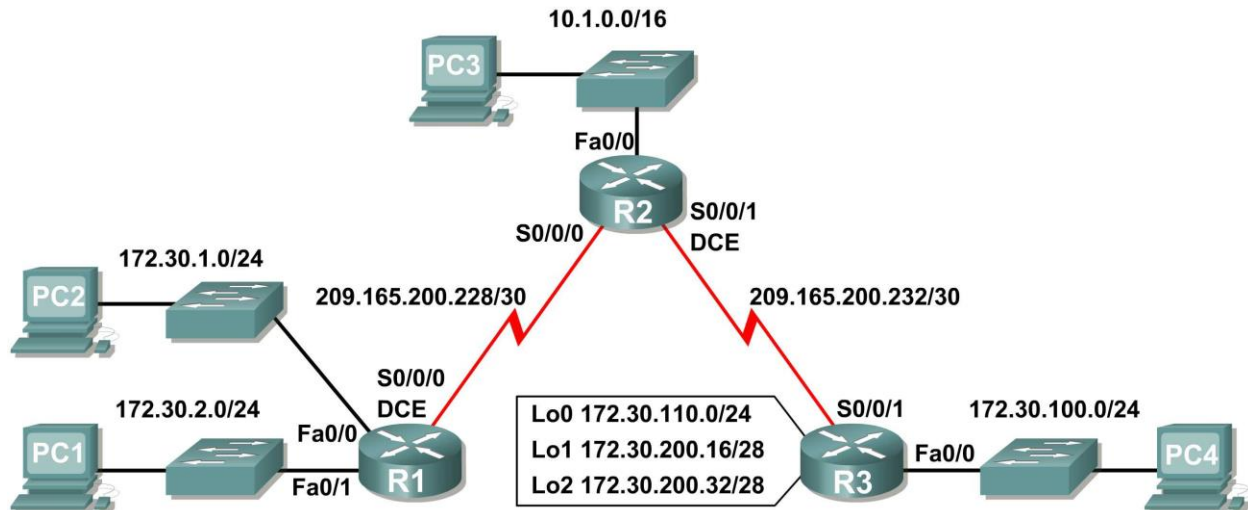


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 CEL 51, DCCN, Monsoon 2020
 Lab 7: RIPv2 Router Configuration

Topology Diagram



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	172.30.1.1	255.255.255.0	N/A
	Fa0/1	172.30.2.1	255.255.255.0	N/A
	S0/0/0	209.165.200.230	255.255.255.252	N/A
R2	Fa0/0	10.1.0.1	255.255.0.0	N/A
	S0/0/0	209.165.200.229	255.255.255.252	N/A
	S0/0/1	209.165.200.233	255.255.255.252	N/A
R3	Fa0/0	172.30.100.1	255.255.255.0	N/A
	S0/0/1	209.165.200.234	255.255.255.252	N/A
	Lo0	172.30.110.1	255.255.255.0	N/A
	Lo1	172.30.200.17	255.255.255.240	N/A
	Lo2	172.30.200.33	255.255.255.240	N/A
PC1	NIC	172.30.2.10	255.255.255.0	172.30.2.1
PC2	NIC	172.30.1.10	255.255.255.0	172.30.1.1
PC3	NIC	10.1.0.10	255.255.0.0	10.1.0.1
PC4	NIC	172.30.100.10	255.255.255.0	172.30.100.1

Learning Objectives

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

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

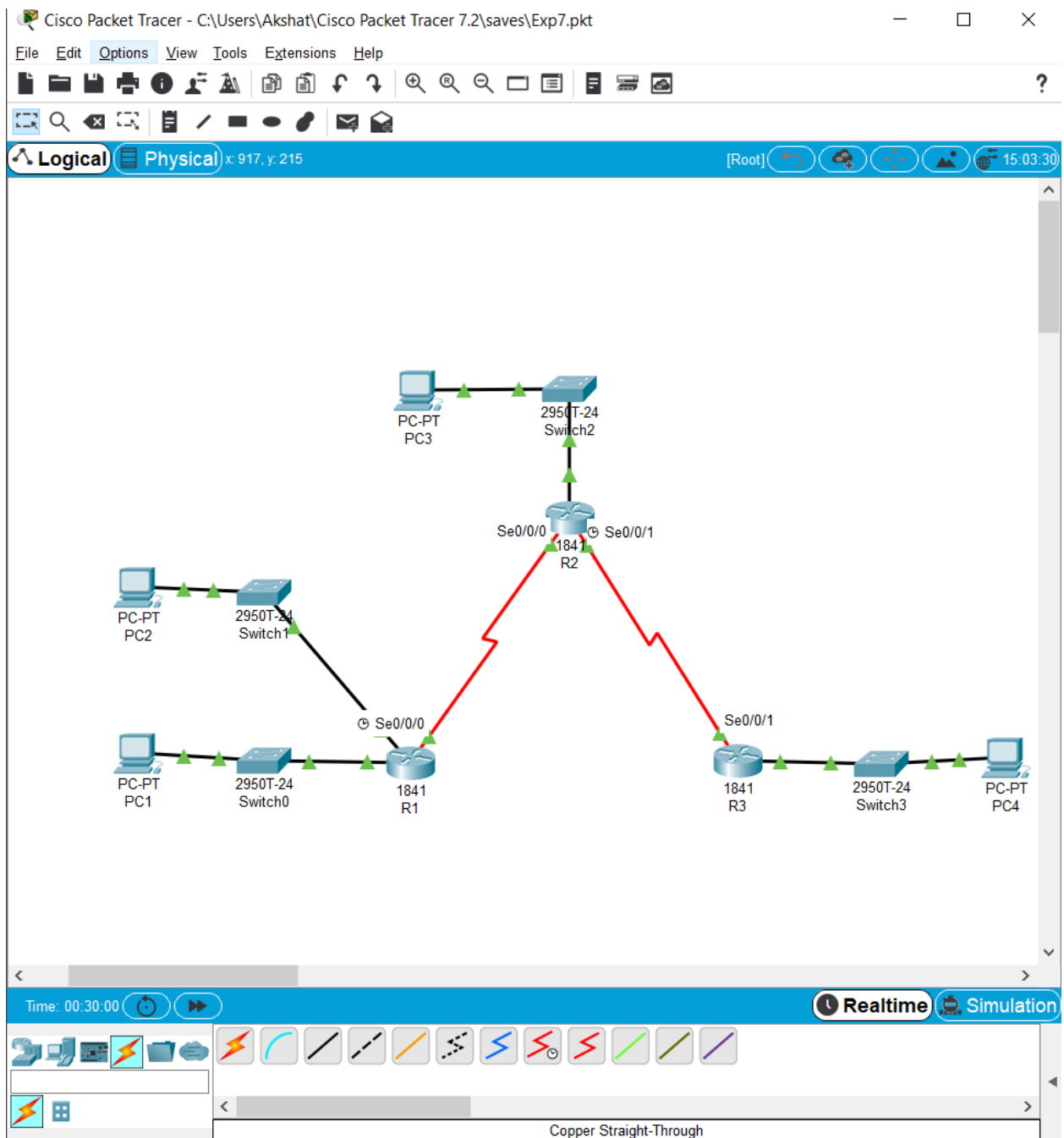
Scenario

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

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

Step 1: Cable a network.

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



PC1 config

PC1

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IP Address 172.30.1.10

Subnet Mask 255.255.255.0

Default Gateway 172.30.2.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::201:43FF:FE36:C27

IPv6 Gateway

IPv6 DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

PC2 config

PC2

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IP Address 172.30.2.10

Subnet Mask 255.255.255.0

Default Gateway 172.30.1.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::206:2AFF:FE46:5230

IPv6 Gateway

IPv6 DNS Server

802.1X

☐ Use 802.1X Security

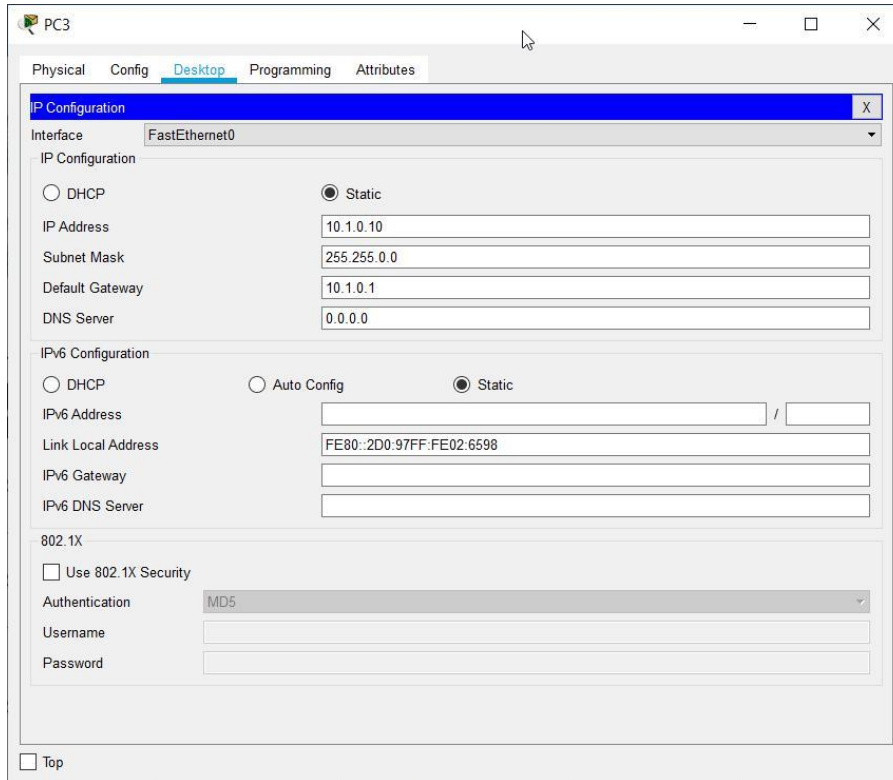
Authentication MD5

Username

Password

☐ Top

PC3 config



PC3 configuration window showing the Desktop tab. The IP Configuration section is active, showing settings for FastEthernet0. The IP Address is 10.1.0.10, Subnet Mask is 255.255.0.0, Default Gateway is 10.1.0.1, and DNS Server is 0.0.0.0. The IPv6 Configuration section is also visible, showing settings for IPv6 Address, Link Local Address, IPv6 Gateway, and IPv6 DNS Server. The 802.1X section is also visible, showing settings for Use 802.1X Security, Authentication, Username, and Password.

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IP Address 10.1.0.10

Subnet Mask 255.255.0.0

Default Gateway 10.1.0.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::2D0:97FF:FE02:6598

IPv6 Gateway

IPv6 DNS Server

802.1X

☐ Use 802.1X Security

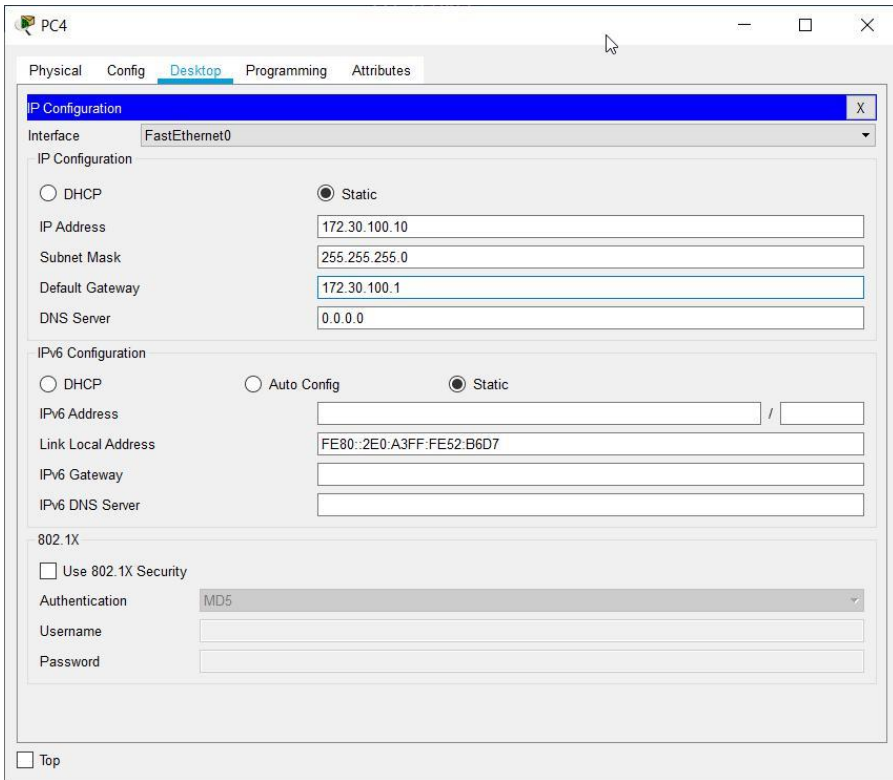
Authentication MD5

Username

Password

☐ Top

PC4 config



PC4 configuration window showing the Desktop tab. The IP Configuration section is active, showing settings for FastEthernet0. The IP Address is 172.30.100.10, Subnet Mask is 255.255.255.0, Default Gateway is 172.30.100.1, and DNS Server is 0.0.0.0. The IPv6 Configuration section is also visible, showing settings for IPv6 Address, Link Local Address, IPv6 Gateway, and IPv6 DNS Server. The 802.1X section is also visible, showing settings for Use 802.1X Security, Authentication, Username, and Password.

