

ACTIVIDAD 2.5.3. PROPAGUE UNA RUTA PREDETERMINADA EN OSPFV2

Memoria Técnica

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7 A IELC

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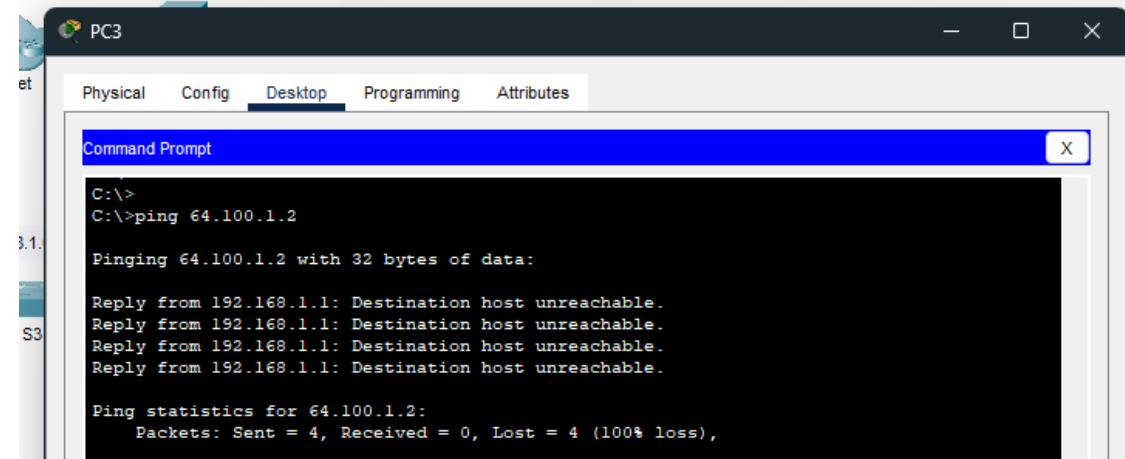
I. ANTECEDENTES

- **I.1. Objetivos**
 - Parte 1. Propague una ruta predeterminada
 - Parte 2. Verifique la conectividad
- **I.2. Alcance**
 - En esta actividad, configurará una ruta predeterminada de IPv4 a Internet y propagará esa ruta predeterminada a otros routers OSPF. Usted luego verificará que la ruta predeterminada está en las tablas de enrutamiento de descarga y que los hosts ahora pueden acceder a un servidor web en Internet.

2. DESCRIPCIÓN TÉCNICA DE LA SOLUCIÓN

**Parte 1: Propague una ruta
predeterminada**

PASO 1: PRUEBA DE CONECTIVIDAD CON EL SERVIDOR WEB



PC3

Physical Config Desktop Programming Attributes

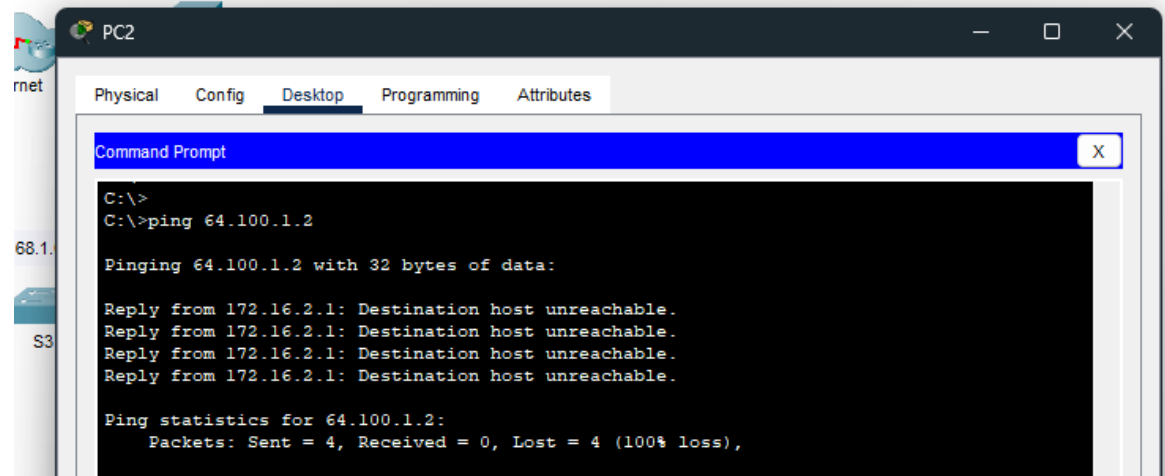
Command Prompt

```
C:\>
C:\>ping 64.100.1.2

Pinging 64.100.1.2 with 32 bytes of data:

Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.

Ping statistics for 64.100.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```



PC2

Physical Config Desktop Programming Attributes

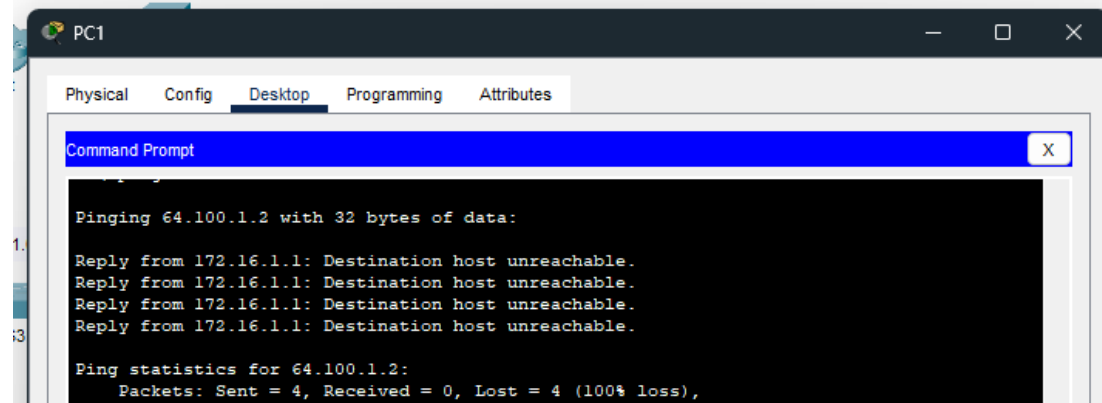
Command Prompt

```
C:\>
C:\>ping 64.100.1.2

Pinging 64.100.1.2 with 32 bytes of data:

Reply from 172.16.2.1: Destination host unreachable.
Reply from 172.16.2.1: Destination host unreachable.
Reply from 172.16.2.1: Destination host unreachable.
Reply from 172.16.2.1: Destination host unreachable.

