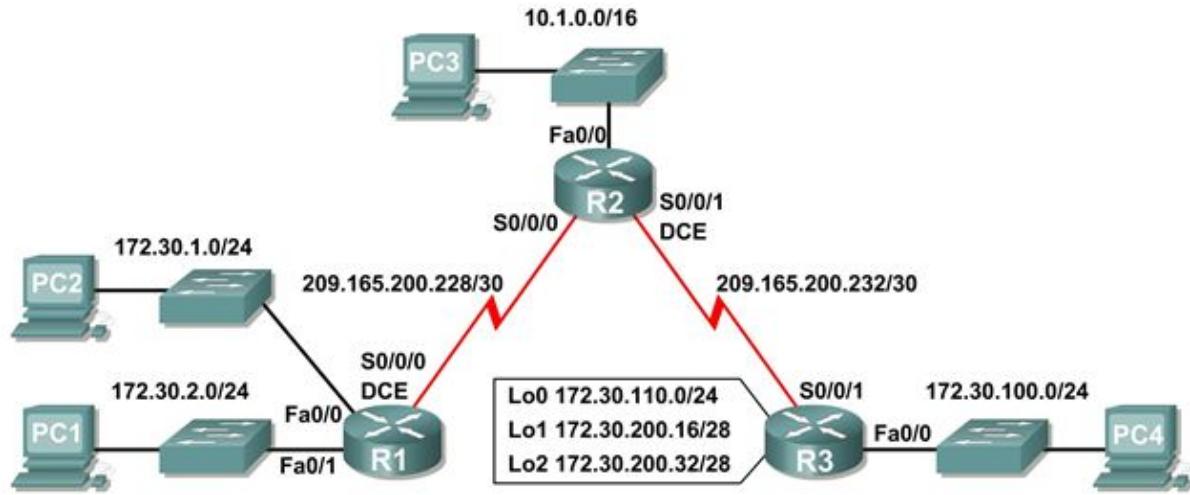


NAME: SAKSHI CHHEDA
 ROLL NO: 7
 UID: 2018130005
 BATCH: A
 CLASS: T.E. COMPS

CEL 51, DCCN, Monsoon 2020

Lab 7: RIPv2 Router Configuration

Topology Diagram



Addressing Table

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

PC2	NIC	172.30.1.10	255.255.255.0	172.30.1.1
PC3	NIC	10.1.0.10	255.255.0.0	10.1.0.1
PC4	NIC	172.30.100.10	255.255.255.0	172.30.100.1

Learning Objectives

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

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

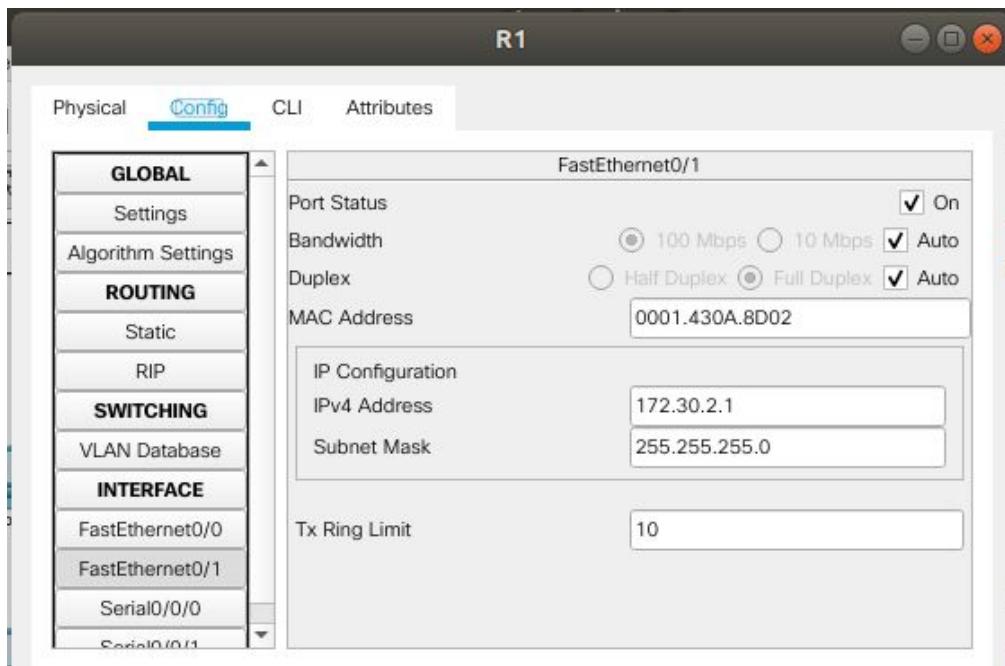
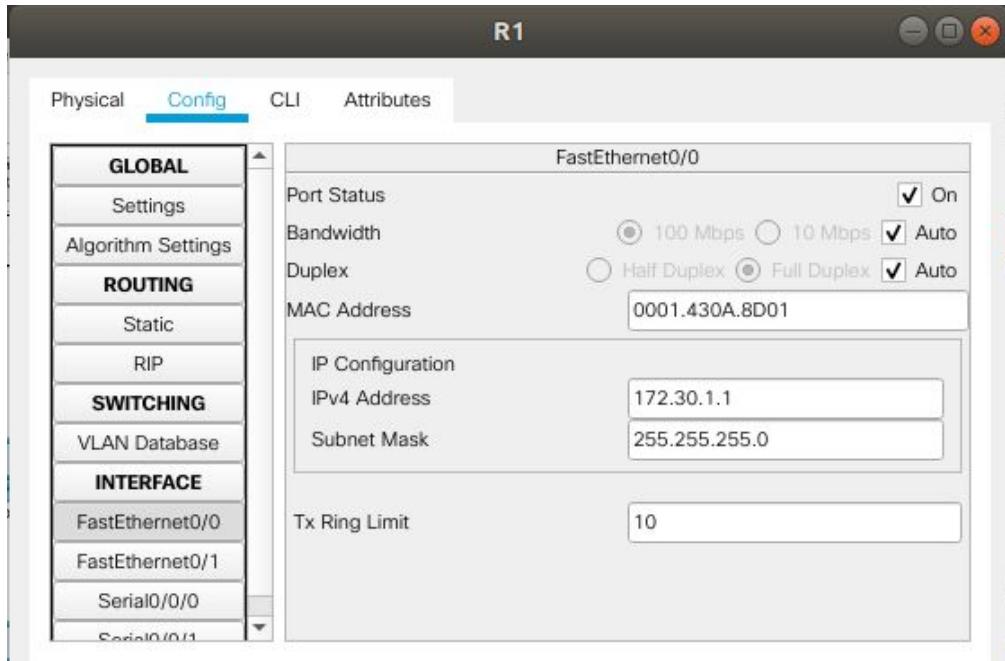
Scenario

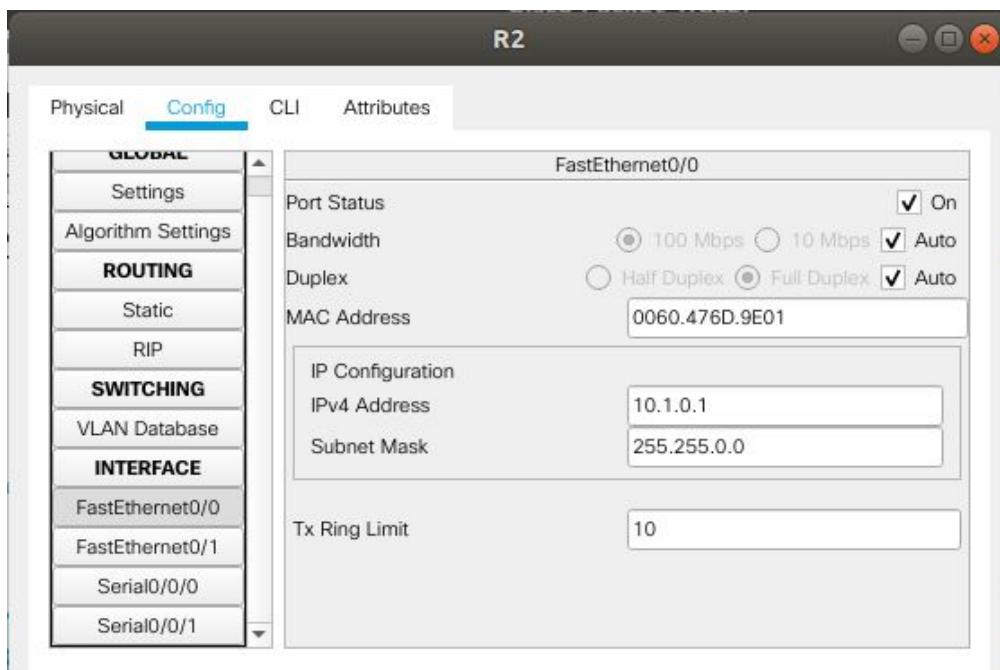
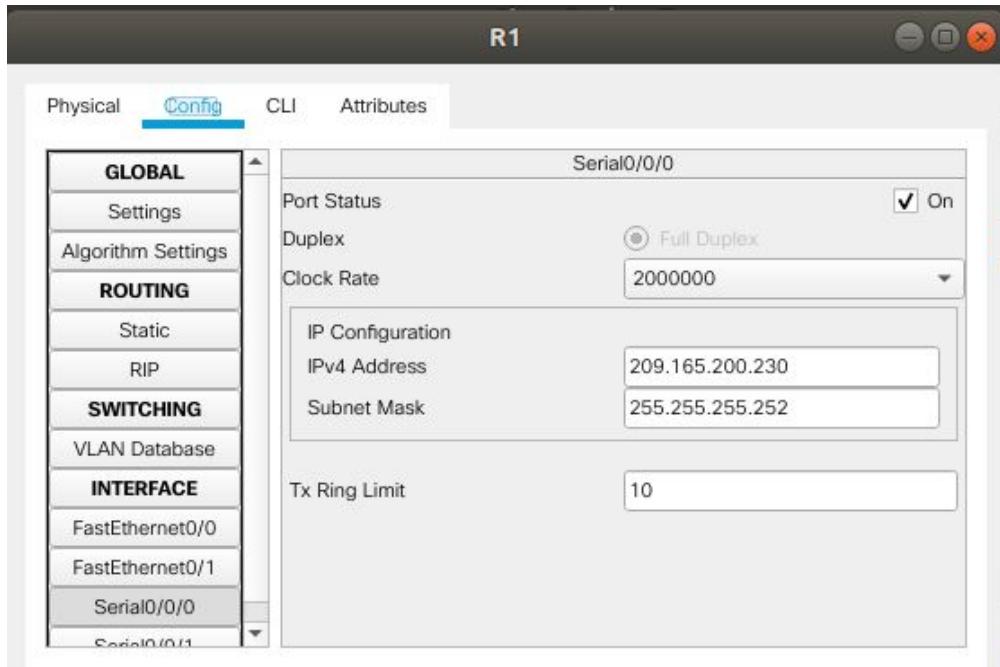
The network shown in the Topology Diagram contains a discontiguous network, 172.30.0.0. This network has been subnetted using VLSM. The 172.30.0.0 subnets are physically and logically divided by at least one other classful or major network, in this case the two serial networks 209.165.200.228/30 and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

