



# Instituto Politécnico Nacional



## Escuela Superior de Cómputo

### Practica 5. Redistribución de rutas OSPF y RIPv2

Materia:

Administración de servicios en red

Grupo:

4CV13

Profesor:

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Integrantes: (*Equipo 1*)

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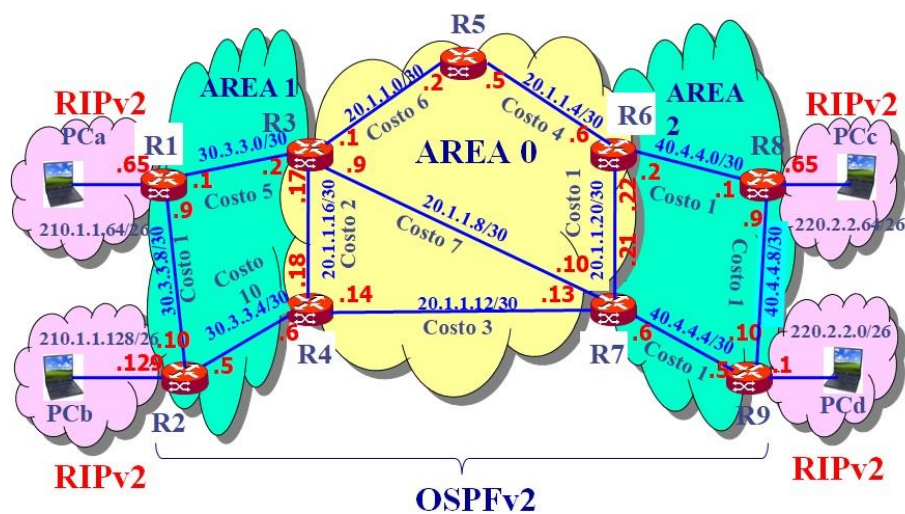
Fecha:

lunes, 7 de marzo de 2022

## Práctica Redistribución de rutas con protocolo OSPF y RIPv2

### OBJETIVOS:

- Utilizar los conocimientos adquiridos previamente acerca de protocolos interiores de estado de enlace.
- Emplear la configuración las subredes para un protocolo interior por vector distancia.
- Identificar las características acerca de los tipos de enrutamiento dinámico.
- Configurar y establecer comunicación entre todos los nodos mostrados en la topología.
- Emplear técnicas de solución de problemas (troubleshooting) en caso de afrontar dificultades en la configuración.

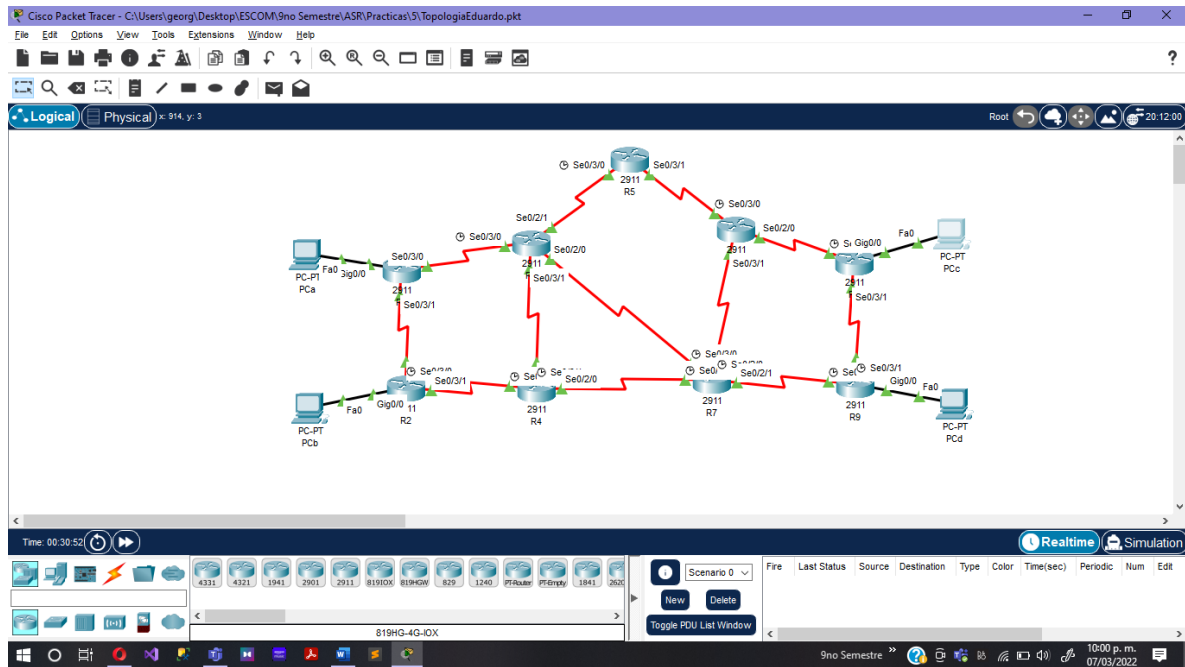
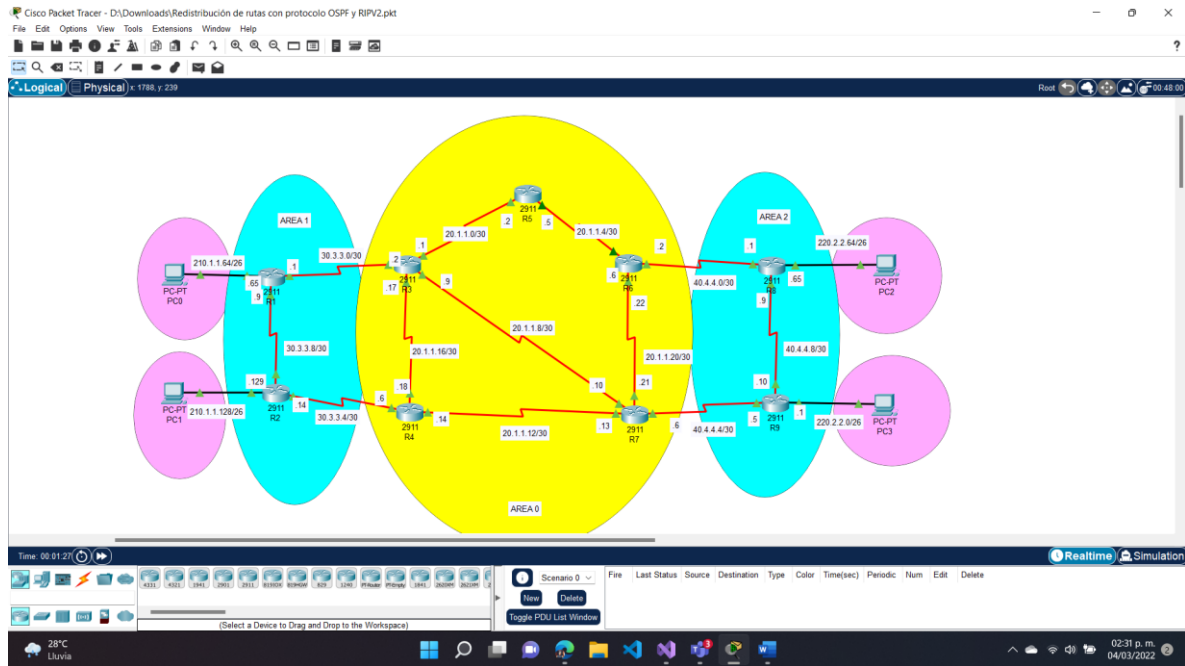