Ping statistics for 64.100.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```



PC1

Physical Config Desktop Programming Attributes

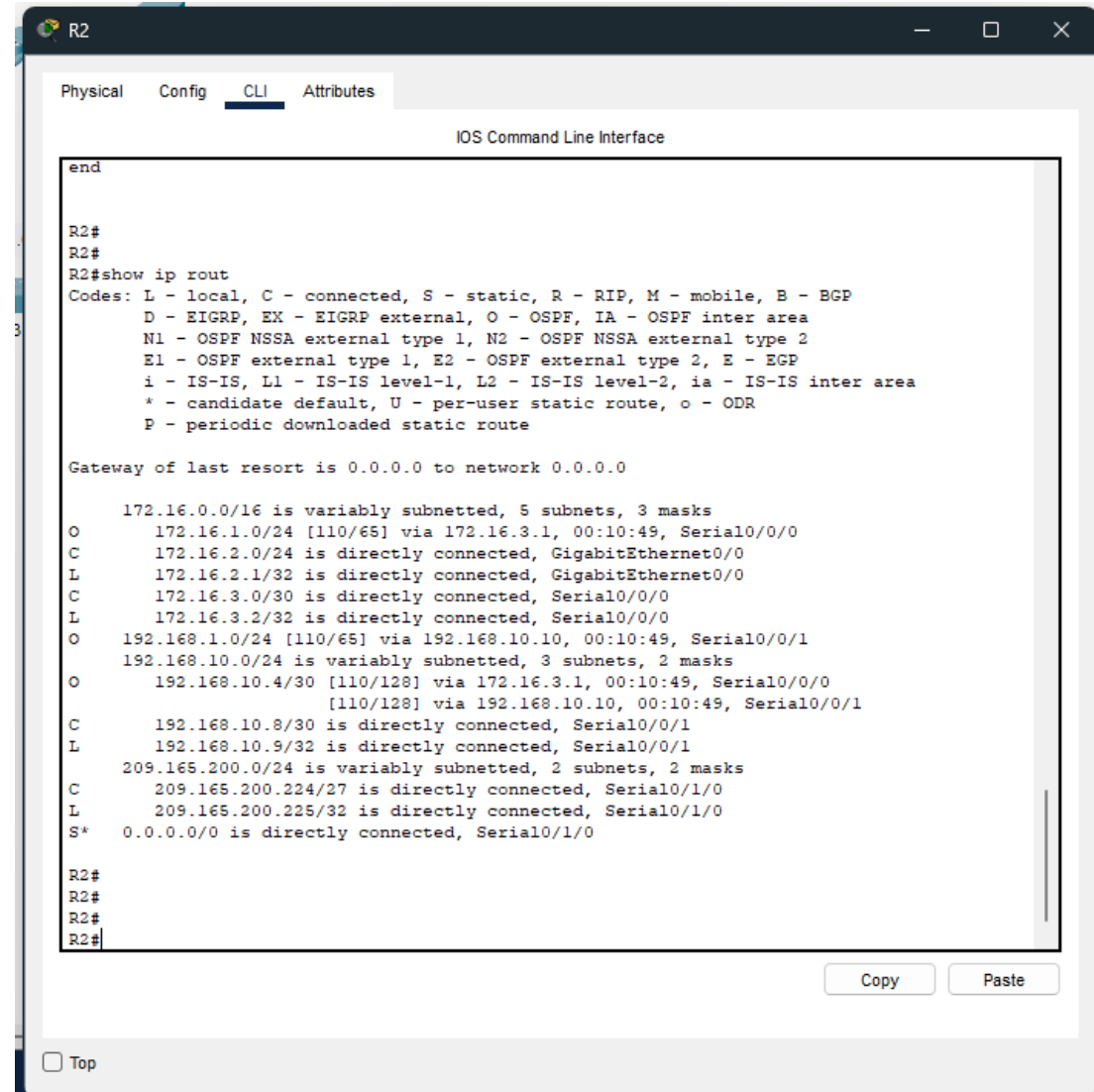
Command Prompt

```
Pinging 64.100.1.2 with 32 bytes of data:

Reply from 172.16.1.1: Destination host unreachable.
Reply from 172.16.1.1: Destination host unreachable.
Reply from 172.16.1.1: Destination host unreachable.
Reply from 172.16.1.1: Destination host unreachable.

Ping statistics for 64.100.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PASO 2: CONFIGURE UNA RUTA PREDETERMINADA EN R2.



The screenshot shows a network simulator window titled 'R2' with tabs for 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The user has entered the command 'show ip route', and the output is displayed. The output includes a legend for route codes (L, C, S, R, M, B, D, EX, O, IA, N1, N2, E1, E2, E, i, L1, L2, ia, *, U, P) and a list of routes. The routes are categorized by their type: O (OSPF NSSA external type 1), C (connected), L (OSPF external type 1), and S* (candidate default). The routes are listed with their destination network, mask, and next hop information.

```
end
R2#
R2#
R2#show ip rout
Codes: L - local, C - connected, S - static, 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 0.0.0.0 to network 0.0.0.0