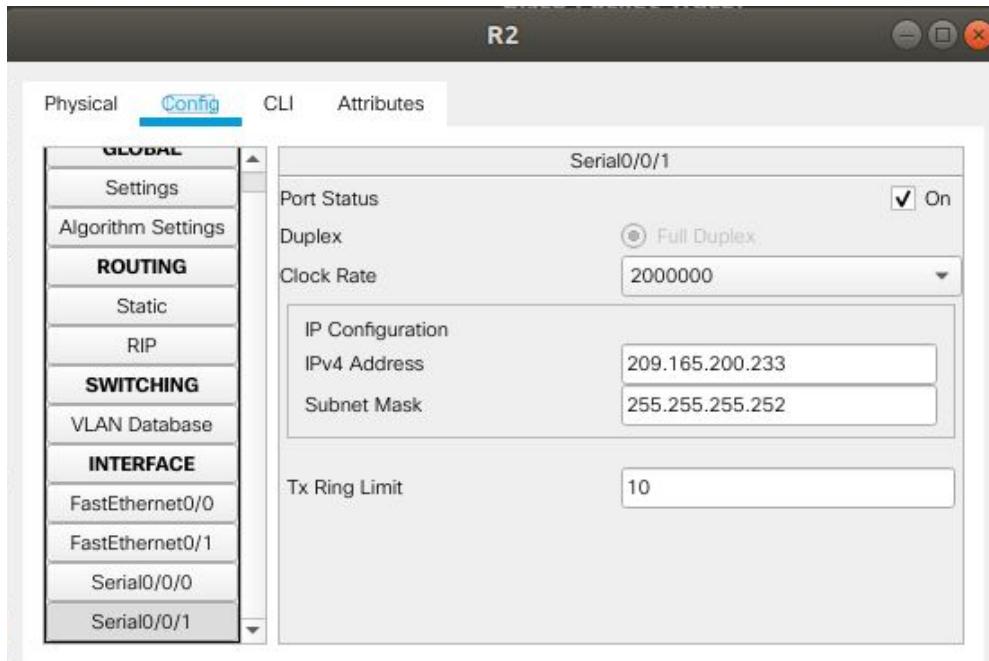
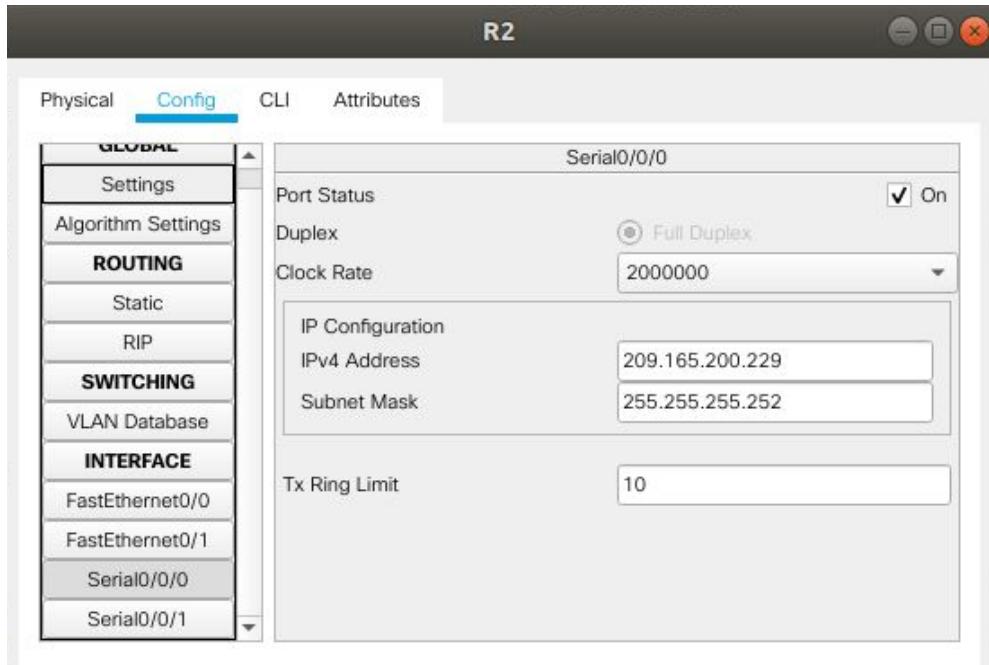
Task 1: Cable, Erase, and Reload the Routers.

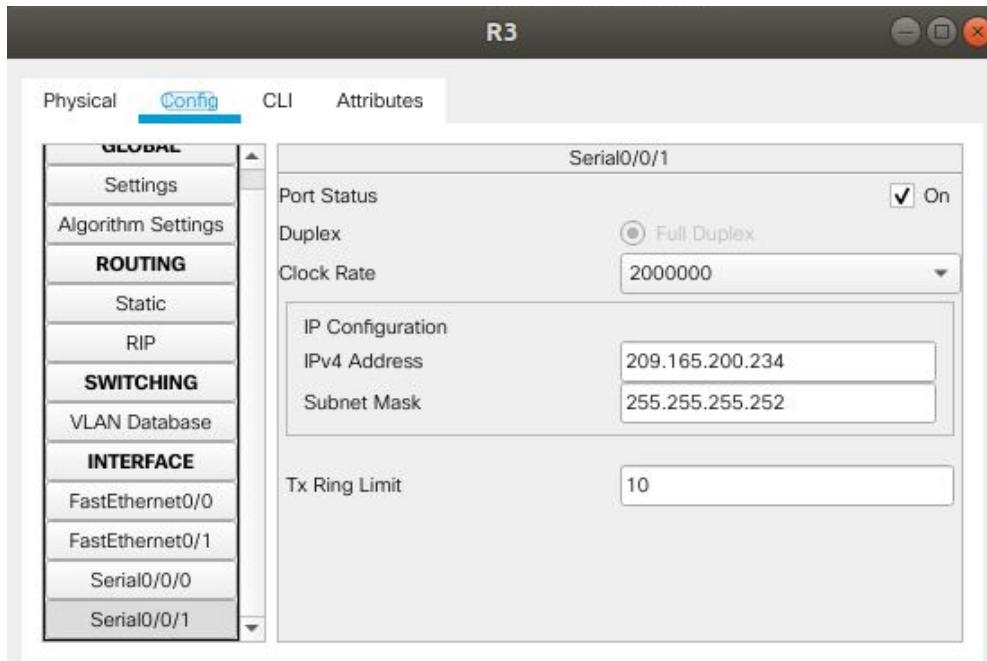
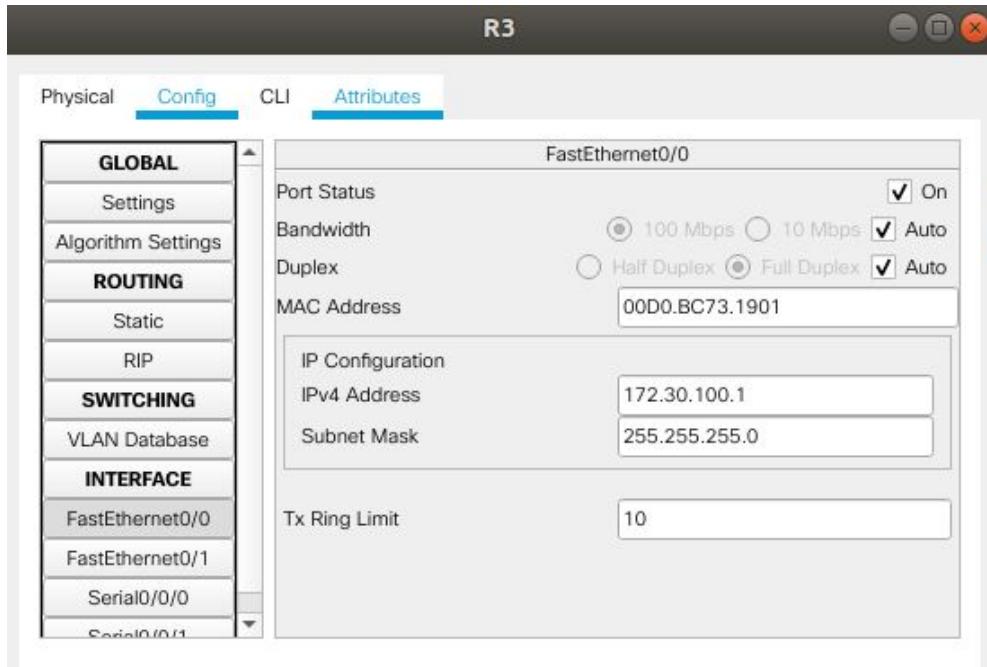
Step 1: Cable a network.

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









PC1

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface	FastEthernet0
-----------	---------------

IP Configuration

<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	172.30.2.10
Subnet Mask	255.255.255.0
Default Gateway	172.30.2.1
DNS Server	0.0.0.0

IPv6 Configuration

<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	/
Link Local Address	FE80::2E0:F9FF:FE61:4BB
Default Gateway	
DNS Server	