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IP Address 172.30.100.10

Subnet Mask 255.255.255.0

Default Gateway 172.30.100.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::2E0:A3FF:FE52:B6D7

IPv6 Gateway

IPv6 DNS Server

802.1X

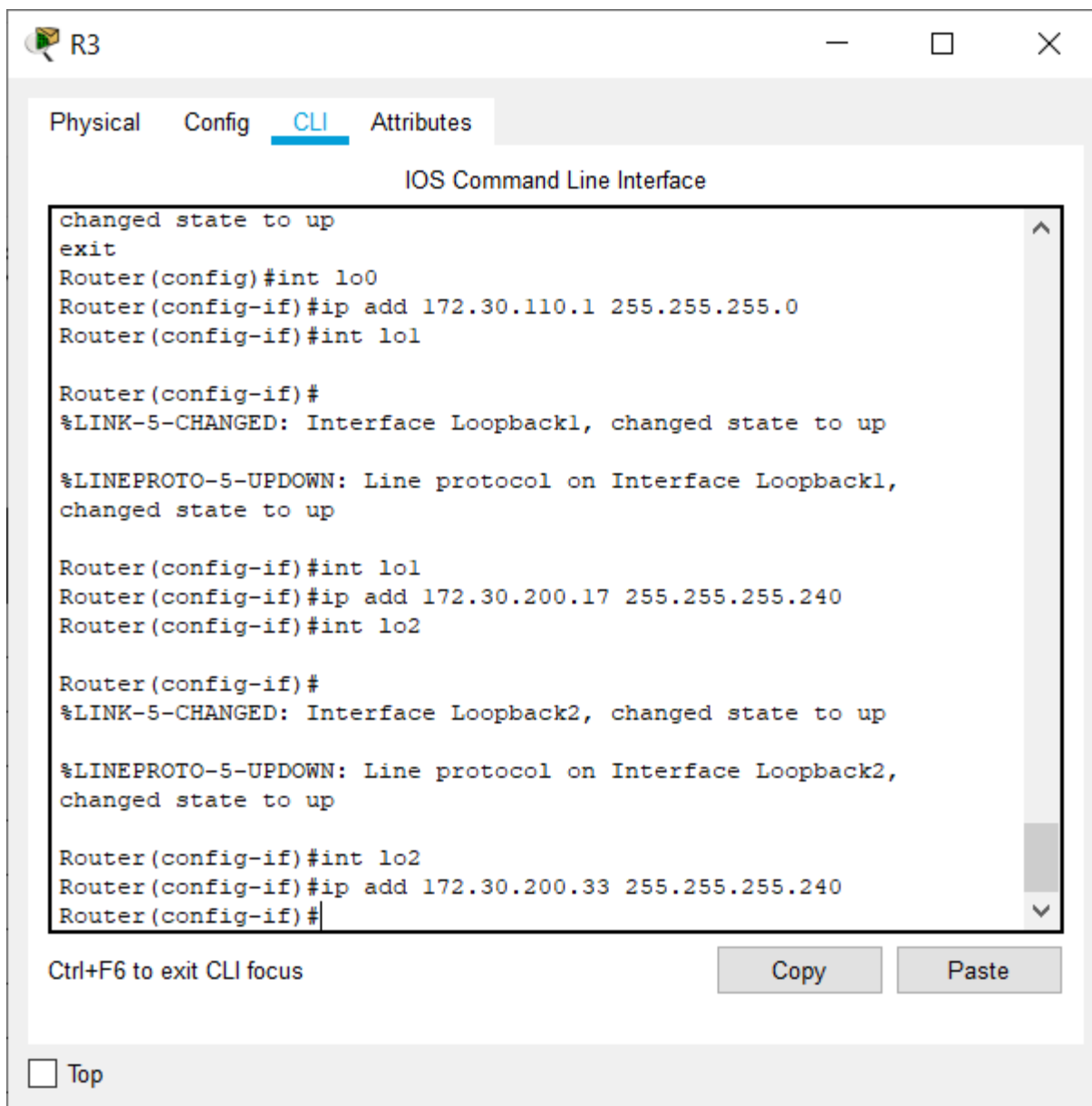
☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top



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.



Physical Config CLI Attributes

IOS Command Line Interface

```
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#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
```

Ctrl+F6 to exit CLI focus

Copy

Paste

☐ Top

 R1

Physical Config CLI Attributes

IOS Command Line Interface

```
CISCO 1841 (revision 5.0) with 114688K/16384K bytes of memory.
Processor board ID FTX0947218E
M860 processor: part number 0, mask 49
2 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
191K bytes of NVRAM.
63488K bytes of ATA CompactFlash (Read/Write)
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]: no


Press RETURN to get started!

Router>
```

Ctrl+F6 to exit CLI focus

CopyPaste

☐ Top

 R2

Physical Config CLI Attributes

IOS Command Line Interface

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

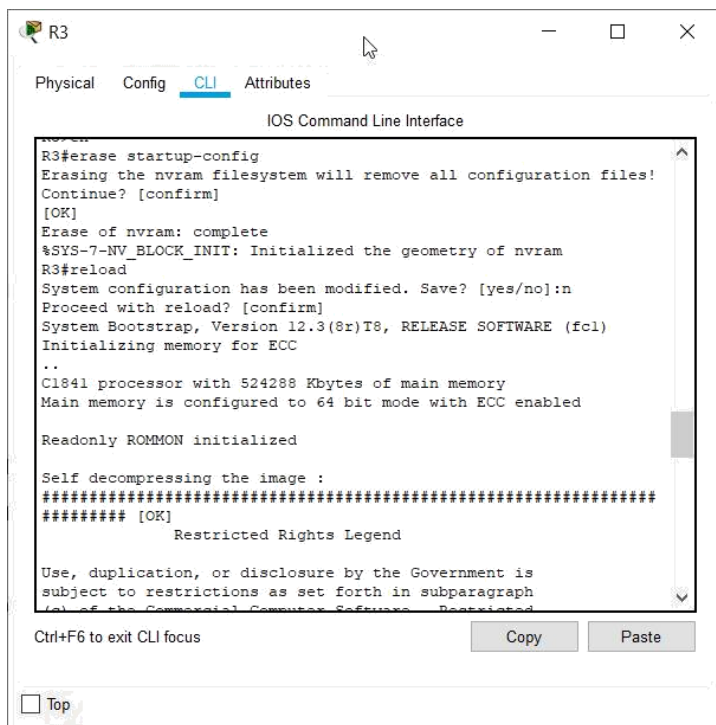
Self decompressing the image :
##### [OK]
Restricted Rights Legend

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(a) of the Commercial Computer Software - Restricted
```

Ctrl+F6 to exit CLI focus

CopyPaste

☐ Top



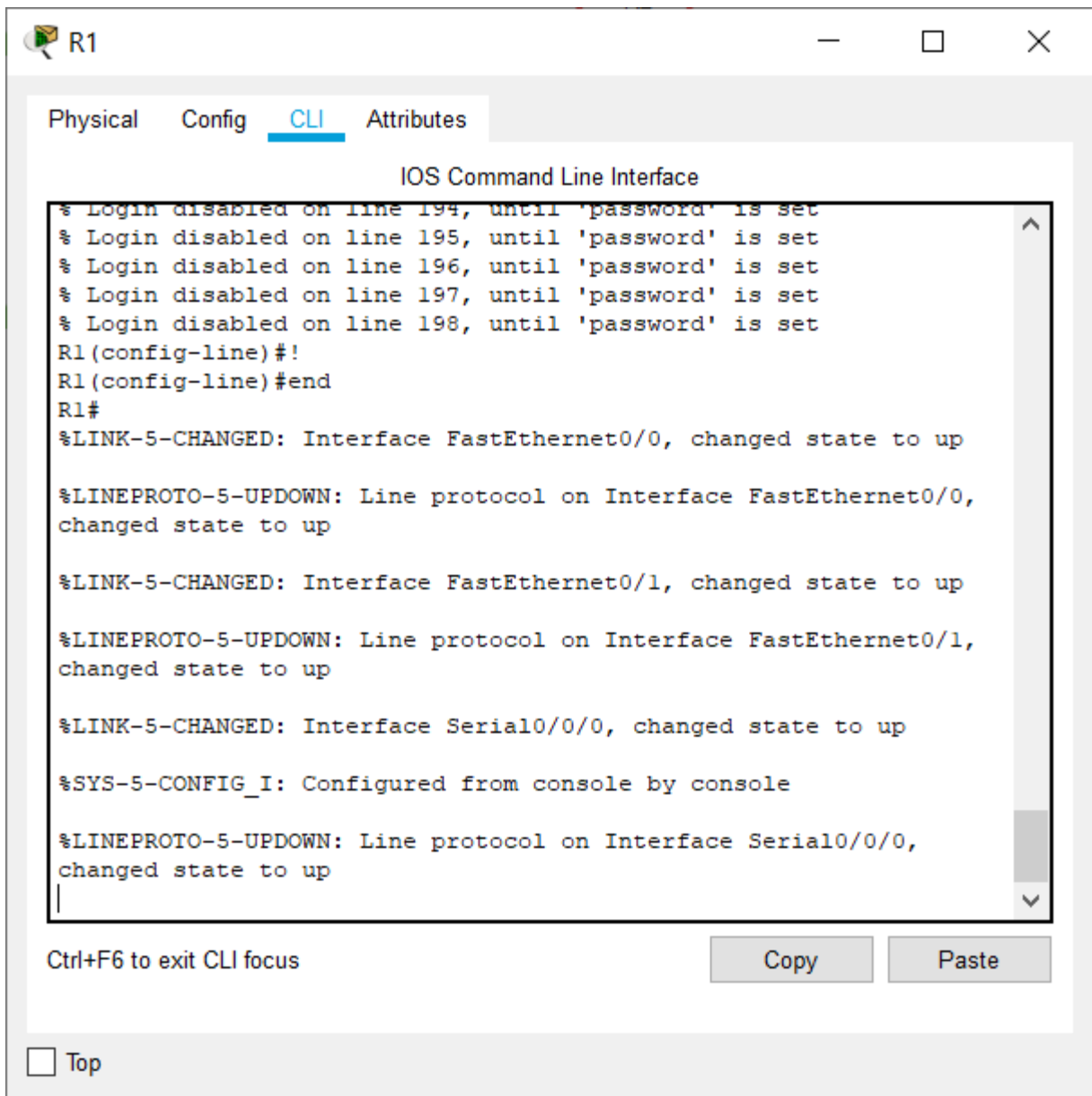
Task 2: Load Routers with the Supplied Scripts.

Step 1: Load the following script onto R1.

```

!
hostname R1
!
!
!
interface FastEthernet0/0
 ip address 172.30.1.1 255.255.255.0
 duplex auto
 speed auto
 no shutdown
!
interface FastEthernet0/1
 ip address 172.30.2.1 255.255.255.0
 dupleazazax auto
 speed auto
 no shutdown
!
interface Serial0/0/0
 ip address 209.165.200.230 255.255.255.252
 clock rate 64000
 no shutdown
!
router rip
 passive-interface FastEthernet0/0
 passive-interface FastEthernet0/1
 network 172.30.0.0
 network 209.165.200.0
!
line con 0
line vty 0 4
 login
!
End

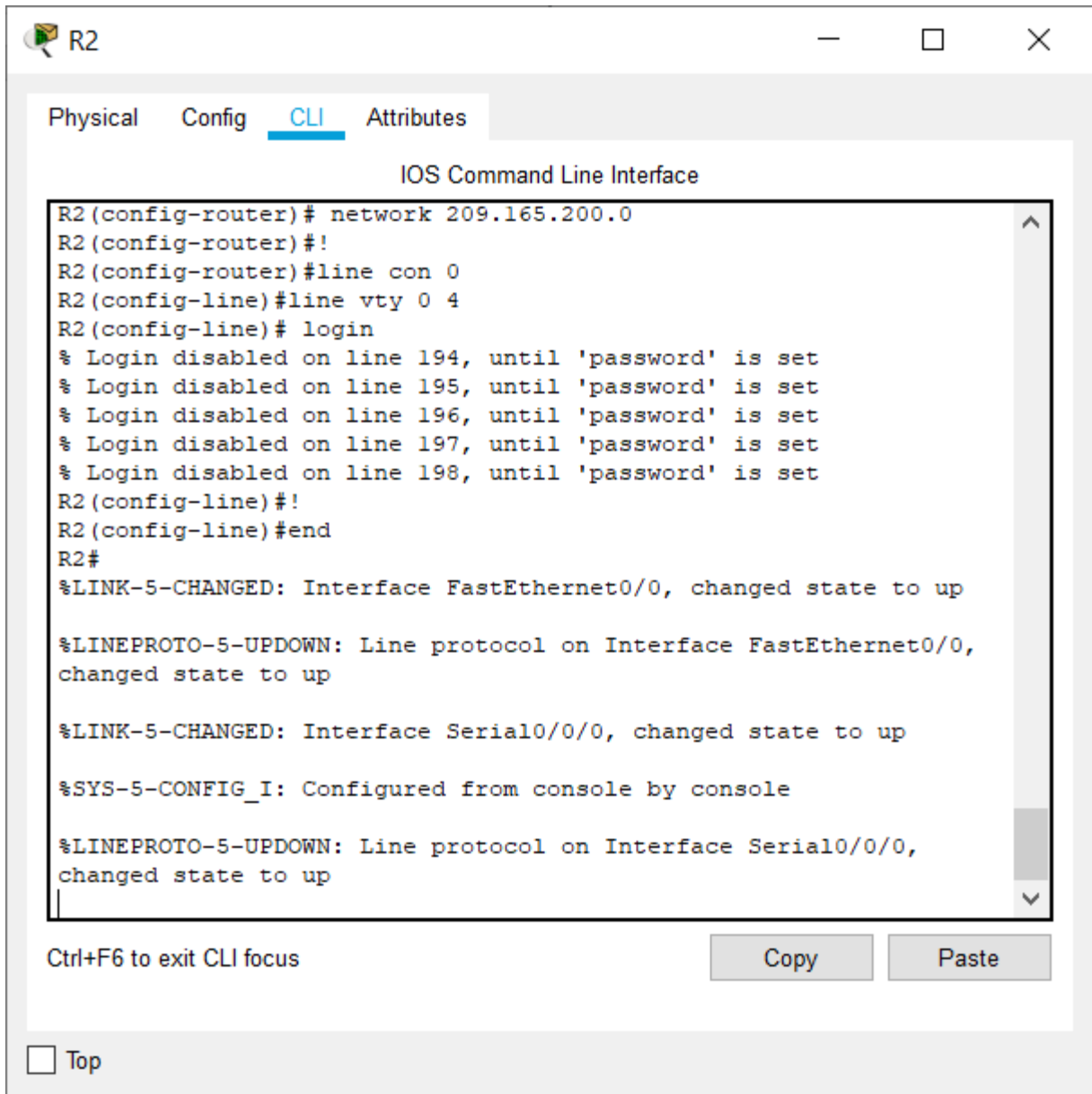
```



Step 2: Load the following script onto R2.