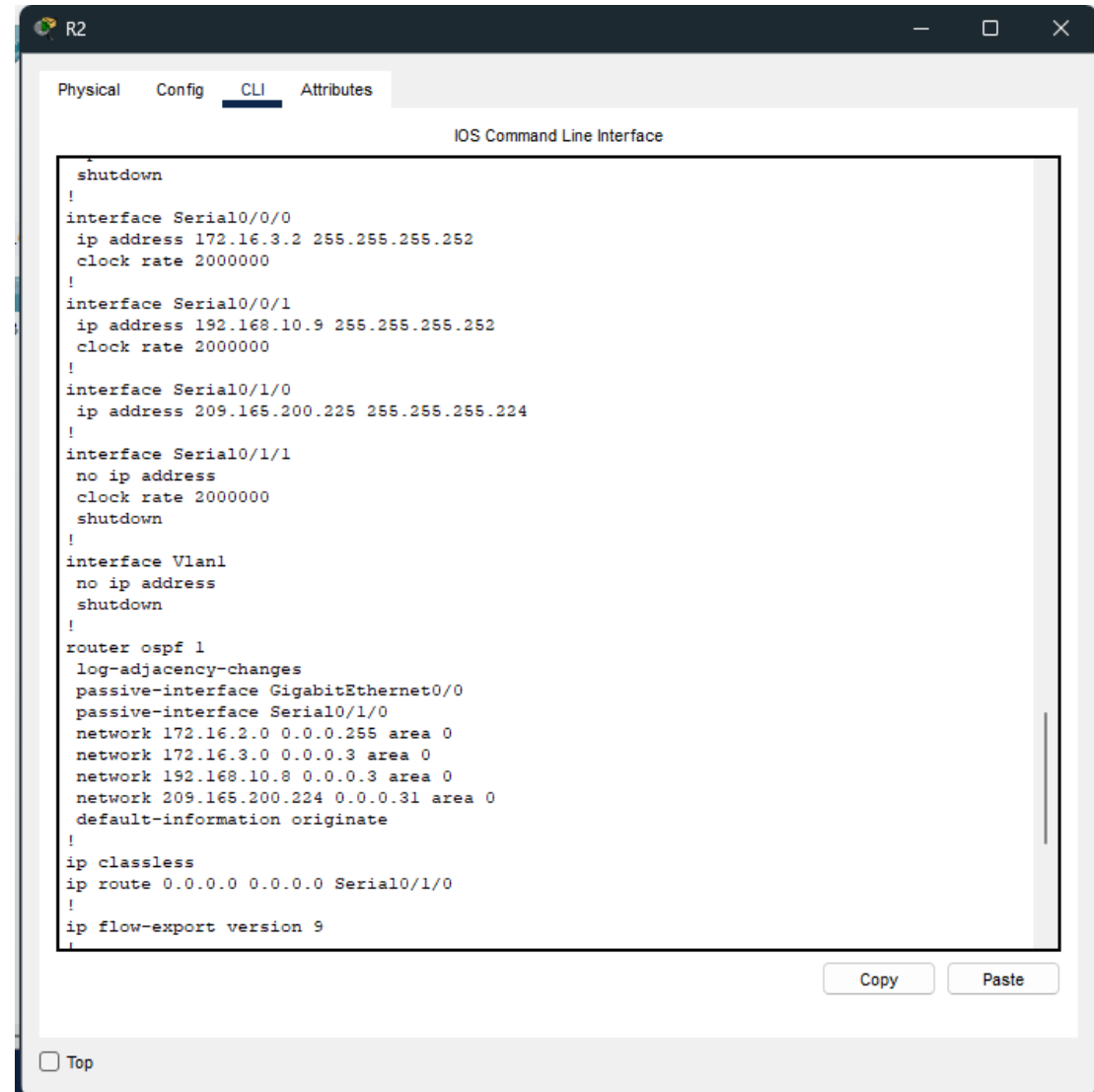
    172.16.0.0/16 is variably subnetted, 5 subnets, 3 masks
O       172.16.1.0/24 [110/65] via 172.16.3.1, 00:10:49, Serial0/0/0
C       172.16.2.0/24 is directly connected, GigabitEthernet0/0
L       172.16.2.1/32 is directly connected, GigabitEthernet0/0
C       172.16.3.0/30 is directly connected, Serial0/0/0
L       172.16.3.2/32 is directly connected, Serial0/0/0
O       192.168.1.0/24 [110/65] via 192.168.10.10, 00:10:49, Serial0/0/1
    192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
O       192.168.10.4/30 [110/128] via 172.16.3.1, 00:10:49, Serial0/0/0
        [110/128] via 192.168.10.10, 00:10:49, Serial0/0/1
C       192.168.10.8/30 is directly connected, Serial0/0/1
L       192.168.10.9/32 is directly connected, Serial0/0/1
C       209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
L       209.165.200.224/27 is directly connected, Serial0/1/0
L       209.165.200.225/32 is directly connected, Serial0/1/0
S*    0.0.0.0/0 is directly connected, Serial0/1/0

R2#
R2#
R2#
R2#
```

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STEP 3: PROPAGATE THE ROUTE IN OSPF.



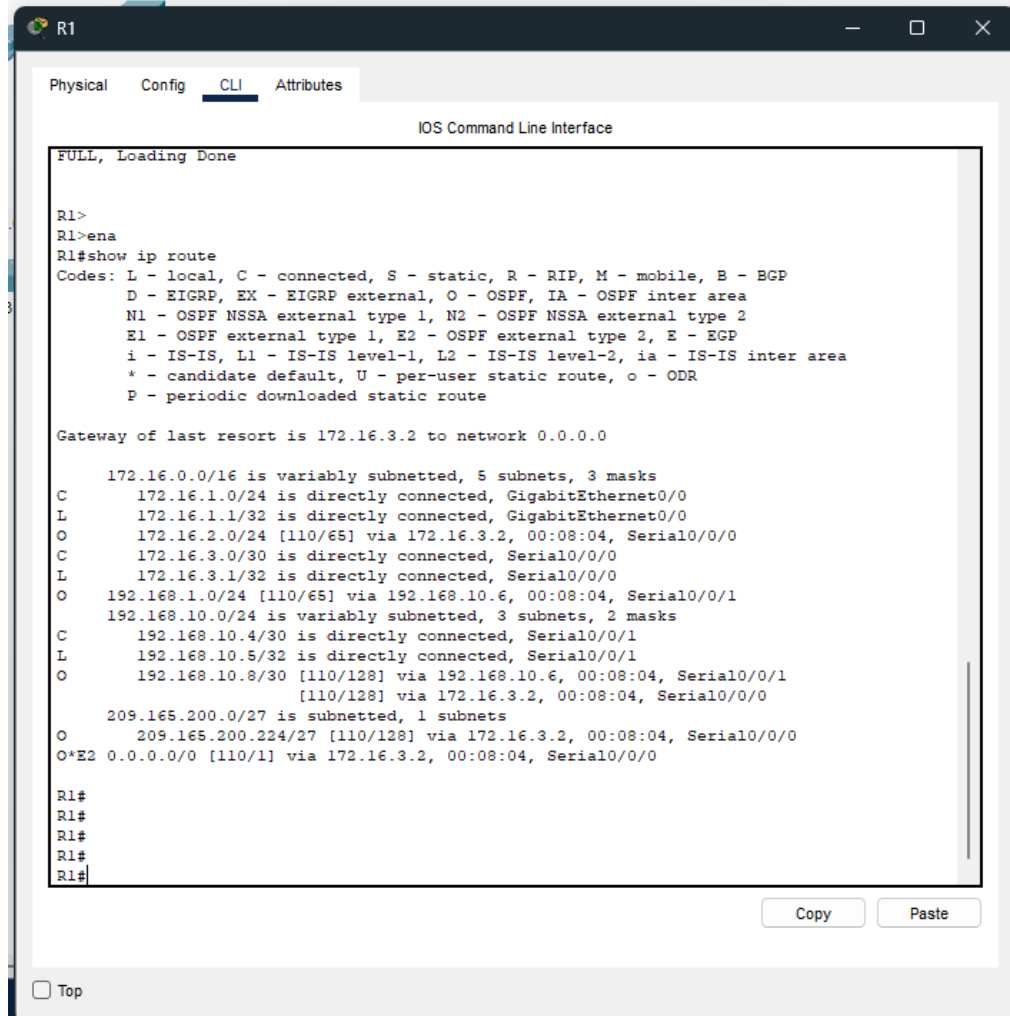
The screenshot shows a network configuration window titled "R2" with tabs for Physical, Config, CLI, and Attributes. The CLI tab is active, displaying the "IOS Command Line Interface" configuration. The configuration includes shutting down the router, configuring three serial interfaces (Serial0/0/0, Serial0/0/1, and Serial0/1/0) with IP addresses and clock rates, shutting down interface Serial0/1/1, configuring a VLAN interface (Vlan1) with no IP address and shutting it down, and configuring OSPF (Open Shortest Path First) with log-adjacency-changes, passive-interfaces, and network statements. The configuration also includes a classless IP routing setup and a flow-export version 9.