PC2

Physical Config **Desktop** Programming Attributes

IP Configuration

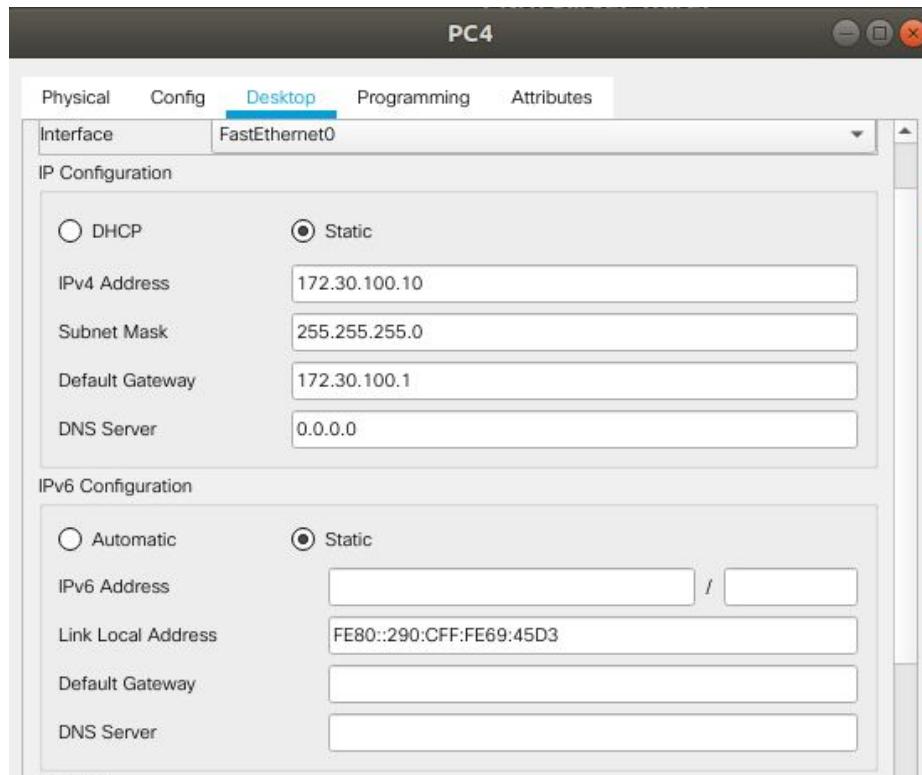
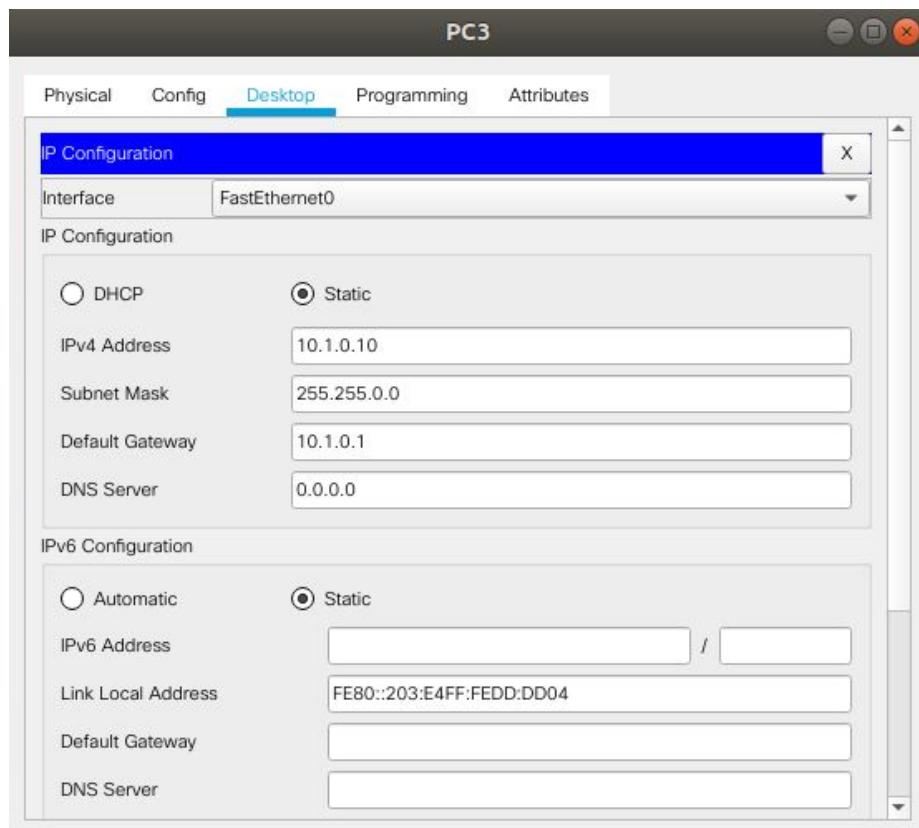
Interface	FastEthernet0
-----------	---------------

IP Configuration

<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	172.30.1.10
Subnet Mask	255.255.255.0
Default Gateway	172.30.1.1
DNS Server	0.0.0.0

IPv6 Configuration

<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	/
Link Local Address	FE80::205:5EFF:FE23:5E40
Default Gateway	
DNS Server	



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.

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router# %SYS-5-CONFIG_I: Configured from console by console
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files! Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#reload
System configuration has been modified. Save? [yes/no]:no
Proceed with reload? [confirm]
System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)
Copyright (c) 2000 by cisco Systems, Inc.
Initializing memory for ECC
...
C2800 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

 Readonly ROMMON initialized

program load complete, entry point: 0x8000f000, size: 0xc940
program load complete, entry point: 0x8000f000, size: 0xc940
```

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
System configuration has been modified. Save? [yes/no]:no
Proceed with reload? [confirm]
System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)
Copyright (c) 2000 by cisco Systems, Inc.
Initializing memory for ECC
...
C2800 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

 Readonly ROMMON initialized

program load complete, entry point: 0x8000f000, size: 0xc940
program load complete, entry point: 0x8000f000, size: 0xc940

program load complete, entry point: 0x8000f000, size: 0x3ed1338
```

```
R3
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
System configuration has been modified. Save? [yes/no]:no
Proceed with reload? [confirm]
System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)
Copyright (c) 2000 by cisco Systems, Inc.
Initializing memory for ECC
..
C2800 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

 Readonly ROMMON initialized

program load complete, entry point: 0x8000f000, size: 0xc940
program load complete, entry point: 0x8000f000, size: 0xc940

program load complete, entry point: 0x8000f000, size: 0x3ed1338
```

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
password consolepwd
line vty 0 4
password telnetpwd
login
!
end
```

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#
R1(config)#
R1(config)#
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)#
R1(config-if)#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)#
R1(config-if)#interface Serial0/0/0
R1(config-if)# ip address 209.165.200.230 255.255.255.252
```

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

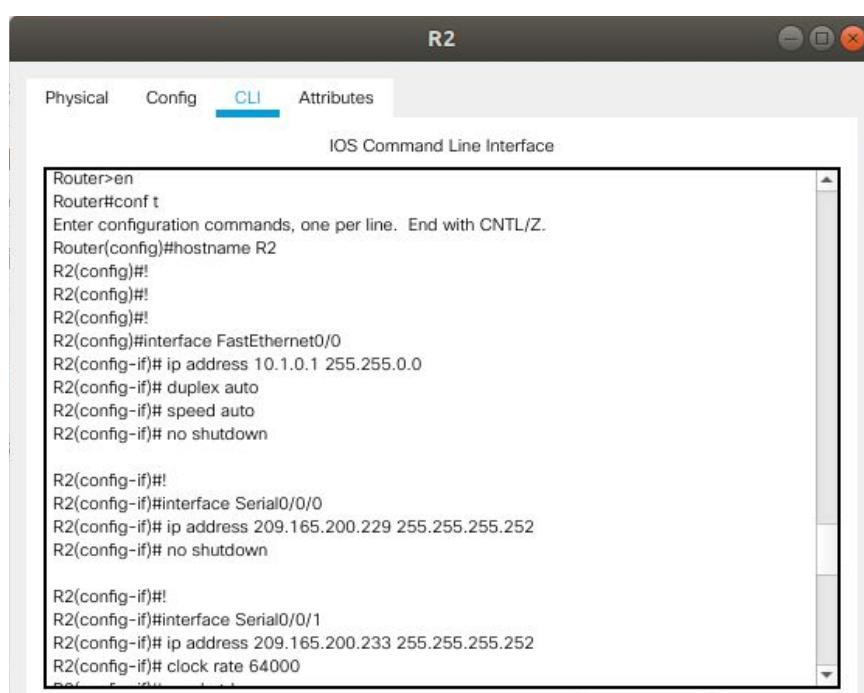
```
R1(config-if)#interface Serial0/0/0
R1(config-if)# ip address 209.165.200.230 255.255.255.252
R1(config-if)# clock rate 64000
R1(config-if)# no shutdown

R1(config-if)#
R1(config-if)#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)#
R1(config-router)#line con 0
R1(config-line)#password consolepwd
R1(config-line)#line vty 0 4
R1(config-line)#password telnetpwd
R1(config-line)# login
R1(config-line)#
R1(config-line)#
R1#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
```

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
password consolepwd
line vty 0 4
password telnetpwd
login
!
end
```



R2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R2(config-if)# ip address 209.165.200.233 255.255.255.252
R2(config-if)# clock rate 64000
R2(config-if)# no shutdown

R2(config-if)#
R2(config-if)#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)#
R2(config-router)#
R2(config-router)#line con 0
R2(config-line)#password consolepwd
R2(config-line)#line vty 0 4
R2(config-line)#password telnetpwd
R2(config-line)# login
R2(config-line)#
R2(config-line)#end
R2#
%LINK-5-CHANGED: Interface FastEthernet0/0, 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
```

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
password consolepwd
```

```
line vty 0 4
password telnetpwd
login
!
end
```

R3

Physical Config **CLI** Attributes

IOS Command Line Interface

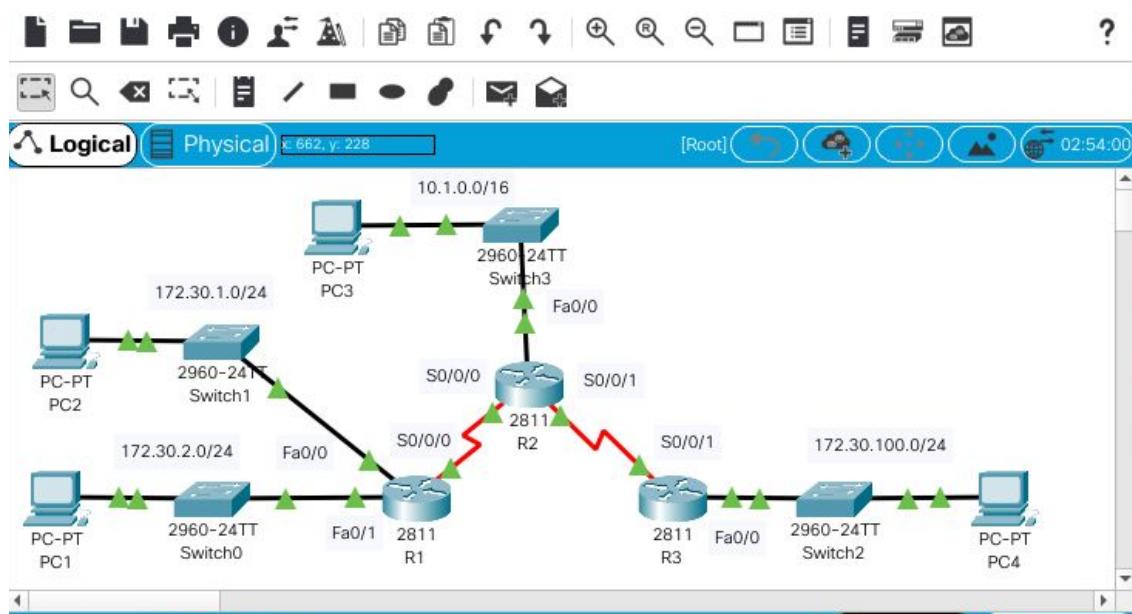
```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#!
R3(config)#!
R3(config)#!
R3(config-if)#interface FastEthernet0/0
R3(config-if)# ip address 172.30.100.1 255.255.255.0
R3(config-if)# duplex auto
R3(config-if)# speed auto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

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

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

Final Network



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
%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
%LINK-3-UPDOWN: Interface Serial0/0/0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to down
%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>en
R2#show ip interface brief
Interface      IP-Address  OK? Method Status      Protocol
FastEthernet0/0  10.1.0.1    YES manual up       up
FastEthernet0/1  unassigned   YES NVRAM administratively down down
Serial0/0/0     209.165.200.229 YES manual up       up
Serial0/0/1     209.165.200.233 YES manual up       up
Vlan1          unassigned   YES NVRAM administratively down down
R2#
```

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

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

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

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

Answer: 60 percent (3/5)

```
R2
Physical Config CLI Attributes

IOS Command Line Interface

Sending 5, 100-byte ICMP Echos to 172.30.2.10, timeout is 2 seconds:
U.U!
Success rate is 20 percent (1/5), round-trip min/avg/max = 2/75/61 ms

