

**PRUEBA DE HABILIDADES PRACTICAS CCNA**

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**UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA “UNAD”  
ESCUELA DE CIENCIAS BASICAS Y TECNOLOGIAS  
INGENIERIA DE TELECOMUNICACIONES  
CEAD VALLEDUPAR  
2020**

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**DIPLOMADO DE PROFUNDIZACIÓN CISCO (DISEÑO E IMPLEMENTACIÓN  
DE SOLUCIONES INTEGRADAS LAN / WAN)**

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**2020**

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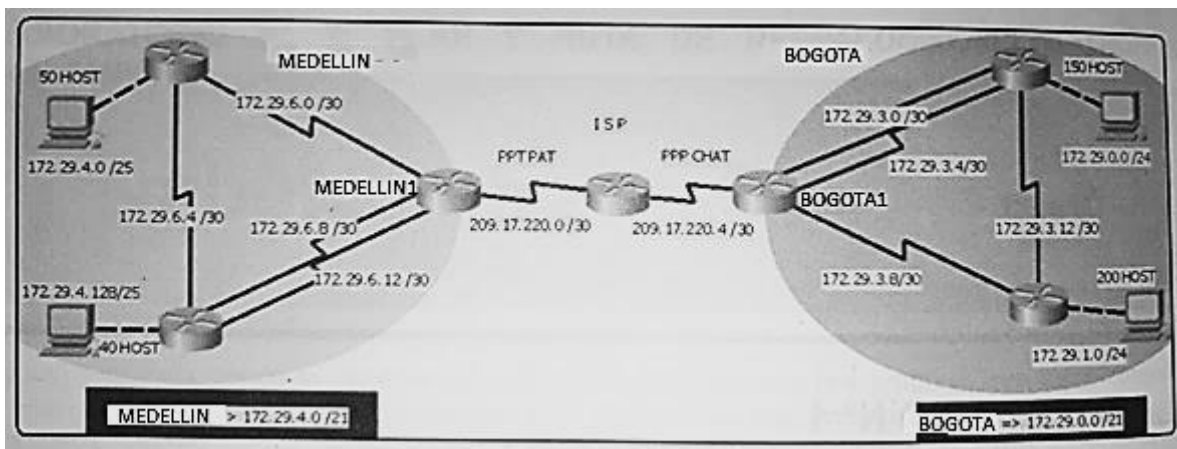
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## **INTRODUCCION**

La importancia de la tecnología para los seres humanos es enorme porque les ha ayudado a adaptarse al entorno ya que el desarrollo de alta tecnología ha ayudado a conquistar las barreras de comunicación y reducir la brecha entre la gente de todo el mundo. Los lugares lejanos se han vuelto más cercanos cada vez y en consecuencia el ritmo de vida ha aumentado. Las cosas que antes tardaban horas para ser completadas, se puede hacer en cuestión de segundos en la actualidad. El mundo es más pequeño y la vida es mucho más rápida.

## 1.0 DESCRIPCION DEL ESCENARIO 1

Una empresa posee sucursales distribuidas en las ciudades de Bogotá y Medellín, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.



Este escenario plantea el uso de RIP como protocolo de enrutamiento, considerando que se tendrán rutas por defecto redistribuidas; asimismo, habilitar el encapsulamiento PPP y su autenticación.

Los routers Bogota2 y medellin2 proporcionan el servicio DHCP a su propia red LAN y a los routers 3 de cada ciudad.

Debe configurar PPP en los enlaces hacia el ISP, con autenticación.

Debe habilitar NAT de sobrecarga en los routers Bogota1 y medellin1.