```
shutdown
!
interface Serial0/0/0
ip address 172.16.3.2 255.255.255.252
clock rate 2000000
!
interface Serial0/0/1
ip address 192.168.10.9 255.255.255.252
clock rate 2000000
!
interface Serial0/1/0
ip address 209.165.200.225 255.255.255.224
!
interface Serial0/1/1
no ip address
clock rate 2000000
shutdown
!
interface Vlan1
no ip address
shutdown
!
router ospf 1
log-adjacency-changes
passive-interface GigabitEthernet0/0
passive-interface Serial0/1/0
network 172.16.2.0 0.0.0.255 area 0
network 172.16.3.0 0.0.0.3 area 0
network 192.168.10.8 0.0.0.3 area 0
network 209.165.200.224 0.0.0.31 area 0
default-information originate
!
ip classless
ip route 0.0.0.0 0.0.0.0 Serial0/1/0
!
ip flow-export version 9
!
```

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PASO 4: EXAMINE LAS TABLAS DE ENRUTAMIENTO EN R1 Y R3.



The screenshot shows the CLI of router R1. The 'show ip route' command has been executed, displaying a routing table with various entries including directly connected networks, OSPF learned routes, and a default route. The interface has tabs for Physical, Config, CLI, and Attributes, with CLI being the active tab.

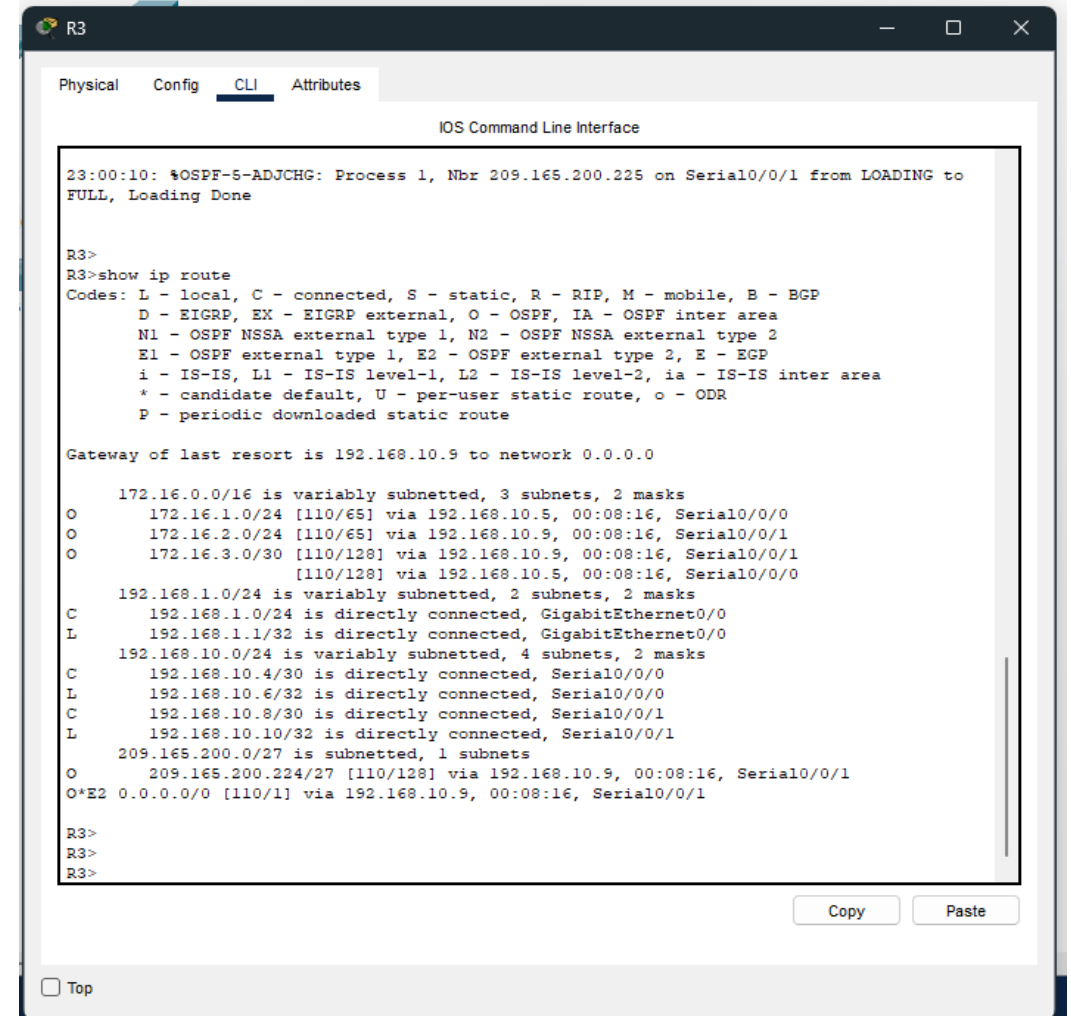
```
Full, Loading Done

R1>
R1>ena
R1#show ip route
Codes: L - local, C - connected, S - static, 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 172.16.3.2 to network 0.0.0.0

    172.16.0.0/16 is variably subnetted, 5 subnets, 3 masks
      C    172.16.1.0/24 is directly connected, GigabitEthernet0/0
      L    172.16.1.1/32 is directly connected, GigabitEthernet0/0
      O    172.16.2.0/24 [110/65] via 172.16.3.2, 00:08:04, Serial0/0/0
      C    172.16.3.0/30 is directly connected, Serial0/0/0
      L    172.16.3.1/32 is directly connected, Serial0/0/0
      O    192.168.1.0/24 [110/65] via 192.168.10.6, 00:08:04, Serial0/0/1
      O    192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
        C    192.168.10.4/30 is directly connected, Serial0/0/1
        L    192.168.10.5/32 is directly connected, Serial0/0/1
        O    192.168.10.8/30 [110/128] via 192.168.10.6, 00:08:04, Serial0/0/1
            [110/128] via 172.16.3.2, 00:08:04, Serial0/0/0
      O    209.165.200.0/27 is subnetted, 1 subnets
        O    209.165.200.224/27 [110/128] via 172.16.3.2, 00:08:04, Serial0/0/0
O*E2 0.0.0.0/0 [110/1] via 172.16.3.2, 00:08:04, Serial0/0/0

R1#
R1#
R1#
R1#
```



The screenshot shows the CLI of router R3. The 'show ip route' command has been executed, displaying a routing table with various entries including directly connected networks, OSPF learned routes, and a default route. The interface has tabs for Physical, Config, CLI, and Attributes, with CLI being the active tab.