R2#ping 172.30.2.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.2.10, timeout is 2 seconds:
!U!.!
Success rate is 60 percent (3/5), round-trip min/avg/max = 1/14/40 ms

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!.U
Success rate is 40 percent (2/5), round-trip min/avg/max = 1/54/52 ms

R2#ping 172.30.2.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.2.10, timeout is 2 seconds:
!U!.!
Success rate is 60 percent (3/5), round-trip min/avg/max = 1/14/29 ms
```

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

Answer: 60 percent (3/5)

R2>en
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 = 14/27/21 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!.U
Success rate is 40 percent (2/5), round-trip min/avg/max = 14/62/44 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 60 percent (3/5), round-trip min/avg/max = 1/19/31 ms

R2#

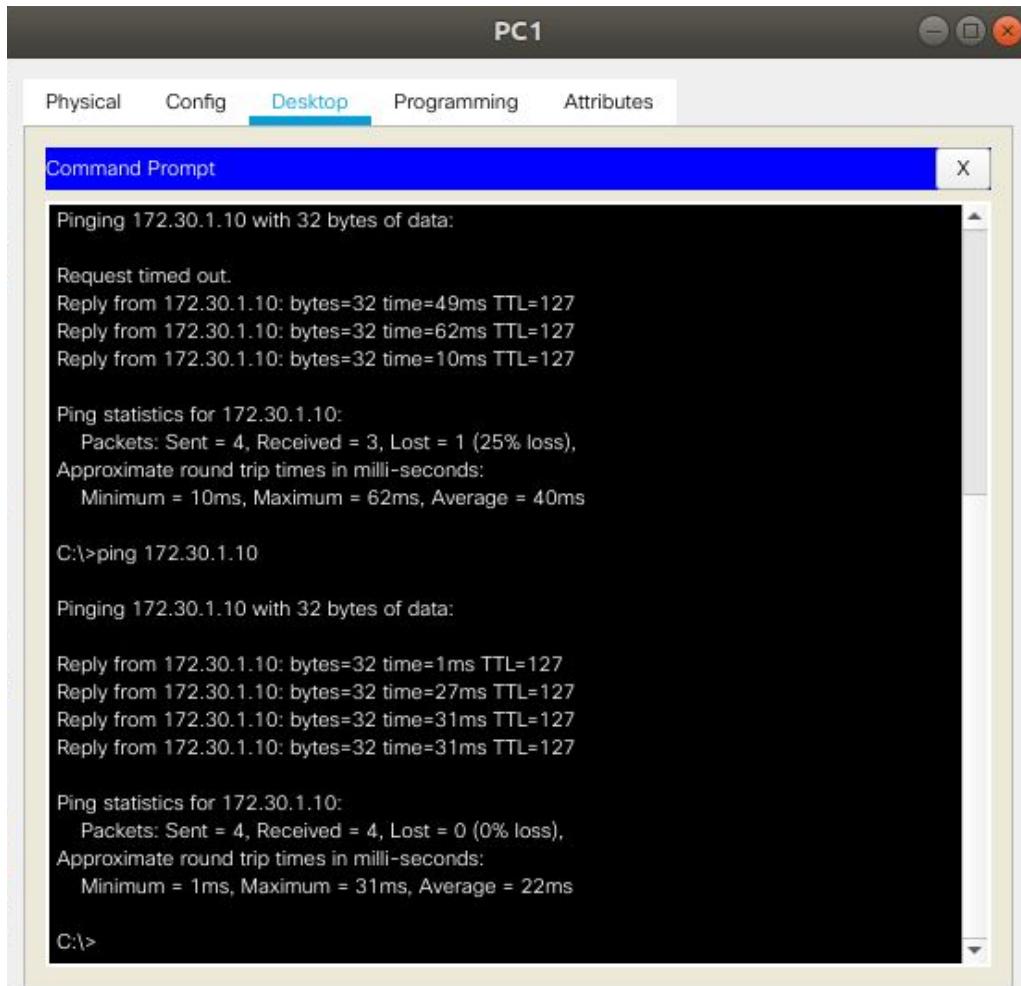
Ctrl+F6 to exit CLI focus

Top

Step 3: Check the connectivity between the PCs.

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

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



PC1

Physical Config Desktop Programming Attributes

Command Prompt X

```
Pinging 172.30.1.10 with 32 bytes of data:  
Request timed out.  
Reply from 172.30.1.10: bytes=32 time=49ms TTL=127  
Reply from 172.30.1.10: bytes=32 time=62ms TTL=127  
Reply from 172.30.1.10: bytes=32 time=10ms 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 = 10ms, Maximum = 62ms, Average = 40ms  
  
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=27ms TTL=127  
Reply from 172.30.1.10: bytes=32 time=31ms TTL=127  
Reply from 172.30.1.10: bytes=32 time=31ms 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 = 1ms, Maximum = 31ms, Average = 22ms  
  
C:\>
```

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

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

The screenshot shows a terminal window titled "Command Prompt" running on a device labeled "PC1". The window has tabs at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. The terminal output is as follows:

```
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=27ms TTL=127  
Reply from 172.30.1.10: bytes=32 time=31ms TTL=127  
Reply from 172.30.1.10: bytes=32 time=31ms 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 = 1ms, Maximum = 31ms, Average = 22ms  
  
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=61ms TTL=126  
Request timed out.  
Reply from 10.1.0.10: bytes=32 time=45ms 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 = 45ms, Maximum = 61ms, Average = 53ms  
|  
C:\>
```

Top

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

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

The screenshot shows a software interface for managing network nodes. The title bar says "PC1". Below it is a navigation bar with tabs: "Physical", "Config", "Desktop" (which is highlighted in blue), "Programming", and "Attributes". A sub-menu window titled "Command Prompt" is open under the "Desktop" tab. It contains the following text:

```
Pinging 10.1.0.10 with 32 bytes of data:  
Request timed out.  
Reply from 10.1.0.10: bytes=32 time=61ms TTL=126  
Request timed out.  
Reply from 10.1.0.10: bytes=32 time=45ms TTL=126  
  
Ping statistics for 10.1.0.10:  
    Packets: Sent = 4, Received = 2 (50% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 45ms, Maximum = 61ms, Average = 53ms  
  
C:\>ping 172.20.100.10  
  
Pinging 172.20.100.10 with 32 bytes of data:  
  
Reply from 172.30.2.1: Destination host unreachable.  
  
Ping statistics for 172.20.100.10:  
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

At the bottom left of the main window, there is a checkbox labeled "Top".

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

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

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

Pinging 172.30.1.10 with 32 bytes of data:

Reply from 172.30.100.1: Destination host unreachable.

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 PC3? **Answer: Yes**

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

```
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=13ms TTL=126
Request timed out.
Reply from 10.1.0.10: bytes=32 time=47ms 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 = 13ms, Maximum = 47ms, Average = 30ms
C:\>
```

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**

```
R2>en
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 209.165.200.234, 00:00:01, Serial0/0/1
                  [120/1] via 209.165.200.230, 00:00:20, Serial0/0/0
      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

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

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1>en
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, 00:00:13, 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, 00:00:13, Serial0/0/0

R1#
```

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

Physical Config **CLI** Attributes

IOS Command Line Interface

```
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, 00:00:10, 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, 00:00:10, Serial0/0/1
C    209.165.200.232 is directly connected, Serial0/0/1

R3#
```

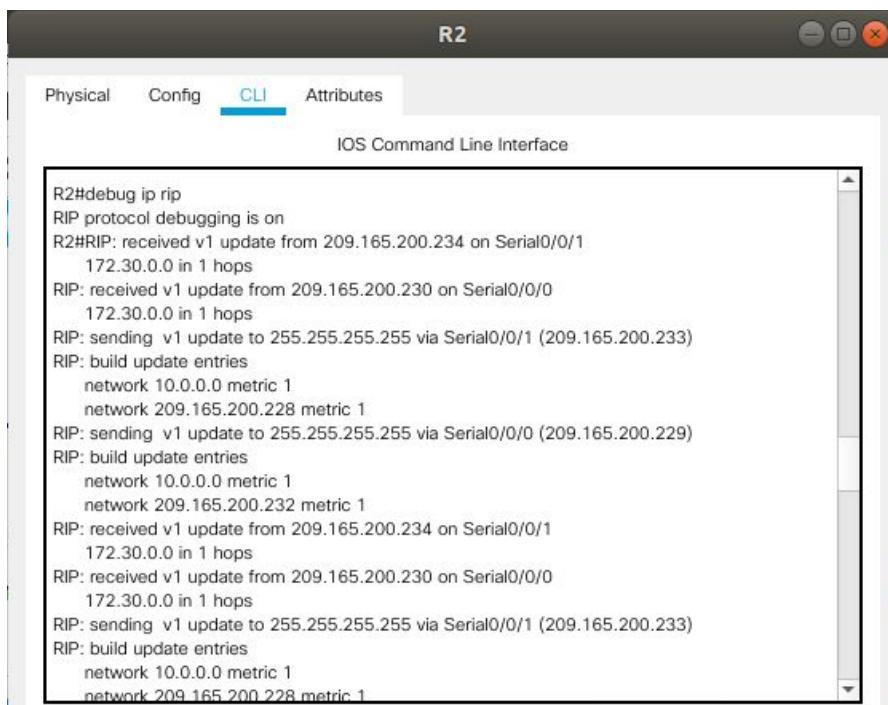
Step 7: Examine the RIPv1 packets that are being received by R2.

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.

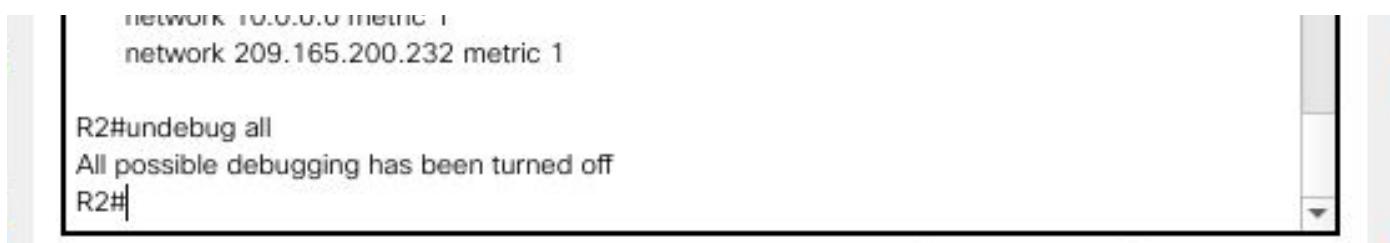


The screenshot shows a terminal window titled "R2". The tab bar at the top has "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is the text "IOS Command Line Interface". The main area contains the output of the "debug ip rip" command:

```
R2#debug ip rip
RIP protocol debugging is on
R2#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 Serial0/0/1 (209.165.200.233)
RIP: build update entries
  network 10.0.0.0 metric 1
  network 209.165.200.228 metric 1
RIP: sending v1 update to 255.255.255.255 via 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: 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 Serial0/0/1 (209.165.200.233)
RIP: build update entries
  network 10.0.0.0 metric 1
  network 209.165.200.228 metric 1
```

When you are finished, turn off the debugging.

