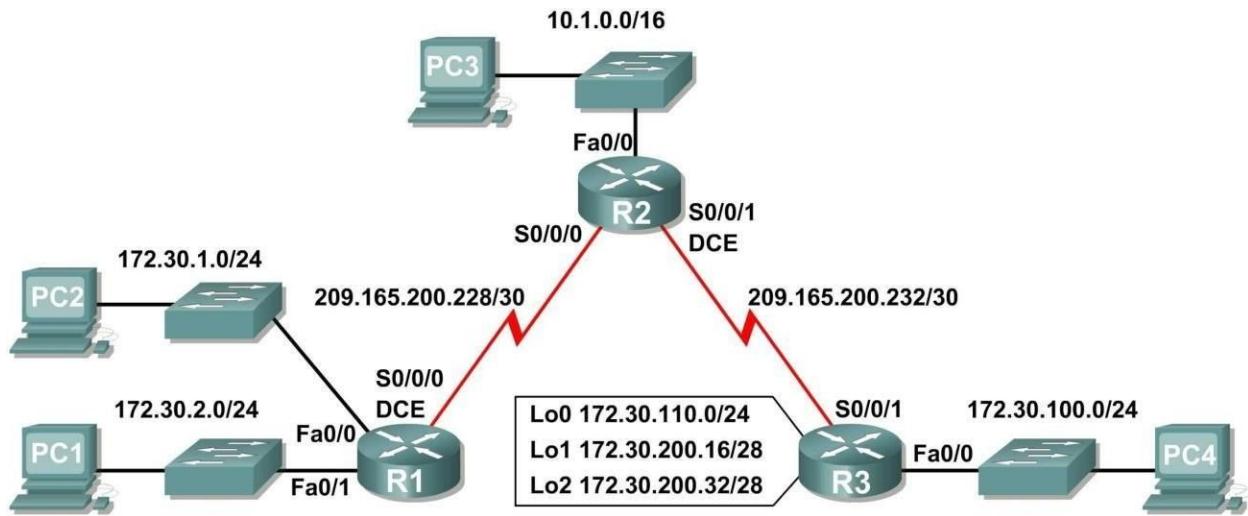


Name: Vedant Mehta  
Batch : B  
UID : 2018130028

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

	<b>Lo2</b>	172.30.200.33	255.255.255.240	N/A
<b>PC1</b>	<b>NIC</b>	172.30.2.10	255.255.255.0	172.30.2.1
<b>PC2</b>	<b>NIC</b>	172.30.1.10	255.255.255.0	172.30.1.1
<b>PC3</b>	<b>NIC</b>	10.1.0.10	255.255.0.0	10.1.0.1
<b>PC4</b>	<b>NIC</b>	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

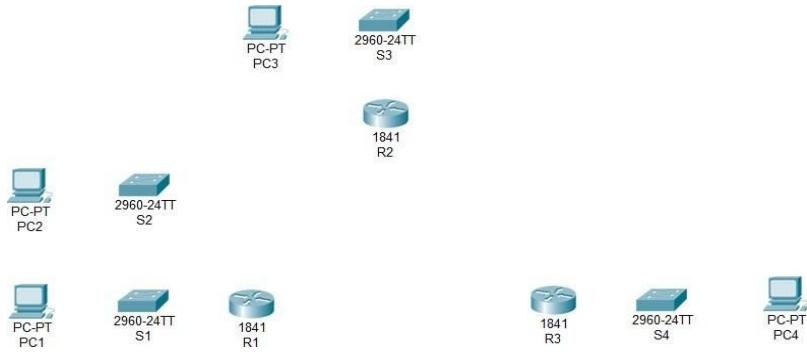
The network shown in the Topology Diagram contains a discontiguous network, 172.30.0.0. This network has been subnetted using VLSM. The 172.30.0.0 subnets are physically and logically divided by at least one other classful or major network, in this case the two serial networks 209.165.200.228/30 and 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.

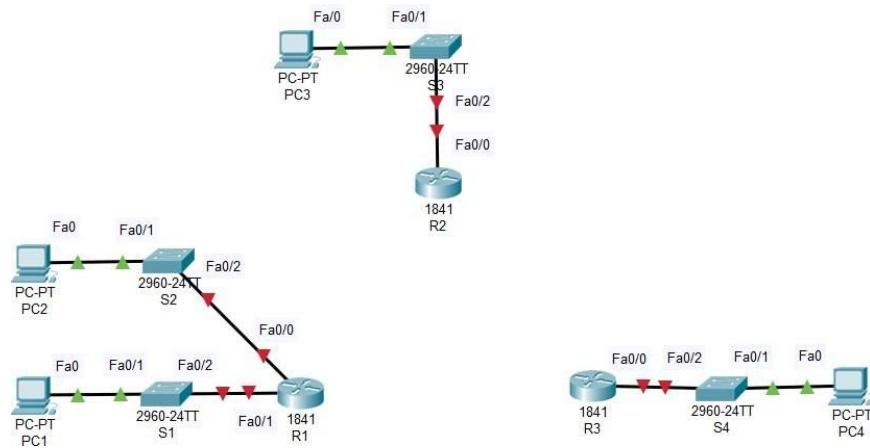
#### Step 1: Cable a network.

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

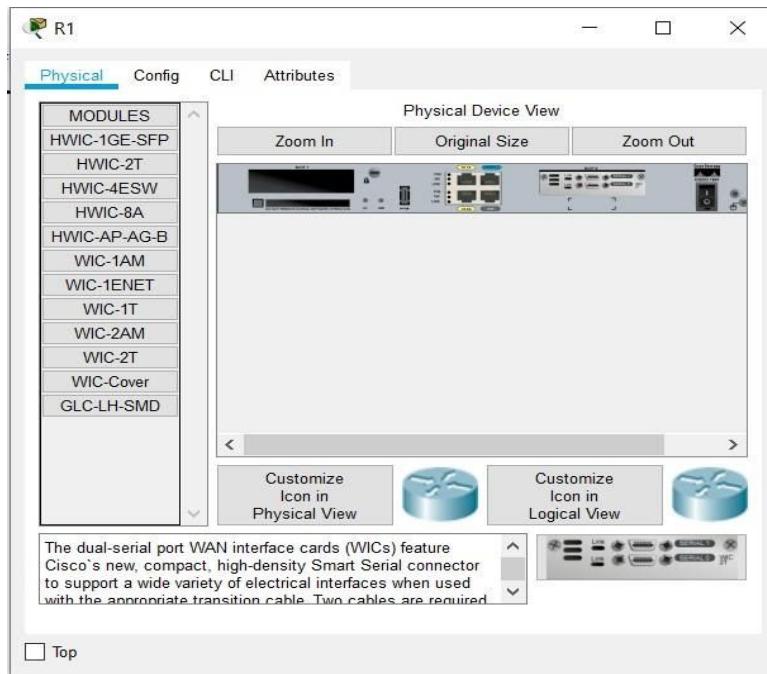
- Arrange 4 PC's, 4 2960 Switches and 3 1841 routers.



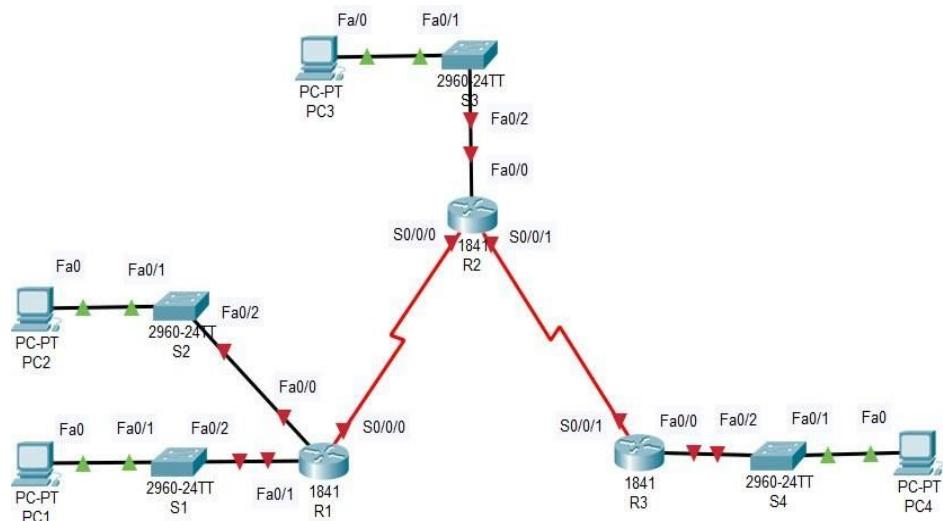
- Connect the switches, pc's and routers using copper straight through cable as shown in the diagram.



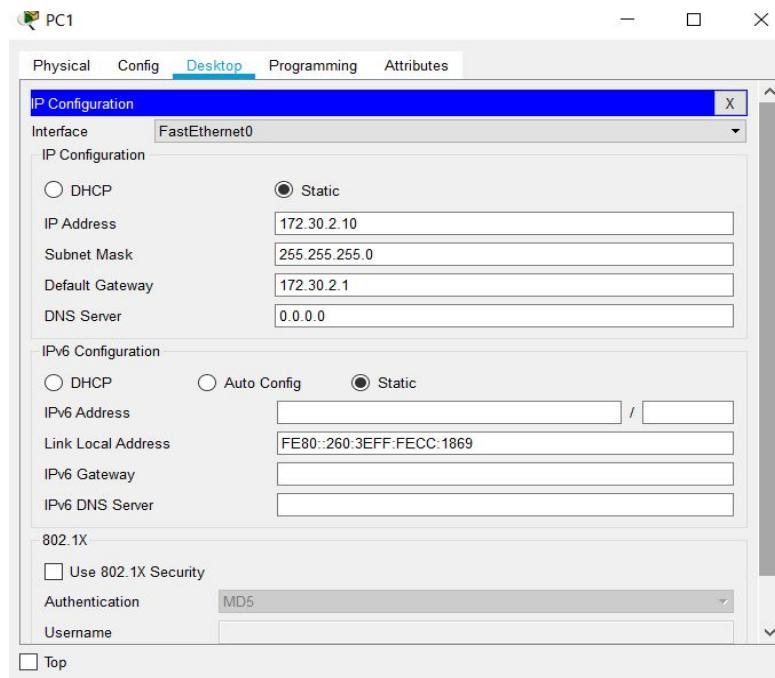
- For Serial connection between routers, add WIC-2T cards in each router.



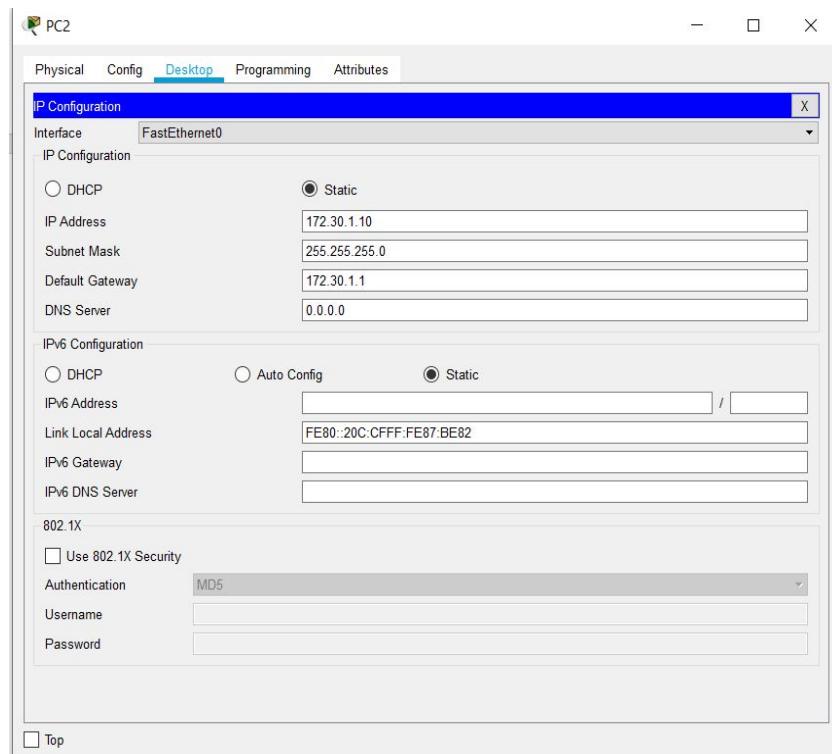
- Connect the routers with serial DCE cable.