## **Configuración Básica MEDELLIN1**

Hostname MEDELLIN

Enable secret: **itsasecret**

Password Line Console 0: **cisco**

Password Line vty 0 15: **cisco**

Service password-encryption

Banner motd "Acceso solo al personal autorizado"

## **Configuración Básica BOGOTA1**

Hostname BOGOTA

Enable secret: **itsasecret**

Password Line Console 0: **cisco**

Password Line vty 0 15: **cisco**

Service password-encryption

Banner motd "Acceso solo al personal autorizado"

## **Configuración Básica BOGOTA2**

Hostname BOGOTA2

Enable secret: **itsasecret**

Password Line Console 0: **cisco**

Password Line vty 0 15: **cisco**

Service password-encryption

Banner motd "Acceso solo al personal autorizado"

### **Configuración Básica BOGOTA3**

Hostname BOGOTA3

Enable secret: **itsasecret**

Password Line Console 0: **cisco**

Password Line vty 0 15: **cisco**

Service password-encryption

Banner motd "Acceso solo al personal autorizado"

### **Configuración Básica MEDELLIN2**

Hostname MEDELLIN2

Enable secret: **itsasecret**

Password Line Console 0: **cisco**

Password Line vty 0 15: **cisco**

Service password-encryption

Banner motd "Acceso solo al personal autorizado"

### **Configuración Básica MEDELLIN3**

Hostname MEDELLIN3

Enable secret: **itsasecret**

Password Line Console 0: **cisco**

Password Line vty 0 15: **cisco**

Service password-encryption

Banner motd "Acceso solo al personal autorizado"

### 1.1.3 CONFIGURACIÓN DEL PROTOCOLO RIP V2

#### **Configuración RIPv2 en MEDELLIN1**

Router rip

Version 2

No auto-summary

Do show ip route connected

**Network 172.29.6.0**

**Network 172.29.6.8**

**Network 172.29.6.12**

**Passive-interface s0/0/0 (WAN A ISP).**

#### **Configuración RIPv2 en MEDELLIN2**

Router rip

Version 2

No auto-summary

Do show ip route connected

**Network 172.29.4.0**

**Network 172.29.6.0**

**Network 172.29.6.4**

**Passive-interface g0/0**

### **Configuración RIPv2 en MEDELLIN3**

Router rip

Version 2

No auto-summary

Do show ip route connected

Network 172.29.4.128

Network 172.29.6.4

Network 172.29.6.8

Network 172.29.6.12

Passive-interface g0/0

### **Configuración RIPv2 en BOGOTA1**

Router rip

Version 2

No auto-summary

Do show ip route connected

Network 172.29.3.0

Network 172.29.3.4

Network 172.29.3.8

Passive-interface s0/0/0

### **Configuración RIPv2 en BOGOTA2**

Router rip

Version 2

No auto-summary

Do show ip route connected

**Network 172.29.1.0**

**Network 172.29.3.8**

**Network 172.29.3.12**

**Passive-interface g0/0**

### **Configuración RIPv2 en BOGOTA3**

Router rip

Version 2

No auto-summary

Do show ip route connected

**Network 172.29.0.0**

**Network 172.29.3.0**

**Network 172.29.3.4**

**Network 172.29.3.12**

**Passive-interface g0/0**

#### 1.1.4 CONFIGURACIÓN DE RUTAS ESTÁTICAS

##### **Configuración Rutas Estáticas de MEDELLIN1 a ISP**

Configure terminal

```
Ip route 0.0.0.0 0.0.0.0 209.17.220.1
```

##### **Configuración Rutas Estáticas de BOGOTA1 a ISP**

Configure terminal

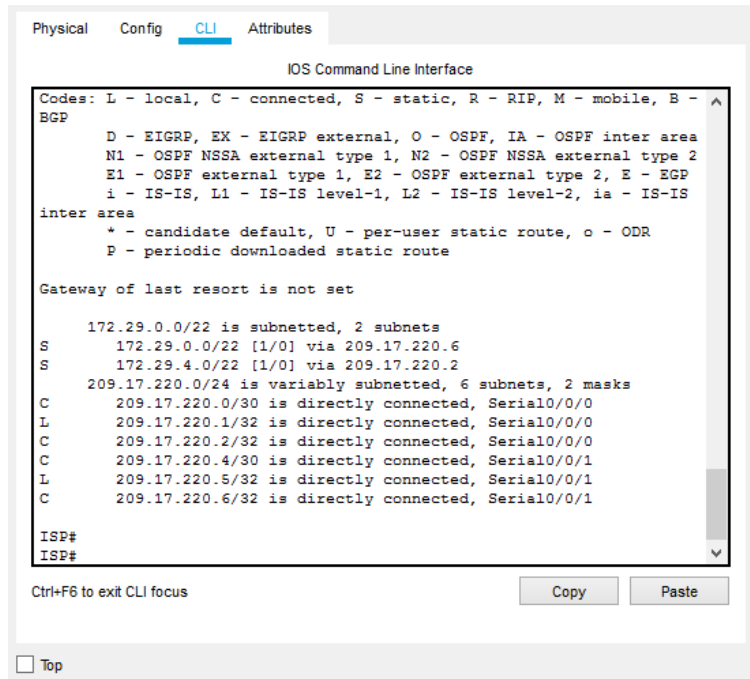
```
Ip route 0.0.0.0 0.0.0.0 209.17.220.5
```