```
23:00:10: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.200.225 on Serial0/0/1 from LOADING to FULL, Loading Done

R3>
R3>show ip route
Codes: L - local, C - connected, S - static, 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 192.168.10.9 to network 0.0.0.0

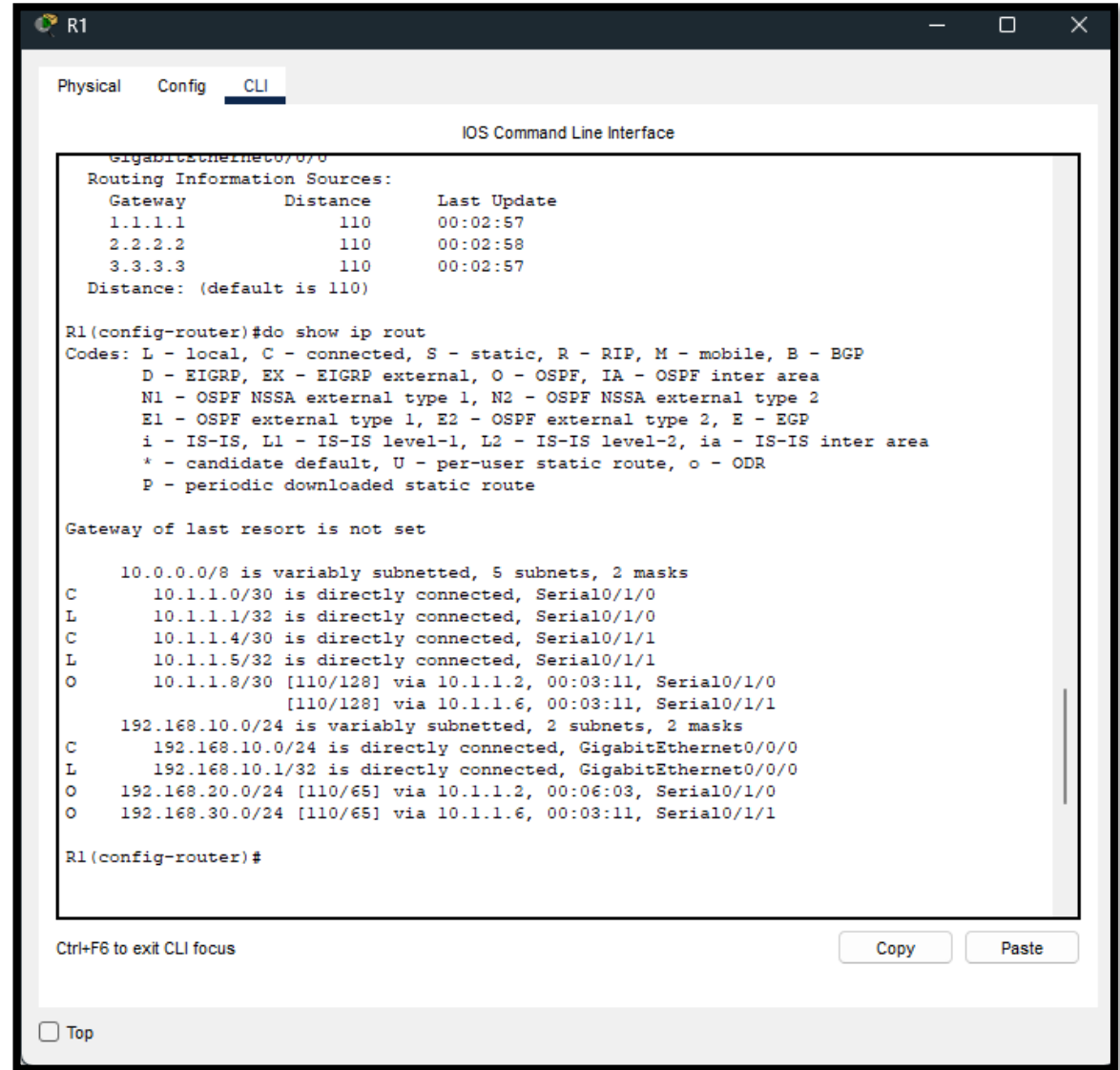
    172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
      O    172.16.1.0/24 [110/65] via 192.168.10.5, 00:08:16, Serial0/0/0
      O    172.16.2.0/24 [110/65] via 192.168.10.9, 00:08:16, Serial0/0/1
      O    172.16.3.0/30 [110/128] via 192.168.10.9, 00:08:16, Serial0/0/1
            [110/128] via 192.168.10.5, 00:08:16, Serial0/0/0
      O    192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
        C    192.168.1.0/24 is directly connected, GigabitEthernet0/0
        L    192.168.1.1/32 is directly connected, GigabitEthernet0/0
      O    192.168.10.0/24 is variably subnetted, 4 subnets, 2 masks
        C    192.168.10.4/30 is directly connected, Serial0/0/0
        L    192.168.10.6/32 is directly connected, Serial0/0/0
        C    192.168.10.8/30 is directly connected, Serial0/0/1
        L    192.168.10.10/32 is directly connected, Serial0/0/1
      O    209.165.200.0/27 is subnetted, 1 subnets
        O    209.165.200.224/27 [110/128] via 192.168.10.9, 00:08:16, Serial0/0/1
O*E2 0.0.0.0/0 [110/1] via 192.168.10.9, 00:08:16, Serial0/0/1

R3>
R3>
R3>
```


2. DESCRIPCIÓN TÉCNICA DE LA SOLUCIÓN

Parte 2. Verifique la conectividad

VERIFICAR LA CONECTIVIDAD



The screenshot shows a Cisco IOS Command Line Interface (CLI) window for a router named R1. The window has three tabs: Physical, Config, and CLI, with the CLI tab selected. The CLI window displays the output of the 'show ip route' command. The output shows the routing table, including the Routing Information Sources, the Gateway of last resort, and the IP routes. The routes are listed with their destination networks, masks, and next hops. The window also includes a 'Copy' button and a 'Paste' button at the bottom right.