### INSTRUCCIONES

- Configurar los nodos mostrados en la topología anterior empleando OSPF
- Realizar pruebas de conexión entre los equipos.
- Los segmentos de red conectados a los R1, R2, R8 Y R9 emplear RIPv2 y OSPF process ID:100.
- Utilizar Packet Tracer para la elaboración de la práctica.
- Guardar la configuración de cada uno de los routers,
- Adjuntar la configuración de los routers R1, R2, R8 Y R9 , así como su tabla de enrutamiento
- Enviar el archivo de Packet Tracer y el reporte, ambos a la plataforma en su respectivo canal.

# CAPTURA TOPOLOGÍA PACKET TRACER

## Topología general



# 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 not set

20.0.0.0/30 is subnetted, 6 subnets
O IA 20.1.1.0/30 [110/11] via 30.3.3.2, 00:05:16, Serial0/3/0
O IA 20.1.1.4/30 [110/15] via 30.3.3.2, 00:04:46, Serial0/3/0
O IA 20.1.1.8/30 [110/12] via 30.3.3.2, 00:05:16, Serial0/3/0
O IA 20.1.1.12/30 [110/10] via 30.3.3.2, 00:04:46, Serial0/3/0
O IA 20.1.1.16/30 [110/7] via 30.3.3.2, 00:05:16, Serial0/3/0
O IA 20.1.1.20/30 [110/11] via 30.3.3.2, 00:04:46, Serial0/3/0
30.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
C 30.3.3.0/30 is directly connected, Serial0/3/0
L 30.3.3.1/32 is directly connected, Serial0/3/0
O 30.3.3.4/30 [110/11] via 30.3.3.2, 00:05:16, Serial0/3/1
C 30.3.3.8/30 is directly connected, Serial0/3/1
L 30.3.3.9/32 is directly connected, Serial0/3/1
40.0.0.0/30 is subnetted, 3 subnets
O IA 40.4.4.0/30 [110/12] via 30.3.3.2, 00:04:46, Serial0/3/0
O IA 40.4.4.4/30 [110/11] via 30.3.3.2, 00:04:46, Serial0/3/0
O IA 40.4.4.8/30 [110/12] via 30.3.3.2, 00:04:46, Serial0/3/0
210.1.1.0/24 is variably subnetted, 3 subnets, 2 masks
L 210.1.1.64/26 is directly connected, GigabitEthernet0/0
L 210.1.1.65/32 is directly connected, GigabitEthernet0/0
O E2 210.1.1.129/26 [110/200] via 30.3.3.10, 00:05:16, Serial0/3/1
220.2.2.0/26 is subnetted, 1 subnets
O E2 220.2.2.0/26 [110/200] via 30.3.3.2, 00:00:28, Serial0/3/0

R1#
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

```
R1>ena
R1#show ip ospf interface
Serial0/3/0 is up, line protocol is up
Internet address is 30.3.3.1/30, Area 1
Process ID 100, Router ID 210.1.1.65, Network Type POINT-TO-POINT, Cost: 5
Transmit Delay is 1 sec, State POINT-TO-POINT,
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:07
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 30.3.3.2
Suppress hello for 0 neighbor(s)
Serial0/3/1 is up, line protocol is up
Internet address is 30.3.3.9/30, Area 1
Process ID 100, Router ID 210.1.1.65, Network Type POINT-TO-POINT, Cost: 1
Transmit Delay is 1 sec, State POINT-TO-POINT,
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:07
Index 2/2, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 210.1.1.129
Suppress hello for 0 neighbor(s)

R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
```