```
hostname R2
!
!
!
interface FastEthernet0/0
 ip address 10.1.0.1 255.255.0.0
 duplex auto
 speed auto
 no shutdown
!
interface Serial0/0/0
 ip address 209.165.200.229 255.255.255.252
 no shutdown
!
interface Serial0/0/1
```

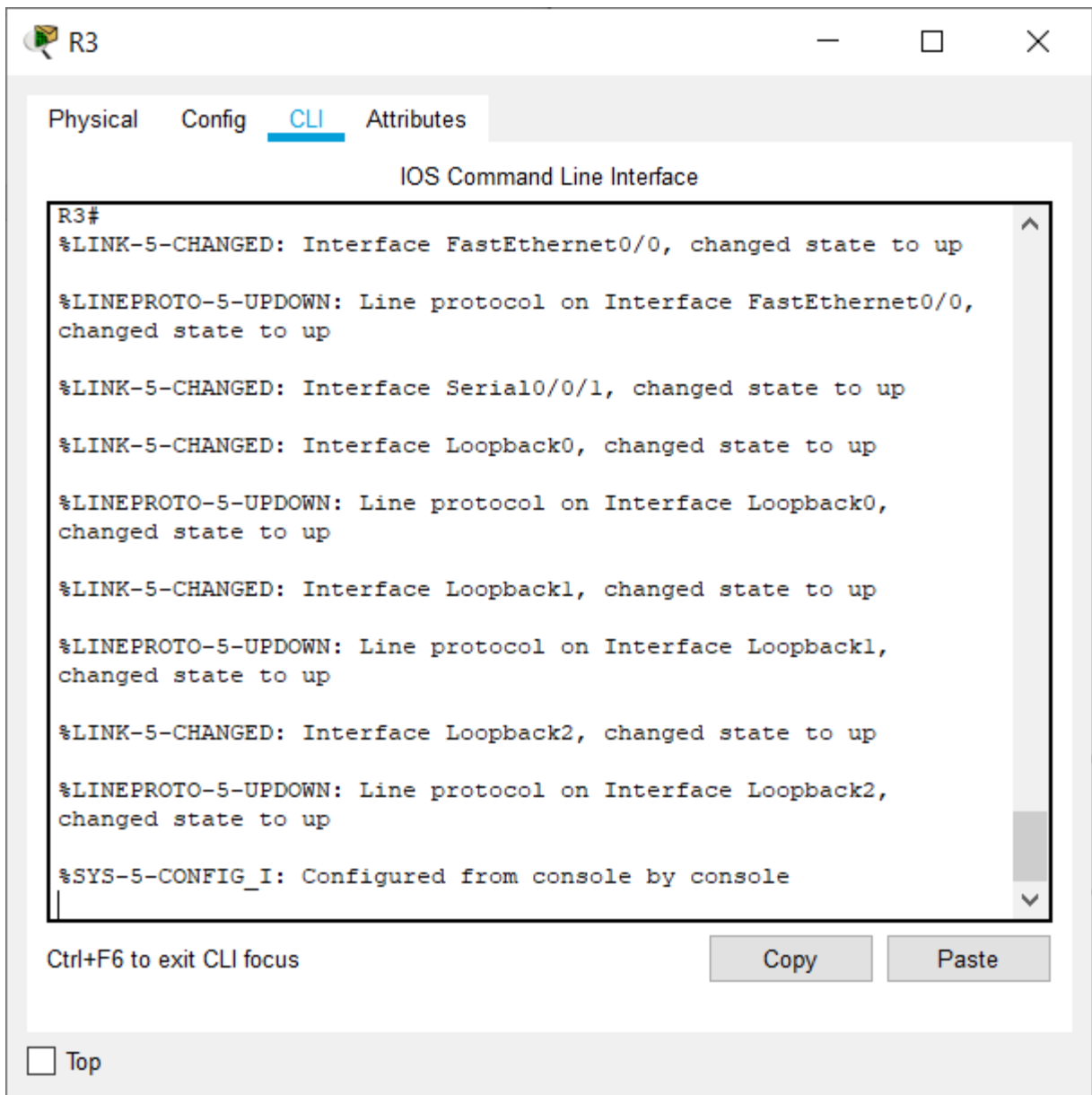
```
ip address 209.165.200.233 255.255.255.252
clock rate 64000
no shutdown
!
router rip
passive-interface FastEthernet0/0
network 10.0.0.0
network 209.165.200.0
!
line con 0
line vty 0 4
login
!
end
```



Step 3: Load the following script onto R3.

```
hostname R3
!
```

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



Task 3: Examine the Current Status of the Network.

Step 1: Verify that both serial links are up.

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

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

R2

Physical

Config

CLI

Attributes

IOS Command Line Interface

%SYS-5-CONFIG_I: Configured from console by console

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

%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

R2#show ip interface brief

Interface	IP-Address	OK?	Method	Status
FastEthernet0/0	10.1.0.1	YES	manual	up
FastEthernet0/1	unassigned	YES	NVRAM	administratively 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

R2#

Ctrl+F6 to exit CLI focus

Copy

Paste

☐ Top

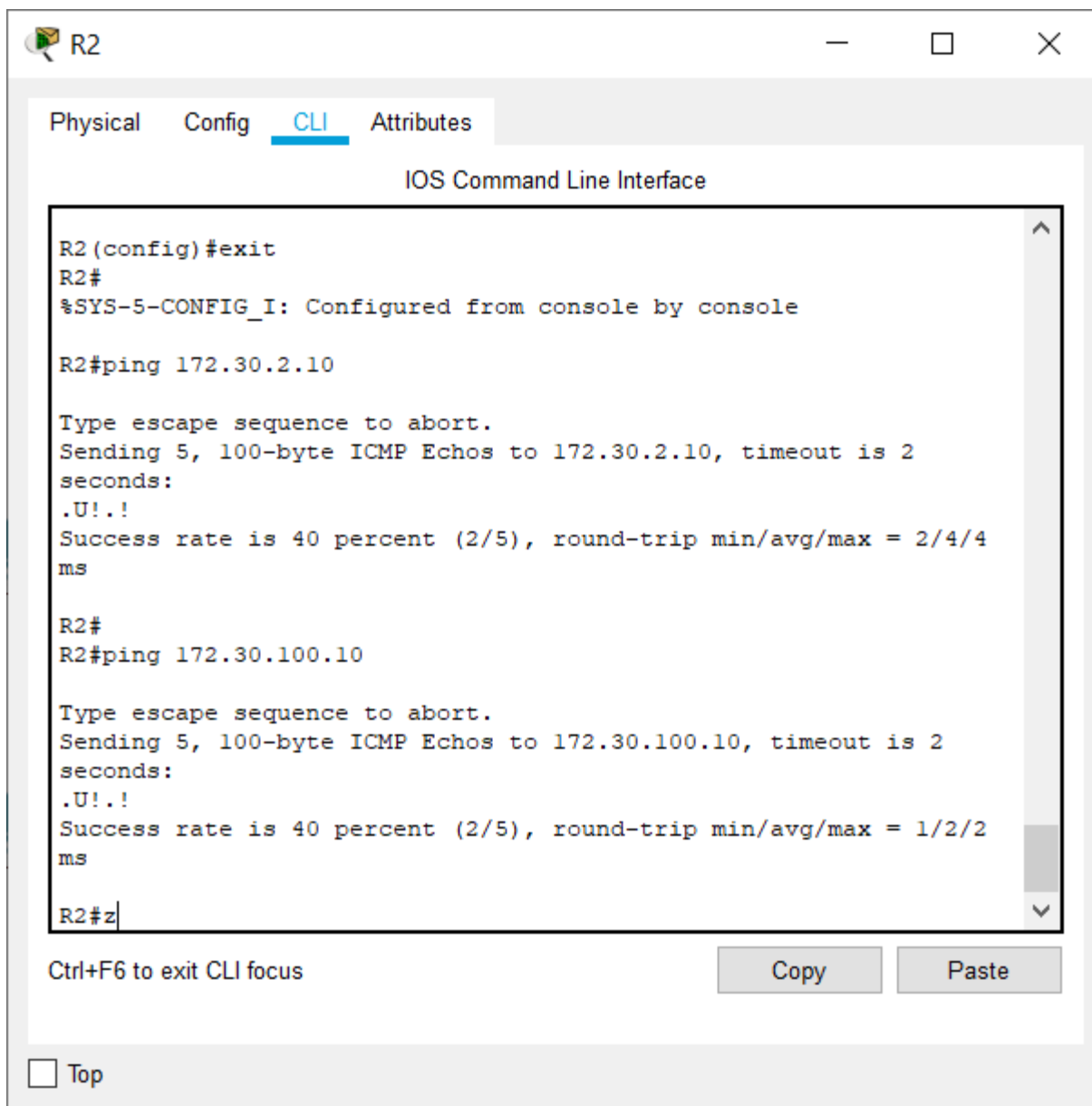
Step 2: Check the connectivity from R2 to the hosts on the R1 and R3 LANs.

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
```

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

40 percent (2/5)



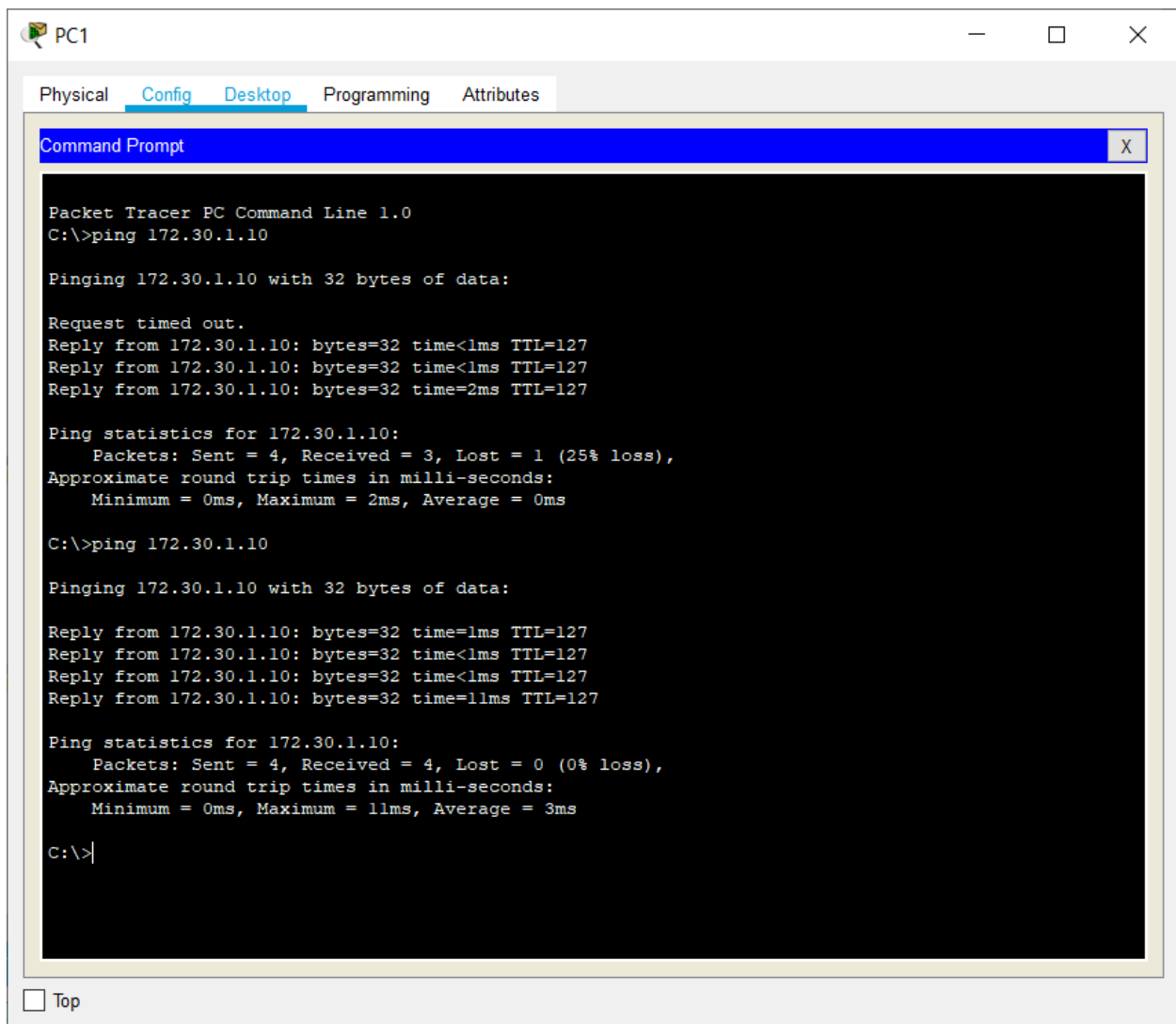
From the R2 router, how many ICMP messages are successful when pinging PC4?

Success Rate: 40 percent (2/5)

Step 3: Check the connectivity between the PCs.