```
Physical  Config  CLI
IOS Command Line Interface

GigabitEthernet0/0/0
Routing Information Sources:
  Gateway         Distance      Last Update
  1.1.1.1          110           00:02:57
  2.2.2.2          110           00:02:58
  3.3.3.3          110           00:02:57
Distance: (default is 110)

R1(config-router)#do show ip rout
Codes: L - local, C - connected, S - static, 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

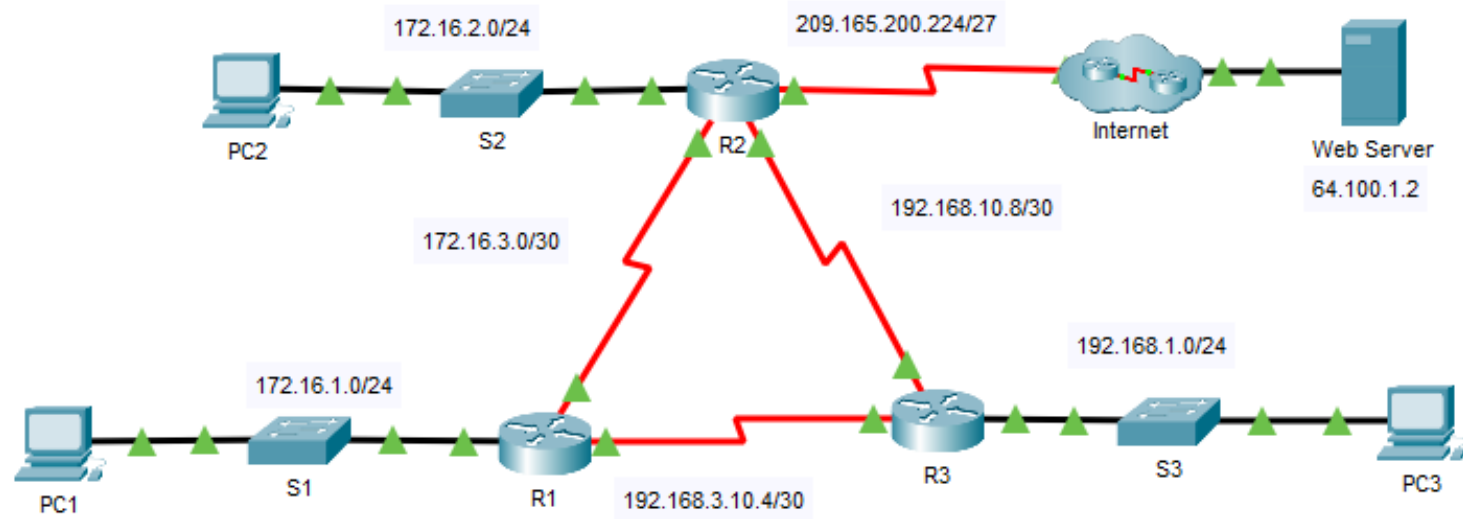
  10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
C       10.1.1.0/30 is directly connected, Serial0/1/0
L       10.1.1.1/32 is directly connected, Serial0/1/0
C       10.1.1.4/30 is directly connected, Serial0/1/1
L       10.1.1.5/32 is directly connected, Serial0/1/1
O       10.1.1.8/30 [110/128] via 10.1.1.2, 00:03:11, Serial0/1/0
         [110/128] via 10.1.1.6, 00:03:11, Serial0/1/1
  192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.0/24 is directly connected, GigabitEthernet0/0/0
L       192.168.10.1/32 is directly connected, GigabitEthernet0/0/0
O       192.168.20.0/24 [110/65] via 10.1.1.2, 00:06:03, Serial0/1/0
O       192.168.30.0/24 [110/65] via 10.1.1.6, 00:03:11, Serial0/1/1

R1(config-router)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

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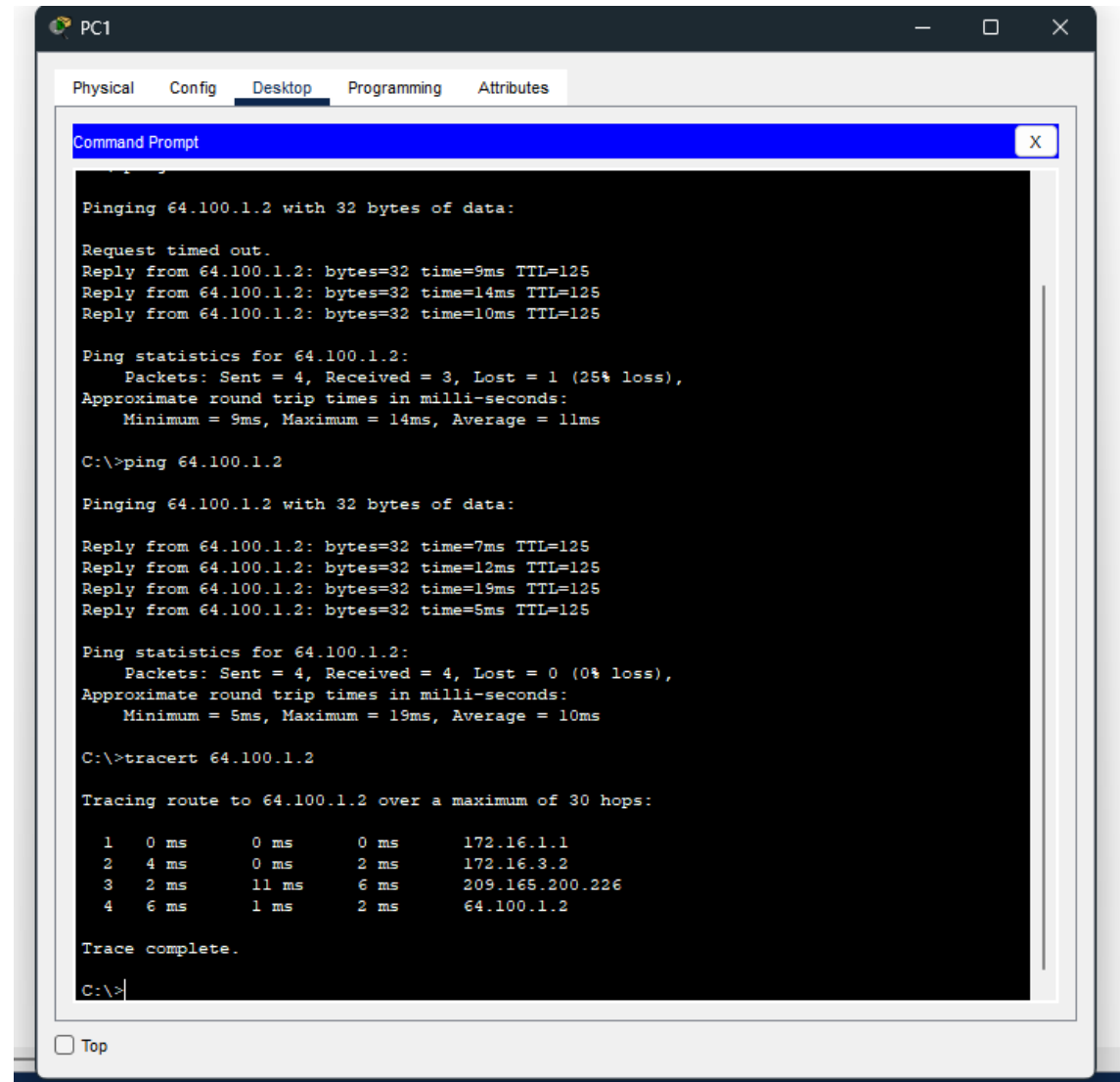