Ctrl+F6 to exit CLI focus

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Top

## R2

```
R2
Physical Config CLI Attributes
IOS Command Line Interface

R2>ena
R2#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 not set

20.0.0.0/30 is subnetted, 6 subnets
O IA 20.1.1.0/30 [110/12] via 30.3.3.9, 00:09:11, Serial0/3/0
O IA 20.1.1.4/30 [110/16] via 30.3.3.9, 00:08:41, Serial0/3/0
O IA 20.1.1.8/30 [110/12] via 30.3.3.9, 00:09:11, Serial0/3/0
O IA 20.1.1.12/30 [110/11] via 30.3.3.9, 00:08:41, Serial0/3/0
O IA 20.1.1.16/30 [110/8] via 30.3.3.9, 00:09:11, Serial0/3/0
O IA 20.1.1.20/30 [110/13] via 30.3.3.9, 00:08:41, Serial0/3/0
30.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
O 30.3.3.0/30 [110/6] via 30.3.3.9, 00:09:11, Serial0/3/0
C 30.3.3.4/30 is directly connected, Serial0/3/1
L 30.3.3.5/32 is directly connected, Serial0/3/1
C 30.3.3.0/30 is directly connected, Serial0/3/0
L 30.3.3.10/32 is directly connected, Serial0/3/0
40.0.0.0/30 is subnetted, 3 subnets
O IA 40.4.4.0/30 [110/13] via 30.3.3.9, 00:08:41, Serial0/3/0
O IA 40.4.4.4/30 [110/12] via 30.3.3.9, 00:08:41, Serial0/3/0
O IA 40.4.4.8/30 [110/12] via 30.3.3.9, 00:08:41, Serial0/3/0
210.1.1.0/24 is variably subnetted, 3 subnets, 2 masks
O E2 210.1.1.64/26 [110/200] via 30.3.3.9, 00:09:11, Serial0/3/0
C 210.1.1.128/26 is directly connected, GigabitEthernet0/0
L 210.1.1.129/32 is directly connected, GigabitEthernet0/0

R2#
R2#
R2#
R2#

Ctrl+F6 to exit CLI focus
```

```
R2
Physical Config CLI Attributes
IOS Command Line Interface

R2#sh ip ospf interface
Serial0/3/1 is up, line protocol is up
Internet address is 30.3.3.5/30, Area 1
Process ID 100, Router ID 210.1.1.129, Network Type POINT-TO-POINT, Cost: 10
Transmit Delay is 1 sec, State POINT-TO-POINT,
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:05
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 30.3.3.6
Suppress hello for 0 neighbor(s)
Serial0/3/0 is up, line protocol is up
Internet address is 30.3.3.10/30, Area 1
Process ID 100, Router ID 210.1.1.129, Network Type POINT-TO-POINT, Cost: 1
Transmit Delay is 1 sec, State POINT-TO-POINT,
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:04
Index 2/2, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 210.1.1.65
Suppress hello for 0 neighbor(s)

R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#

Ctrl+F6 to exit CLI focus
```

## R8

```
Physical Config CLI Attributes
IOS Command Line Interface

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 - BGP
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

20.0.0.0/30 is subnetted, 6 subnets
O IA 20.1.1.0/30 [110/11] via 40.4.4.2, 00:10:05, Serial0/3/0
O IA 20.1.1.4/30 [110/5] via 40.4.4.2, 00:10:05, Serial0/3/0
O IA 20.1.1.8/30 [110/14] via 40.4.4.2, 00:10:05, Serial0/3/0
O IA 20.1.1.12/30 [110/8] via 40.4.4.2, 00:10:05, Serial0/3/0
O IA 20.1.1.16/30 [110/7] via 40.4.4.10, 00:09:45, Serial0/3/1
O IA 20.1.1.20/30 [110/7] via 40.4.4.10, 00:09:45, Serial0/3/1
O IA 20.1.1.24/30 [110/2] via 40.4.4.2, 00:10:05, Serial0/3/0
30.0.0.0/30 is subnetted, 3 subnets
O IA 30.3.3.0/30 [110/12] via 40.4.4.2, 00:10:05, Serial0/3/0
O IA 30.3.3.4/30 [110/12] via 40.4.4.10, 00:09:45, Serial0/3/1
O IA 30.3.3.8/30 [110/16] via 40.4.4.2, 00:09:55, Serial0/3/0
O IA 30.3.3.12/30 [110/13] via 40.4.4.10, 00:09:45, Serial0/3/1
O IA 30.3.3.16/30 [110/13] via 40.4.4.2, 00:10:05, Serial0/3/0
O IA 30.3.3.20/30 [110/13] via 40.4.4.10, 00:09:45, Serial0/3/1
40.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
C 40.4.4.0/30 is directly connected, Serial0/3/0
O 40.4.4.1/32 is directly connected, Serial0/3/0
O 40.4.4.3/30 [110/2] via 40.4.4.10, 00:10:15, Serial0/3/1
C 40.4.4.9/30 is directly connected, Serial0/3/1
O 40.4.4.9/32 is directly connected, Serial0/3/1
210.1.1.0/24 is subnetted, 1 subnets
O E2 210.1.1.128/24 [110/200] via 40.4.4.2, 00:10:15, Serial0/3/0
220.2.2.0/24 is variably subnetted, 3 subnets, 2 masks
O E2 220.2.2.0/24 [110/200] via 40.4.4.10, 00:10:15, Serial0/3/1
C 220.2.2.64/24 is directly connected, GigabitEthernet0/0
L 220.2.2.65/32 is directly connected, GigabitEthernet0/0

Ctrl+F6 to exit CLI focus
```

```
Physical Config CLI Attributes
IOS Command Line Interface

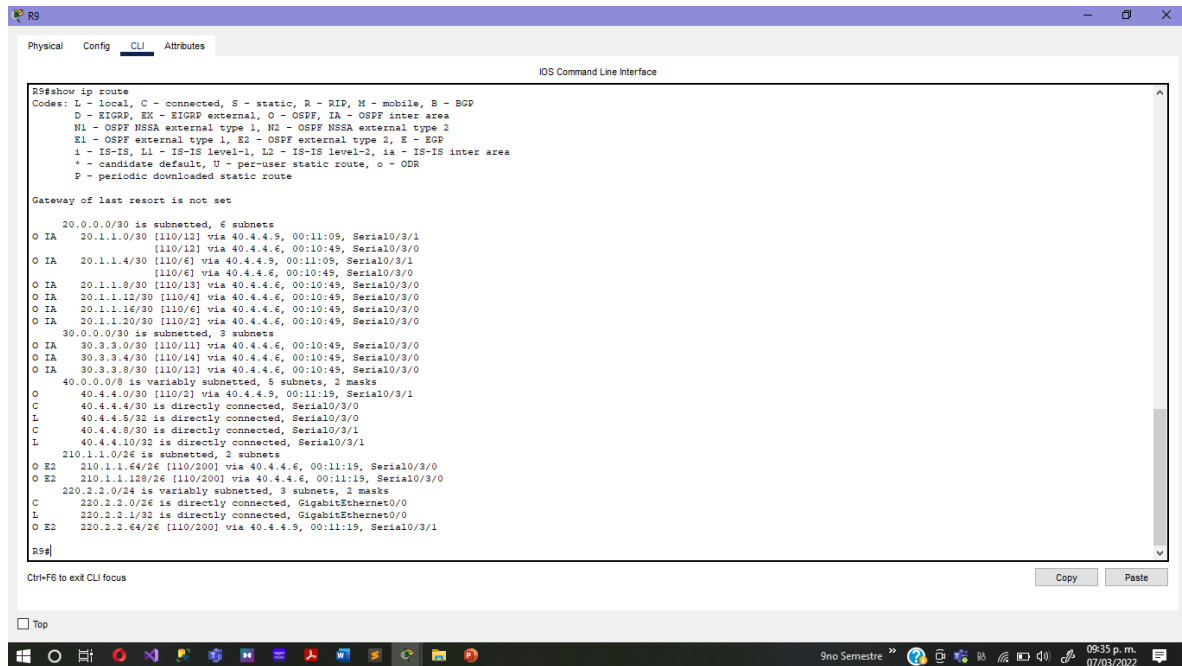
R8#
R8#sh ip ospf interface

Serial0/3/1 is up, line protocol is up
Internet address is 40.4.4.9/30, Area 2
Process ID 100, Router ID 220.2.2.65, Network Type POINT-TO-POINT, Cost: 1
Transmit Delay is 1 sec, State POINT-TO-POINT,
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:02
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 220.2.2.1
Suppress hello for 0 neighbor(s)
Serial0/3/0 is up, line protocol is up
Internet address is 40.4.4.1/30, Area 2
Process ID 100, Router ID 220.2.2.65, Network Type POINT-TO-POINT, Cost: 1
Transmit Delay is 1 sec, State POINT-TO-POINT,
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:02
Index 2/2, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 40.4.4.2
Suppress hello for 0 neighbor(s)

R8#
R8#
R8#
R8#
R8#
R8#
R8#
R8#

Ctrl+F6 to exit CLI focus
```