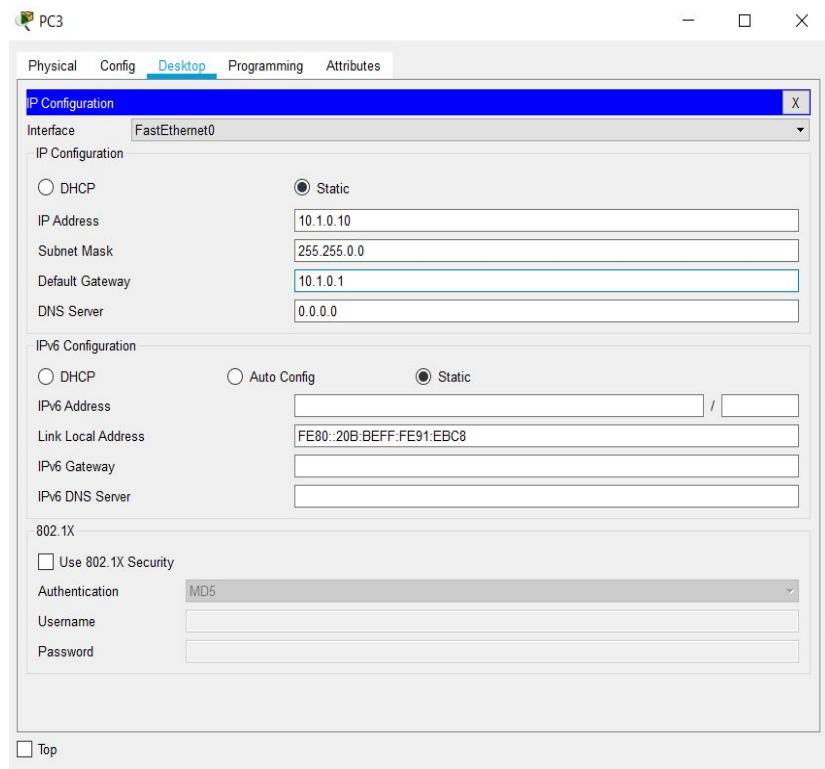
- Configuration of PC1:



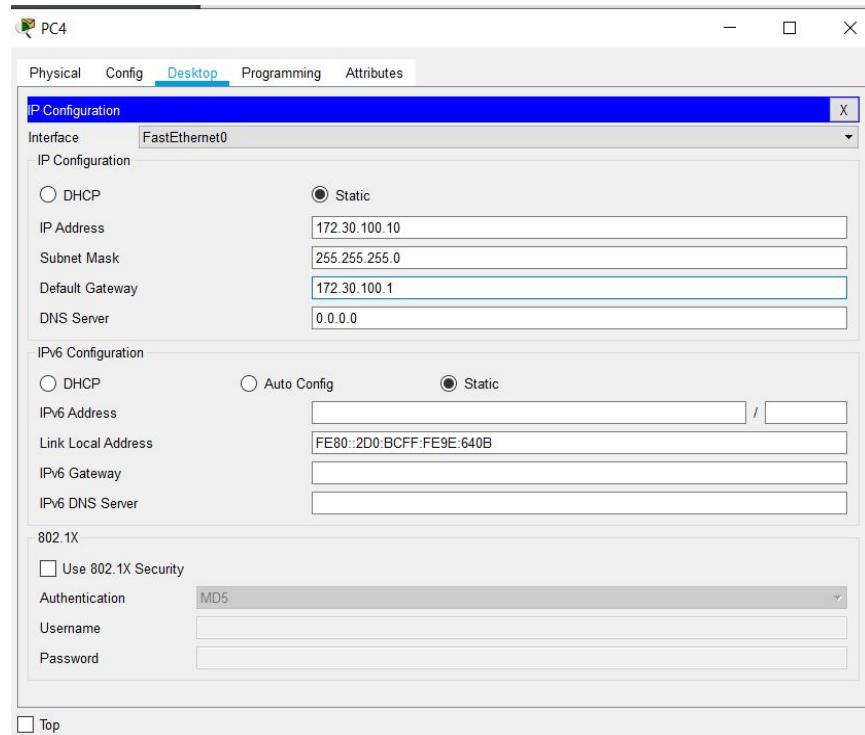
- Configuration of PC2:

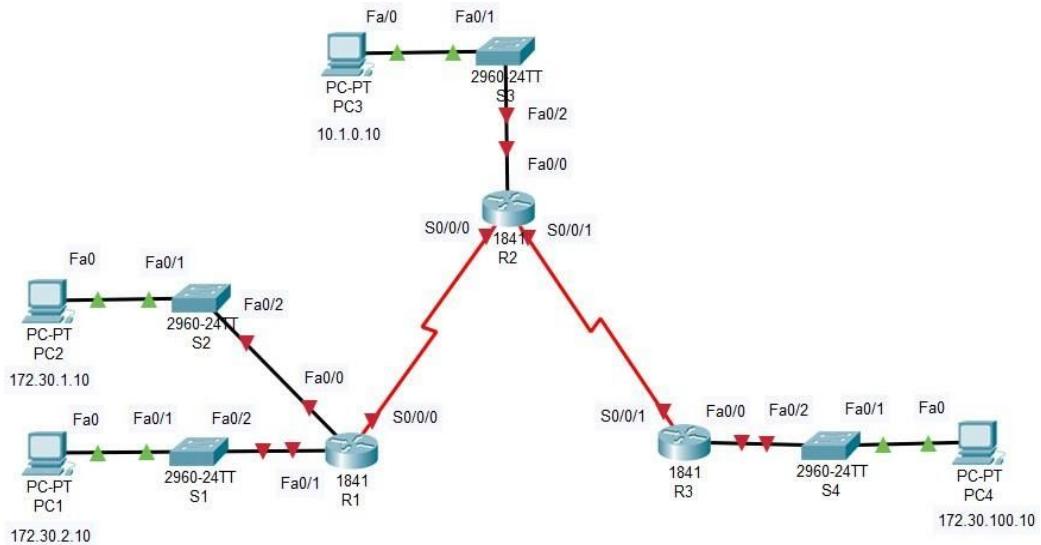


- Configuration of PC3:



- 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:

```
R1
Physical Config CLI Attributes
IOS Command Line Interface
Cisco IOS Software, 1841 Software (C1841-ADVIPSERVICESK9-M),
Version 12.4(15)T1, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Wed 18-Jul-07 04:52 by pt_team

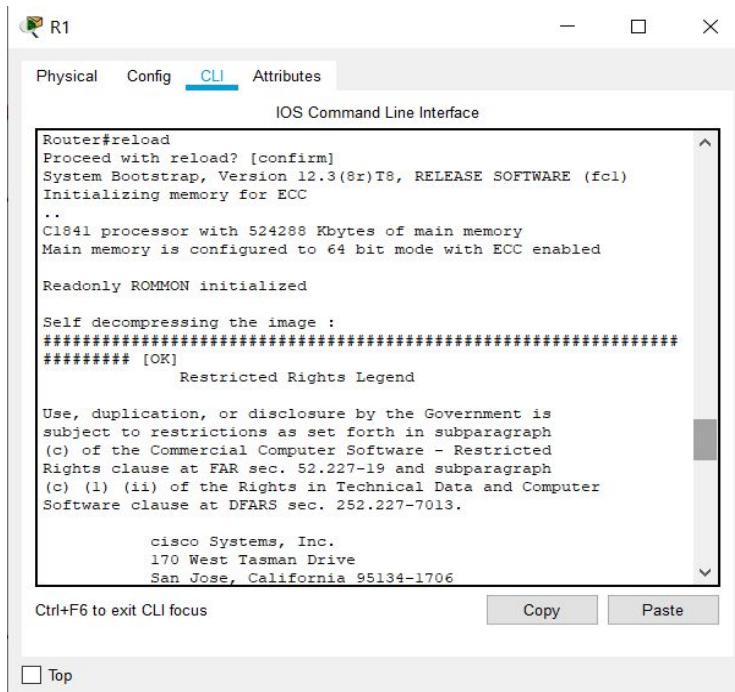
--- System Configuration Dialog ---

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

Press RETURN to get started!

Router>enable
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#
```

- Reloading R1:



R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Router#reload
Proceed with reload? [confirm]
System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fc1)
Initializing memory for ECC
..
C1841 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

 Readonly ROMMON initialized

 Self decompressing the image :
#####
##### [OK]
      Restricted Rights Legend

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.

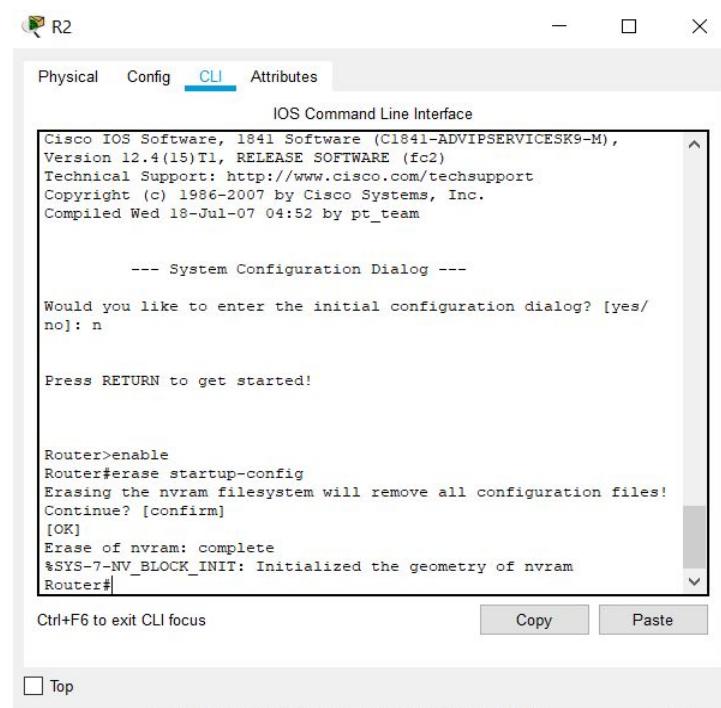
cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706

```

Ctrl+F6 to exit CLI focus      **Copy**      **Paste**

Top

- Clearing configuration of R2:



R2

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Cisco IOS Software, 1841 Software (C1841-ADVIPSERVICESK9-M),
Version 12.4(15)T1, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Wed 18-Jul-07 04:52 by pt_team

--- System Configuration Dialog ---

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

Press RETURN to get started!

Router>enable
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

- Reloading R2:

R2

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Router#reload
Proceed with reload? [confirm]
System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fc1)
Initializing memory for ECC
.
C1841 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

Readonly ROMMON initialized

Self decompressing the image :
#####
##### [OK]
#####
Restricted Rights Legend

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.

cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706

```

Ctrl+F6 to exit CLI focus     

Top

- Clearing configuration of R3:

R3

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Cisco IOS Software, 1841 Software (C1841-ADVIPSERVICESK9-M),
Version 12.4(15)T1, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Wed 18-Jul-07 04:52 by pt_team

--- System Configuration Dialog ---

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

Press RETURN to get started!

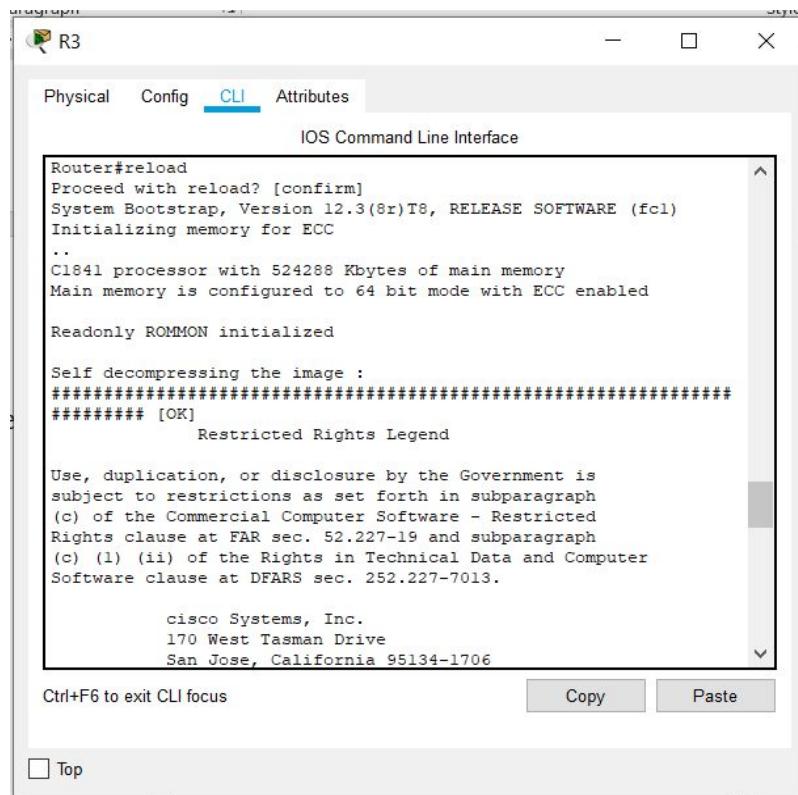
Router>enable
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#

```

Ctrl+F6 to exit CLI focus     

Top

- Reloading R3:



## Task 2: Load Routers with the Supplied Scripts.

**Step 1: Load the following script onto R1.**

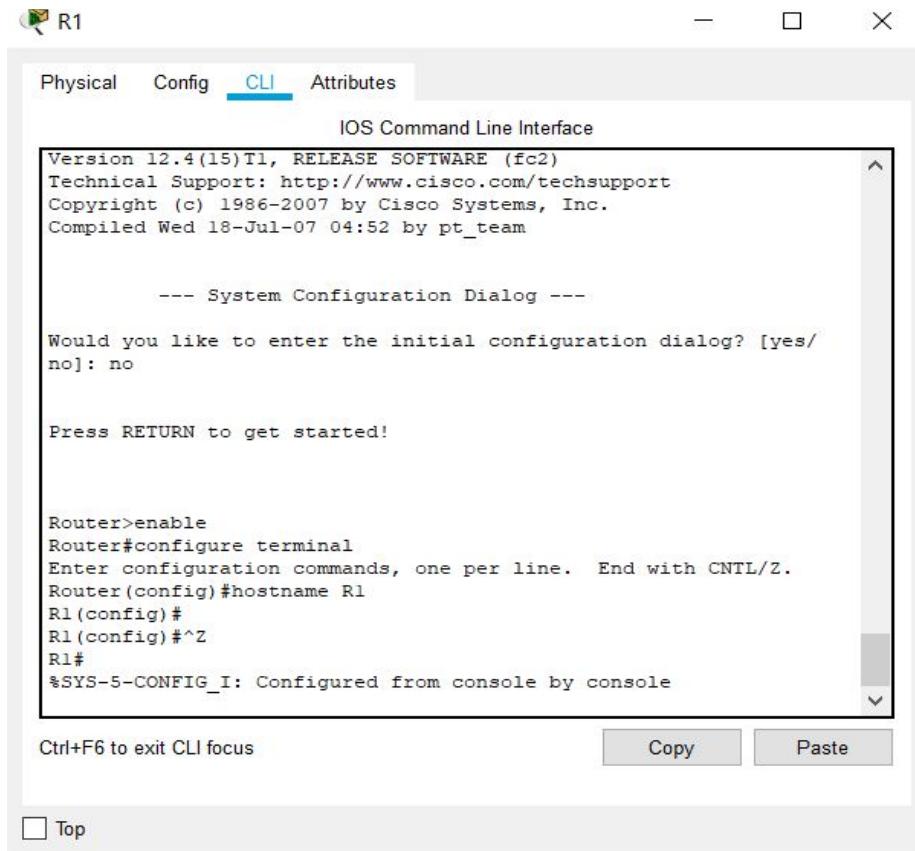
```
!
hostname R1
!
!
!
interface FastEthernet0/0
ip address 172.30.1.1 255.255.255.0
duplex auto
speed auto
no shutdown
!
interface FastEthernet0/1
ip address 172.30.2.1 255.255.255.0
duplex auto
speed auto
no shutdown
```

```

!
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:

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#
R1(config)#{^Z
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface FastEthernet0/0
R1(config-if)#ip address 172.30.1.1 255.255.255.0
R1(config-if)#duplex auto
R1(config-if)#speed auto
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