R2#undebbug all



The screenshot shows a terminal window titled "R2". The main area contains the output of the "undebbug all" command:

```
network 10.0.0.0 metric 1
network 209.165.200.232 metric 1

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

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>en
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#
```

```
R1(config)#router rip
R1(config-router)#version 2
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)#exit
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#
```

```
R3(config)#router rip
R3(config-router)#version 2
R3>en
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router rip
R3(config-router)#version 2
R3(config-router)#exit
R3(config)#exit
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#
```

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

The screenshot shows the CLI interface for router R1. The title bar says "R1". Below it, there are tabs: "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". The main window is titled "IOS Command Line Interface". The output of the "show ip protocols" command is displayed:

```
R1#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
  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#
```

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>en
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 209.165.200.234, 00:00:02, Serial0/0/1
      [120/1] via 209.165.200.230, 00:00:13, Serial0/0/0
      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#
```

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>en
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

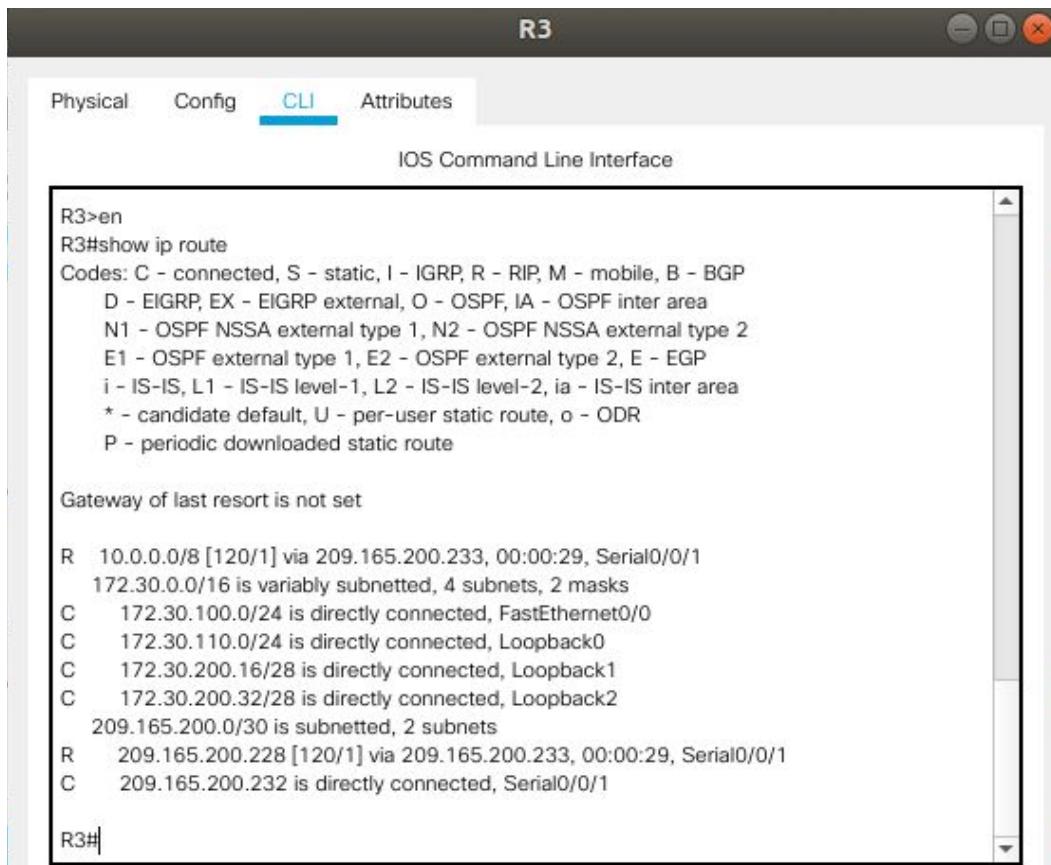
Gateway of last resort is not set

R  10.0.0.0/8 [120/1] via 209.165.200.229, 00:00:24, 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, 00:00:24, Serial0/0/0

R1#
```

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>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

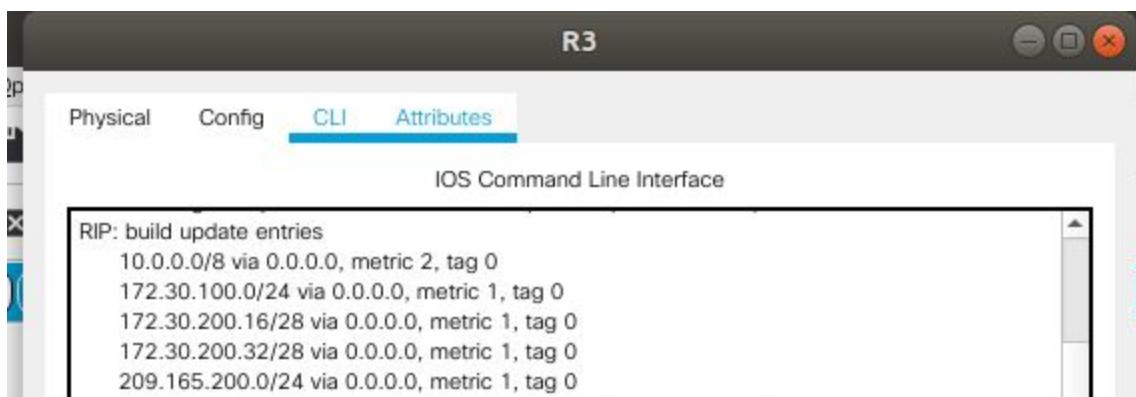
Gateway of last resort is not set

R 10.0.0.0/8 [120/1] via 209.165.200.233, 00:00:29, 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, 00:00:29, 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 R3?



R3>en
R3#**debug ip rip**
Physical Config CLI Attributes
IOS Command Line Interface

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

R3#

On R2, what routes are in the RIP updates that are received from R3? **Answer: 172.30.0.0/16**

```
R2#debug ip rip
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
```

```
R2>en
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router rip
R2(config-router)#no auto-summary
R2(config-router)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console
R2#
```

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

```
R1>en  
R1#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
R1(config)#router rip  
R1(config-router)#no auto-summary  
R1(config-router)#exit  
R1(config)#exit  
R1#  
%SYS-5-CONFIG_I: Configured from console by console  
  
R1#
```

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

```
R3>  
R3>en  
R3#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
R3(config)#router rip  
R3(config-router)#no auto-summary  
R3(config-router)#exit  
R3(config)#exit  
R3#  
%SYS-5-CONFIG_I: Configured from console by console  
  
R3#
```

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

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, 00:02:43, Serial0/0/0

R 172.30.1.0/24 [120/1] via 209.165.200.230, 00:00:23, Serial0/0/0

R 172.30.2.0/24 [120/1] via 209.165.200.230, 00:00:23, Serial0/0/0

R 172.30.100.0/24 [120/1] via 209.165.200.234, 00:00:23, Serial0/0/1

R 172.30.110.0/24 [120/1] via 209.165.200.234, 00:00:23, Serial0/0/1

R 172.30.200.16/28 [120/1] via 209.165.200.234, 00:00:23, Serial0/0/1

R 172.30.200.32/28 [120/1] via 209.165.200.234, 00:00:23, 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#

R1#show ip route

R1

Physical Config CLI Attributes

IOS Command Line Interface

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

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

R 10.0.0.0/8 is possibly down, routing via 209.165.200.229, Serial0/0/0

R 10.1.0.0/16 [120/1] via 209.165.200.229, 00:00:03, Serial0/0/0

172.30.0.0/16 is variably subnetted, 7 subnets, 3 masks

R 172.30.0.0/16 is possibly down, routing via 209.165.200.229, 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

R 172.30.100.0/24 [120/2] via 209.165.200.229, 00:00:03, Serial0/0/0

R 172.30.110.0/24 [120/2] via 209.165.200.229, 00:00:03, Serial0/0/0

R 172.30.200.16/28 [120/2] via 209.165.200.229, 00:00:03, Serial0/0/0

R 172.30.200.32/28 [120/2] via 209.165.200.229, 00:00:03, Serial0/0/0

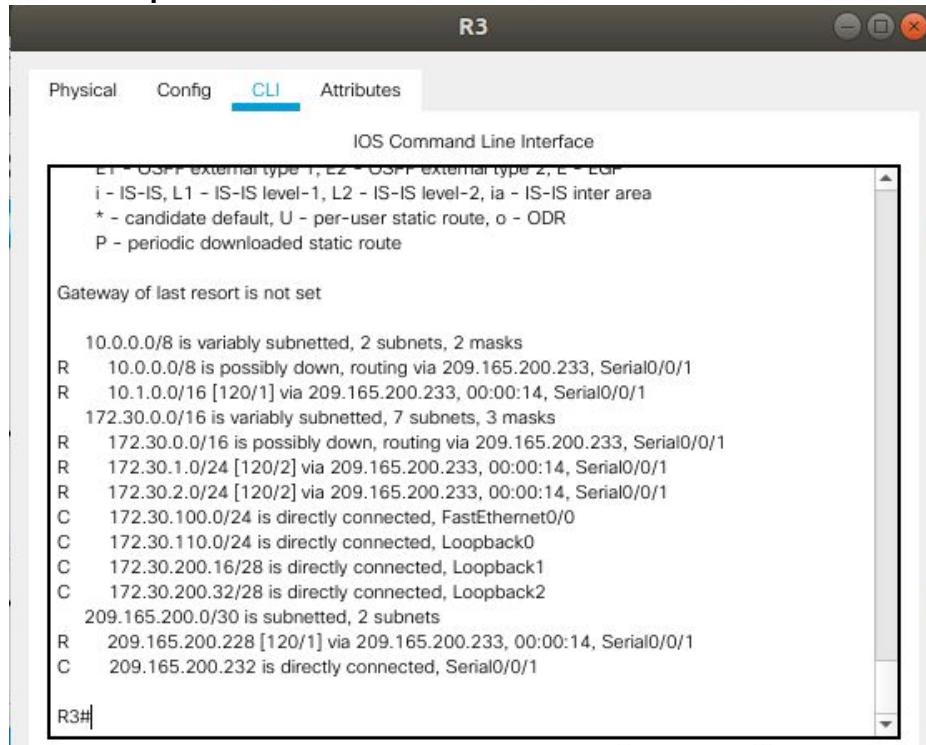
209.165.200.0/30 is subnetted, 2 subnets

C 209.165.200.228 is directly connected, Serial0/0/0

R 209.165.200.232 [120/1] via 209.165.200.229, 00:00:03, Serial0/0/0

R1#

R3#show ip route



R3

Physical Config **CLI** Attributes

IOS Command Line Interface

L1 = OSPF external type 1, L2 = 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

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

R 10.0.0.0/8 is possibly down, routing via 209.165.200.233, Serial0/0/1

R 10.1.0.0/16 [120/1] via 209.165.200.233, 00:00:14, Serial0/0/1

172.30.0.0/16 is variably subnetted, 7 subnets, 3 masks

R 172.30.0.0/16 is possibly down, routing via 209.165.200.233, Serial0/0/1

R 172.30.1.0/24 [120/2] via 209.165.200.233, 00:00:14, Serial0/0/1

R 172.30.2.0/24 [120/2] via 209.165.200.233, 00:00:14, 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, 00:00:14, Serial0/0/1