## R9



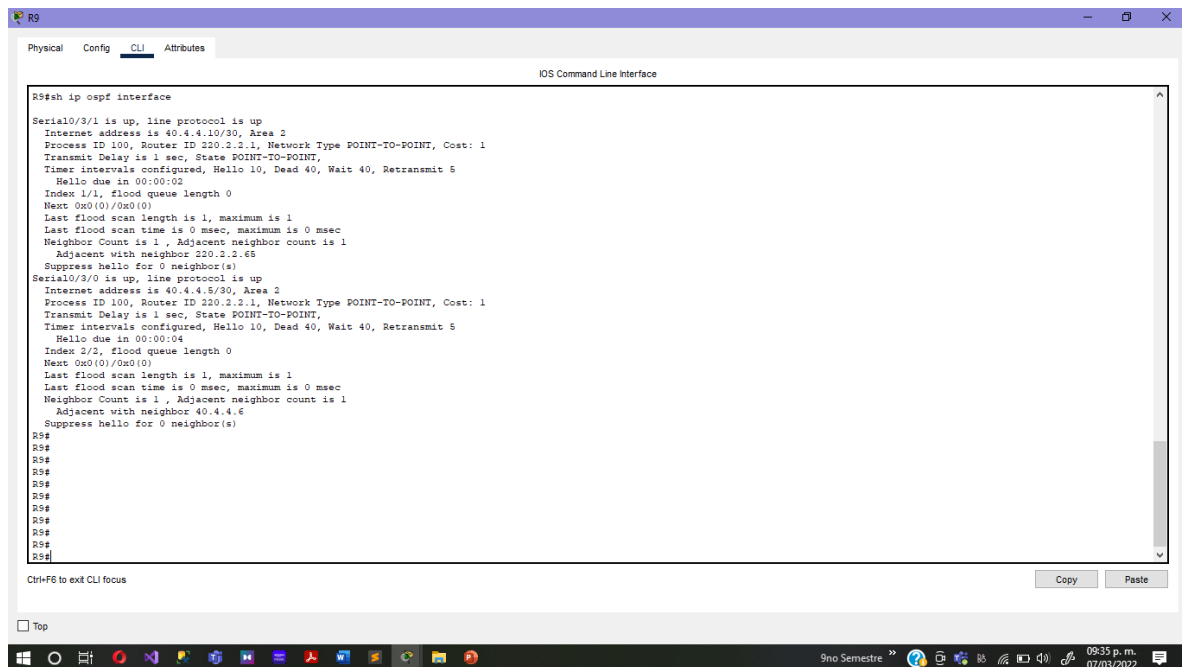
The screenshot shows the R9 CLI interface with the 'show ip route' command executed. The output displays the routing table, including codes for route types, a gateway of last resort, and a list of routes with their metrics and interfaces. The routes include various subnets and their connections to other interfaces.

```
R9#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 not set

 20.0.0.0/30 is subnetted, 6 subnets
O IA  20.1.1.0/30 [110/12] via 40.4.4.9, 00:11:09, Serial0/3/1
      [110/12] via 40.4.4.6, 00:10:49, Serial0/3/0
O IA  20.1.1.4/30 [110/6] via 40.4.4.9, 00:11:09, Serial0/3/1
      [110/6] via 40.4.4.6, 00:10:49, Serial0/3/0
O IA  20.1.1.8/30 [110/13] via 40.4.4.6, 00:10:49, Serial0/3/0
O IA  20.1.1.12/30 [110/4] via 40.4.4.6, 00:10:49, Serial0/3/0
O IA  20.1.1.16/30 [110/6] via 40.4.4.6, 00:10:49, Serial0/3/0
O IA  20.1.1.20/30 [110/2] via 40.4.4.6, 00:10:49, Serial0/3/0
 30.0.0.0/30 is subnetted, 3 subnets
O IA  30.3.3.0/30 [110/11] via 40.4.4.6, 00:10:49, Serial0/3/0
O IA  30.3.3.4/30 [110/14] via 40.4.4.6, 00:10:49, Serial0/3/0
O IA  30.3.3.8/30 [110/12] via 40.4.4.6, 00:10:49, Serial0/3/0
 40.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
O   40.4.4.0/30 [110/2] via 40.4.4.9, 00:11:19, Serial0/3/1
C   40.4.4.4/30 is directly connected, Serial0/3/0
L   40.4.4.8/30 is directly connected, Serial0/3/1
C   40.4.4.10/32 is directly connected, Serial0/3/1
 210.1.1.0/24 is subnetted, 2 subnets
O E2  210.1.1.64/26 [110/200] via 40.4.4.6, 00:11:19, Serial0/3/0
O E2  210.1.1.128/26 [110/200] via 40.4.4.6, 00:11:19, Serial0/3/0
 220.2.2.0/24 is variably subnetted, 3 subnets, 2 masks
C   220.2.2.0/26 is directly connected, GigabitEthernet0/0
L   220.2.2.1/32 is directly connected, GigabitEthernet0/0
O E2  220.2.2.64/26 [110/200] via 40.4.4.9, 00:11:19, Serial0/3/1

R9#
```