R1(config-if)#
Ctrl+F6 to exit CLI focus
```

Top

Copy Paste

- Configuring FastEthernet0/1:

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1(config)#interface FastEthernet0/0
R1(config-if)#ip address 172.30.1.1 255.255.255.0
R1(config-if)#duplex auto
R1(config-if)#speed auto
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

R1(config-if)#exit
R1(config)#interface FastEthernet0/1
R1(config-if)#ip address 172.30.2.1 255.255.255.0
R1(config-if)#duplex auto
R1(config-if)#speed auto
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up
```

Top

Ctrl+F6 to exit CLI focus

Copy Paste

- Configuring Serial0/0/0:

The screenshot shows the Cisco IOS CLI interface for router R1. The window title is 'R1'. The tab bar at the top has 'Physical', 'Config', 'CLI' (which is selected), and 'Attributes'. The main area is titled 'IOS Command Line Interface'. The command history is as follows:

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1(config-if)#exit
R1(config)#interface FastEthernet0/1
R1(config-if)#ip address 172.30.2.1 255.255.255.0
R1(config-if)#duplex auto
R1(config-if)#speed auto
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

R1(config-if)#exit
R1(config)#interface Serial 0/0/0
R1(config-if)#ip address 209.165.200.230 255.255.255.252
R1(config-if)#clock rate 64000
R1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#

```

At the bottom of the window, there are 'Copy' and 'Paste' buttons, and a checkbox labeled 'Top'.

- Configuration of RIP:

The screenshot shows the Cisco IOS CLI interface for router R1. The window title is 'R1'. The tab bar at the top has 'Physical', 'Config', 'CLI' (which is selected), and 'Attributes'. The main area is titled 'IOS Command Line Interface'. The command history is as follows:

```
R1(config-if)#ip address 172.30.2.1 255.255.255.0
R1(config-if)#duplex auto
R1(config-if)#speed auto
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

R1(config-if)#exit
R1(config)#interface Serial 0/0/0
R1(config-if)#ip address 209.165.200.230 255.255.255.252
R1(config-if)#clock rate 64000
R1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
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
R1(config-router)#network 172.30.0.0
R1(config-router)#network 209.165.200.0
R1(config-router)#

```

At the bottom of the window, there are 'Copy' and 'Paste' buttons, and a checkbox labeled 'Top'.

- Running Config:

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1#^Z
R1#show running-config
Building configuration...

Current configuration : 857 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R1
!
!
```

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
!
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
!
```

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
router rip
passive-interface FastEthernet0/0
passive-interface FastEthernet0/1
network 172.30.0.0
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 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:

The screenshot shows a window titled 'R2' with four tabs: Physical, Config, CLI (which is selected), and Attributes. The main area is labeled 'IOS Command Line Interface'. It displays the following text:

```
Press RETURN to get started.

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#
```

At the bottom of the window, there are buttons for 'Copy' and 'Paste', and a checkbox labeled 'Top'.

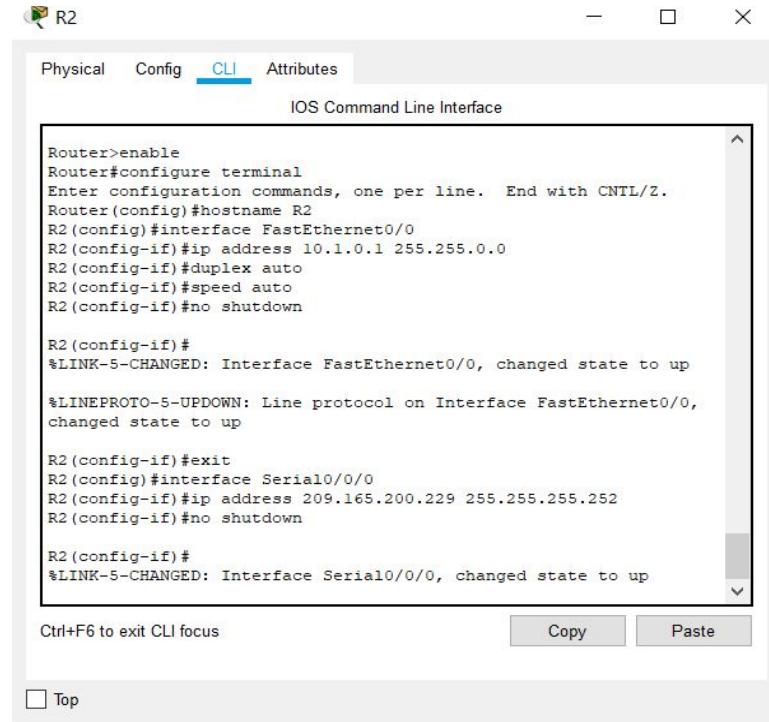
- Configuring FastEthernet0/0:

The screenshot shows the same 'R2' CLI window. The configuration command for FastEthernet0/0 has been entered:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#interface FastEthernet0/0
R2(config-if)#ip address 10.1.0.1 255.255.0.0
R2(config-if)#duplex auto
R2(config-if)#speed auto
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
```

- Configuring Serial0/0/0:



The screenshot shows the Cisco IOS CLI interface for router R2. The tab bar at the top has 'Physical', 'Config', and 'CLI' tabs, with 'CLI' being the active tab. Below the tab bar is the title 'IOS Command Line Interface'. The main window displays the following configuration commands:

```

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#interface FastEthernet0/0
R2(config-if)#ip address 10.1.0.1 255.255.0.0
R2(config-if)#duplex auto
R2(config-if)#speed auto
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

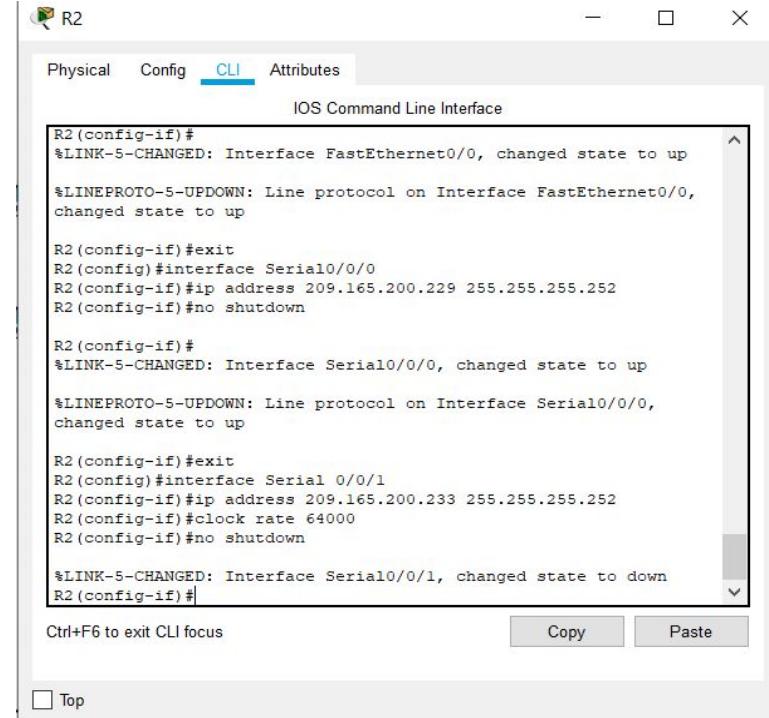
R2(config-if)#exit
R2(config)#interface Serial0/0/0
R2(config-if)#ip address 209.165.200.229 255.255.255.252
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

```

At the bottom of the CLI window, there are 'Copy' and 'Paste' buttons, and a note 'Ctrl+F6 to exit CLI focus'. There is also a 'Top' button.

- Configuring Serial0/0/1:



The screenshot shows the Cisco IOS CLI interface for router R2. The tab bar at the top has 'Physical', 'Config', and 'CLI' tabs, with 'CLI' being the active tab. Below the tab bar is the title 'IOS Command Line Interface'. The main window displays the following configuration commands:

```

R2(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

R2(config-if)#exit
R2(config)#interface Serial0/0/0
R2(config-if)#ip address 209.165.200.229 255.255.255.252
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0,
changed state to up

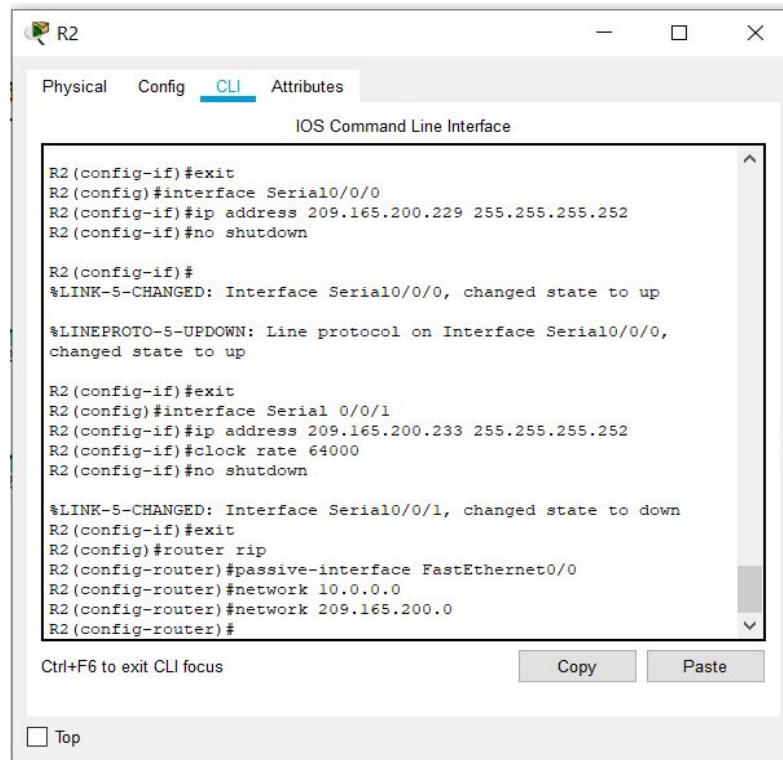
R2(config-if)#exit
R2(config)#interface Serial0/0/1
R2(config-if)#ip address 209.165.200.233 255.255.255.252
R2(config-if)#clock rate 64000
R2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R2(config-if)#

```

At the bottom of the CLI window, there are 'Copy' and 'Paste' buttons, and a note 'Ctrl+F6 to exit CLI focus'. There is also a 'Top' button.

- Configuration of RIP:



The screenshot shows the Cisco Configuration Constructor (CNC) interface. The window title is "R2". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is titled "IOS Command Line Interface". The command-line session shows the configuration of interface Serial0/0/0, including setting its IP address to 209.165.200.229 and enabling RIP. The session also includes messages about link state changes and clock rate.

```
R2(config-if)#exit
R2(config)#interface Serial0/0/0
R2(config-if)#ip address 209.165.200.229 255.255.255.252
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

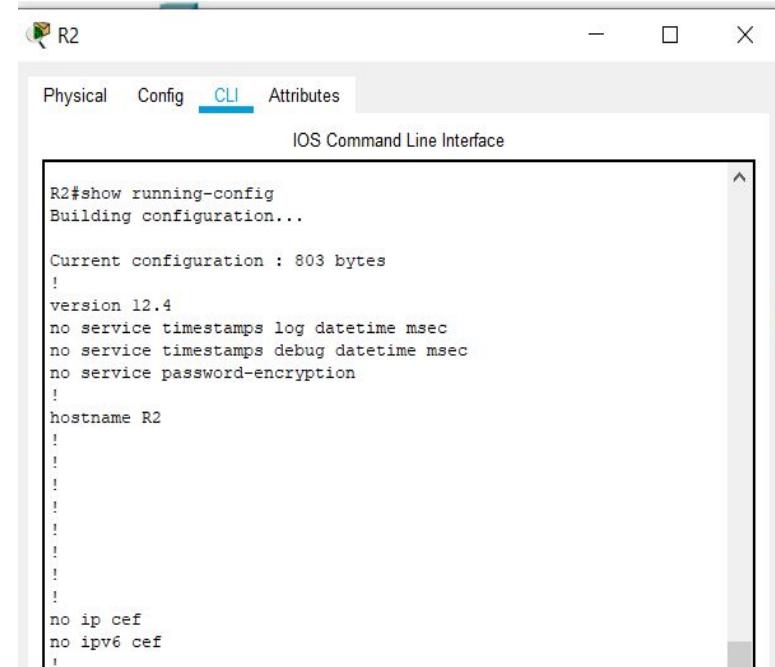
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

R2(config-if)#exit
R2(config)#interface Serial 0/0/1
R2(config-if)#ip address 209.165.200.233 255.255.255.252
R2(config-if)#clock rate 64000
R2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R2(config-if)#exit
R2(config)#router rip
R2(config-router)#passive-interface FastEthernet0/0
R2(config-router)#network 10.0.0.0
R2(config-router)#network 209.165.200.0
R2(config-router)#

Ctrl+F6 to exit CLI focus
```

- Running Config:



The screenshot shows the Cisco Configuration Constructor (CNC) interface. The window title is "R2". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is titled "IOS Command Line Interface". The command-line session shows the output of the "show running-config" command, which displays the current configuration of the router, including the build configuration, version, service timestamps, hostname (R2), and no ip cef/no ipv6 cef settings.