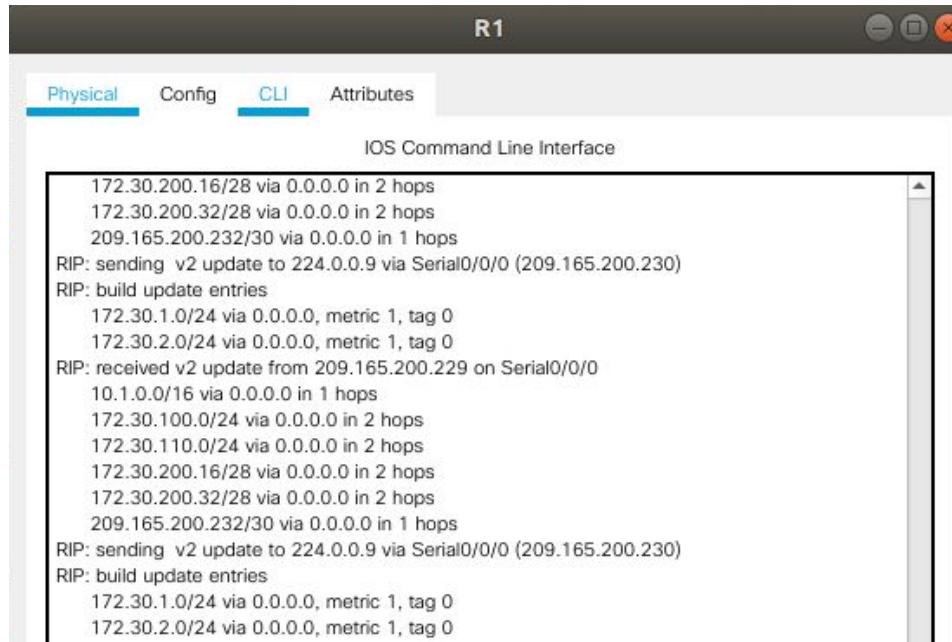
C 209.165.200.232 is directly connected, Serial0/0/1

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?

Answer: 172.30.1.0/24 and 172.30.2.0/24



R1

Physical Config **CLI** Attributes

IOS Command Line Interface

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)

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

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

Answer: 172.30.1.0/24 and 172.30.2.0/24

```
R2>en
R2#debug ip rip
RIP protocol debugging is on
R2#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 Serial0/0/1 (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: 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: 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
```

Are the subnet masks now included in the routing updates? **Answer: 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?

Answer: 5/5 messages successful

```
R2>en
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 80 percent (4/5), round-trip min/avg/max = 1/3/10 ms

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 = 1/1/2 ms
```

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

Answer: 5/5 messages successful

```
R2>en
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 80 percent (4/5), round-trip min/avg/max = 1/14/28 ms

R2#ping 172.30.100.10

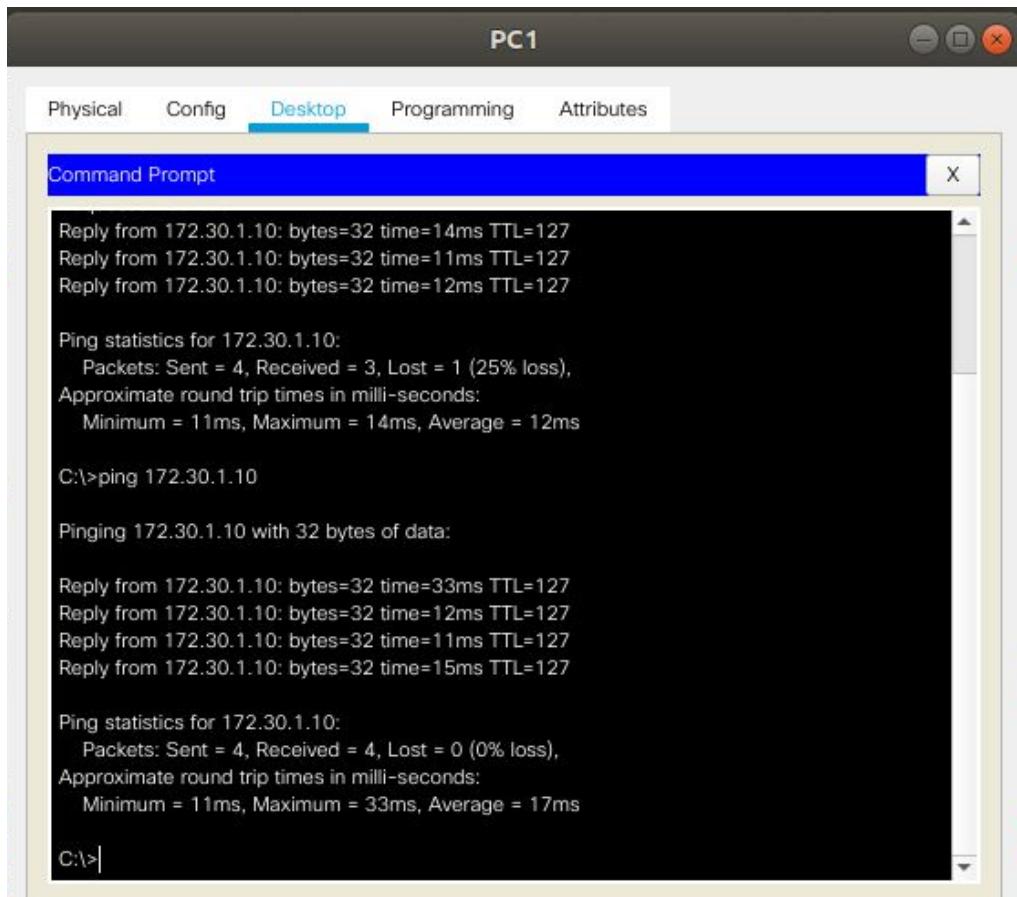
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.30.100.10, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/9/30 ms

R2#
```

Step 2: Check the connectivity between the PCs.

From PC1, is it possible to ping PC2? **Answer: Yes**

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



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 is a black terminal window displaying the output of a ping command. The output shows three successful replies from 172.30.1.10 with TTL=127, followed by ping statistics for 172.30.1.10, which show 4 sent, 3 received, and 1 lost packet (25% loss). This pattern repeats for two more sets of pings. At the bottom of the terminal window, the prompt "C:\>" is visible.

```
Reply from 172.30.1.10: bytes=32 time=14ms TTL=127
Reply from 172.30.1.10: bytes=32 time=11ms TTL=127
Reply from 172.30.1.10: bytes=32 time=12ms 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 = 11ms, Maximum = 14ms, Average = 12ms

C:\>ping 172.30.1.10

Pinging 172.30.1.10 with 32 bytes of data:

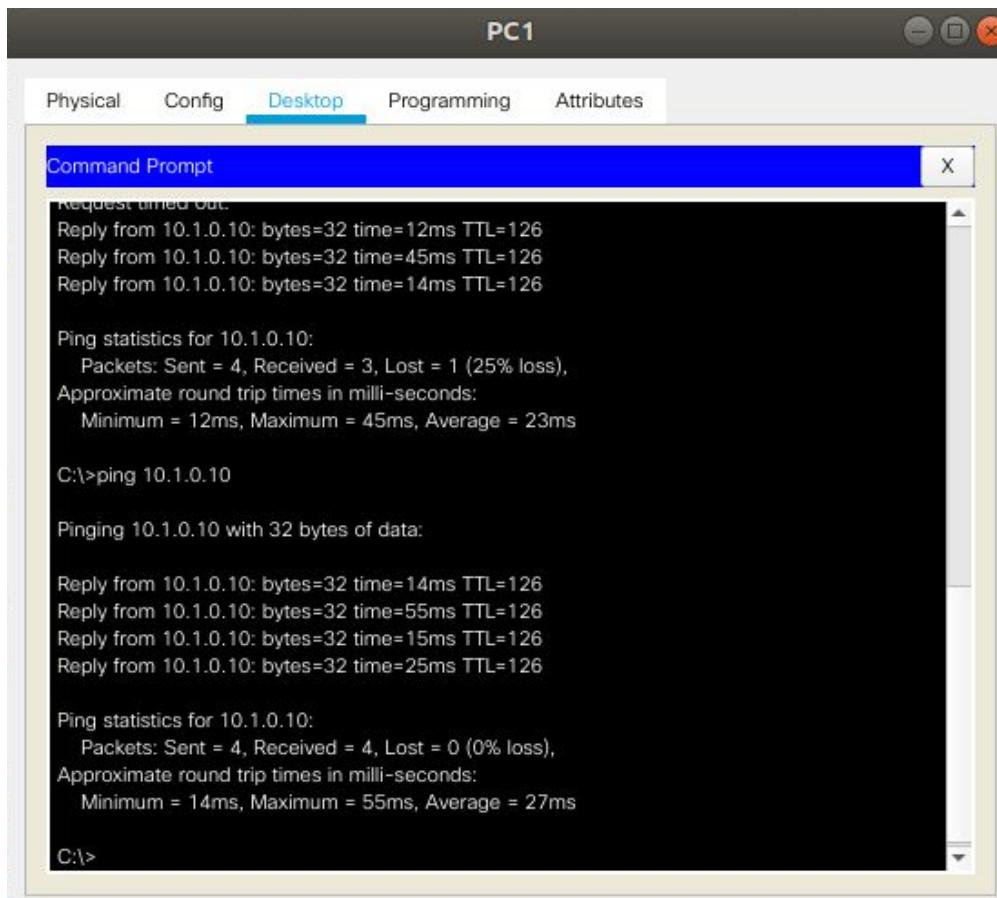
Reply from 172.30.1.10: bytes=32 time=33ms TTL=127
Reply from 172.30.1.10: bytes=32 time=12ms TTL=127
Reply from 172.30.1.10: bytes=32 time=11ms TTL=127
Reply from 172.30.1.10: bytes=32 time=15ms TTL=127

Ping statistics for 172.30.1.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 33ms, Average = 17ms

C:\>
```