The screenshot shows the R9 CLI interface with the 'show ip ospf interface' command executed. The output displays the OSPF configuration and status for the Serial0/3/1 and Serial0/3/0 interfaces, including IP addresses, network types, and neighbor information.

```
R9#sh ip ospf interface
Serial0/3/1 is up, line protocol is up
Internet address is 40.4.4.10/30, Area 2
Process ID 100, Router ID 220.2.2.1, Network Type POINT-TO-POINT, Cost: 1
Transmit Delay is 1 sec, State POINT-TO-POINT,
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:02
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
  Adjacent with neighbor 220.2.2.65
Suppress hello for 0 neighbor(s)
Serial0/3/0 is up, line protocol is up
Internet address is 40.4.4.5/30, Area 2
Process ID 100, Router ID 220.2.2.1, Network Type POINT-TO-POINT, Cost: 1
Transmit Delay is 1 sec, State POINT-TO-POINT,
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:04
Index 2/2, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
  Adjacent with neighbor 40.4.4.6
Suppress hello for 0 neighbor(s)
R9#
R9#
R9#
R9#
R9#
R9#
R9#
R9#
R9#
R9#
```

## PRUEBAS DE CONEXIÓN ENTRE PC'S

**R1 -> R2**

PCa

Physical Config Desktop Programming Attributes

Command Prompt

```
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>tracert 210.1.1.130

Tracing route to 210.1.1.130 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    210.1.1.65
  1  1 ms    0 ms    11 ms   30.9.3.10
  2  *        10 ms   12 ms   210.1.1.130

Trace complete.

C:\>ping 210.1.1.130

Pinging 210.1.1.130 with 32 bytes of data:

Reply from 210.1.1.130: bytes=32 time=13ms TTL=126
Reply from 210.1.1.130: bytes=32 time=13ms TTL=126
Reply from 210.1.1.130: bytes=32 time=21ms TTL=126
Reply from 210.1.1.130: bytes=32 time=11ms TTL=126

Ping statistics for 210.1.1.130:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 21ms, Average = 15ms

C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
```

Top

Sno Semestre 09:43 p.m. 07/03/2022

**R1 -> R8**

A screenshot of a Windows desktop environment. The top taskbar shows the Start button and several pinned applications. A window titled "PCa" is open, displaying a "Command Prompt" application. The command prompt has tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes", with "Desktop" currently selected. The command prompt window contains the following text:  

```
C:\>tracert 220.2.2.66  
  
Tracing route to 220.2.2.66 over a maximum of 30 hops:  
  
  0 ms  0 ms  0 ms   210.1.1.65  
  1 ms  1 ms  1 ms   30.3.3.2  
  0 ms  *      11 ms  30.3.3.2  
  *     *      *      Request timed out.  
  1 ms  *      10 ms  30.3.3.2  
  6  
Control-C  
C  
C:\>ping 220.2.2.66  
  
Pinging 220.2.2.66 with 32 bytes of data:  
  
Reply from 30.3.3.2: Destination host unreachable.  
Reply from 30.3.3.2: Destination host unreachable.  
Reply from 30.3.3.2: Destination host unreachable.  
Reply from 30.3.3.2: Destination host unreachable.  
  
Ping statistics for 220.2.2.66:  
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),  
  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>
```

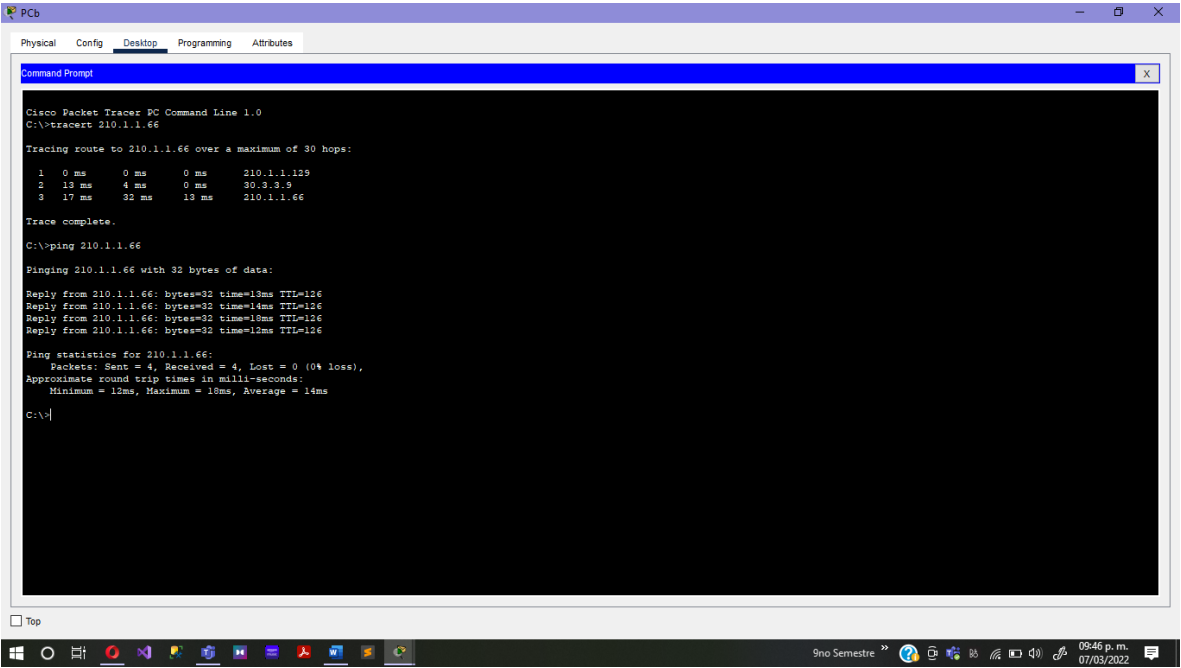
  
At the bottom of the screen, there is a system tray area showing the date and time as "09:42 p.m. 07/03/2022".