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

Current configuration : 803 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
!
```

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     

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     

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:

The screenshot shows a Windows-style application window titled "R3". The tab bar at the top has "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area is a large text box containing the following text:  
Press RETURN to get started.  
  
Router>  
Router>enable  
Router#configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#hostname R3  
R3(config)#  
Ctrl+F6 to exit CLI focus         
 Top

- Configuration of FastEthernet0/0:

The screenshot shows a Windows-style application window titled "R3". The tab bar at the top has "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area is a large text box containing the following text:  
Router>  
Router>enable  
Router#configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#hostname R3  
R3(config)#interface FastEthernet0/0  
R3(config-if)#ip address 172.30.100.1 255.255.255.0  
R3(config-if)#duplex auto  
R3(config-if)#speed auto  
R3(config-if)#no shutdown  
  
R3(config-if)#  
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,  
changed state to up  
  
Ctrl+F6 to exit CLI focus         
 Top

- Configuration of Serial0/0/1:

The screenshot shows the Cisco IOS CLI interface for router R3. The window title is "R3". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area displays the following configuration commands:

```

Router>
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#interface FastEthernet0/0
R3(config-if)#ip address 172.30.100.1 255.255.255.0
R3(config-if)#duplex auto
R3(config-if)#speed auto
R3(config-if)#no shutdown

R3(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

R3(config-if)#exit
R3(config)#interface Serial0/0/1
R3(config-if)#ip address 209.165.200.234 255.255.255.252
R3(config-if)#no shutdown

R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

```

At the bottom of the CLI window, there are buttons for "Copy" and "Paste". A checkbox labeled "Top" is also present.

- Configuration of Loopback0:

The screenshot shows the Cisco IOS CLI interface for router R3. The window title is "R3". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area displays the following configuration commands:

```

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

R3(config-if)#exit
R3(config)#interface Serial0/0/1
R3(config-if)#ip address 209.165.200.234 255.255.255.252
R3(config-if)#no shutdown

R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1,
changed state to up

R3(config-if)#exit
R3(config)#interface Loopback0

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0,
changed state to up

R3(config-if)#ip address 172.30.110.1 255.255.255.0
R3(config-if)#

```

At the bottom of the CLI window, there are buttons for "Copy" and "Paste". A checkbox labeled "Top" is also present.

- Configuration of Loopback1:

The screenshot shows the Cisco IOS CLI interface for router R3. The window title is "R3". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is titled "IOS Command Line Interface". The command history is as follows:

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
R3(config-if)#exit
R3(config)#interface Loopback0
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
R3(config-if)#ip address 172.30.110.1 255.255.255.0
R3(config-if)#exit
R3(config)#interface Loopback1
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up
R3(config-if)#ip address 172.30.200.17 255.255.255.240
R3(config-if)#

```

At the bottom of the CLI window, there are buttons for "Copy" and "Paste", and a checkbox labeled "Top".

- Configuration of Loopback2:

The screenshot shows the Cisco IOS CLI interface for router R3. The window title is "R3". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is titled "IOS Command Line Interface". The command history is as follows:

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
R3(config-if)#ip address 172.30.110.1 255.255.255.0
R3(config-if)#exit
R3(config)#interface Loopback1
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up
R3(config-if)#ip address 172.30.200.17 255.255.255.240
R3(config-if)#exit
R3(config)#interface Loopback2
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback2, changed state to up
R3(config-if)#ip address 172.30.200.33 255.255.255.240
R3(config-if)#

```

At the bottom of the CLI window, there are buttons for "Copy" and "Paste", and a checkbox labeled "Top".

- Configuration of RIP:

The screenshot shows the Cisco IOS CLI interface for router R3. The window title is "R3". The tab bar at the top has "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is the text "IOS Command Line Interface". The main pane displays the following configuration commands:

```
R3(config-if)#  
%LINK-5-CHANGED: Interface Loopback1, changed state to up  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1,  
changed state to up  
  
R3(config-if)#ip address 172.30.200.17 255.255.255.240  
R3(config-if)#exit  
R3(config)#interface Loopback2  
  
R3(config-if)#  
%LINK-5-CHANGED: Interface Loopback2, changed state to up  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback2,  
changed state to up  
  
R3(config-if)#ip address 172.30.200.33 255.255.255.240  
R3(config-if)#  
R3(config-if)#exit  
R3(config)#router rip  
R3(config-router)#passive-interface FastEthernet0/0  
R3(config-router)#network 172.30.0.0  
R3(config-router)#network 209.165.200.0  
R3(config-router)#
```

At the bottom of the CLI window, there are buttons for "Copy" and "Paste", and a checkbox labeled "Top".

- Running Configuration:

The screenshot shows the Cisco IOS CLI interface for router R3. The window title is "R3". The tab bar at the top has "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is the text "IOS Command Line Interface". The main pane displays the following running configuration command:

```
R3#show running-config  
Building configuration...  
  
Current configuration : 983 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  
!  
--More--
```

At the bottom of the CLI window, there are buttons for "Copy" and "Paste", and a checkbox labeled "Top".

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

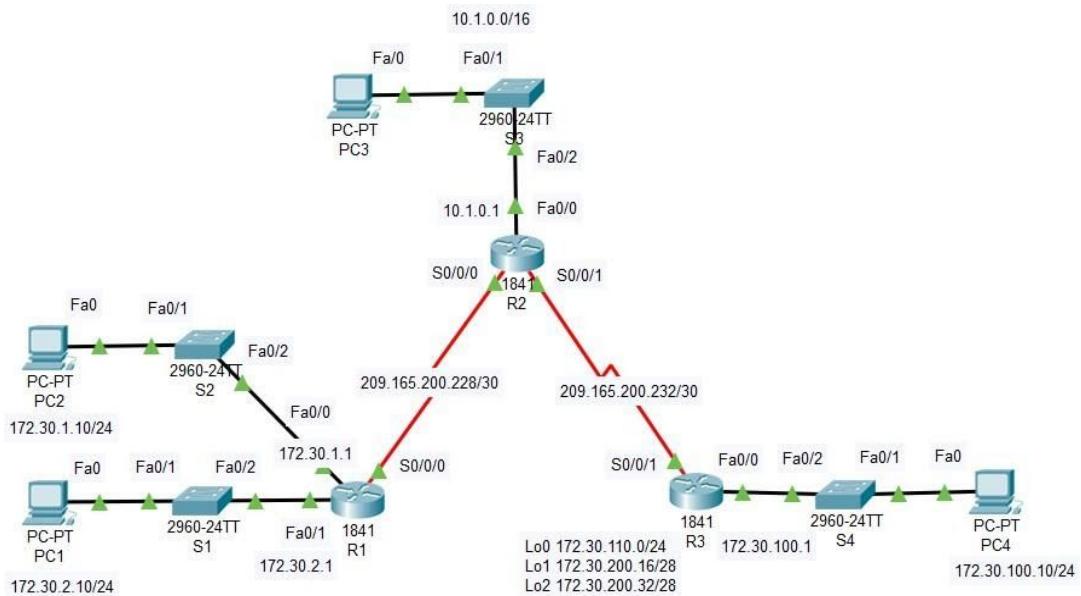
IOS Command Line Interface

```
enable
!
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
!
!
!
!
!
!
line con 0
```

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
```

```
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#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#no ip cef
R2(config)#
```

Ctrl+F6 to exit CLI focus      Copy      Paste

```
Press RETURN to get started.

R1>enable
R1#configure terminal
^
% Invalid input detected at '^' marker.

R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#no ip cef
R1(config)#
```

Ctrl+F6 to exit CLI focus      Copy      Paste

Top

R3

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Press RETURN to get started.

R3>enable
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#no ip cef
R3(config)#[
```

Ctrl+F6 to exit CLI focus      **Copy**      **Paste**

Top

- Ping PC1 from R2:

R2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
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#configure terminal
Enter configuration commands, one per line. End with CNTL/
Z.
R2(config)#no ip cef
R2(config)#^Z
R2#
%SYS-5-CONFIG_I: Configured from console by console
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 40 percent (2/5), round-trip min/avg/max =
1/4/5 ms
R2#
```

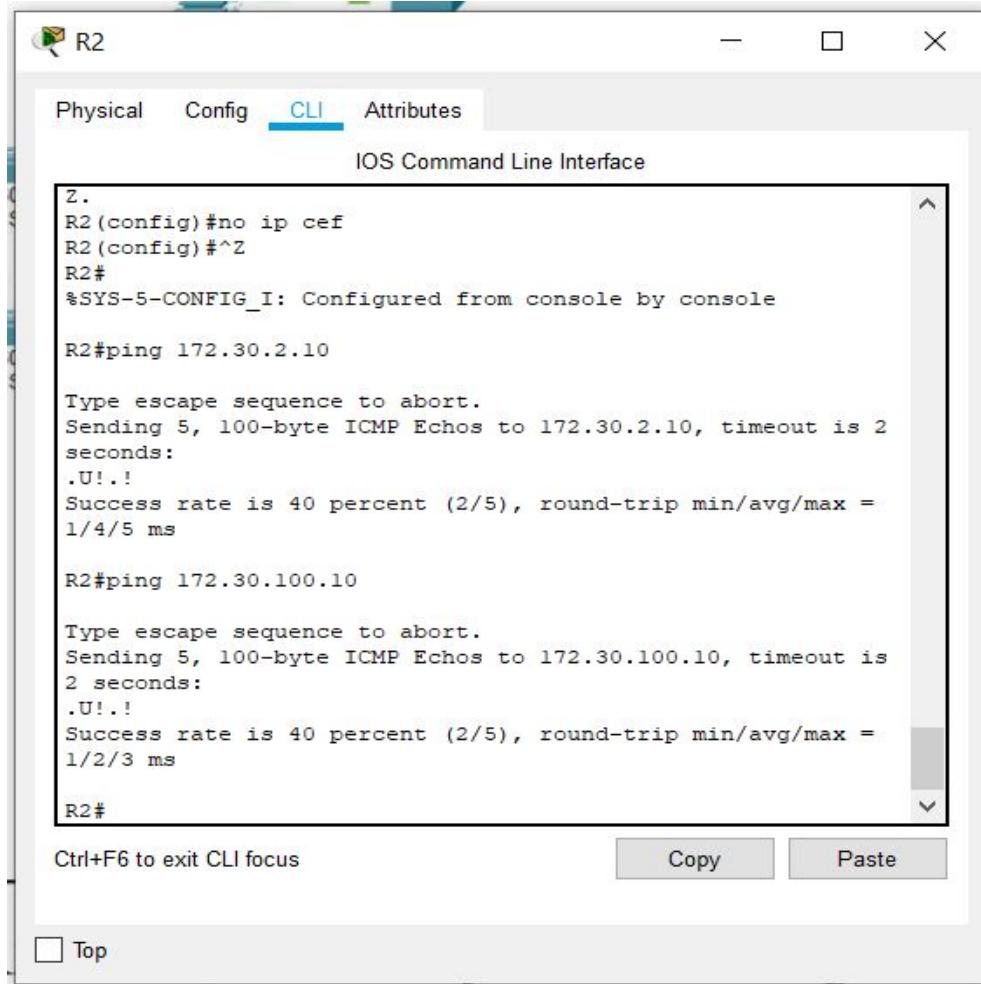
Ctrl+F6 to exit CLI focus      **Copy**      **Paste**

Top

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

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

- Ping PC4 from R2:



```
Z.
R2(config)#no ip cef
R2(config)#^Z
R2#
%SYS-5-CONFIG_I: Configured from console by console

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 40 percent (2/5), round-trip min/avg/max =
1/4/5 ms

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 40 percent (2/5), round-trip min/avg/max =
1/2/3 ms

R2#
```

Ctrl+F6 to exit CLI focus     

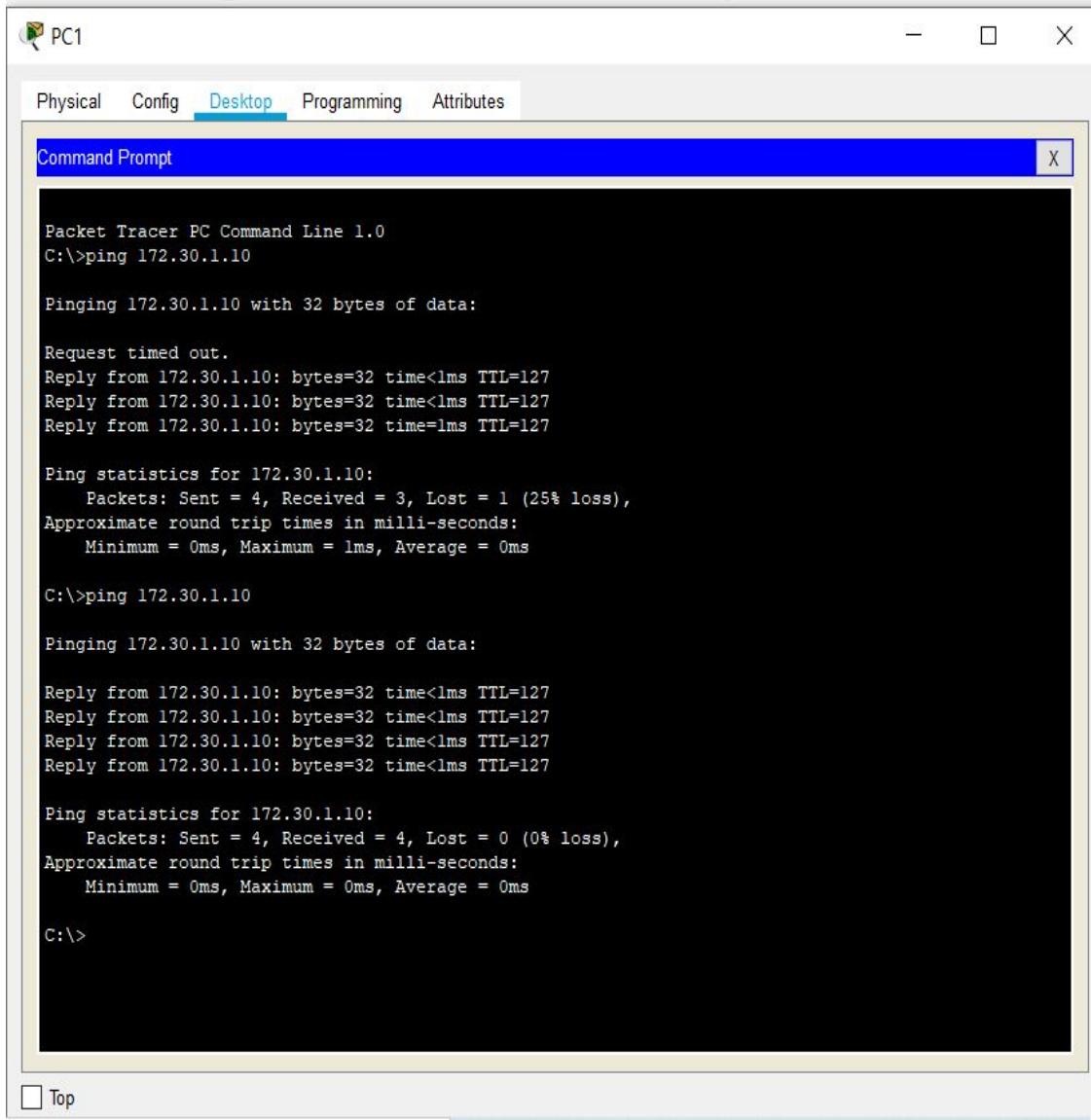
Top

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:



The screenshot shows a Windows Command Prompt window titled "Command Prompt". The window is part of a software interface titled "PC1" with tabs for Physical, Config, Desktop (which is selected), Programming, and Attributes. The command line output is as follows:

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

Pinging 172.30.1.10 with 32 bytes of data:

Request timed out.
Reply from 172.30.1.10: bytes=32 time<lms TTL=127
Reply from 172.30.1.10: bytes=32 time<lms TTL=127
Reply from 172.30.1.10: bytes=32 time=lms TTL=127

Ping statistics for 172.30.1.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

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<lms 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 = 0ms, Average = 0ms

C:\>
```

Top

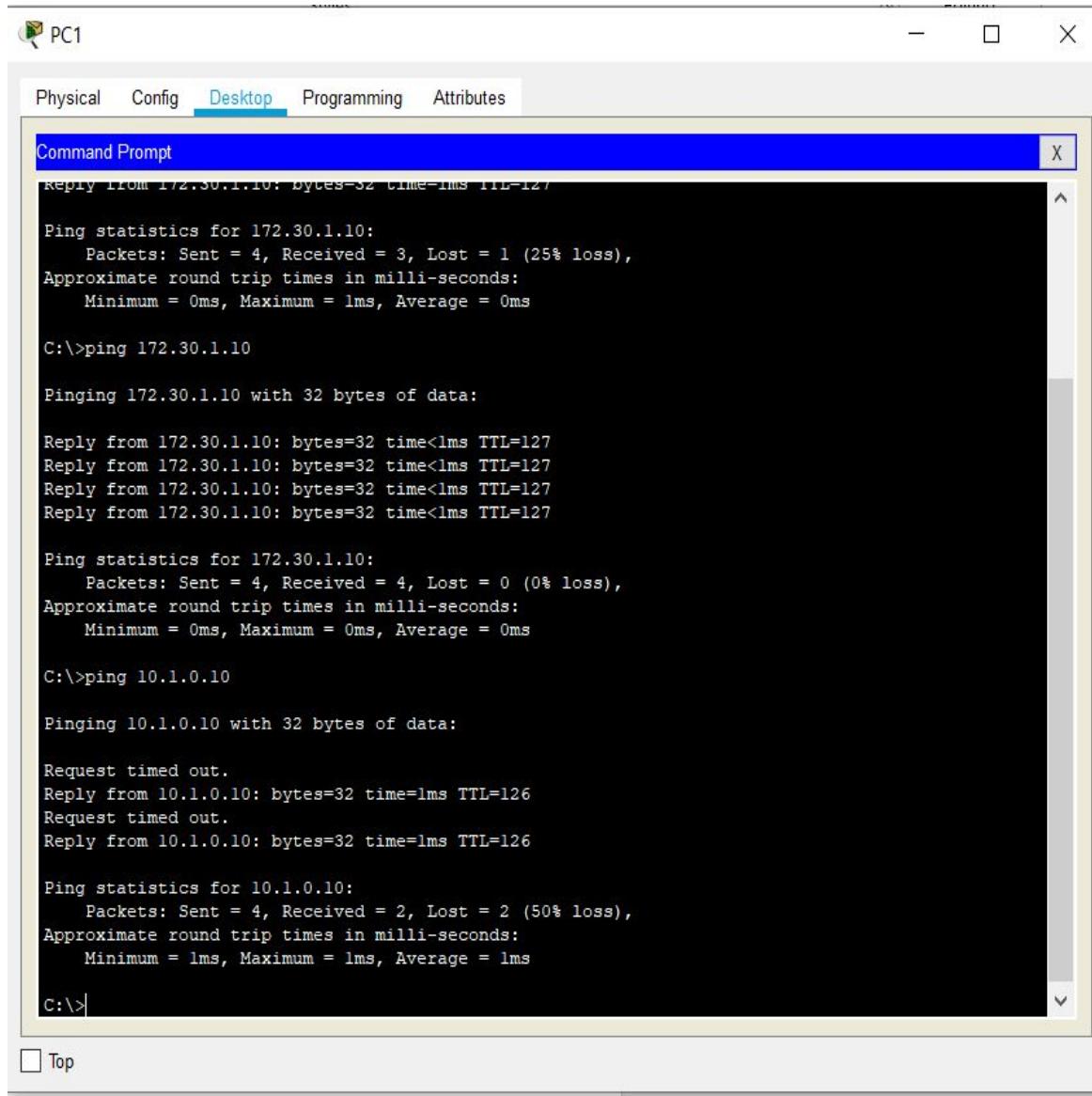
From the PC1, is it possible to ping PC2?

=> Yes.

What is the success rate?

=> 100%

- Ping PC3 from PC1:



The screenshot shows a Windows Command Prompt window titled "PC1". The window has tabs at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. The main area displays the output of several ping commands. The first command is a self-ping to 172.30.1.10, showing 25% loss. The second command is a ping to 172.30.1.10, showing 0% loss. The third command is a ping to 10.1.0.10, which times out. The fourth command is a ping to 10.1.0.10, showing 50% loss.

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

Ping statistics for 172.30.1.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

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

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 = 0ms, Average = 0ms

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=1ms 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 = 1ms, Average = 1ms

C:\>
```

Top

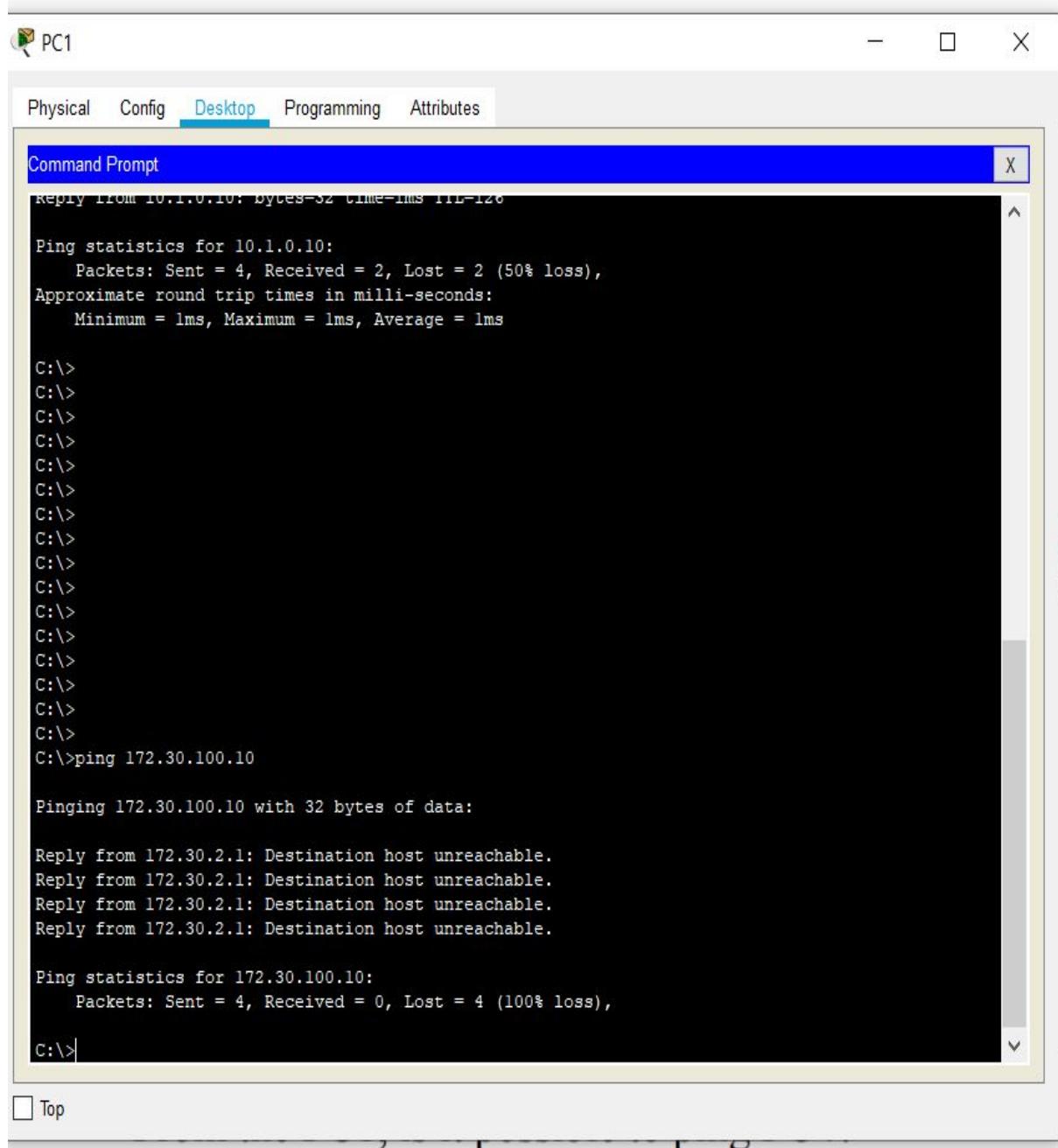
From the PC1, is it possible to ping PC3?

=> Yes

What is the success rate?

=> 50%

- Ping PC4 from PC1:



The screenshot shows a Windows desktop environment with a window titled "Command Prompt". The window is part of a software interface for managing network devices, with tabs for "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". The main area of the window displays command-line output. The output shows a successful ping to 10.1.0.10 followed by multiple failed pings to 172.30.100.10, indicating a routing issue or network segmentation.

```
reply from 10.1.0.10: bytes=32 time=1ms TTL=128
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

C:\>
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.

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

From the PC1, is it possible to ping PC4?

=> No

What is the success rate?

=> 0%

- Ping PC2 from PC4:

```

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.

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

```

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

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

- Ping PC3 from PC4:

```

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.

Ping statistics for 172.30.1.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
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
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 = 2ms, Average = 1ms
C:\>

```

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

The screenshot shows a Windows-style application window titled "R2". The tab bar at the top has "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains the output of the "show ip route" command:

```
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, 00:00:16, Serial0/0/0
                  [120/1] via 209.165.200.234, 00:00:24, 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#
```

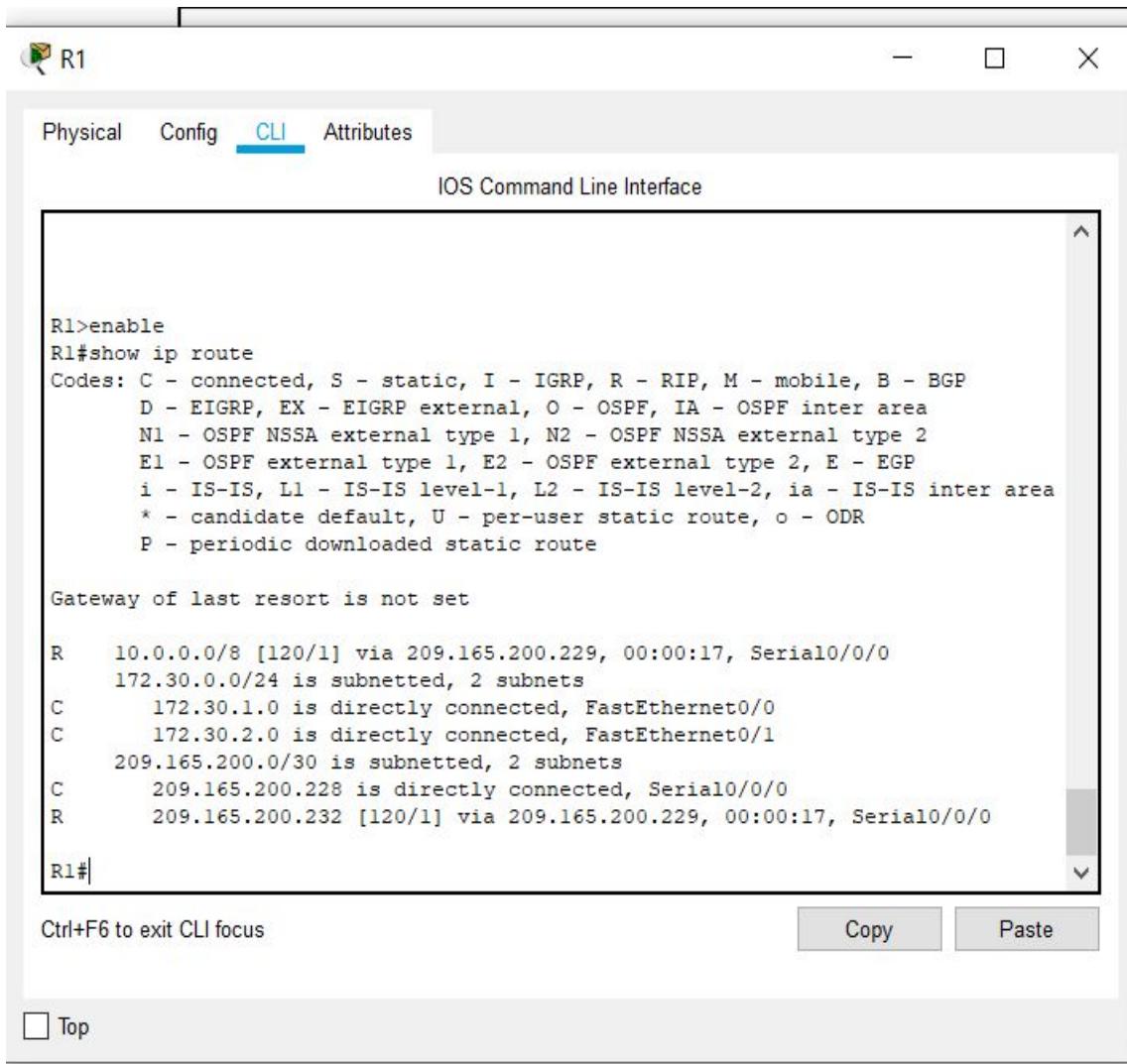
At the bottom of the window, there are buttons for "Copy" and "Paste". A "Ctrl+F6 to exit CLI focus" keybinding is also displayed. A "Top" button is located at the bottom left.

#### **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**



R1>enable  
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  
  
R 10.0.0.0/8 [120/1] via 209.165.200.229, 00:00:17, Serial0/0/0  
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, FastEthernet0/1  
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, 00:00:17, Serial0/0/0  
  
R1#

Ctrl+F6 to exit CLI focus Copy Paste

Top

## 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

R3>enable  
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  
  
R 10.0.0.0/8 [120/1] via 209.165.200.233, 00:00:22, Serial0/0/1  
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, 2 subnets  
R 209.165.200.228 [120/1] via 209.165.200.233, 00:00:22, Serial0/0/1  
C 209.165.200.232 is directly connected, Serial0/0/1  
  
R3#

Ctrl+F6 to exit CLI focus     

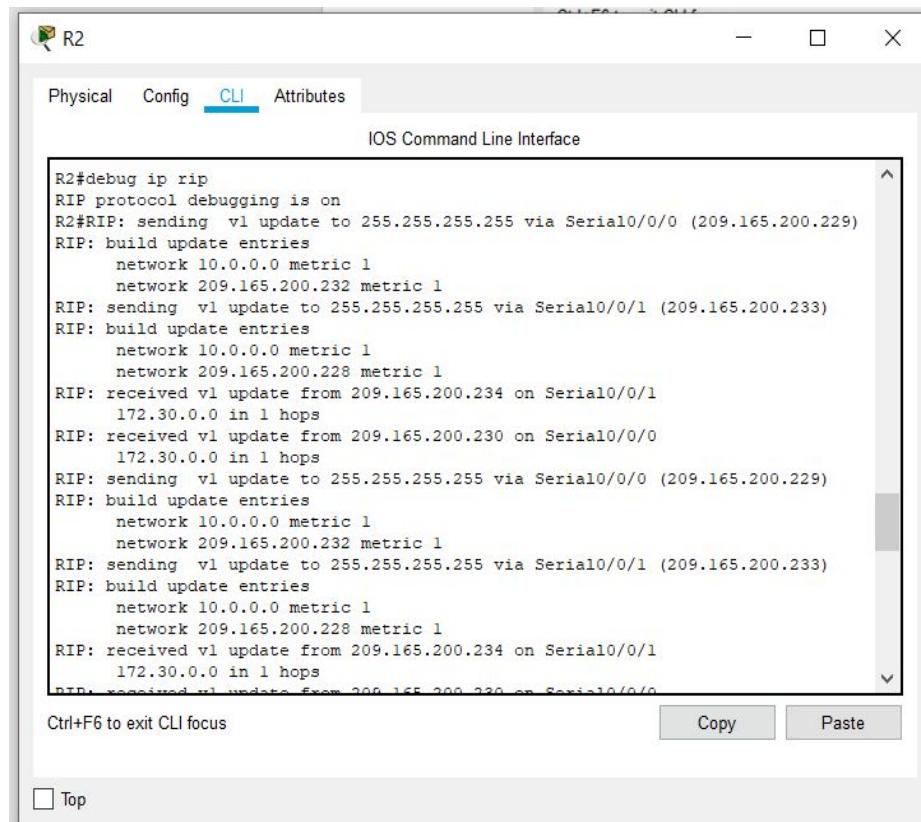
Top

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

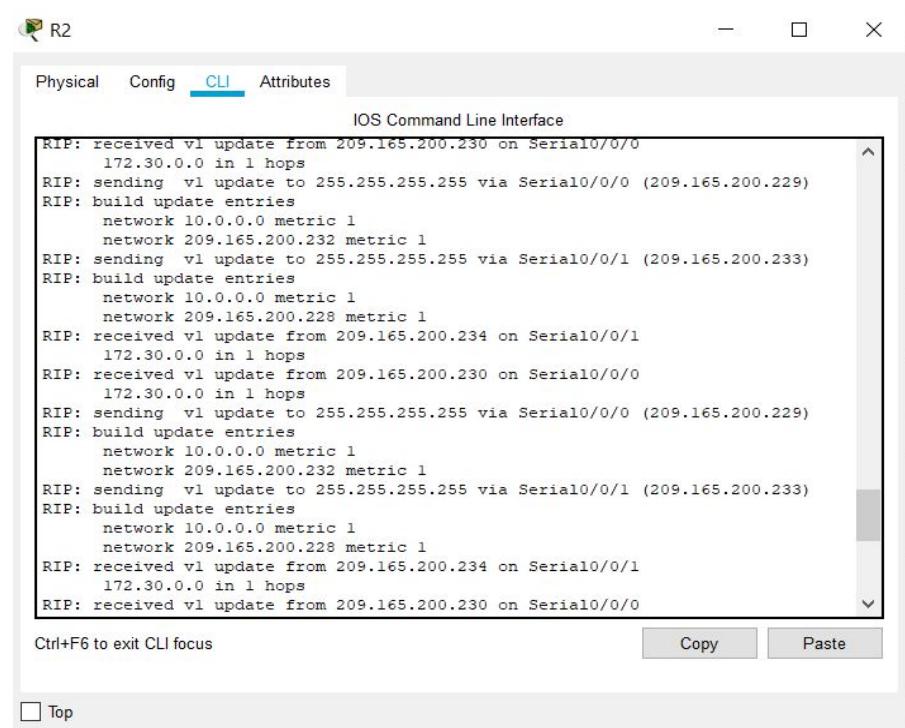
Use the **debug ip rip** command to display RIP routing updates.

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#debug ip rip  
RIP protocol debugging is on  
R2#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  
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  
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



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  
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  
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

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#undebbug all**

The screenshot shows a Cisco IOS CLI interface. The title bar says "R2". Below it, there are tabs: "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". The main area is titled "IOS Command Line Interface". It displays the following text:

```
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
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
undebbug all
All possible debugging has been turned off
R2#
```

At the bottom of the window, there are buttons for "Copy" and "Paste". A checkbox labeled "Top" is also present.

#### 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
undebbug 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     

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     

Top

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

The screenshot shows the Cisco Configuration Constructor (CNC) application window for router R1. The title bar says "R1". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is titled "IOS Command Line Interface". It displays the following text:

```
Press RETURN to get started.  
  
R1>enable  
R1#configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
R1(config)#router rip  
R1(config-router)#version 2  
R1(config-router)#[
```

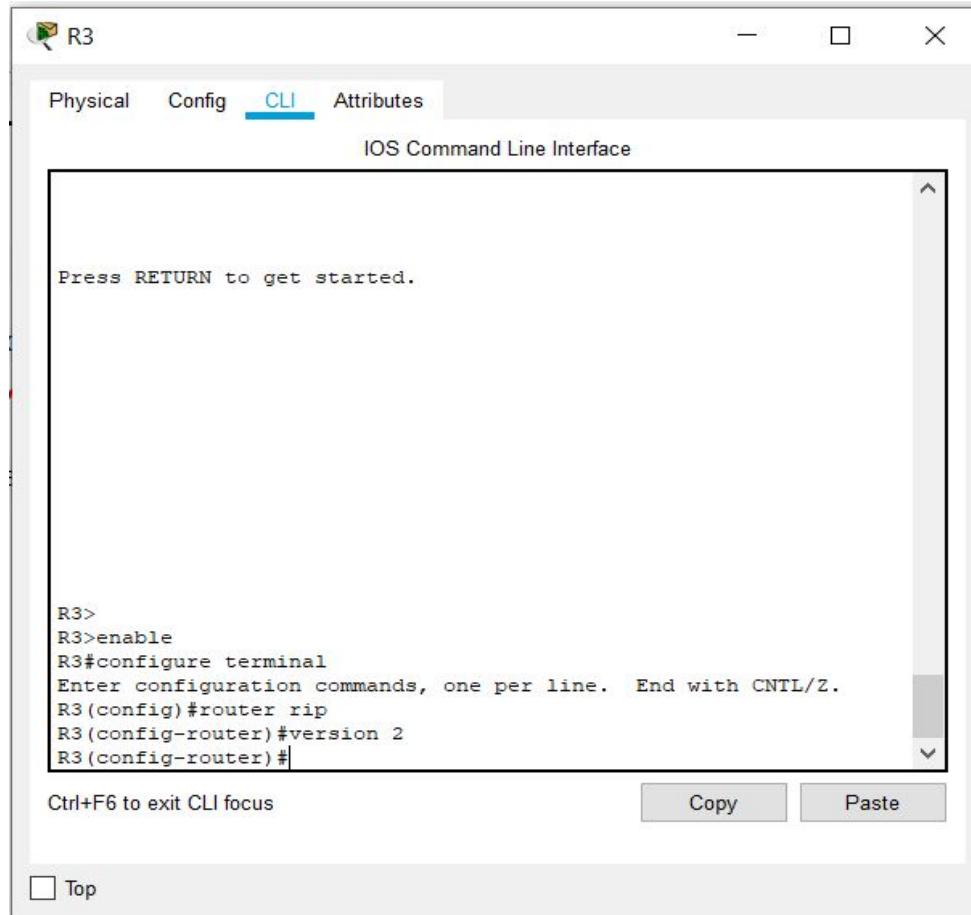
At the bottom of the CLI window, there are "Copy" and "Paste" buttons. Below the window, there is a "Top" button.

The screenshot shows the Cisco Configuration Constructor (CNC) application window for router R1. The title bar says "R1". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is titled "IOS Command Line Interface". It displays a large configuration script:

```
shutdown  
!  
router rip  
version 2  
passive-interface FastEthernet0/0  
passive-interface FastEthernet0/1  
network 172.30.0.0  
network 209.165.200.0  
!  
ip classless  
!  
ip flow-export version 9  
!  
!  
!  
!  
!  
line con 0  
!  
line aux 0  
!  
--More-- |
```

At the bottom of the CLI window, there are "Copy" and "Paste" buttons. Below the window, there is a "Top" button.

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



The screenshot shows the Cisco Configuration Constructor (CNC) interface for a device named 'R3'. The 'CLI' tab is selected. The main window displays the IOS Command Line Interface (CLI) prompt. It shows the configuration commands entered:

```
Press RETURN to get started.  
  
R3>  
R3>enable  
R3#configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
R3(config)#router rip  
R3(config-router)#version 2  
R3(config-router) #
```

Below the CLI window, there are buttons for 'Copy' and 'Paste'. At the bottom left, there is a checkbox labeled 'Top'.



The screenshot shows the Cisco Configuration Constructor (CNC) interface for a device named 'R3'. The 'CLI' tab is selected. The main window displays the IOS Command Line Interface (CLI) prompt. It shows the full running configuration of the router:

```
router rip  
version 2  
passive-interface FastEthernet0/0  
network 172.30.0.0  
network 209.165.200.0  
!  
ip classless  
!  
ip flow-export version 9  
!  
!  
!
```

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**

```
R1#
R1#
R1#show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 12 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 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          00:00:09
  Distance: (default is 120)
R1#
```

Ctrl+F6 to exit CLI focus     

Top

## 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**

R2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R2#
R2#
R2#
R2#
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
R        172.30.0.0/16 [120/1] via 209.165.200.230, 00:00:00, Serial0/0/0
                  [120/1] via 209.165.200.234, 00:00:12, 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#
```

Ctrl+F6 to exit CLI focus     

Top

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

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

Gateway	Distance	Last Update
209.165.200.229	120	00:00:09

```
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

R     10.0.0.0/8 [120/1] via 209.165.200.229, 00:00:10, Serial0/0/0
      172.30.0.0/16 is variably subnetted, 3 subnets, 2 masks
R     172.30.0.0/16 is possibly down, routing via 209.165.200.229,
Serial0/0/0
C       172.30.1.0/24 is directly connected, FastEthernet0/0
C       172.30.2.0/24 is directly connected, FastEthernet0/1
          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#
```

Ctrl+F6 to exit CLI focus     

Top

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 terminal window titled "R3". The tab bar at the top has "Physical", "Config", "CLI" (which is underlined), and "Attributes". Below the title bar is the text "IOS Command Line Interface". The main pane displays the output of the "show ip route" command:

```
R3#
R3#
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

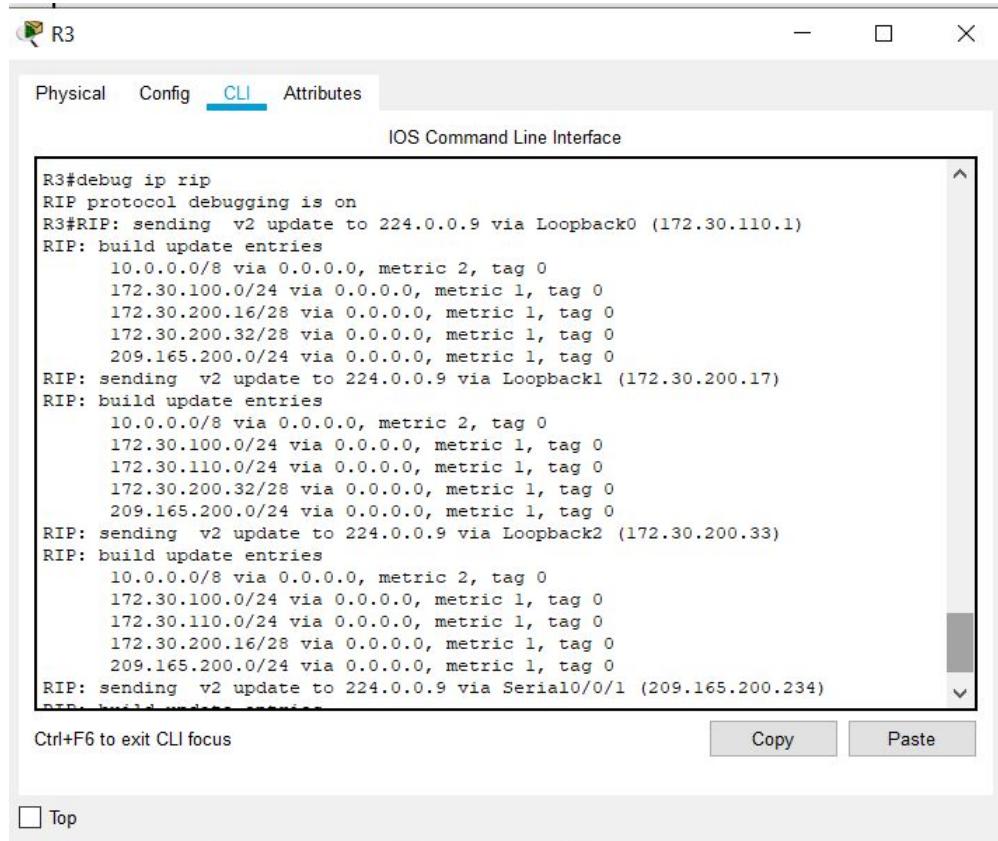
R    10.0.0.0/8 [120/1] via 209.165.200.233, 00:00:05, Serial0/0/1
      172.30.0.0/16 is variably subnetted, 4 subnets, 2 masks
C      172.30.100.0/24 is directly connected, FastEthernet0/0
C      172.30.110.0/24 is directly connected, Loopback0
C      172.30.200.16/28 is directly connected, Loopback1
C      172.30.200.32/28 is directly connected, Loopback2
      209.165.200.0/30 is subnetted, 2 subnets
R      209.165.200.228 [120/1] via 209.165.200.233, 00:00:05, Serial0/0/1
C      209.165.200.232 is directly connected, Serial0/0/1

R3#
```

At the bottom left, it says "Ctrl+F6 to exit CLI focus". At the bottom right are "Copy" and "Paste" buttons. A "Top" button is located at the bottom left of the main pane.