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

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

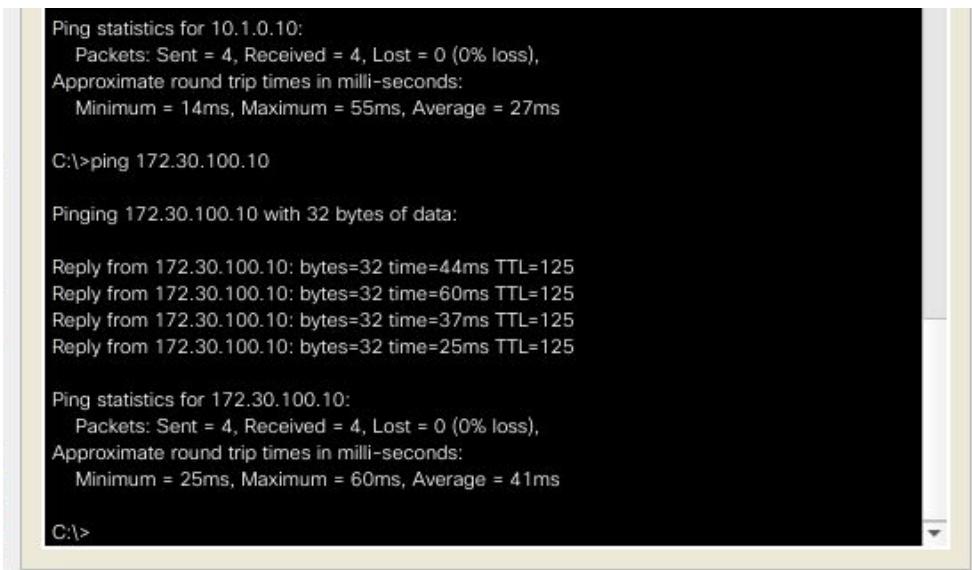


The screenshot shows a terminal window titled "PC1". The tab bar at the top has tabs for "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". A sub-menu window titled "Command Prompt" is open, showing the output of a ping command. The output is as follows:

```
Request timed out.  
Reply from 10.1.0.10: bytes=32 time=12ms TTL=126  
Reply from 10.1.0.10: bytes=32 time=45ms TTL=126  
Reply from 10.1.0.10: bytes=32 time=14ms 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 = 12ms, Maximum = 45ms, Average = 23ms  
  
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=14ms TTL=126  
Reply from 10.1.0.10: bytes=32 time=55ms TTL=126  
Reply from 10.1.0.10: bytes=32 time=15ms TTL=126  
Reply from 10.1.0.10: bytes=32 time=25ms 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 = 14ms, Maximum = 55ms, Average = 27ms  
  
C:\>
```

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

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

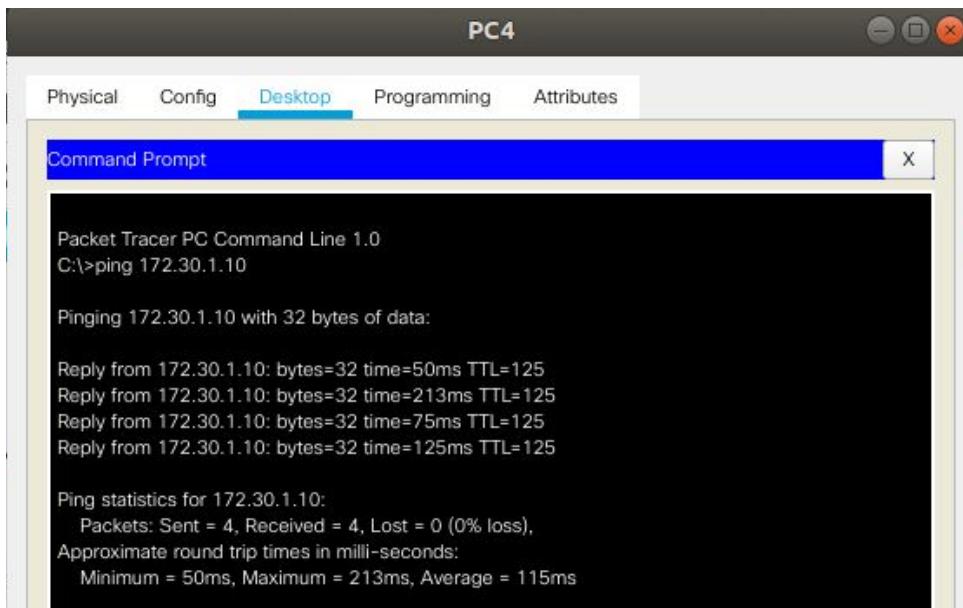


The screenshot shows a terminal window titled "PC1". The tab bar at the top has tabs for "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". A sub-menu window titled "Command Prompt" is open, showing the output of a ping command. The output is as follows:

```
Ping statistics for 10.1.0.10:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 14ms, Maximum = 55ms, Average = 27ms  
  
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=44ms TTL=125  
Reply from 172.30.100.10: bytes=32 time=60ms TTL=125  
Reply from 172.30.100.10: bytes=32 time=37ms TTL=125  
Reply from 172.30.100.10: bytes=32 time=25ms 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 = 25ms, Maximum = 60ms, Average = 41ms  
  
C:\>
```

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

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



The screenshot shows a desktop window titled "PC4". Inside, a "Command Prompt" window is open with the title "Command Prompt". The command entered was "C:\>ping 172.30.1.10". The output shows four successful replies from the target IP address, followed by ping statistics indicating 0% loss and an average round trip time of 115ms.

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

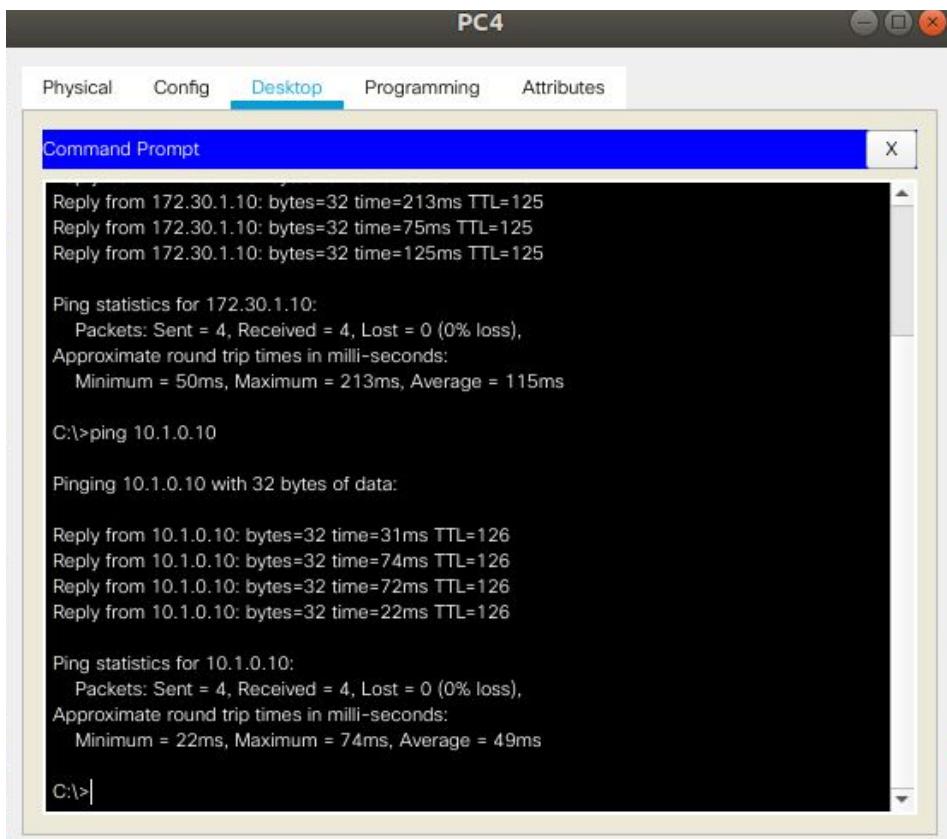
Pinging 172.30.1.10 with 32 bytes of data:

Reply from 172.30.1.10: bytes=32 time=50ms TTL=125
Reply from 172.30.1.10: bytes=32 time=213ms TTL=125
Reply from 172.30.1.10: bytes=32 time=75ms TTL=125
Reply from 172.30.1.10: bytes=32 time=125ms 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 = 50ms, Maximum = 213ms, Average = 115ms
```

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

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



The screenshot shows a desktop window titled "PC4". Inside, a "Command Prompt" window is open with the title "Command Prompt". The command entered was "C:\>ping 10.1.0.10". The output shows four successful replies from the target IP address, followed by ping statistics indicating 0% loss and an average round trip time of 49ms.

```
Reply from 172.30.1.10: bytes=32 time=213ms TTL=125
Reply from 172.30.1.10: bytes=32 time=75ms TTL=125
Reply from 172.30.1.10: bytes=32 time=125ms 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 = 50ms, Maximum = 213ms, Average = 115ms

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=31ms TTL=126
Reply from 10.1.0.10: bytes=32 time=74ms TTL=126
Reply from 10.1.0.10: bytes=32 time=72ms TTL=126
Reply from 10.1.0.10: bytes=32 time=22ms 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 = 22ms, Maximum = 74ms, Average = 49ms

C:\>
```

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.

1. Router R1

R1#show running-config

Building configuration...

Current configuration : 926 bytes

!

version 12.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

!

hostname R1

!

!

!

!

!

!

!

no ip cef

no ipv6 cef

!

!

!

!

!

```
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface FastEthernet0/0
ip address 172.30.1.1 255.255.255.0
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 172.30.2.1 255.255.255.0
duplex auto
speed auto
!
interface Serial0/0/0
ip address 209.165.200.230 255.255.255.252
clock rate 64000
!
interface Serial0/0/1
no ip address
clock rate 2000000
shutdown
!
interface Vlan1
no ip address
shutdown
!
```

```
router rip
version 2
passive-interface FastEthernet0/0
passive-interface FastEthernet0/1
network 172.30.0.0
network 209.165.200.0
no auto-summary
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
line con 0
password consolepwd
!
line aux 0
!
line vty 0 4
password telnetpwd
login
!
!
!
end
```

R1#show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/16 is subnetted, 1 subnets
R 10.1.0.0 [120/1] via 209.165.200.229, 00:00:00, 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, 00:00:00, Serial0/0/0
R 172.30.110.0/24 [120/2] via 209.165.200.229, 00:00:00, Serial0/0/0
R 172.30.200.16/28 [120/2] via 209.165.200.229, 00:00:00, Serial0/0/0
R 172.30.200.32/28 [120/2] via 209.165.200.229, 00:00:00, 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, 00:00:00, Serial0/0/0

R1#show ip interface brief

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

R1#show ip protocols

Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 23 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip

Default version control: send version 2, receive 2

Interface Send Recv Triggered RIP Key-chain

Serial0/0/0 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 00:00:20

Distance: (default is 120)

R1#

2. Router R2

R2#show running-config

Building configuration...

Current configuration : 872 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
password consolepwd
!
line aux 0
!
line vty 0 4
password telnetpwd
login
!
```

```
!
!
end
```

R2#show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/16 is subnetted, 1 subnets
C 10.1.0.0 is directly connected, FastEthernet0/0
172.30.0.0/16 is variably subnetted, 6 subnets, 2 masks
R 172.30.1.0/24 [120/1] via 209.165.200.230, 00:00:17, Serial0/0/0
R 172.30.2.0/24 [120/1] via 209.165.200.230, 00:00:17, Serial0/0/0
R 172.30.100.0/24 [120/1] via 209.165.200.234, 00:00:25, Serial0/0/1
R 172.30.110.0/24 [120/1] via 209.165.200.234, 00:00:25, Serial0/0/1
R 172.30.200.16/28 [120/1] via 209.165.200.234, 00:00:25, Serial0/0/1
R 172.30.200.32/28 [120/1] via 209.165.200.234, 00:00:25, Serial0/0/1
209.165.200.0/30 is subnetted, 2 subnets
C 209.165.200.228 is directly connected, Serial0/0/0
C 209.165.200.232 is directly connected, Serial0/0/1

R2#show ip interface brief

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

Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 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

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 00:00:06

209.165.200.234 120 00:00:15

Distance: (default is 120)

3. Router R3

R3#show running-config

Building configuration...