**R1 -> R9**

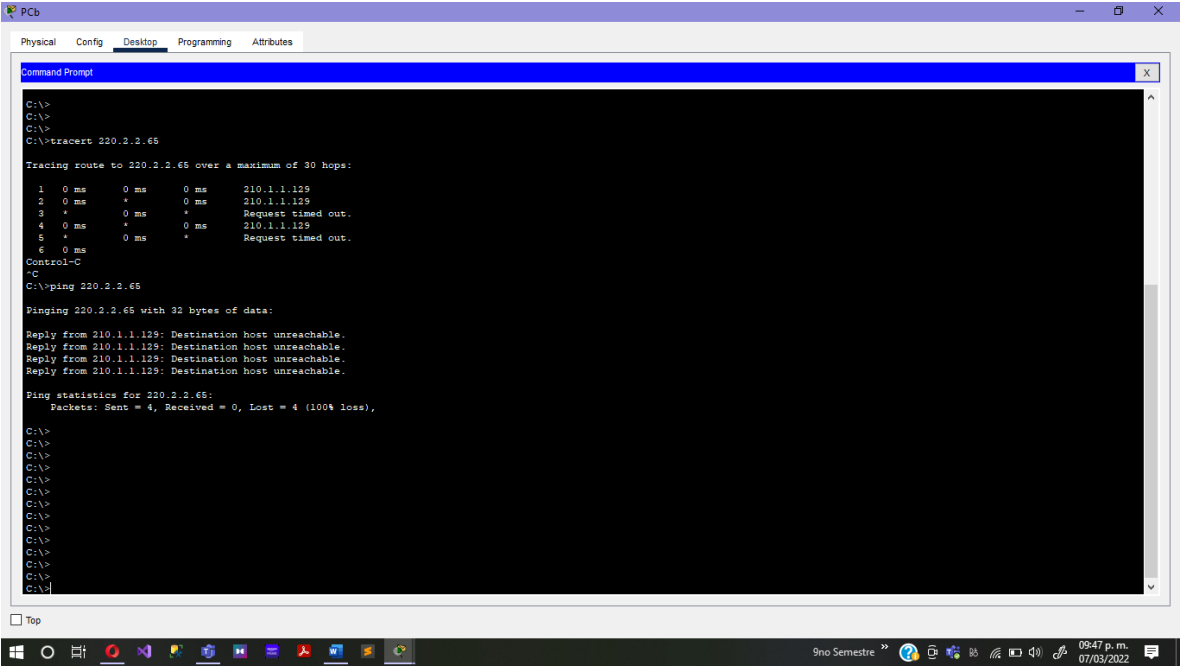
[illegible]