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

- For R3:



The screenshot shows the Cisco Network Assistant interface with a window titled "R3". The tab bar at the top has "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is titled "IOS Command Line Interface". The terminal window displays the output of the "debug ip rip" command. The output shows RIP protocol debugging is on, and it lists several "RIP: sending v2 update" messages to various interfaces (Loopback0, Loopback1, Loopback2, and Serial0/0/1) with specific IP addresses and metrics. At the bottom of the terminal window, there are "Copy" and "Paste" buttons, and a status message "Ctrl+F6 to exit CLI focus". Below the terminal window, there is a "Top" button.

```
R3#debug ip rip
RIP protocol debugging is on
R3#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
    172.30.110.0/24 via 0.0.0.0, metric 1, tag 0
    172.30.200.16/28 via 0.0.0.0, metric 1, tag 0
    209.165.200.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/1 (209.165.200.234)
```

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
    172.30.110.0/24 via 0.0.0.0, metric 1, tag 0
```

Ctrl+F6 to exit CLI focus     

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
    172.30.110.0/24 via 0.0.0.0, metric 1, tag 0
```

Ctrl+F6 to exit CLI focus     

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- For R2:

R2

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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)
RIP: build update entries
```

Ctrl+F6 to exit CLI focus      **Copy**      **Paste**

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R2

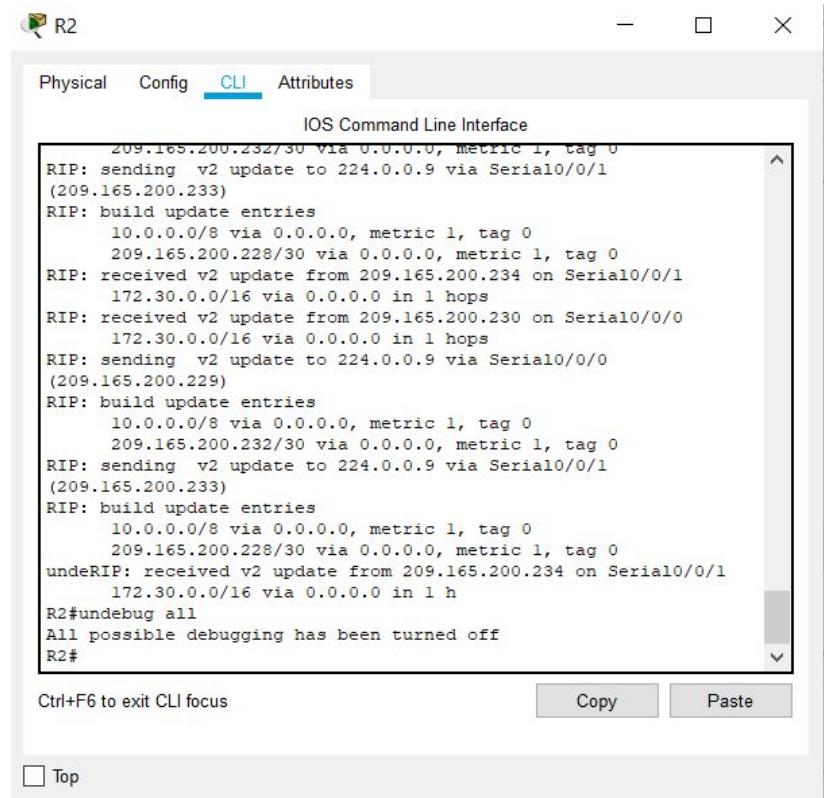
Physical Config **CLI** Attributes

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
    172.30.0.0/16 via 0.0.0.0 in 1 hops
```

Ctrl+F6 to exit CLI focus      **Copy**      **Paste**

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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#
```

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- For R1:

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1>enable
R1#debug ip rip
RIP protocol debugging is on
R1#RIP: received v2 update from 209.165.200.229 on Serial0/0/0
  10.0.0.0/8 via 0.0.0.0 in 1 hops
  209.165.200.232/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.230)
RIP: build update entries
  172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.229 on Serial0/0/0
  10.0.0.0/8 via 0.0.0.0 in 1 hops
  209.165.200.232/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.230)
RIP: build update entries
  172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.230)
RIP: build update entries
  172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.229 on Serial0/0/0
  10.0.0.0/8 via 0.0.0.0 in 1 hops
  209.165.200.232/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.230)
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
```

Ctrl+F6 to exit CLI focus     

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R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.230)
RIP: build update entries
  172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.229 on Serial0/0/0
  10.0.0.0/8 via 0.0.0.0 in 1 hops
  209.165.200.232/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.230)
RIP: build update entries
  172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.229 on Serial0/0/0
  10.0.0.0/8 via 0.0.0.0 in 1 hops
  209.165.200.232/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.230)
RIP: build update entries
  172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 209.165.200.229 on Serial0/0/0
  10.0.0.0/8 via 0.0.0.0 in 1 hops
  209.165.200.232/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.230)
RIP: build update entries
  172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
```

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

$\Rightarrow$

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
```

 R2  
Physical Config CLI Attributes  

### IOS Command Line Interface

```
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#
R2#
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router rip
R2(config-router)#no auto-summary
R2(config-router)#
 Top
```

```
IOS Command Line Interface
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
!
--More--
```

Ctrl+F6 to exit CLI focus      Copy      Paste

Top

R1(config)#**router rip**

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

```
IOS Command Line Interface
RIP: received v2 update from 209.165.200.229 on Serial0/0/0
    10.0.0.0/8 via 0.0.0.0 in 1 hops
    209.165.200.232/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0
(209.165.200.230)
RIP: build update entries
    172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
undebbug a;;
^
% Invalid input detected at '^' marker.

R1#RIP: received v2 update from 209.165.200.229 on Serial0/0/0
    10.0.0.0/8 via 0.0.0.0 in 1 hops
    209.165.200.232/30 via 0.0.0.0 in 1 hops
undebbug all
All possible debugging has been turned off
R1#
R1#
R1#
R1#
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router rip
R1(config-router)#no auto-summary
R1(config-router)#

```

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R3(config)#**router rip**

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

R3

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```

Press RETURN to get started.

R3>enable
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router rip
R3(config-router)#no auto-summary
R3(config-router)#

```

Ctrl+F6 to exit CLI focus      Copy      Paste

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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**

R2

Physical Config **CLI** Attributes

IOS Command Line Interface

```

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, 7 subnets, 3 masks
R          172.30.0.0/16 is possibly down, routing via 209.165.200.230, Serial0/0/0
                  is possibly down, routing via 209.165.200.234, Serial0/0/1
R          172.30.1.0/24 [120/1] via 209.165.200.230, 00:00:24, Serial0/0/0
R          172.30.2.0/24 [120/1] via 209.165.200.230, 00:00:24, Serial0/0/0
R          172.30.100.0/24 [120/1] via 209.165.200.234, 00:00:01, Serial0/0/1
R          172.30.110.0/24 [120/1] via 209.165.200.234, 00:00:01, Serial0/0/1
R          172.30.200.16/28 [120/1] via 209.165.200.234, 00:00:01, Serial0/0/1
R          172.30.200.32/28 [120/1] via 209.165.200.234, 00:00:01, 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

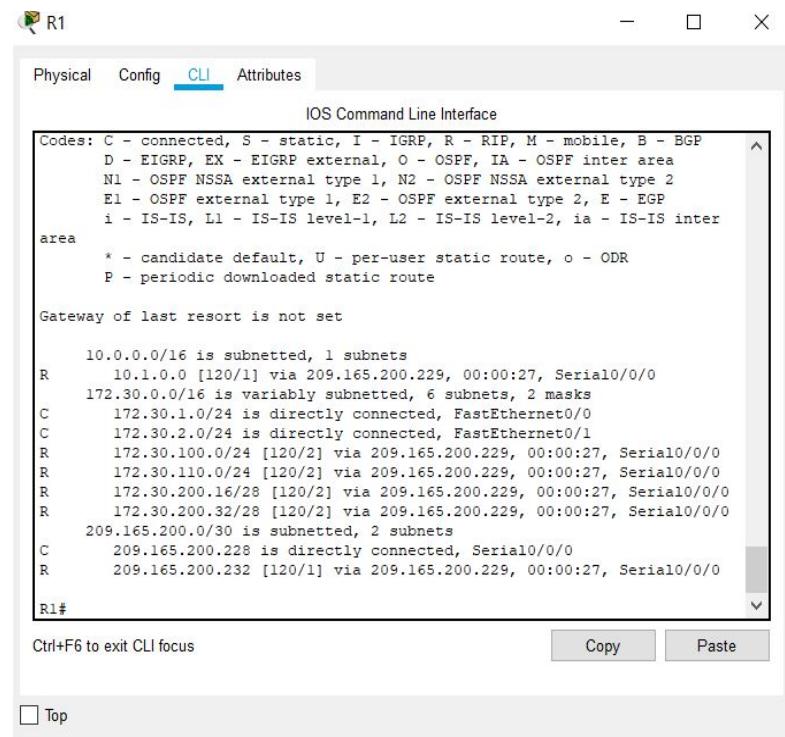
```

R2#

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R1#show ip route



R1

Physical Config **CLI** Attributes

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```
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

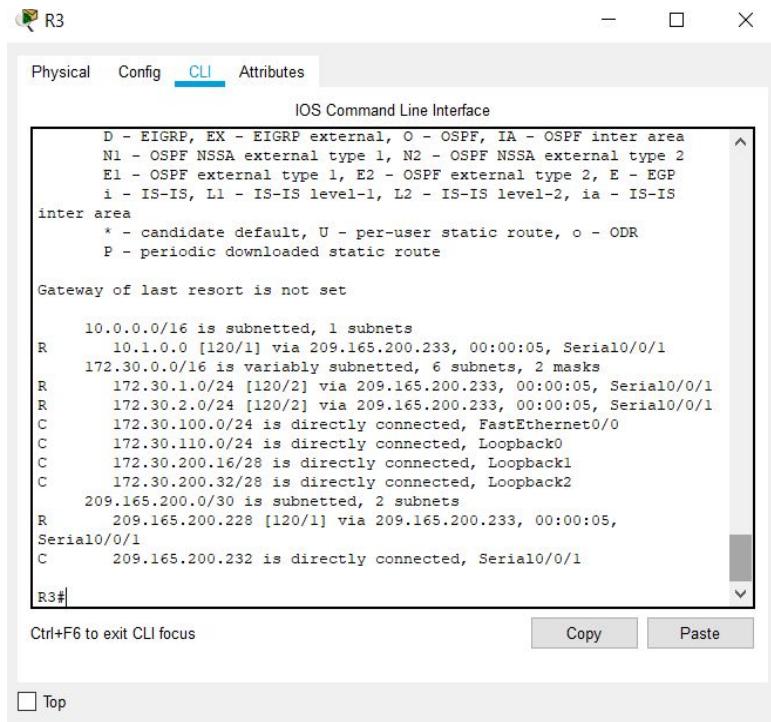
  10.0.0.0/16 is subnetted, 1 subnets
R    10.1.0.0 [120/1] via 209.165.200.229, 00:00:27, Serial0/0/0
  172.30.0.0/16 is variably subnetted, 6 subnets, 2 masks
C      172.30.1.0/24 is directly connected, FastEthernet0/0
C      172.30.2.0/24 is directly connected, FastEthernet0/1
R      172.30.100.0/24 [120/2] via 209.165.200.229, 00:00:27, Serial0/0/0
R      172.30.110.0/24 [120/2] via 209.165.200.229, 00:00:27, Serial0/0/0
R      172.30.200.16/28 [120/2] via 209.165.200.229, 00:00:27, Serial0/0/0
R      172.30.200.32/28 [120/2] via 209.165.200.229, 00:00:27, 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, 00:00:27, Serial0/0/0

R1#
```

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R3#show ip route



R3

Physical Config **CLI** Attributes

IOS Command Line Interface

```
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, 00:00:05, 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, 00:00:05, Serial0/0/1
R      172.30.2.0/24 [120/2] via 209.165.200.233, 00:00:05, 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, 00:00:05,
Serial0/0/1
C      209.165.200.232 is directly connected, Serial0/0/1

R3#
```

Ctrl+F6 to exit CLI focus     

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

- For R1:

```
R1#debug ip rip
RIP protocol debugging is on
R1#RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (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: received v2 update from 209.165.200.229 on Serial0/0/0
    10.1.0.0/16 via 0.0.0.0 in 1 hops
    172.30.100.0/24 via 0.0.0.0 in 2 hops
    172.30.110.0/24 via 0.0.0.0 in 2 hops
    172.30.200.16/28 via 0.0.0.0 in 2 hops
    172.30.200.32/28 via 0.0.0.0 in 2 hops
    209.165.200.232/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (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: received v2 update from 209.165.200.229 on Serial0/0/0
    10.1.0.0/16 via 0.0.0.0 in 1 hops
    172.30.100.0/24 via 0.0.0.0 in 2 hops
    172.30.110.0/24 via 0.0.0.0 in 2 hops
    172.30.200.16/28 via 0.0.0.0 in 2 hops
    172.30.200.32/28 via 0.0.0.0 in 2 hops
    209.165.200.232/30 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.230)
```

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:

```

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
    10.1.0.0/16 via 0.0.0.0, metric 1, tag 0
    172.30.100.0/24 via 0.0.0.0, metric 2, tag 0
    172.30.110.0/24 via 0.0.0.0, metric 2, tag 0
    172.30.200.16/28 via 0.0.0.0, metric 2, tag 0
    172.30.200.32/28 via 0.0.0.0, metric 2, tag 0
    209.165.200.228/30 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
    10.1.0.0/16 via 0.0.0.0, metric 1, tag 0
    172.30.1.0/24 via 0.0.0.0, metric 2, tag 0
    172.30.2.0/24 via 0.0.0.0, metric 2, 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
    172.30.100.0/24 via 0.0.0.0 in 1 hops
    172.30.110.0/24 via 0.0.0.0 in 1 hops
    172.30.200.16/28 via 0.0.0.0 in 1 hops
    172.30.200.32/28 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
    172.30.1.0/24 via 0.0.0.0 in 1 hops
    172.30.2.0/24 via 0.0.0.0 in 1 hops