3.ESQUEMA GENERAL

Dispositivo	Interfaz	Dirección IPv4	Máscara de subred	Puerta de enlace predeterminada
R1	G0/0	172.16.1.1	255.255.255.0	N/D
	S0/0/0	172.16.3.1	255.255.255.252	
	S0/0/1	192.168.10.5	255.255.255.252	
R2	G0/0	172.16.2.1	255.255.255.0	N/D
	S0/0/0	172.16.3.2	255.255.255.252	
	S0/0/1	192.168.10.9	255.255.255.252	
	S0/1/0	209.165.200.225	255.255.255.224	
R3	G0/0	192.168.1.1	255.255.255.0	N/D
	S0/0/0	192.168.10.6	255.255.255.252	
	S0/0/1	192.168.10.10	255.255.255.252	
PC1	NIC	172.16.1.2	255.255.255.0	172.16.1.1
PC2	NIC	172.16.2.2	255.255.255.0	172.16.2.1
PC3	NIC	192.168.1.2	255.255.255.0	192.168.1.1
Servidor web	NIC	64.100.1.2	255.255.255.0	64.100.1.1

4.SCRIPT CTC

5. PRUEBAS



The screenshot shows a virtual desktop environment for PC1. The desktop has a taskbar with icons for Physical, Config, Desktop (selected), Programming, and Attributes. A Command Prompt window is open, displaying the results of two network tests: a ping and a traceroute to the IP address 64.100.1.2.

```
Command Prompt

Pinging 64.100.1.2 with 32 bytes of data:

Request timed out.
Reply from 64.100.1.2: bytes=32 time=9ms TTL=125
Reply from 64.100.1.2: bytes=32 time=14ms TTL=125
Reply from 64.100.1.2: bytes=32 time=10ms TTL=125

Ping statistics for 64.100.1.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 9ms, Maximum = 14ms, Average = 11ms

C:\>ping 64.100.1.2

Pinging 64.100.1.2 with 32 bytes of data:

Reply from 64.100.1.2: bytes=32 time=7ms TTL=125
Reply from 64.100.1.2: bytes=32 time=12ms TTL=125
Reply from 64.100.1.2: bytes=32 time=19ms TTL=125
Reply from 64.100.1.2: bytes=32 time=5ms TTL=125

Ping statistics for 64.100.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 5ms, Maximum = 19ms, Average = 10ms

C:\>tracert 64.100.1.2

Tracing route to 64.100.1.2 over a maximum of 30 hops:

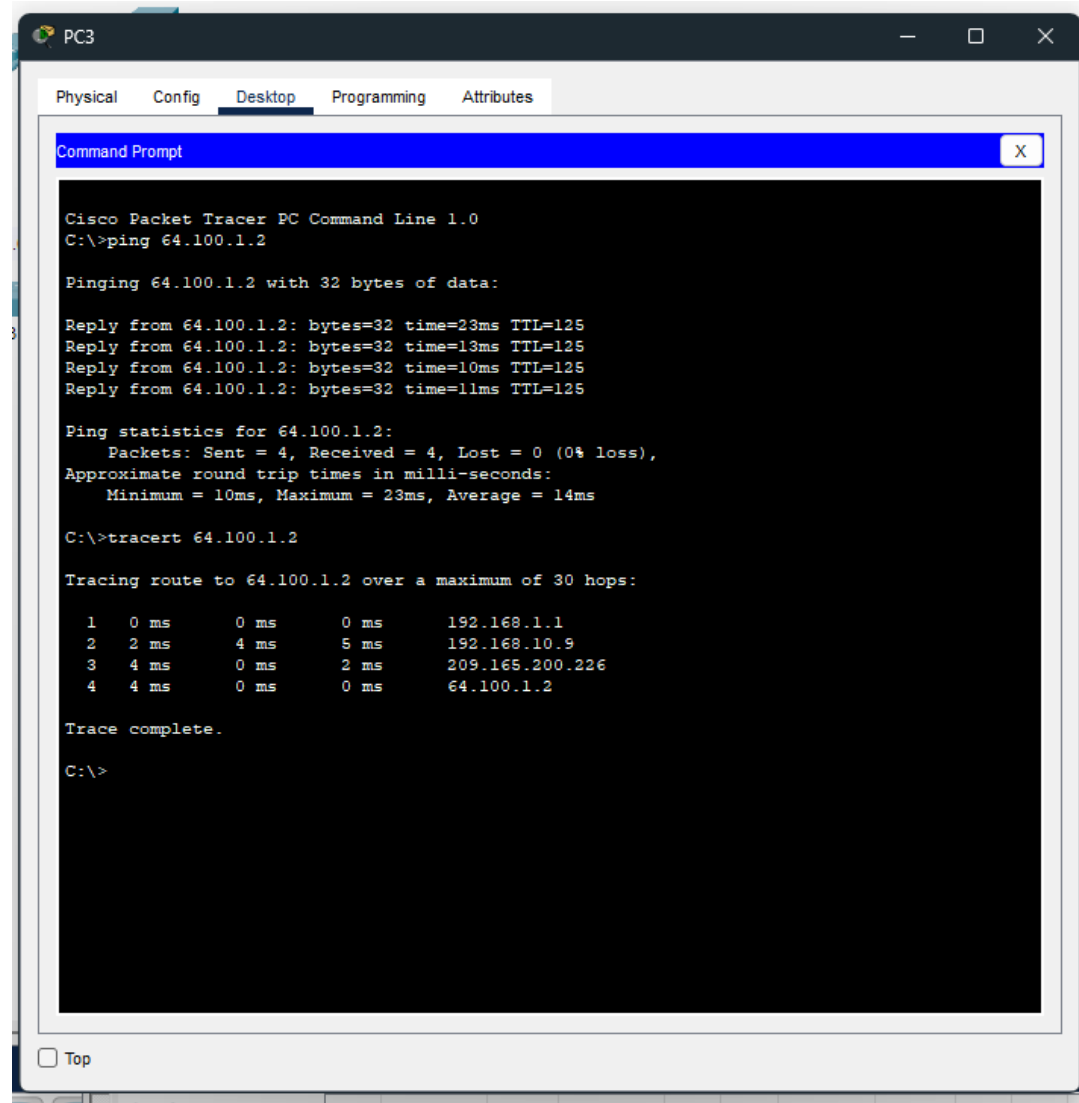
  0  0 ms    0 ms    0 ms   172.16.1.1
  1  4 ms    0 ms    2 ms   172.16.3.2
  2  2 ms   11 ms    6 ms  209.165.200.226
  3  6 ms    1 ms    2 ms   64.100.1.2

Trace complete.

C:\>
```

At the bottom of the window, there is a checkbox labeled "Top" which is currently unchecked.