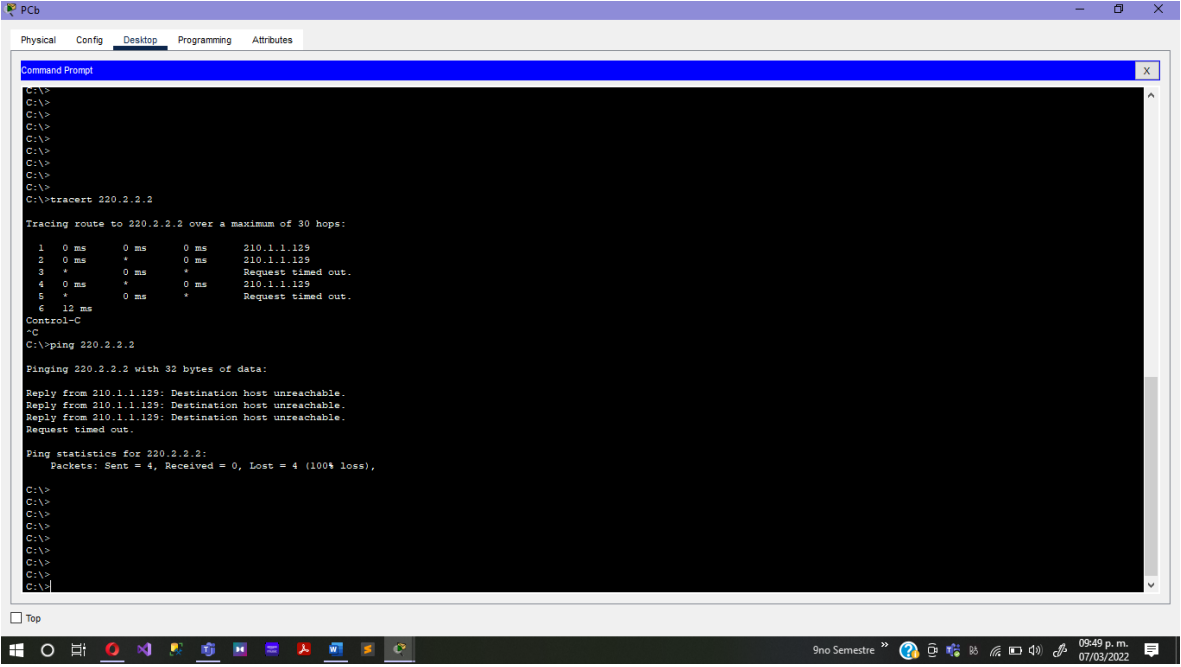
R2 -> R1



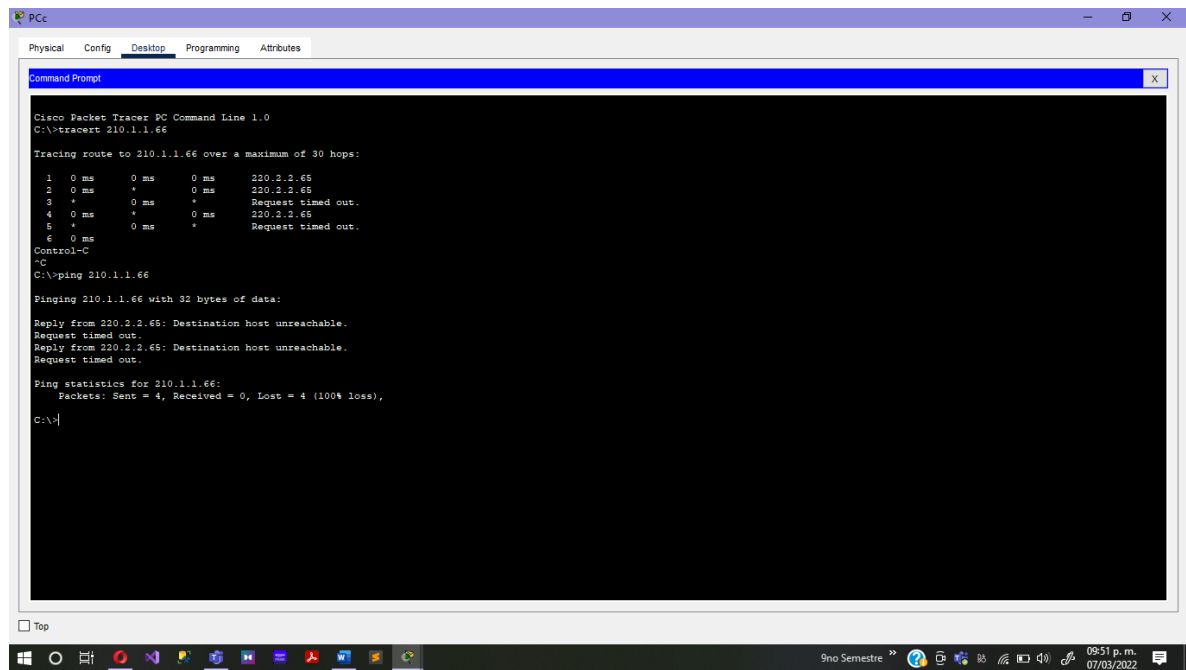
R2 -> R8



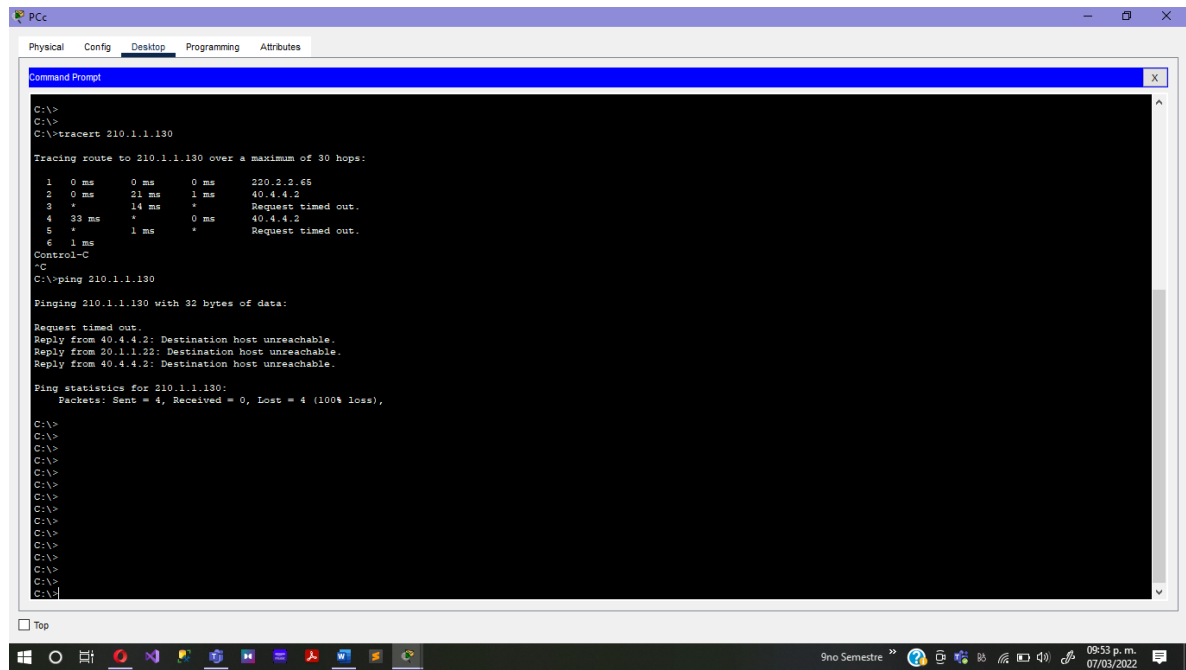
R2 -> R9



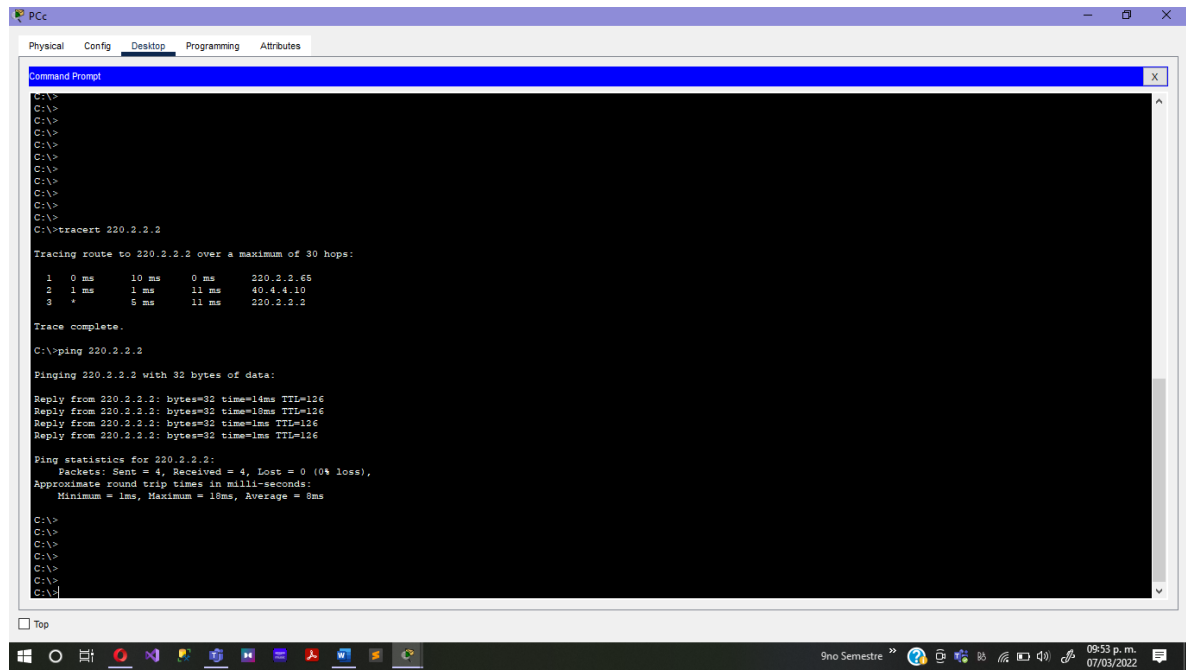