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

What is the success rate? Success Rate: 100%



The screenshot shows a Packet Tracer PC1 window with tabs for Physical, Config, Desktop, Programming, and Attributes. The Desktop tab is active, displaying a Command Prompt window titled "Command Prompt". The Command Prompt shows the output of two ping commands to 172.30.1.10. The first command shows a 25% loss rate (1 out of 4 packets received), and the second command shows a 0% loss rate (4 out of 4 packets received).

```
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<1ms TTL=127
Reply from 172.30.1.10: bytes=32 time<1ms TTL=127
Reply from 172.30.1.10: bytes=32 time=2ms 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 = 2ms, 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
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=11ms 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 = 11ms, Average = 3ms

C:\>
```

☐ Top

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

What is the success rate? **Success Rate: 50%**

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 = 11ms, Average = 3ms

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=10ms 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 = 10ms, Average = 5ms

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

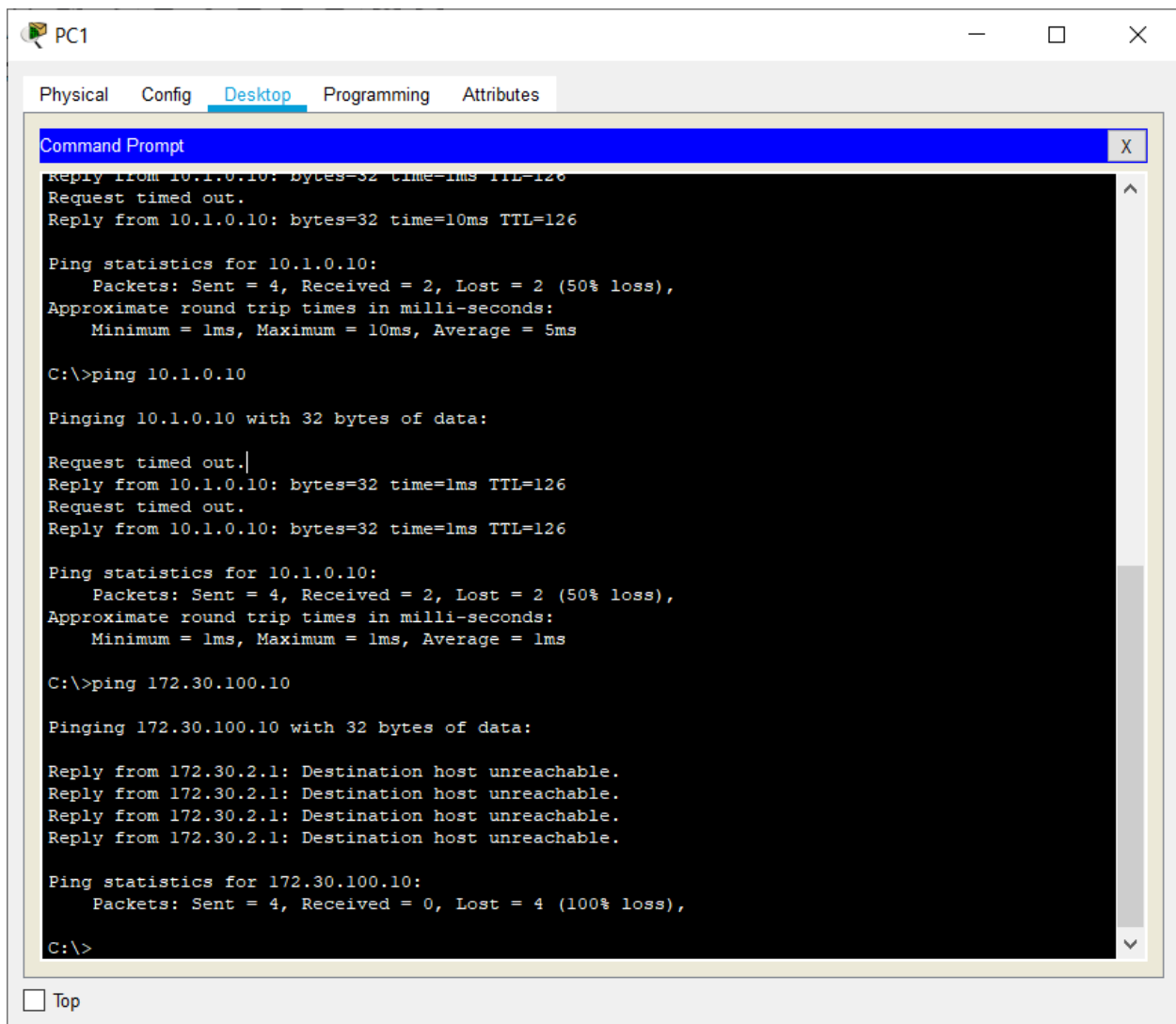
Ping statistics for 10.1.0.10:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>
```

☐ Top

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

What is the success rate? **Success Rate: 0%**



The screenshot shows a window titled "PC1" with tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Desktop" tab is active, displaying a "Command Prompt" window. The Command Prompt shows the results of two ping commands. The first command is "ping 10.1.0.10", which shows a 50% success rate (2 received, 2 lost). The second command is "ping 172.30.100.10", which shows a 100% failure rate (0 received, 4 lost).

```
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126
Request timed out.
Reply from 10.1.0.10: bytes=32 time=10ms 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 = 10ms, Average = 5ms

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:\>ping 172.30.100.10

Pinging 172.30.100.10 with 32 bytes of data:

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

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

C:\>
```

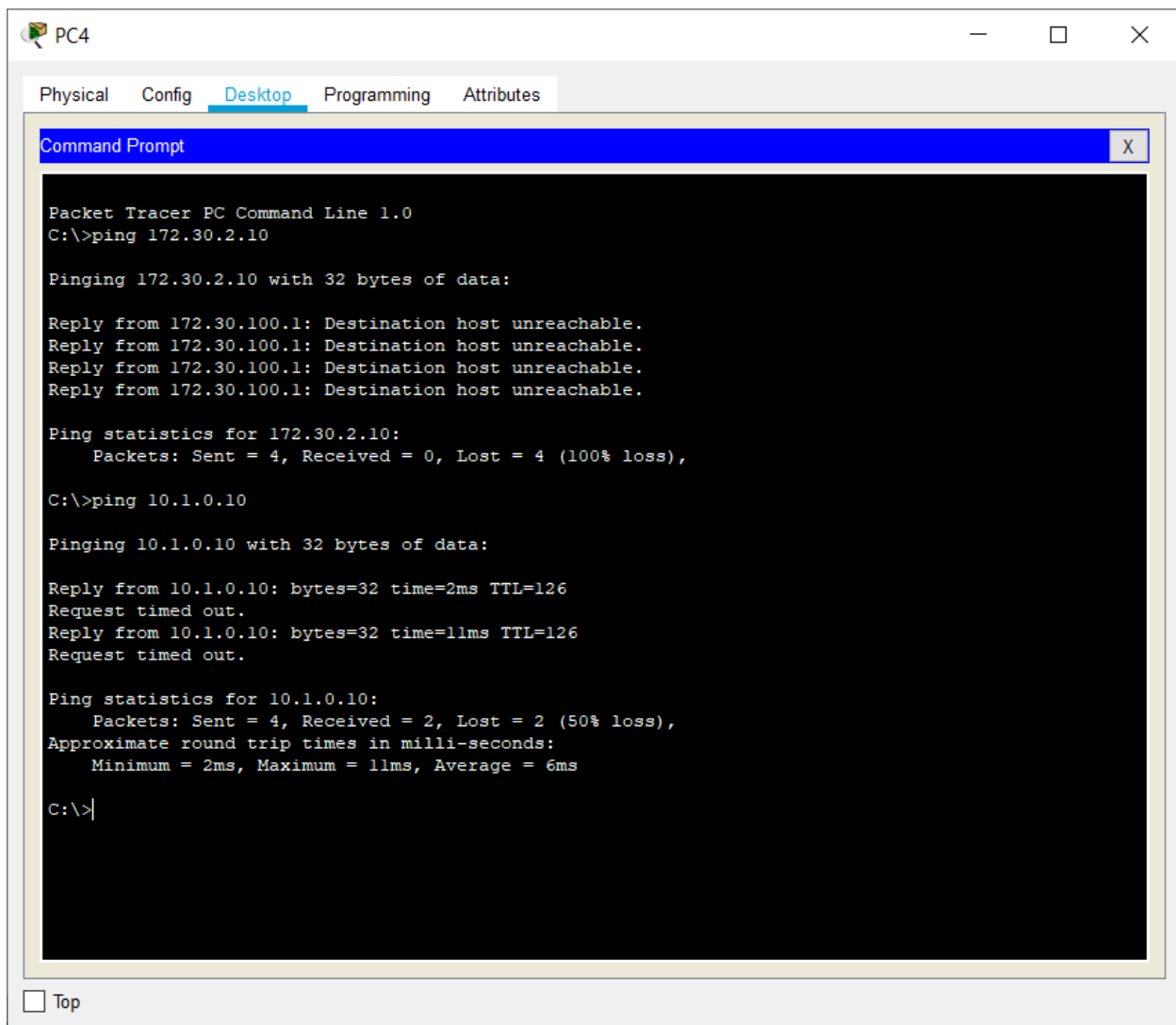
☐ Top

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

What is the success rate? **Success Rate: 0%**

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

What is the success rate? **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 window titled 'R2' with tabs for 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The command 'R2#show ip route' has been entered, and its output is shown. The output includes a legend for route codes (C, S, I, R, M, B, D, EX, O, IA, N1, N2, E1, E2, E, i, L1, L2, ia, *, U, o, P), a message 'Gateway of last resort is not set', and a list of routes. The routes include 10.0.0.0/16 (subnetted), 10.1.0.0 (connected), 172.30.0.0/16 (via 209.165.200.230 and 209.165.200.234), and 209.165.200.0/30 (subnetted). The window also features a 'Ctrl+F6 to exit CLI focus' message and 'Copy' and 'Paste' buttons. A 'Top' button is located at the bottom left.

```
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, 00:00:08,
Serial0/0/0
                  [120/1] via 209.165.200.234, 00:00:16,
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
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

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

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

```
R1#show ip route
```

R1

Physical Config CLI Attributes

IOS Command Line Interface

```
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, 00:00:03,
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, 00:00:03,
Serial0/0/0
```