##### **Configuración Rutas Estáticas de ISP**

```
Ip route 172.29.4.0 255.255.252.0 209.17.220.2
```

```
Ip route 172.29.0.0 255.255.252.0 209.17.220.6
```

## Rutas conectadas directamente a ISP



```
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 - 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

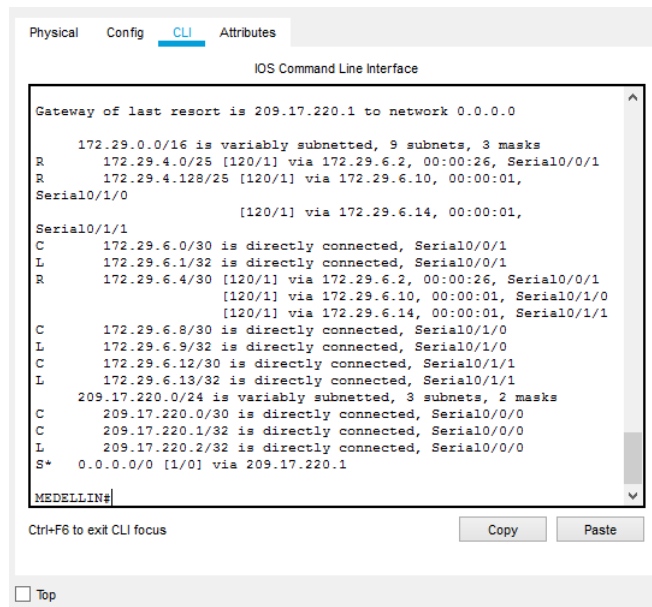
Gateway of last resort is not set

172.29.0.0/22 is subnetted, 2 subnets
S 172.29.0.0/22 [1/0] via 209.17.220.6
S 172.29.4.0/22 [1/0] via 209.17.220.2
209.17.220.0/24 is variably subnetted, 6 subnets, 2 masks
C 209.17.220.0/30 is directly connected, Serial0/0/0
L 209.17.220.1/32 is directly connected, Serial0/0/0
C 209.17.220.2/32 is directly connected, Serial0/0/0
C 209.17.220.4/30 is directly connected, Serial0/0/1
L 209.17.220.5/32 is directly connected, Serial0/0/1
C 209.17.220.6/32 is directly connected, Serial0/0/1

ISP#
ISP#

Ctrl+F6 to exit CLI focus Copy Paste
 Top
```

## Rutas conectadas directamente a MEDELLIN1



```
Physical Config CLI Attributes
IOS Command Line Interface

Gateway of last resort is 209.17.220.1 to network 0.0.0.0

172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R 172.29.4.0/25 [120/1] via 172.29.6.2, 00:00:26, Serial0/0/1
R 172.29.4.128/25 [120/1] via 172.29.6.10, 00:00:01,
Serial0/1/0
[120/1] via 172.29.6.14, 00:00:01,
Serial0/1/1
C 172.29.6.0/30 is directly connected, Serial0/0/1
L 172.29.6.1/32 is directly connected, Serial0/0/1
R 172.29.6.4/30 [120/1] via 172.29.6.2, 00:00:26, Serial0/0/1
[120/1] via 172.29.6.10, 00:00:01, Serial0/1/0
[120/1] via 172.29.6.14, 00:00:01, Serial0/1/1
C 172.29.6.8/30 is directly connected, Serial0/1/0
L 172.29.6.9/32 is directly connected, Serial0/1/0
C 172.29.6.12/30 is directly connected, Serial0/1/1
L 172.29.6.13/32 is directly connected, Serial0/1/1
209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
C 209.17.220.0/30 is directly connected, Serial0/0/0
C 209.17.220.1/32 is directly connected, Serial0/0/0
L 209.17.220.2/32 is directly connected, Serial0/0/0
S* 0.0.0.0/0 [1/0] via 209.17.220.1

MEDELLIN#

Ctrl+F6 to exit CLI focus Copy Paste
 Top
```