5. PRUEBAS



The screenshot shows a Cisco Packet Tracer PC Command Line window for PC3. The window has tabs for Physical, Config, Desktop, Programming, and Attributes. The Desktop tab is active, displaying a Command Prompt window. The Command Prompt shows the execution of a ping command to 64.100.1.2, which is successful. It also shows a traceroute command to the same IP, displaying a path of four hops with increasing latency.

```
PC3
Physical Config Desktop Programming Attributes
Command Prompt X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 64.100.1.2

Pinging 64.100.1.2 with 32 bytes of data:

Reply from 64.100.1.2: bytes=32 time=23ms TTL=125
Reply from 64.100.1.2: bytes=32 time=13ms TTL=125
Reply from 64.100.1.2: bytes=32 time=10ms TTL=125
Reply from 64.100.1.2: bytes=32 time=11ms TTL=125

Ping statistics for 64.100.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 10ms, Maximum = 23ms, Average = 14ms

C:\>tracert 64.100.1.2

Tracing route to 64.100.1.2 over a maximum of 30 hops:

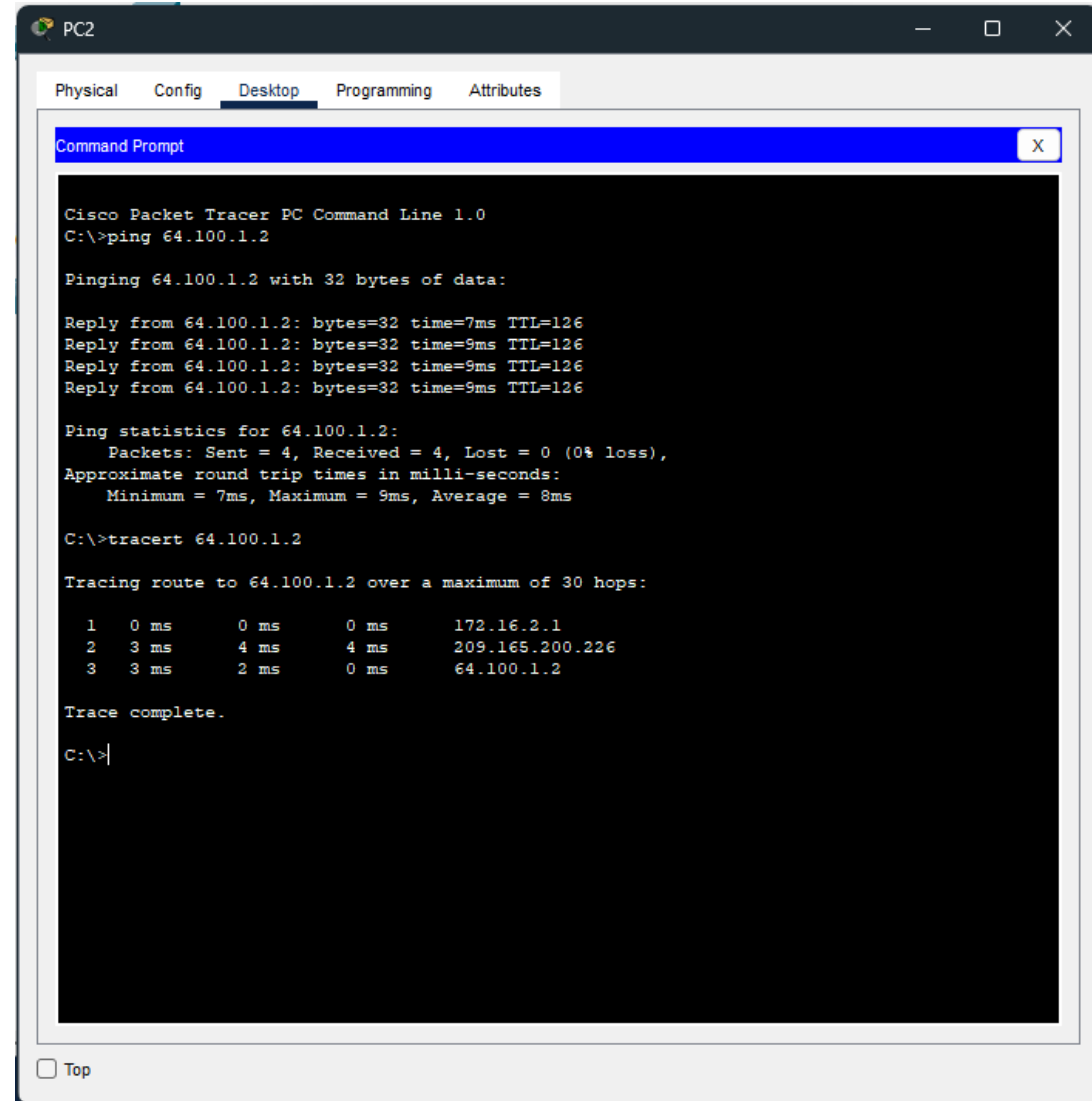
  0  0 ms    0 ms    0 ms    192.168.1.1
  1  2 ms    4 ms    5 ms    192.168.10.9
  2  4 ms    0 ms    2 ms    209.165.200.226
  3  4 ms    0 ms    0 ms    64.100.1.2

Trace complete.

C:\>
```

☐ Top

5. PRUEBAS



The screenshot shows a Cisco Packet Tracer PC Command Line window for PC2. The window has tabs for Physical, Config, Desktop, Programming, and Attributes. The Desktop tab is active, displaying a Command Prompt. The Command Prompt shows the execution of the 'ping 64.100.1.2' command, which successfully pings the destination with 32 bytes of data. The results show four replies from 64.100.1.2 with times of 7ms, 9ms, 9ms, and 9ms, and a TTL of 126. Ping statistics for 64.100.1.2 show 4 packets sent, 4 received, and 0 lost (0% loss). The approximate round trip times in milliseconds are: Minimum = 7ms, Maximum = 9ms, Average = 8ms. The 'tracert 64.100.1.2' command is also executed, showing the route to 64.100.1.2 over a maximum of 30 hops. The route consists of three hops: 1 (0 ms, 0 ms, 0 ms) to 172.16.2.1, 2 (3 ms, 4 ms, 4 ms) to 209.165.200.226, and 3 (3 ms, 2 ms, 0 ms) to 64.100.1.2. The trace is complete.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 64.100.1.2

Pinging 64.100.1.2 with 32 bytes of data:

Reply from 64.100.1.2: bytes=32 time=7ms TTL=126
Reply from 64.100.1.2: bytes=32 time=9ms TTL=126
Reply from 64.100.1.2: bytes=32 time=9ms TTL=126
Reply from 64.100.1.2: bytes=32 time=9ms TTL=126

Ping statistics for 64.100.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 7ms, Maximum = 9ms, Average = 8ms

C:\>tracert 64.100.1.2

Tracing route to 64.100.1.2 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    172.16.2.1
  1  3 ms     4 ms    4 ms    209.165.200.226
  2  3 ms     2 ms    0 ms    64.100.1.2

Trace complete.

C:\>
```