```

```

172.30.200.32/28 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
    172.30.1.0/24 via 0.0.0.0 in 1 hops
    172.30.2.0/24 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
    10.1.0.0/16 via 0.0.0.0, metric 1, tag 0
    172.30.100.0/24 via 0.0.0.0, metric 2, tag 0
    172.30.110.0/24 via 0.0.0.0, metric 2, tag 0
    172.30.200.16/28 via 0.0.0.0, metric 2, tag 0
    172.30.200.32/28 via 0.0.0.0, metric 2, tag 0
    209.165.200.228/30 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
    10.1.0.0/16 via 0.0.0.0, metric 1, tag 0
    172.30.1.0/24 via 0.0.0.0, metric 2, tag 0
    172.30.2.0/24 via 0.0.0.0, metric 2, 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
    172.30.100.0/24 via 0.0.0.0 in 1 hops
    172.30.110.0/24 via 0.0.0.0 in 1 hops
    172.30.200.16/28 via 0.0.0.0 in 1 hops
    172.30.200.32/28 via 0.0.0.0 in 1 hops
RIP: received v2 update from 209.165.200.230 on Serial0/0/0
    172.30.1.0/24 via 0.0.0.0 in 1 hops

```

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.

```
R2
Physical Config CLI Attributes
IOS Command Line Interface
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
    10.1.0.0/16 via 0.0.0.0, metric 1, tag 0
    172.30.100.0/24 via 0.0.0.0, metric 2, tag 0
    172.30.110.0/24 via 0.0.0.0, metric 2, tag 0
    172.30.200.16/28 via 0.0.0.0, metric 2, tag 0
    172.30.200.32/28 via 0.0.0.0, metric 2, tag 0
    209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
RIP: sending v1 update to 224.0.0.9 via Serial0/0/1 (209.165.200.233)
RIP: build update entries
    10.1.0.0/16 via 0.0.0.0, metric 1, tag 0
    172.30.1.0/24 via 0.0.0.0, metric 2, tag 0
    172.30.2.0/24 via 0.0.0.0, metric 2, tag 0
    209.165.200.228/30 via 0.0.0.0, metric 1, tag 0
undebbug all
All possible debugging has been turned off
R2#
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:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/8 ms
R2#
```

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

Ans: 5 ICMP messages are successful.

- Ping PC4 from R2

```
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 = 1/3/14 ms

R2#
```

Ctrl+F6 to exit CLI focus      **Copy**      **Paste**

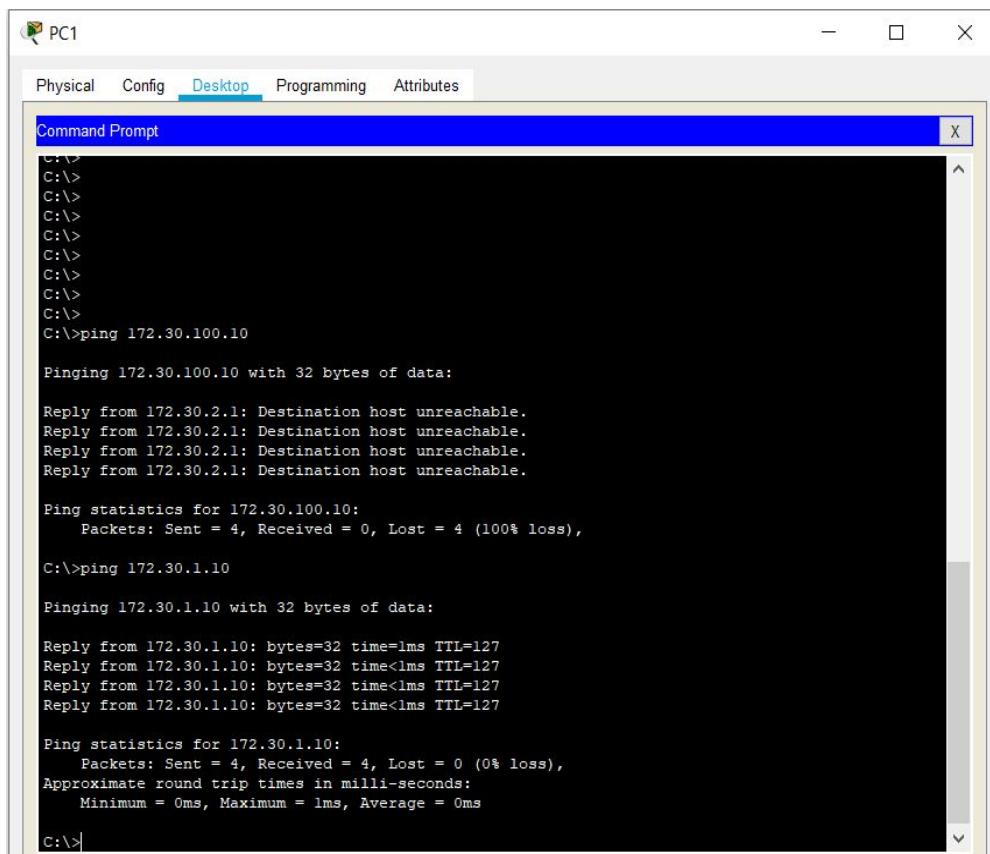
Top

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:



```
PC1
Physical Config Desktop Programming Attributes

Command Prompt
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
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.

Ping statistics for 172.30.100.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 172.30.1.10

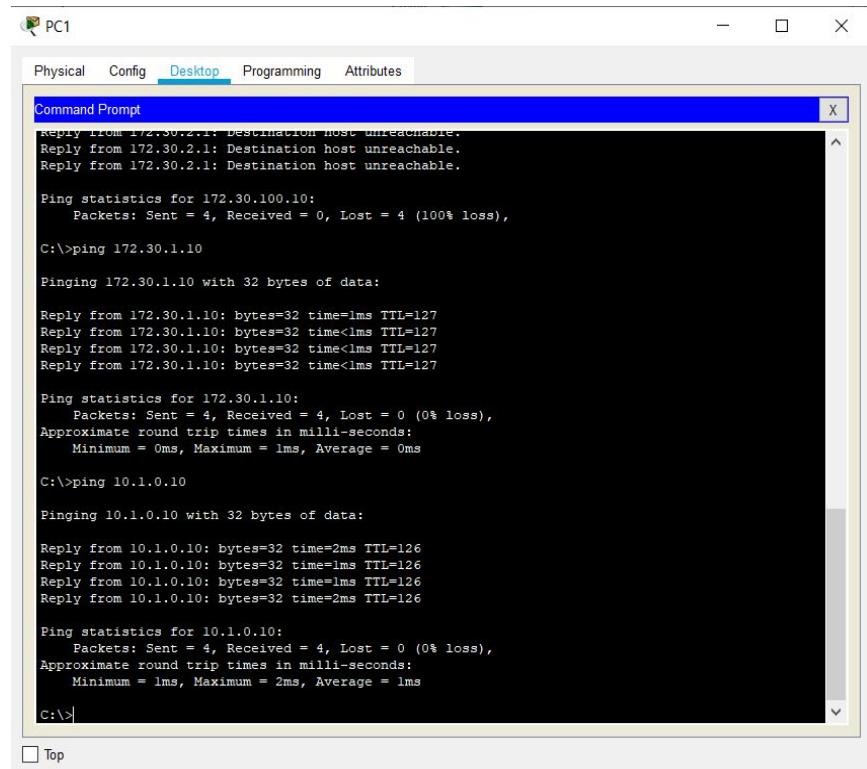
Pinging 172.30.1.10 with 32 bytes of data:
Reply from 172.30.1.10: bytes=32 time=1ms TTL=127
Reply from 172.30.1.10: bytes=32 time<1ms TTL=127
Reply from 172.30.1.10: bytes=32 time<1ms TTL=127
Reply from 172.30.1.10: bytes=32 time<1ms TTL=127

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
C:\>
```

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

What is the success rate? 100%

- Ping PC3 from PC1:



The screenshot shows a Windows Command Prompt window titled "PC1". The window has tabs at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. The main area displays the following command-line session:

```
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),  
  
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  
  
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  
  
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=2ms 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  
  
C:\>
```

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

Yes What is the success rate? => 100%

- Ping PC4 from PC1:



PC1

Physical Config Desktop Programming Attributes

Command Prompt

```
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

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=2ms 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

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=13ms TTL=125
Reply from 172.30.100.10: bytes=32 time=2ms 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 = 13ms, Average = 5ms

C:\>
```

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

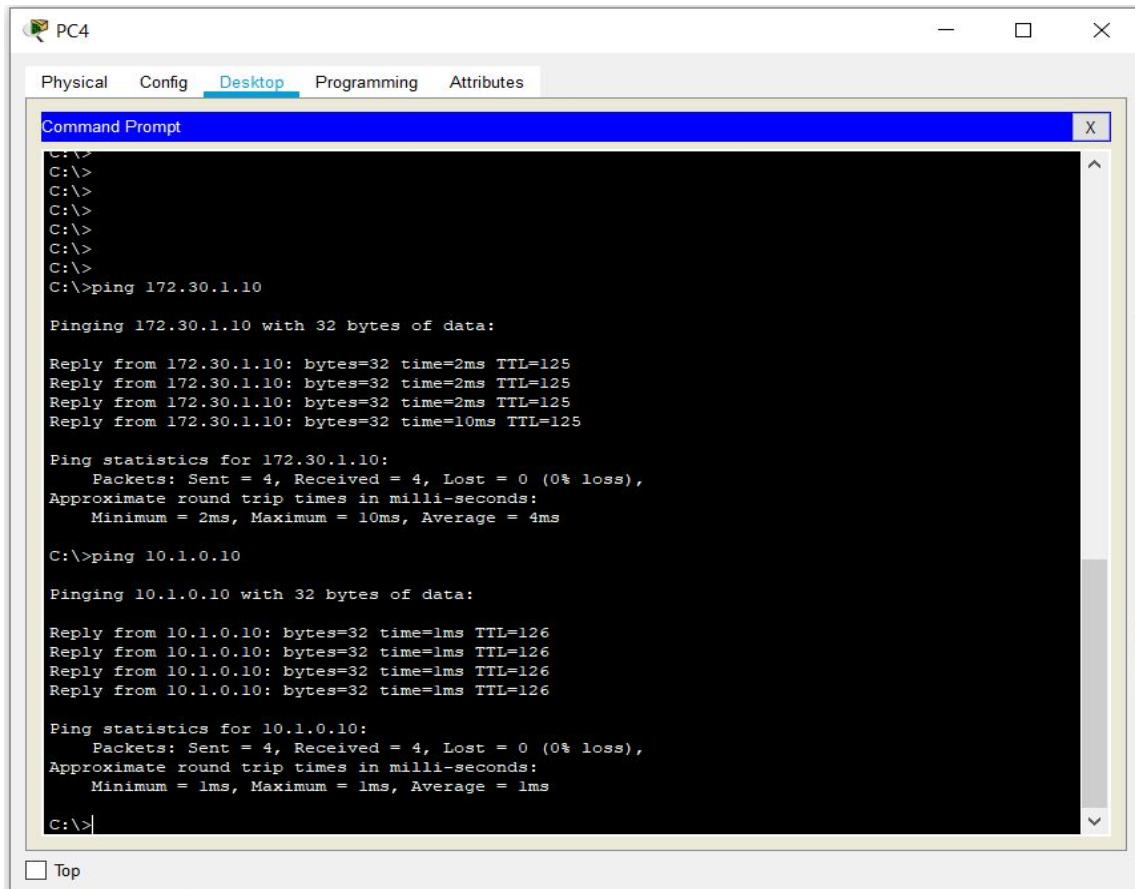
Yes What is the success rate? => 100%

- Ping PC2 from PC4:

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

Yes What is the success rate? => 100%

- Ping PC3 from PC4:



The screenshot shows a Windows Command Prompt window titled "PC4". The window has tabs at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. The main area is a "Command Prompt" window with the following text output:

```
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
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=2ms 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
Reply from 172.30.1.10: bytes=32 time=10ms 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 = 10ms, Average = 4ms

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

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 = 1ms, Average = 1ms

C:\>|
```

At the bottom left of the command prompt window, there is a "Top" button.

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
```

!

!

1

1

!

1

1

!

!

3

## spanning-tree mode pvst

!

1

1

!

!

i

IP address 172.30.1.125

duplex auto

speed auto

!

i

ip address 172.30.2.1 25

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	
FastEthernet0/1	172.30.2.1	YES	manual	up	Serial0/0/0
	209.165.200.230	YES	manual	up	Serial0/0/1
	unassigned	YES	NVRAM	administratively down	down
Vlan1	unassigned	YES	NVRAM	administratively down	down

---

R2:

R2#show ip interface brief

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/0	10.1.0.1	YES	manual	up	FastEthernet0/1
	unassigned	YES	NVRAM	administratively down	down
Serial0/0/0	209.165.200.229	YES	manual	up	
Serial0/0/1	209.165.200.233	YES	manual	up	
Vlan1	unassigned	YES	NVRAM	administratively down	down

---

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:

```
R1#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
R1#reload
System configuration has been modified. Save? [yes/no]:no
Proceed with reload? [confirm]
System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fcl)
Initializing memory for ECC
...
C1841 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

 Readonly ROMMON initialized

 Self decompressing the image :
#####
##### [OK]
 Restricted Rights Legend

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Programs clause at FAR sec. 52.232-14, as applicable.
```

Ctrl+F6 to exit CLI focus

Copy Paste

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- Erase configuration for R2 and reload:

```
R2#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
R2#reload
System configuration has been modified. Save? [yes/no]:no
Proceed with reload? [confirm]
System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fcl)
Initializing memory for ECC
...
C1841 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

 Readonly ROMMON initialized

 Self decompressing the image :
#####
##### [OK]
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subject to restrictions as set forth in subparagraph
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(c) (1) (ii) of the Rights in Technical Data and Computer
Programs clause at FAR sec. 52.232-14, as applicable.
```

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- Erase configuration for R3 and reload:

R3

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R3#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
R3#reload
System configuration has been modified. Save? [yes/no]:no
Proceed with reload? [confirm]
System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fc1)
Initializing memory for ECC
..
C1841 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

 Readonly ROMMON initialized

Self decompressing the image :
#####
##### [OK]
Restricted Rights Legend

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```

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## Conclusion:

I implemented RIPv2 on the given topology and documented the results.