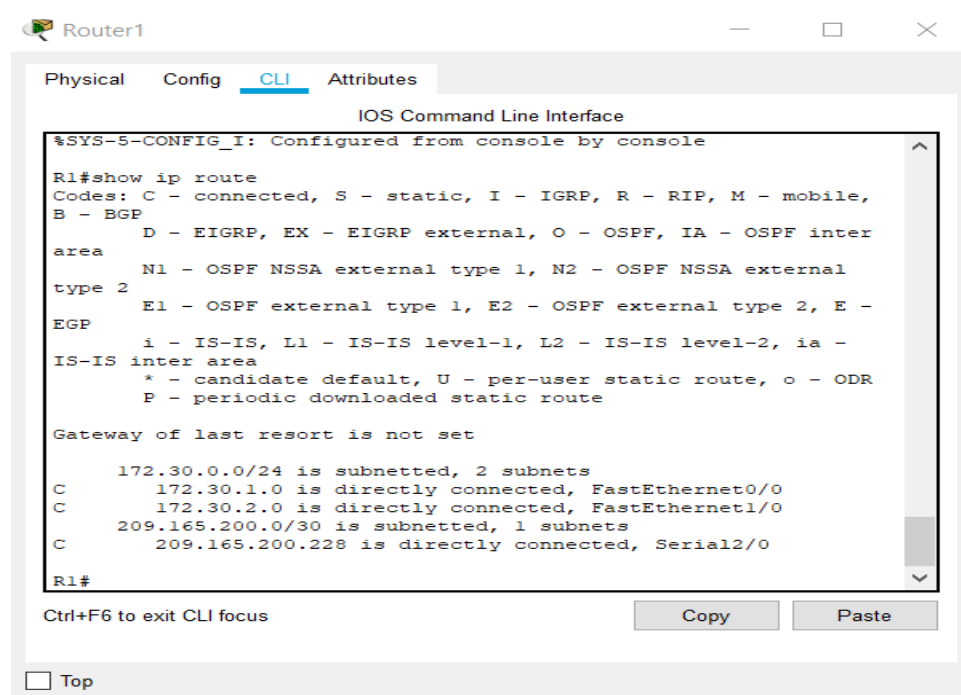
The `no auto-summary` command is used to turn off automatic summarization in RIPv2. Disable auto summarization on all routers. The routers will no longer summarize routes at major network boundaries.

```
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:

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

(209.165.200.230)

RIP: build update entries

172.30.1.0/24 via 0.0.0.0, metric 1, tag 0

172.30.2.0/24 via 0.0.0.0, metric 1, tag 0

RIP: sending v2 update to 224.0.0.9 via Serial2/0

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

(209.165.200.230)

RIP: build update entries

172.30.1.0/24 via 0.0.0.0, metric 1, tag 0

172.30.2.0/24 via 0.0.0.0, metric 1, tag 0

RIP: sending v2 update to 224.0.0.9 via Serial2/0

Are the subnet masks now included in the routing updates? No

## 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?

0/5

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

0/5

### Step 2: Check the connectivity between the PCs.

From PC1, is it possible to ping PC2? Yes

What is the success rate? 3/4

From PC1, is it possible to ping PC3? No

What is the success rate? 0/4

From PC1, is it possible to ping PC4? No

What is the success rate? 0/4

From PC4, is it possible to ping PC2? Yes

What is the success rate? 4/4

From PC4, is it possible to ping PC3? No

What is the success rate? 0/4

### **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.

### **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.