Ctrl+F6 to exit CLI focus

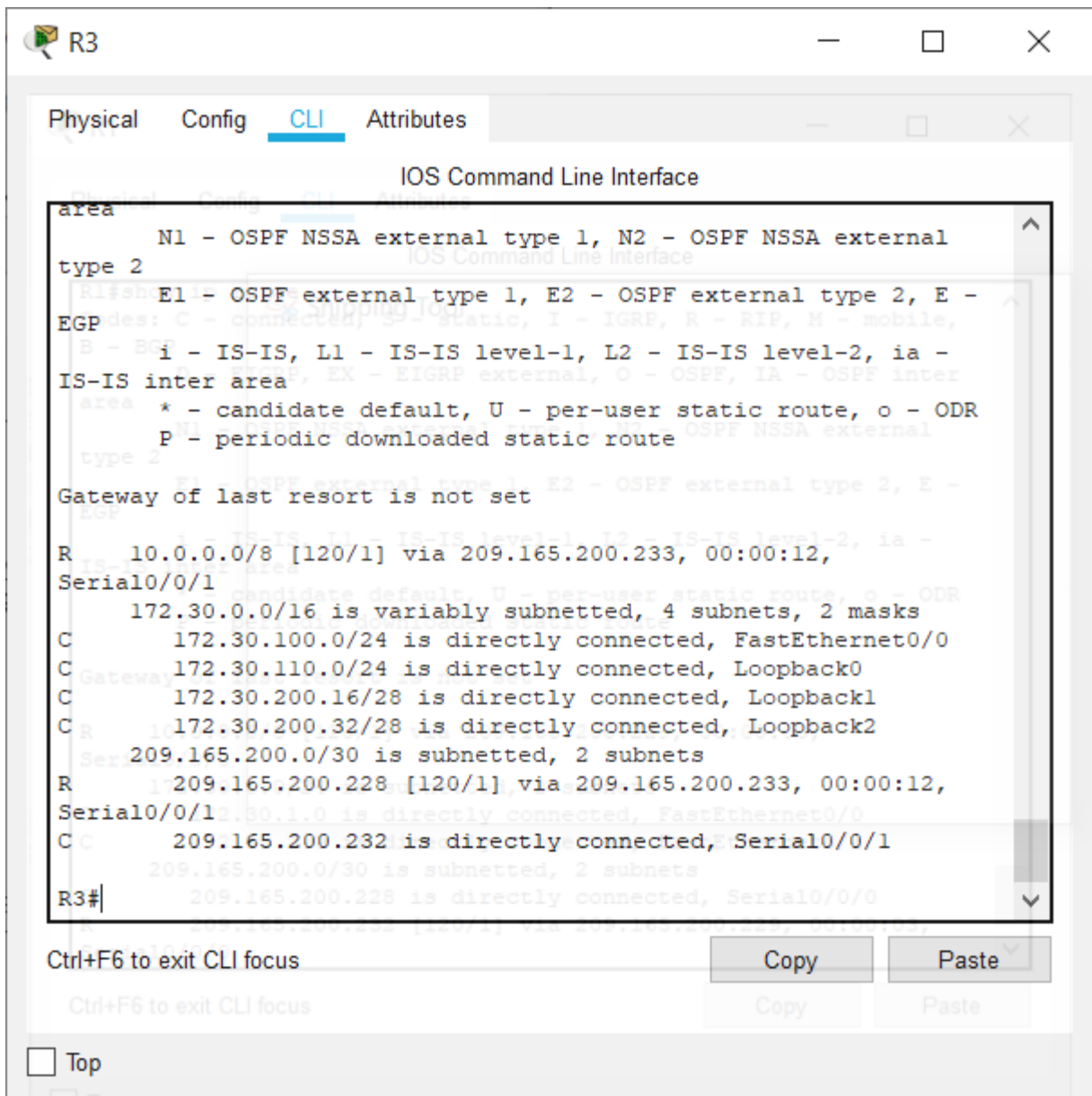
Copy Paste

☐ 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**

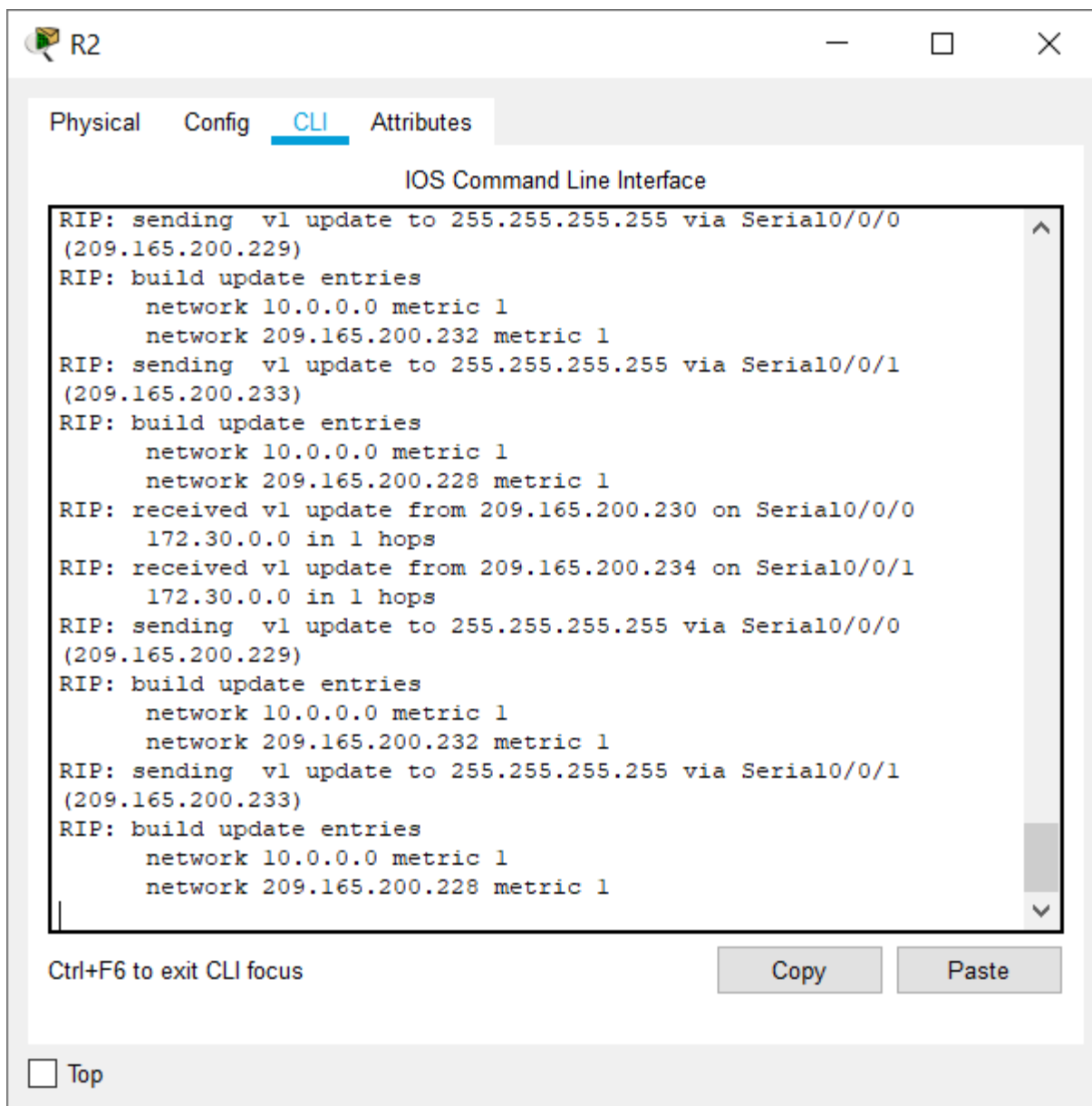


Step 7: Examine the RIPv1 packets that are being received by R2.

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

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


```
R2#debug ip rip
```



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

When you are finished, turn off the debugging.

R2#**undebg all**

 R2

Physical Config CLI Attributes

IOS Command Line Interface

```
RIP: received v1 update from 209.165.200.234 on Serial0/0/1
      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

R2>
R2>undebug all
      ^
% Invalid input detected at '^' marker.

R2>en
R2#RIP: received v1 update from 209.165.200.230 on Serial0/0/0
      172.30.0.0 in 1 hops
undebug all
All possible debugging has been turned off
R2#
```

Ctrl+F6 to exit CLI focus

CopyPaste

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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

```
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0,
changed state to up

R2>enable
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router rip
R2(config-router)#veresion 2
                        ^
% Invalid input detected at '^' marker.

R2(config-router)#version 2
R2(config-router)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

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

R1

Physical Config CLI Attributes

IOS Command Line Interface

```
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

Press RETURN to get started!

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

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

%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

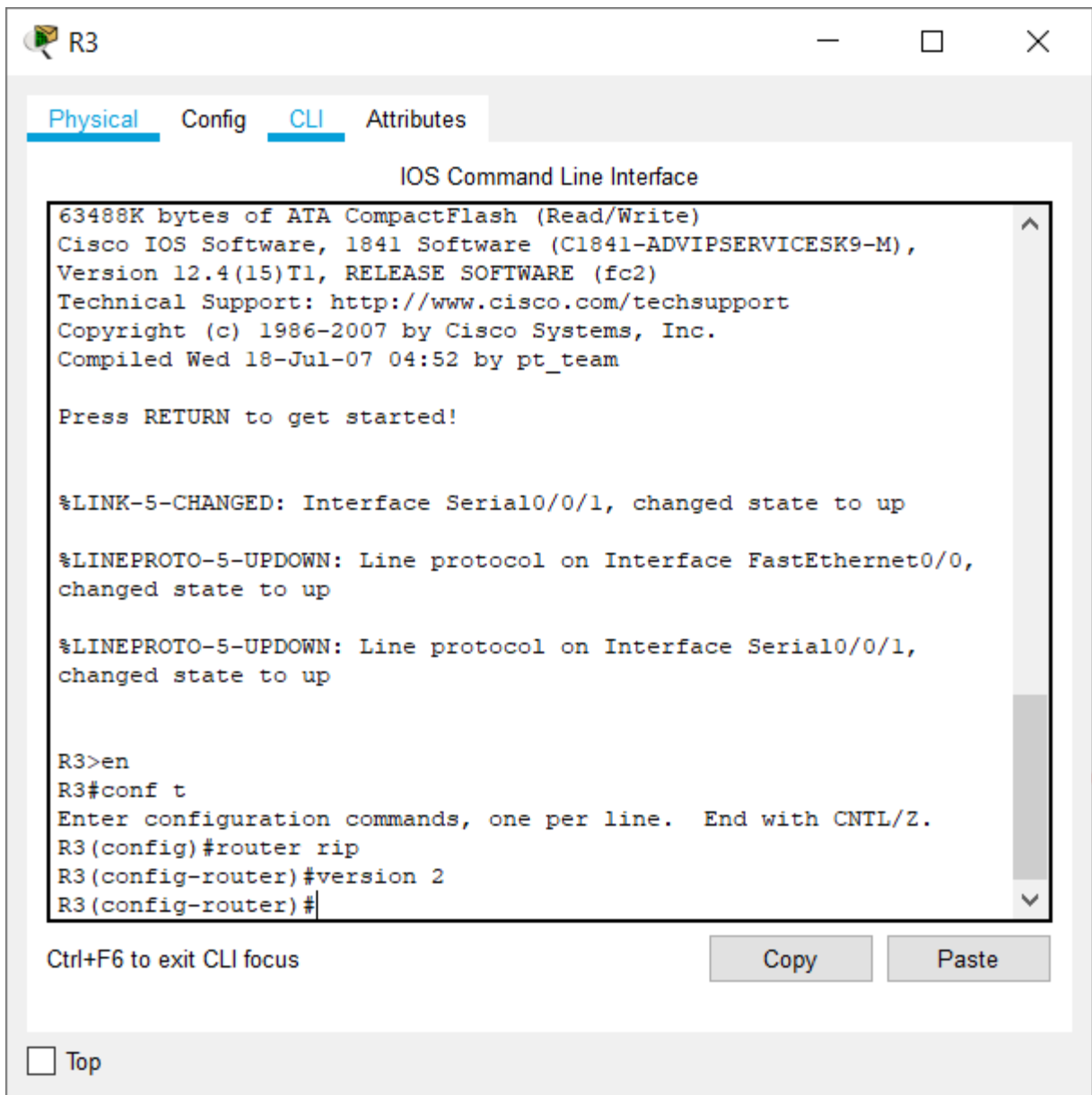
R1>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

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



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

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

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

```
R2# show run
```


R1

Physical Config CLI Attributes

IOS Command Line Interface

```
%SYS-5-CONFIG_I: Configured from console by console

R1#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 0 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        00:00:18
Distance: (default is 120)
R1#
```

Ctrl+F6 to exit CLI focus

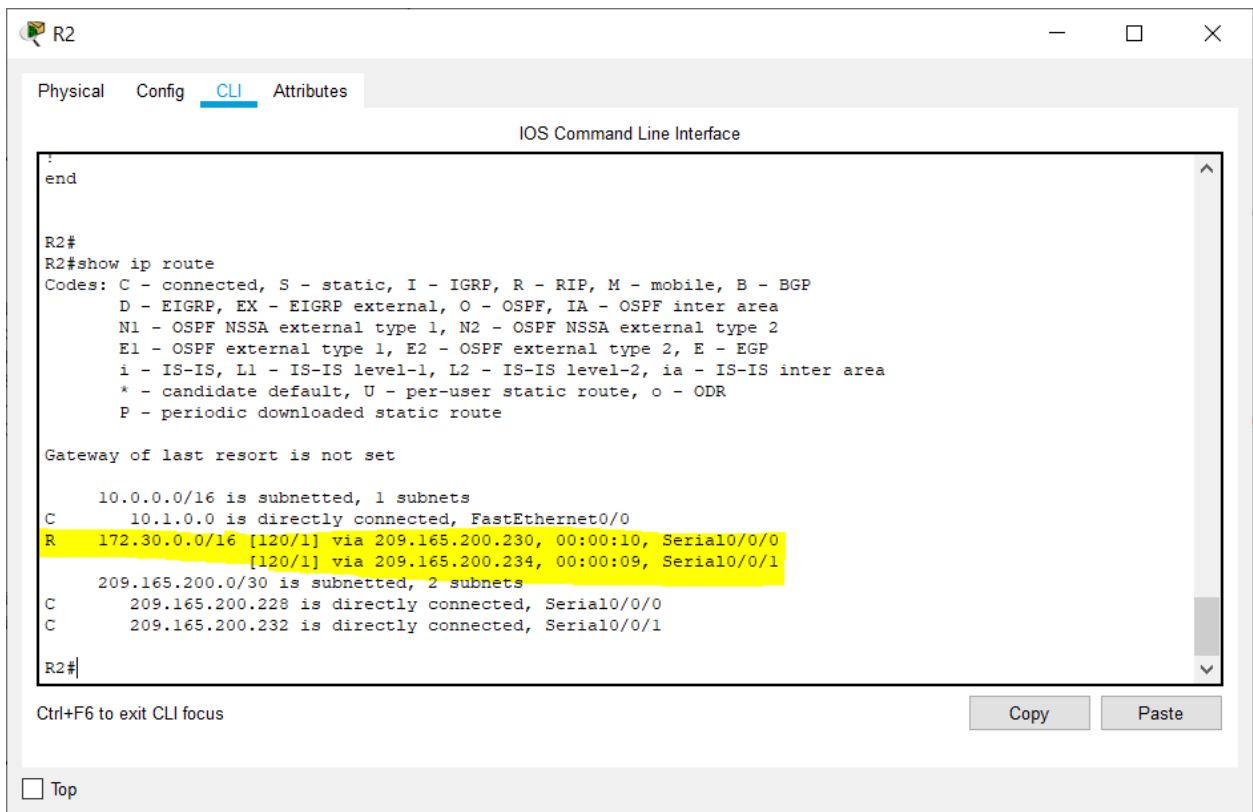
Copy Paste

☐ Top

Task 5: Examine the Automatic Summarization of Routes.