Current configuration : 1052 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
password consolepwd
!
line aux 0
!
line vty 0 4
password telnetpwd
login
!
!
!
end
```

R3#show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/16 is subnetted, 1 subnets
R 10.1.0.0 [120/1] via 209.165.200.233, 00:00:12, 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

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

R3#show ip protocols

Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 1 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 00:00:06

Distance: (default is 120)

ROUTER R1

1. show running-config

```
R1 - Notepad
File Edit Format View Help
R1#show running-config
Building configuration...

Current configuration : 926 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
!
!
```

```
R1 - Notepad
File Edit Format View Help
!
interface FastEthernet0/0
ip address 172.30.1.1 255.255.255.0
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 172.30.2.1 255.255.255.0
duplex auto
speed auto
!
interface Serial0/0/0
ip address 209.165.200.230 255.255.255.252
clock rate 64000
!
interface Serial0/0/1
no ip address
clock rate 2000000
shutdown
!
interface Vlan1
no ip address
shutdown
!
router rip
version 2
passive-interface FastEthernet0/0
passive-interface FastEthernet0/1
network 172.30.0.0
network 209.165.200.0
no auto-summary
!
ip classless
!
```

```
R1 - Notepad
File Edit Format View Help
!
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
password consolepwd
!
line aux 0
!
line vty 0 4
password telnetpwd
login
!
!
end

<
Ln 23, Col 2 | 100%
Ln 23, Col 2 | 100%
Ln 23, Col 2 | 100%
```

2. show ip route

```
R1 - Notepad
File Edit Format View Help
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, 00:00:00, 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, 00:00:00, Serial0/0/0
R 172.30.110.0/24 [120/2] via 209.165.200.229, 00:00:00, Serial0/0/0
R 172.30.200.16/28 [120/2] via 209.165.200.229, 00:00:00, Serial0/0/0
R 172.30.200.32/28 [120/2] via 209.165.200.229, 00:00:00, 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, 00:00:00, Serial0/0/0

R1#
```

3. show ip interface brief

```
R1 - Notepad
File Edit Format View Help
R1#show ip interface brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/0 172.30.1.1 YES manual up up
FastEthernet0/1 172.30.2.1 YES manual up up
Serial0/0/0 209.165.200.230 YES manual up up
Serial0/0/1 unassigned YES NVRAM administratively down down
Vlan1 unassigned YES unset administratively down down
```

4. show ip protocols

```
R1#show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 23 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip
  Default version control: send version 2, receive 2
  Interface Send Recv Triggered RIP Key-chain
    Serial0/0/0 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 00:00:20
  Distance: (default is 120)
R1#
```

ROUTER R2

1. show running-config

R2 - Notepad

```
File Edit Format View Help
R2#show running-config
Building configuration...

Current configuration : 872 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
<
```

Ln 35, Col 24 | 80%

R2 - Notepad

```
File Edit Format View Help
!
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
password consolepwd
!
line aux 0
!
line vty 0 4
password telnetpwd
login
!
!
end
<
```

Ln 35, Col 24 | 80%

2. show ip route

```
R2 - Notepad
File Edit Format View Help
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, 00:00:17, Serial0/0/0
R 172.30.2.0/24 [120/1] via 209.165.200.230, 00:00:17, Serial0/0/0
R 172.30.100.0/24 [120/1] via 209.165.200.234, 00:00:25, Serial0/0/1
R 172.30.110.0/24 [120/1] via 209.165.200.234, 00:00:25, Serial0/0/1
R 172.30.200.16/28 [120/1] via 209.165.200.234, 00:00:25, Serial0/0/1
R 172.30.200.32/28 [120/1] via 209.165.200.234, 00:00:25, 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
```

3. show ip interface brief

```
R2 - Notepad
File Edit Format View Help
R2#
R2#
R2#show ip interface brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/0 10.1.0.1 YES manual up up
FastEthernet0/1 unassigned YES NVRAM administratively down down
Serial0/0/0 209.165.200.229 YES manual up up
Serial0/0/1 209.165.200.233 YES manual up up
Vlan1 unassigned YES unset administratively down down
```

4. show ip protocols

```
R2#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
    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 00:00:06
      209.165.200.234 120 00:00:15
  Distance: (default is 120)
  ~~~
```

ROUTER R3

1. show running-config

R3 - Notepad

```
File Edit Format View Help
R3>en
R3#show running-config
Building configuration...

Current configuration : 1052 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
<
```

Ln 19, Col 2

R3 - Notepad

```
File Edit Format View Help
!
!
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
!
!
!
!
!
```

Ln 19, Col 2

R3 - Notepad

```
File Edit Format View Help
!
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
!
!
!
!
!
```

Ln 19, Col 2

2. show ip route

```
R3 - Notepad
File Edit Format View Help
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
```

3. show ip interface brief

```
R3#show ip interface brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/0 172.30.100.1 YES manual up up
FastEthernet0/1 unassigned YES NVRAM administratively down down
Serial0/0/0 unassigned YES NVRAM administratively down down
Serial0/0/1 209.165.200.234 YES manual up up
Loopback0 172.30.110.1 YES manual up up
Loopback1 172.30.200.17 YES manual up up
Loopback2 172.30.200.33 YES manual up up
Vlan1 unassigned YES unset administratively down down
R3#
```

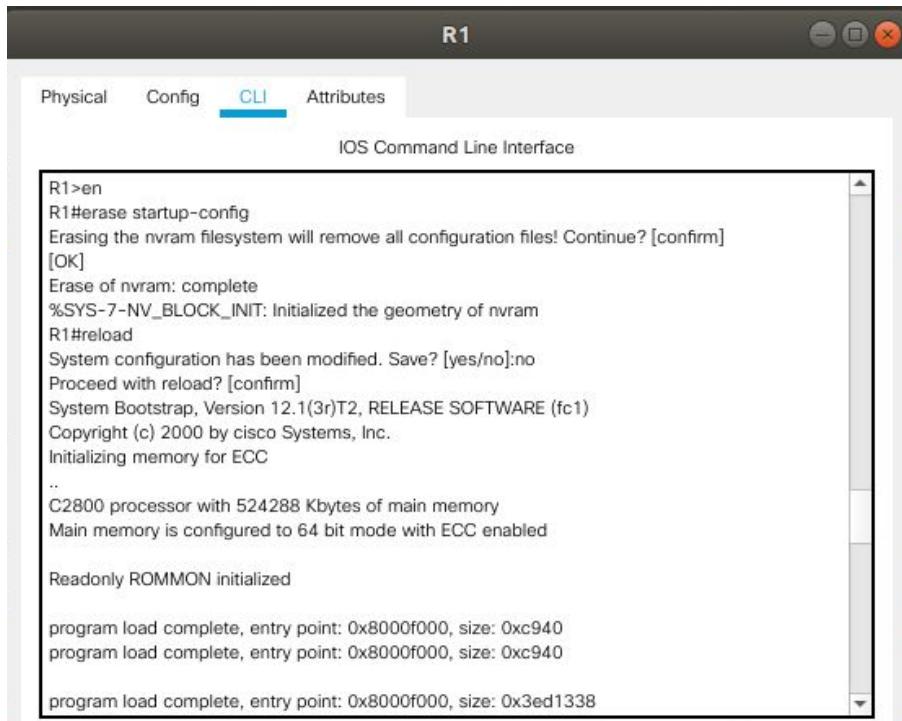
4. show ip protocols

```
R3#show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 1 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 00:00:06
  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.

Router R1



R1

Physical Config **CLI** Attributes

IOS Command Line Interface

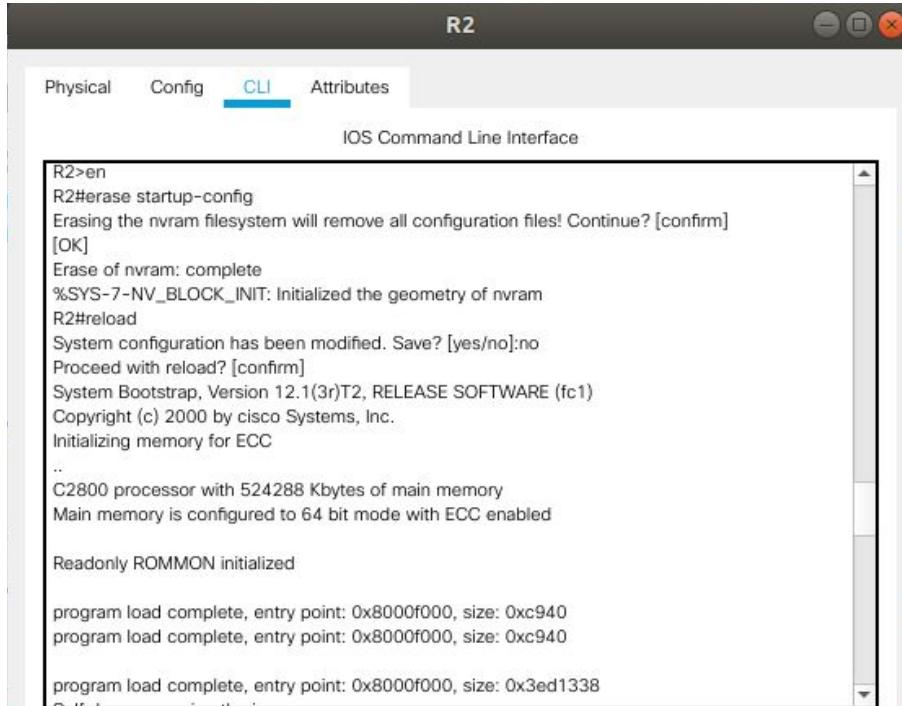
```
R1>en
R1#erase startup-config
Erasing the nvram filesystem will remove all configuration files! Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
R1#reload
System configuration has been modified. Save? [yes/no]:no
Proceed with reload? [confirm]
System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)
Copyright (c) 2000 by cisco Systems, Inc.
Initializing memory for ECC
..
C2800 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

 Readonly ROMMON initialized

program load complete, entry point: 0x8000f000, size: 0xc940
program load complete, entry point: 0x8000f000, size: 0xc940

program load complete, entry point: 0x8000f000, size: 0x3ed1338
```

Router R2



R2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R2>en
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 12.1(3r)T2, RELEASE SOFTWARE (fc1)
Copyright (c) 2000 by cisco Systems, Inc.
Initializing memory for ECC
..
C2800 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

 Readonly ROMMON initialized

program load complete, entry point: 0x8000f000, size: 0xc940
program load complete, entry point: 0x8000f000, size: 0xc940

program load complete, entry point: 0x8000f000, size: 0x3ed1338
```

Router R3

R3>en
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 12.1(3r)T2, RELEASE SOFTWARE (fc1)
Copyright (c) 2000 by cisco Systems, Inc.
Initializing memory for ECC
..
C2800 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled
Readonly ROMMON initialized
program load complete, entry point: 0x8000f000, size: 0xc940
program load complete, entry point: 0x8000f000, size: 0xc940
program load complete, entry point: 0x8000f000, size: 0x3ed1338