**R8 -> R1**



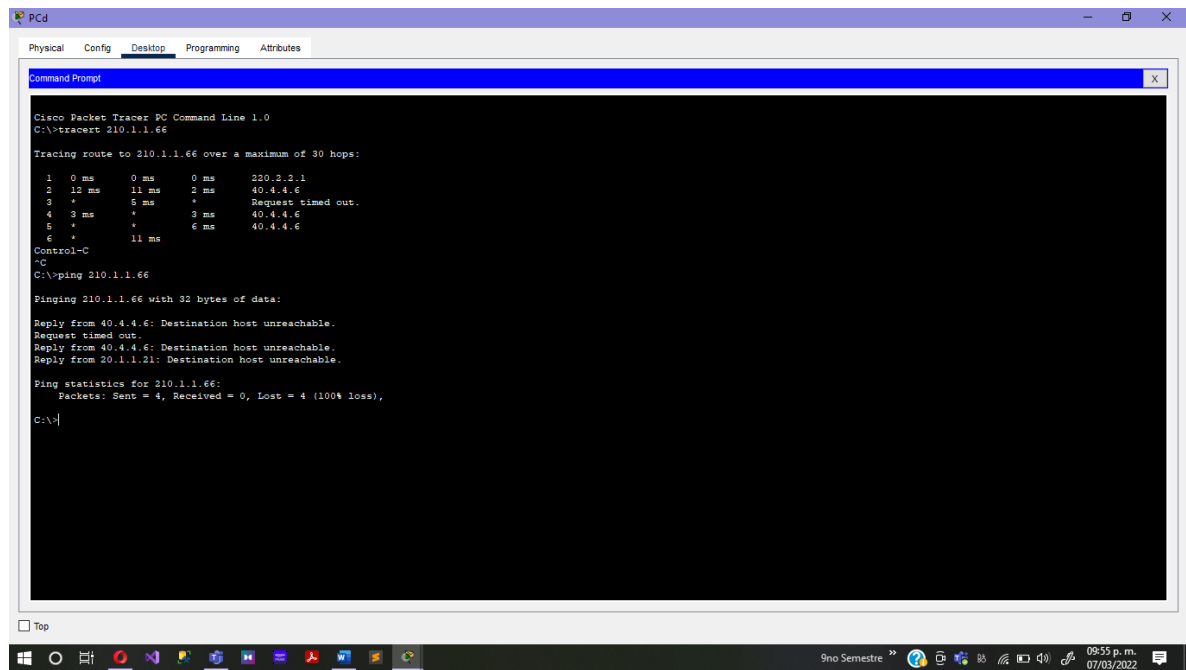
**R8 -> R2**



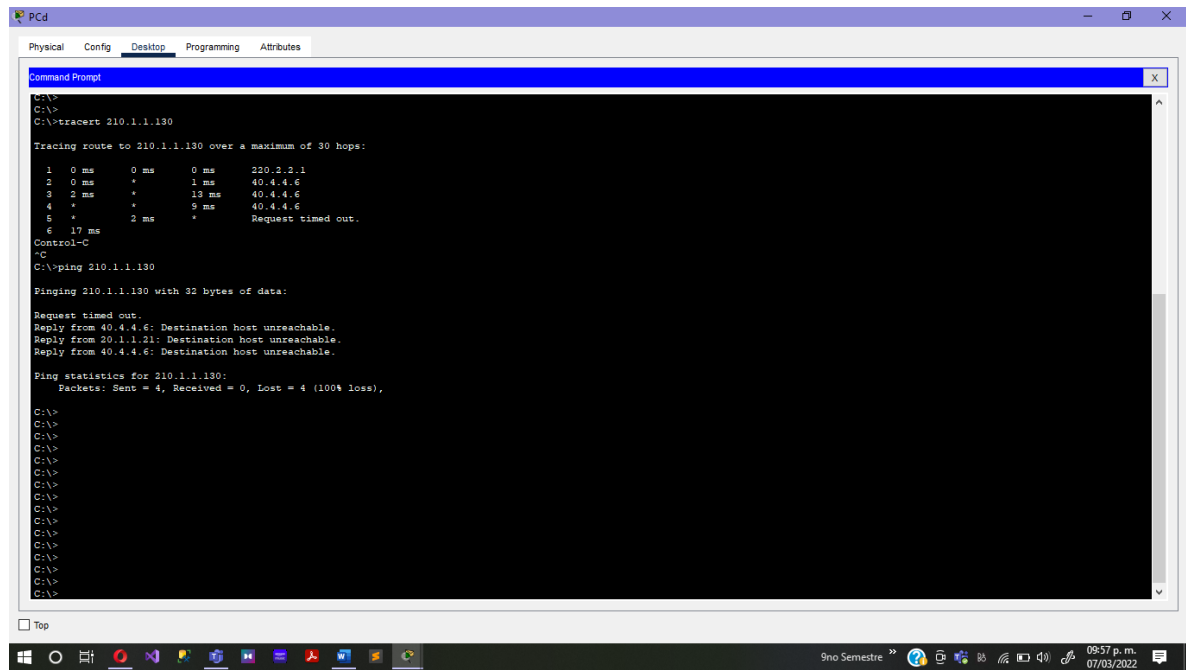
**R8 -> R9**



**R9 -> R1**



**R9 -> R2**



**R9 -> R8**