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

```
R2#show ip route
```



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

R1#**show ip route**

R1

Physical Config CLI Attributes

IOS Command Line Interface

```
R1#
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

R    10.0.0.0/8 [120/1] via 209.165.200.229, 00:00:09, 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, 00:00:09,
Serial0/0/0

R1#
```


Ctrl+F6 to exit CLI focus

Copy Paste

☐ 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**

 R3

Physical

Config

CLI

Attributes

IOS Command Line Interface

```
R3>en
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, 00:00:03, 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, 00:00:03, Serial0/0/1
C     209.165.200.232 is directly connected, Serial0/0/1

R3#
```

Ctrl+F6 to exit CLI focus

Copy

Paste

☐ Top

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

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

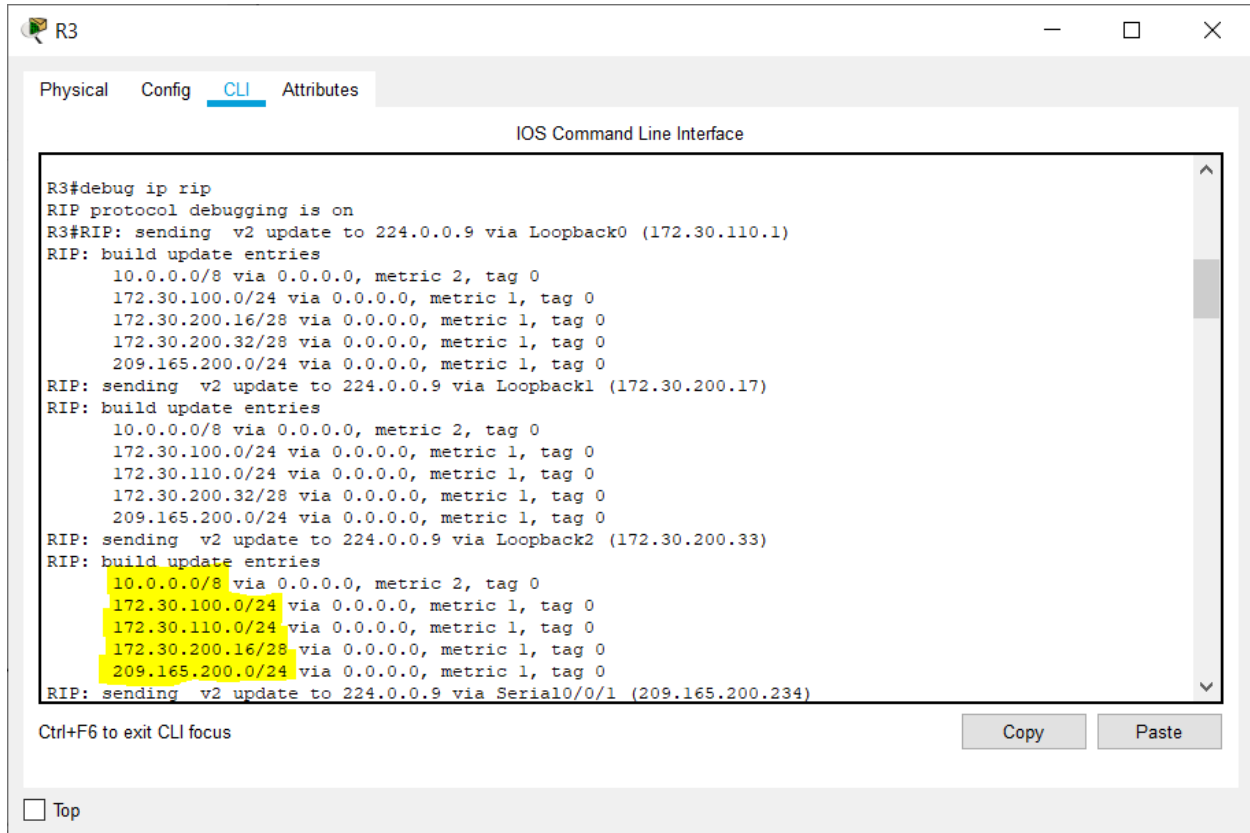
10.0.0.0/8

172.30.100.0/24

172.30.110.0/24

172.30.200.16/28

209.165.200.0/24



```
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)
```

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

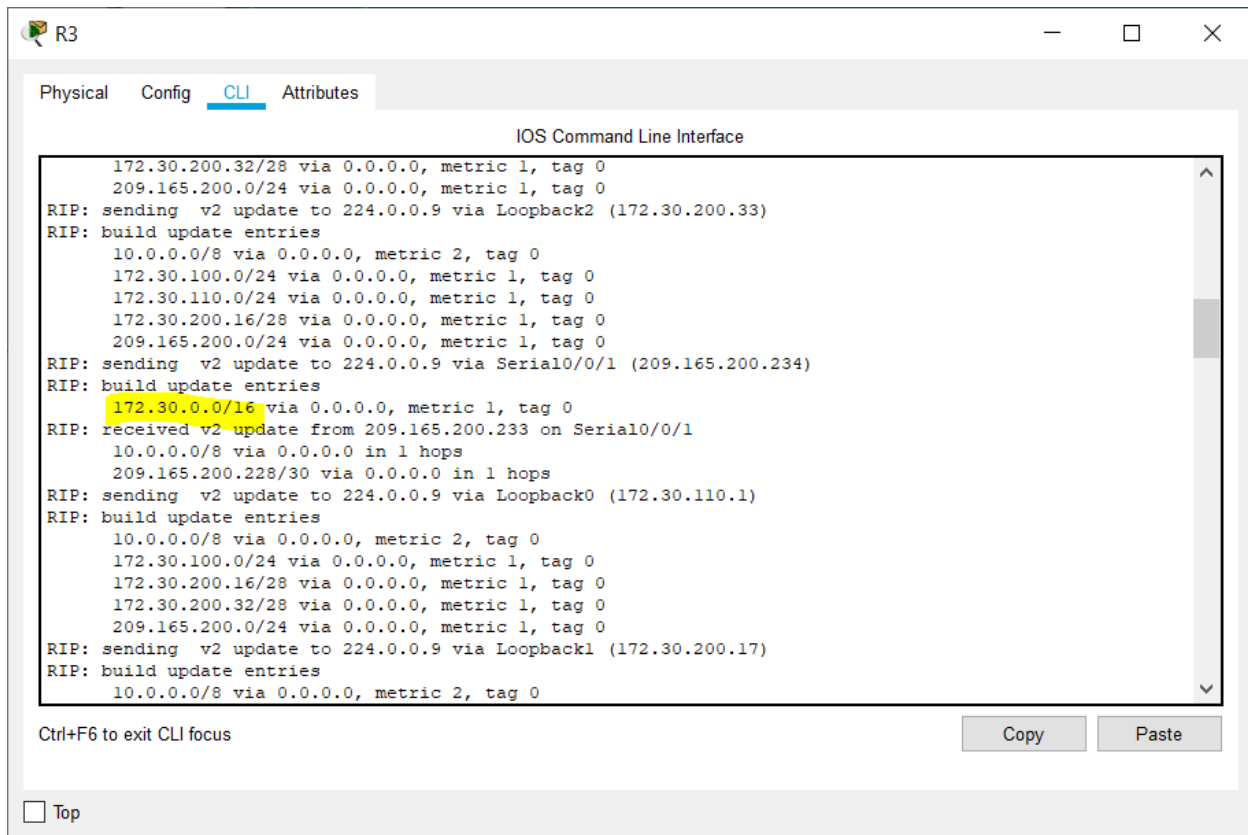
10.0.0.0/8

209.165.200.228/30

172.30.0.0/16

Debug ip rip on R2

```
RIP protocol debugging is on
R2#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: 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: 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
```



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

Task 6: Disable Automatic Summarization.

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

```

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

```

```

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

```

```

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

```

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

Task 7: Examine the Routing Tables.

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

```

R2#show ip route

```

```
R2

Physical Config CLI Attributes

IOS Command Line Interface

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 is variably subnetted, 7 subnets, 3 masks
R 172.30.0.0/16 [120/1] via 209.165.200.230, 00:00:56, Serial0/0/0
  [120/1] via 209.165.200.234, 00:00:55, Serial0/0/1
R 172.30.1.0/24 [120/1] via 209.165.200.230, 00:00:29, Serial0/0/0
R 172.30.2.0/24 [120/1] via 209.165.200.230, 00:00:29, Serial0/0/0
R 172.30.100.0/24 [120/1] via 209.165.200.234, 00:00:26, Serial0/0/1
R 172.30.110.0/24 [120/1] via 209.165.200.234, 00:00:26, Serial0/0/1
R 172.30.200.16/28 [120/1] via 209.165.200.234, 00:00:26, Serial0/0/1
R 172.30.200.32/28 [120/1] via 209.165.200.234, 00:00:26, 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#
R2#
R2#

Ctrl+F6 to exit CLI focus

Copy Paste

Top
```

R1#show ip route

```
R1

Physical Config CLI Attributes

IOS Command Line Interface

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, 00:00:15, Serial0/0/0
R 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, 00:00:15, Serial0/0/0
R 172.30.110.0/24 [120/2] via 209.165.200.229, 00:00:15, Serial0/0/0
R 172.30.200.16/28 [120/2] via 209.165.200.229, 00:00:15, Serial0/0/0
R 172.30.200.32/28 [120/2] via 209.165.200.229, 00:00:15, 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, 00:00:15, Serial0/0/0

R1#

Ctrl+F6 to exit CLI focus

Copy Paste

Top
```

R3#show ip route

```
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, 00:00:13, Serial0/0/1
R    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, 00:00:13, Serial0/0/1
R    172.30.2.0/24 [120/2] via 209.165.200.233, 00:00:13, 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
R    209.165.200.0/30 is subnetted, 2 subnets
R    209.165.200.228 [120/1] via 209.165.200.233, 00:00:13, Serial0/0/1
C    209.165.200.232 is directly connected, Serial0/0/1

R3#
```

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

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

172.30.1.0/24
172.30.2.0/24

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

172.30.1.0/24
172.30.2.0/24

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

Task 8: Verify Network Connectivity.

Step 1: Check connectivity between R2 router and PCs.

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

Success Rate: 100 percent (5/5)

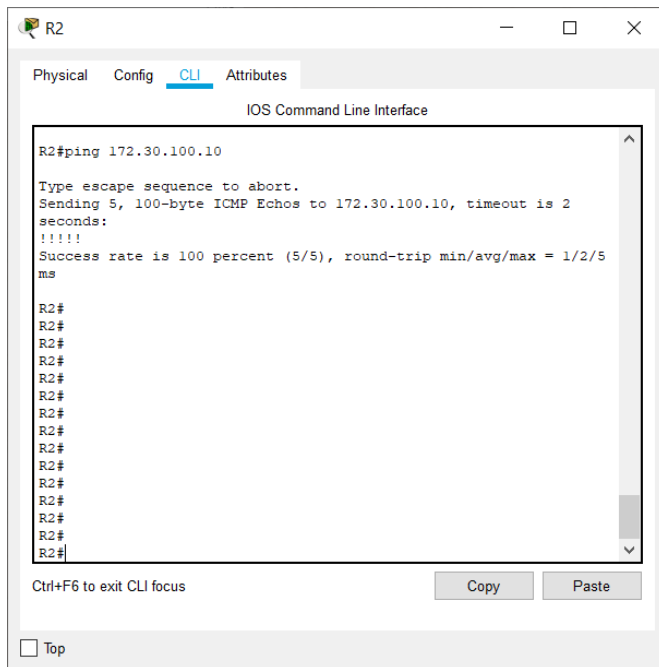
```
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#ping 172.30.2.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 172.30.2.10, timeout is 2
seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/7
ms

R2#
```

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

Success Rate: 100 percent (5/5)



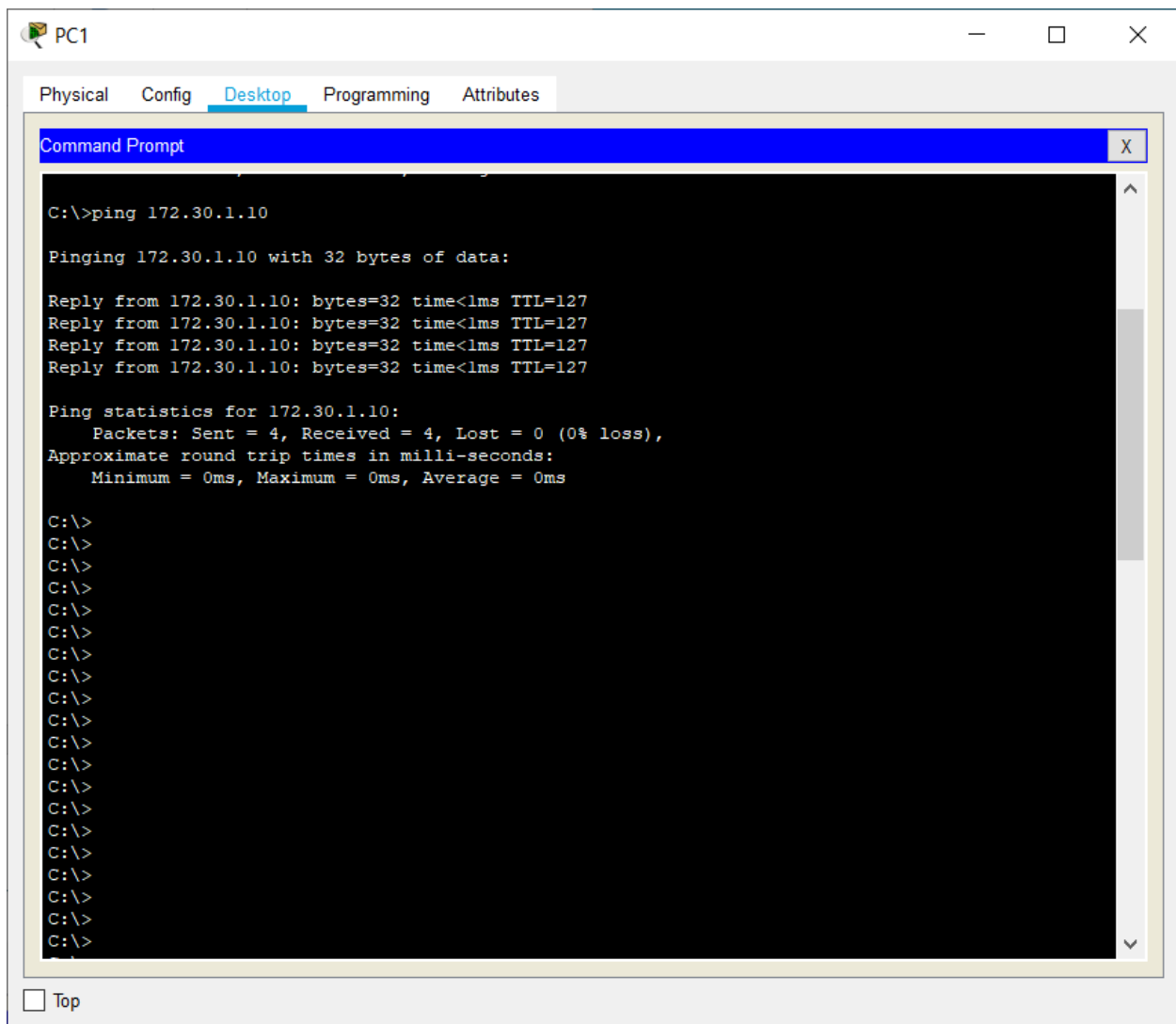
The screenshot shows a network simulator window titled 'R2'. It has tabs for 'Physical', 'Config', 'CLI', and 'Attributes', with 'CLI' selected. The main area is labeled 'IOS Command Line Interface'. The text in the CLI window shows the command 'R2#ping 172.30.100.10' being entered. The output indicates that 5 ICMP Echoes were sent successfully, resulting in a 100 percent success rate. Below the output, there are several 'R2#' prompts. At the bottom of the window, there are buttons for 'Copy' and 'Paste', and a 'Top' button.

```
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 = 1/2/5
ms
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
```

Step 2: Check the connectivity between the PCs.

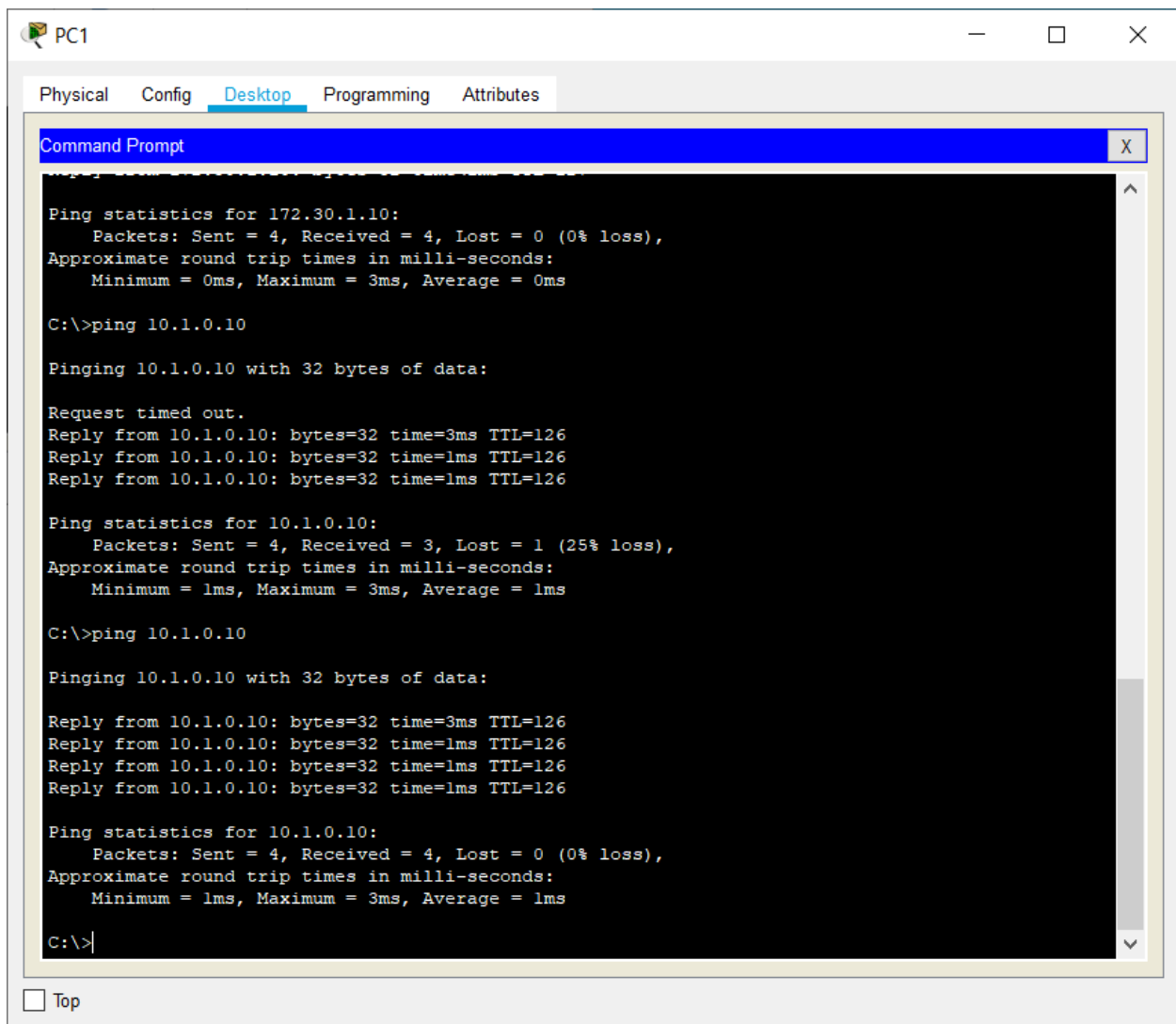
From PC1, is it possible to ping PC2? Yes

What is the success rate? Success rate: 100%



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

What is the success rate? **Success rate: 100%**



The screenshot shows a window titled "PC1" with tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Desktop" tab is active, displaying a "Command Prompt" window. The Command Prompt shows the results of two ping commands. The first command is for 172.30.1.10, which shows 0% loss. The second command is for 10.1.0.10, which shows a 25% loss (1 packet lost) in the first attempt, but 0% loss in the second attempt. The Command Prompt window has a blue title bar and a scroll bar on the right. Below the Command Prompt window, there is a "Top" button.

```
Physical Config Desktop Programming Attributes
Command Prompt X
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 = 3ms, 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=3ms TTL=126
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126

Ping statistics for 10.1.0.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms

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=3ms TTL=126
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126

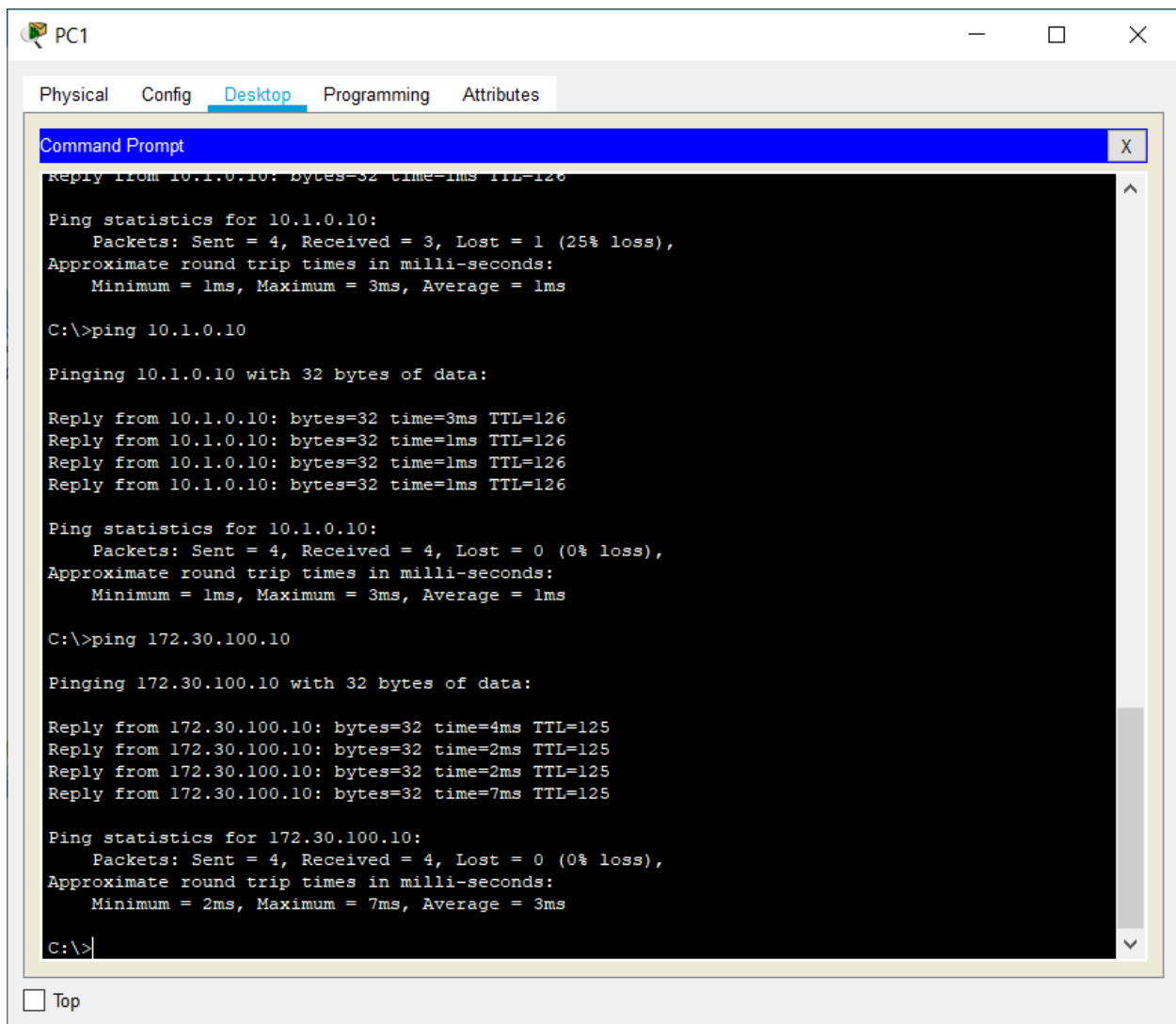
Ping statistics for 10.1.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms

C:\>
```

☐ Top

From PC1, is it possible to ping PC4? **Yes**

What is the success rate? **Success rate: 100%**



The screenshot shows a window titled "PC1" with tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Desktop" tab is active, displaying a "Command Prompt" window. The Command Prompt shows the results of two ping commands. The first command is "ping 10.1.0.10", which shows a 25% loss rate. The second command is "ping 172.30.100.10", which shows a 0% loss rate. The Command Prompt window has a title bar with "X" and a scroll bar on the right.

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

Ping statistics for 10.1.0.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms

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=3ms TTL=126
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126
Reply from 10.1.0.10: bytes=32 time=1ms TTL=126

Ping statistics for 10.1.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, 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=4ms TTL=125
Reply from 172.30.100.10: bytes=32 time=2ms TTL=125
Reply from 172.30.100.10: bytes=32 time=2ms TTL=125
Reply from 172.30.100.10: bytes=32 time=7ms 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 = 7ms, Average = 3ms

C:\>
```

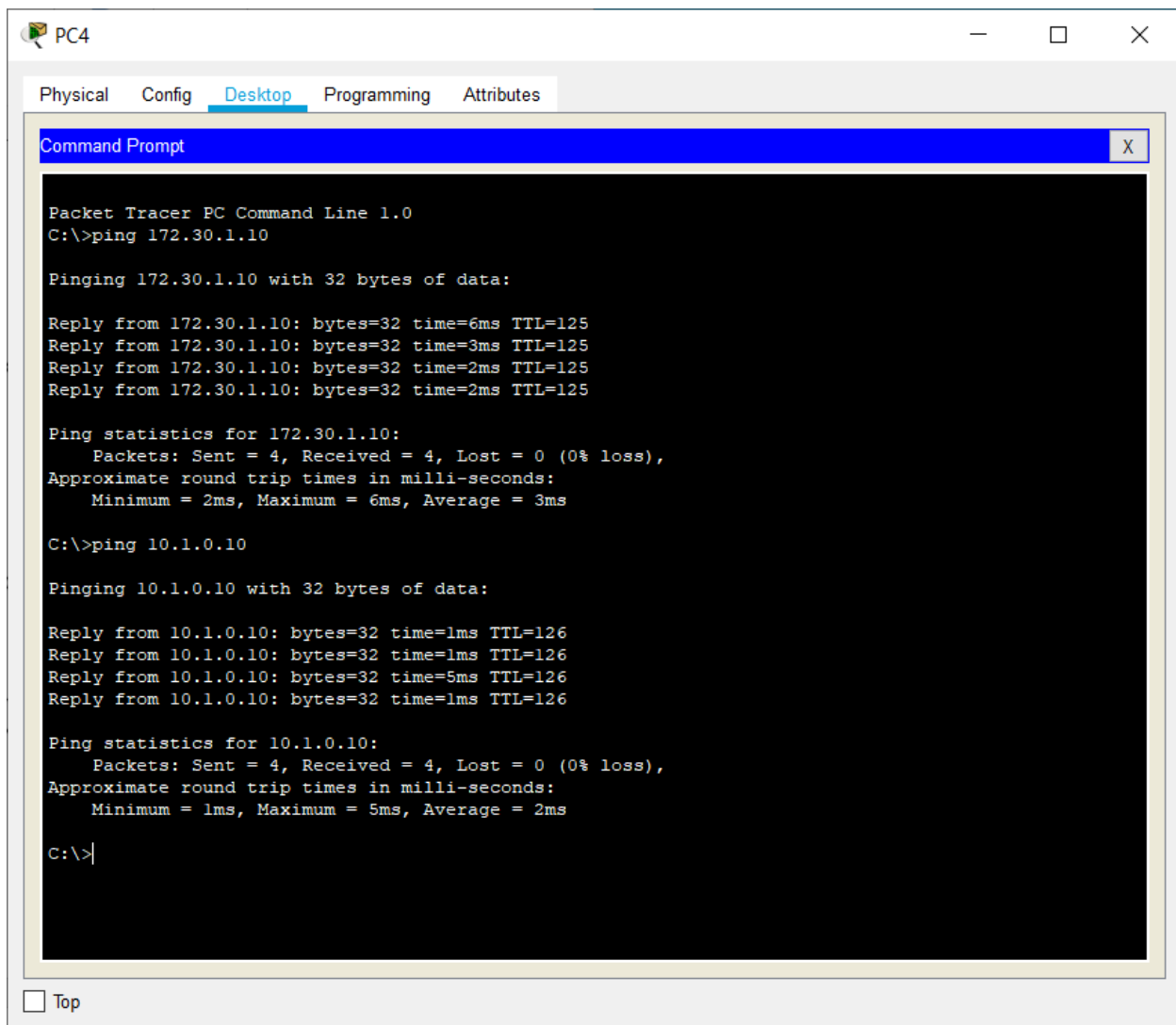
☐ Top

From PC4, is it possible to ping PC2? **Yes**

What is the success rate? **Success rate: 100%**

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

What is the success rate? **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.

Router – R1

- **show running-config**

```
R1#sh running-config
Building configuration...
```

```
Current configuration : 883 bytes
```

```
!
version 12.4
```

```
no service timestamps log datetime msec
no service timestamps debug datetime msec
```

```
no service password-encryption
!
```

```
hostname R1
!
```

```
!
!
!
!
```

```
!
```

```
!
!
```

```
no ip cef
no ipv6 cef
```

```
!
!
```

```
!
!
```

```
!
!
```

```
!
!
```

```
!
```

```
!
!
```

```
!
```

```
spanning-tree mode pvst
```

```
!
!
```

```
!
!
```

```
!
!
```

```
interface FastEthernet0/0
ip address 172.30.1.1 255.255.255.0

duplex auto
speed auto

!
interface FastEthernet0/1

ip address 172.30.2.1 255.255.255.0
duplex auto

speed auto
!

interface Serial0/0/0
ip address 209.165.200.230 255.255.255.252

!

interface Serial0/0/1
no ip address

clock rate 2000000
shutdown

!
interface Vlan1

no ip address
shutdown

!
router rip

version 2
passive-interface FastEthernet0/0

passive-interface FastEthernet0/1
network 172.30.0.0

network 209.165.200.0
no auto-summary

!
ip classless

!
ip flow-export version 9

!
!
```

```

!
!

!

!
!

!
line con 0

!
line aux 0

!
line vty 0 4

password cisco
login

!
!

!

end

```

- **show ip route**

```
R1#sh 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, 00:00:18, 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, 00:00:18, Serial0/0/0 R
172.30.110.0/24 [120/2] via 209.165.200.229, 00:00:18, Serial0/0/0 R
172.30.200.16/28 [120/2] via 209.165.200.229, 00:00:18, Serial0/0/0 R
172.30.200.32/28 [120/2] via 209.165.200.229, 00:00:18, Serial0/0/0
209.165.200.0/30 is subnetted, 2 subnets
C 209.165.200.228 is directly connected, Serial0/0/0

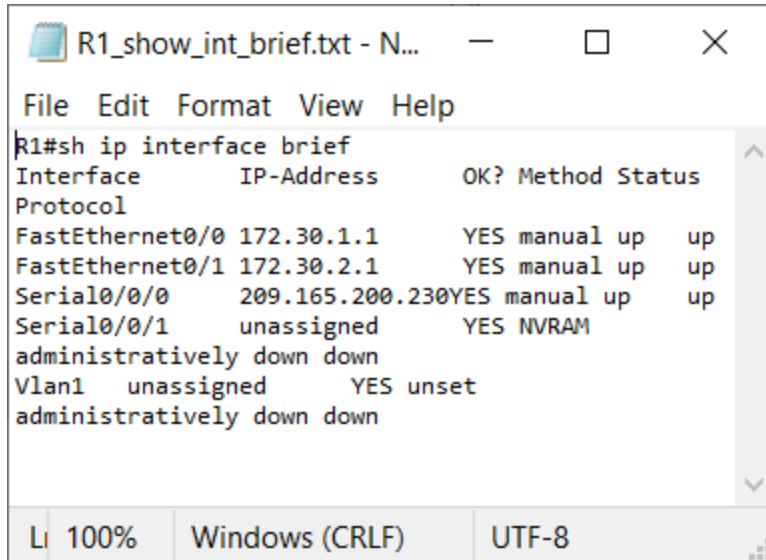
```

```

R 209.165.200.232 [120/1] via 209.165.200.229, 00:00:18, Serial0/0/0

```

- **show ip interface brief**



```

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

```

- **show ip protocols**



```

R1#sh ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 24 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)

```

- **show running-config**

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

```
Current configuration : 867 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

clock rate 2000000
!

interface Serial0/0/1
ip address 209.165.200.233 255.255.255.252

clock rate 64000
!

interface Vlan1
no ip address

shutdown
!

router rip
version 2

passive-interface FastEthernet0/0

network 10.0.0.0
network 209.165.200.0

no auto-summary

```

!

ip classless

!
ip flow-export version 9

!
!

!
!

!
!

!
!

line con 0
!

line aux 0
!

line vty 0 4
password cisco

login
!

!
!

end

```

- **show ip route**

```
R2#sh 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, 00:00:19, Serial0/0/1 R 172.30.110.0/24 [120/1] via 209.165.200.234, 00:00:19, Serial0/0/1 R 172.30.200.16/28 [120/1] via 209.165.200.234, 00:00:19, Serial0/0/1 R 172.30.200.32/28 [120/1] via 209.165.200.234, 00:00:19, 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

- **show ip interface brief**

```
R2_show_int_brief.txt - Notepad
File Edit Format View Help
R2#sh ip int brief
Interface      IP-Address      OK? Method Status      Protocol
FastEthernet0/0 10.1.0.1        YES manual up          up
FastEthernet0/1 unassigned      YES NVRAM   administratively down down
Serial0/0/0     209.165.200.229 YES manual up          up
Serial0/0/1     209.165.200.233 YES manual up          up
Vlan1          unassigned      YES unset   administratively down down
Ln 1, Col 1    100% Windows (CRLF) UTF-8
```

- **show ip protocols**

```
R2_show_ip_protocols.txt - Notepad
File Edit Format View Help
R2#sh ip protocols
Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 18 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 00:00:09
209.165.200.234 120 00:00:13
Distance: (default is 120)
Ln 1, Col 1
```

Router – R3

- **show running-config**

```
R3#sh running-config
```

```
Building configuration...
```

```
Current configuration : 1027 bytes
```

```
!
```

```
version 12.4
```

```
no service timestamps log datetime msec
```

```
no service timestamps debug datetime msec
```

```
no service password-encryption
```

```
!
```

```
hostname R3
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
no ip cef
```

```
no ipv6 cef
```

```
!
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!  
spanning-tree mode pvst  
  
!  
!  
!  
!  
  
!  
!  
  
interface Loopback0  
  
ip address 172.30.110.1 255.255.255.0  
!  
  
interface Loopback1  
ip address 172.30.200.17 255.255.255.240  
  
!  
interface Loopback2  
  
ip address 172.30.200.33 255.255.255.240  
!  
  
interface FastEthernet0/0  
ip address 172.30.100.1 255.255.255.0  
  
duplex auto  
speed auto  
  
!  
interface FastEthernet0/1  
no ip address  
duplex auto  
  
speed auto  
shutdown  
  
!  
interface Serial0/0/0  
  
no ip address  
clock rate 2000000  
  
shutdown  
!  
  
interface Serial0/0/1
```

```
ip address 209.165.200.234 255.255.255.252
!

interface Vlan1
no ip address

shutdown

!
router rip

version 2
passive-interface FastEthernet0/0

network 172.30.0.0
network 209.165.200.0

no auto-summary
!

ip classless
!

ip flow-export version 9
!

!
!

!
!

!
!

!
!

line con 0

!
line aux 0

!

line vty 0 4
password cisco

login
!

!
!
```

end

- **show ip route**

R3#sh 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, 00:00:04, 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, 00:00:04, Serial0/0/1 R 172.30.2.0/24 [120/2] via 209.165.200.233, 00:00:04, 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, 00:00:04, Serial0/0/1 C 209.165.200.232 is directly connected, Serial0/0/1

- **show ip interface brief**

R3_show_int_brief.txt - Notepad

File Edit Format View Help

R3#sh ip interface brief

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/0	172.30.100.1	YES	manual	up	up
FastEthernet0/1	unassigned	YES	NVRAM	administratively down	down
Serial0/0/0	unassigned	YES	NVRAM	administratively down	down
Serial0/0/1	209.165.200.234	YES	manual	up	up
Loopback0	172.30.110.1	YES	manual	up	up
Loopback1	172.30.200.17	YES	manual	up	up
Loopback2	172.30.200.33	YES	manual	up	up
Vlan1	unassigned	YES	unset	administratively down	down

- **show ip protocols**

```
R3_show_ip_protocols.txt - Notepad
File Edit Format View Help
R3#sh ip protocols
Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 13 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:

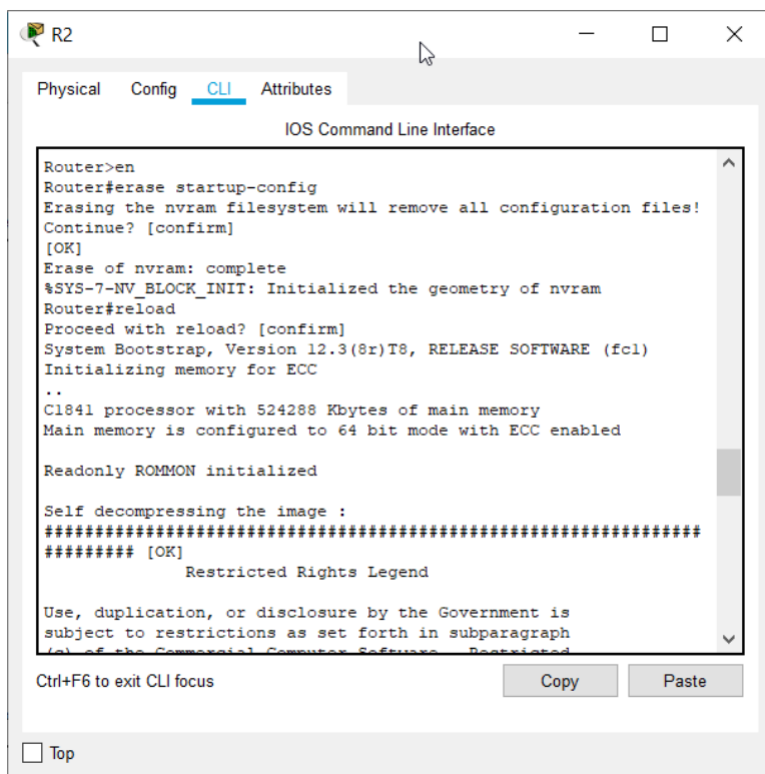
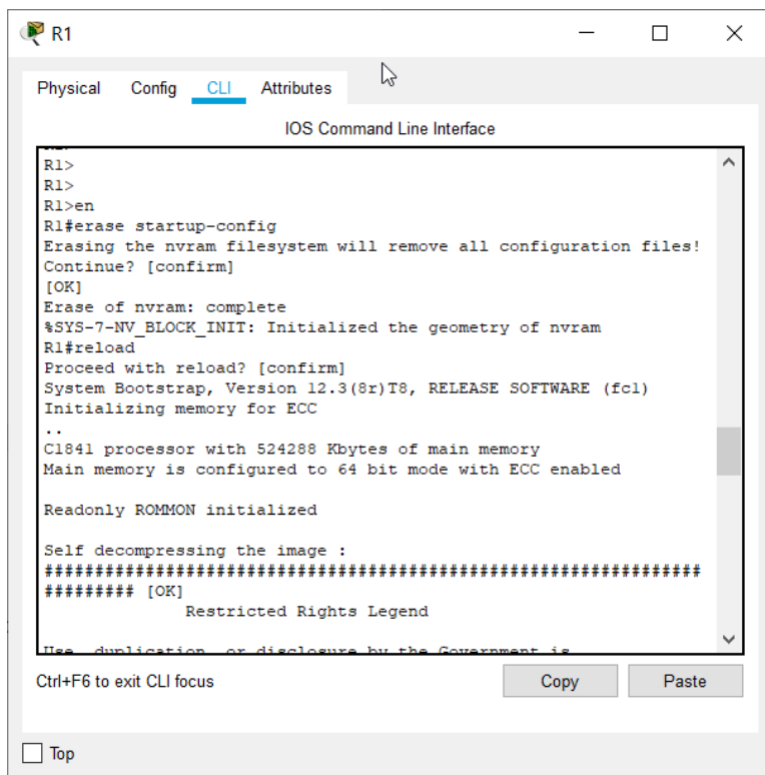
Gateway Distance Last Update
209.165.200.233 120 00:00:19

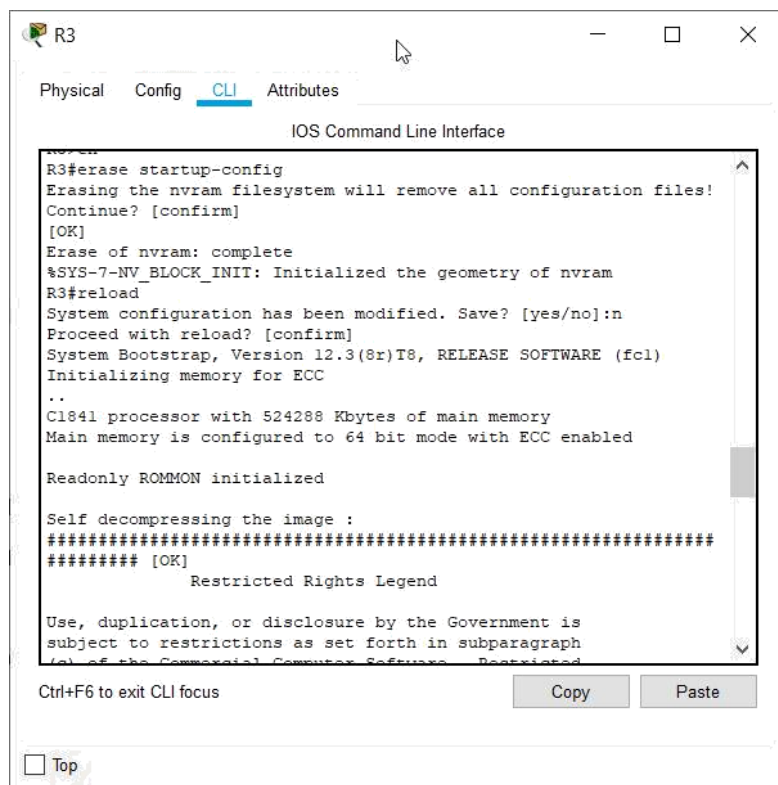
Distance: (default is 120)
```

Ln 1, Col 1

Task 10: Clean Up

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





Hence, we have Erased all configurations and disconnected and stored the cables.