## Rutas conectadas directamente a BOGOTA1

```
Physical Config CLI Attributes
IOS Command Line Interface
P - periodic downloaded static route
Gateway of last resort is 209.17.220.5 to network 0.0.0.0
172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R 172.29.0.0/24 [120/1] via 172.29.3.6, 00:00:17, Serial0/1/1
  [120/1] via 172.29.3.2, 00:00:17, Serial0/1/0
R 172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:26, Serial0/0/1
C 172.29.3.0/30 is directly connected, Serial0/1/0
L 172.29.3.1/32 is directly connected, Serial0/1/0
C 172.29.3.4/30 is directly connected, Serial0/1/1
L 172.29.3.5/32 is directly connected, Serial0/1/1
C 172.29.3.8/30 is directly connected, Serial0/0/1
L 172.29.3.9/32 is directly connected, Serial0/0/1
R 172.29.3.12/30 [120/1] via 172.29.3.6, 00:00:17, Serial0/1/1
  [120/1] via 172.29.3.10, 00:00:26, Serial0/0/1
  [120/1] via 172.29.3.2, 00:00:17, Serial0/1/0
209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
C 209.17.220.4/30 is directly connected, Serial0/0/0
C 209.17.220.5/32 is directly connected, Serial0/0/0
L 209.17.220.6/32 is directly connected, Serial0/0/0
S* 0.0.0.0/0 [1/0] via 209.17.220.5
BOGOTA#
BOGOTA#
```

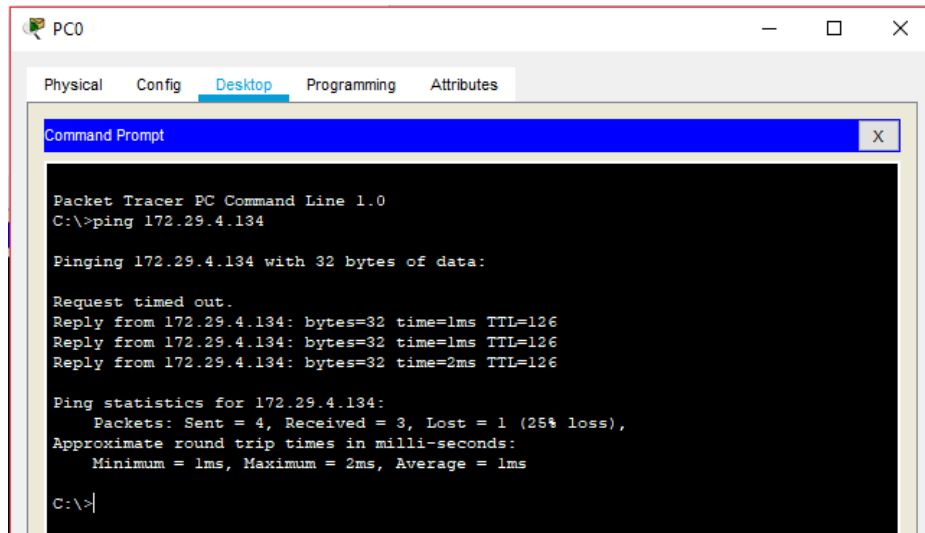
Ctrl+F6 to exit CLI focus

Copy Paste

Top

## 1.1.5 PRUEBAS DE CONECTIVIDAD

Hacer ping de PC0 a PC1



```
PC0
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 172.29.4.134

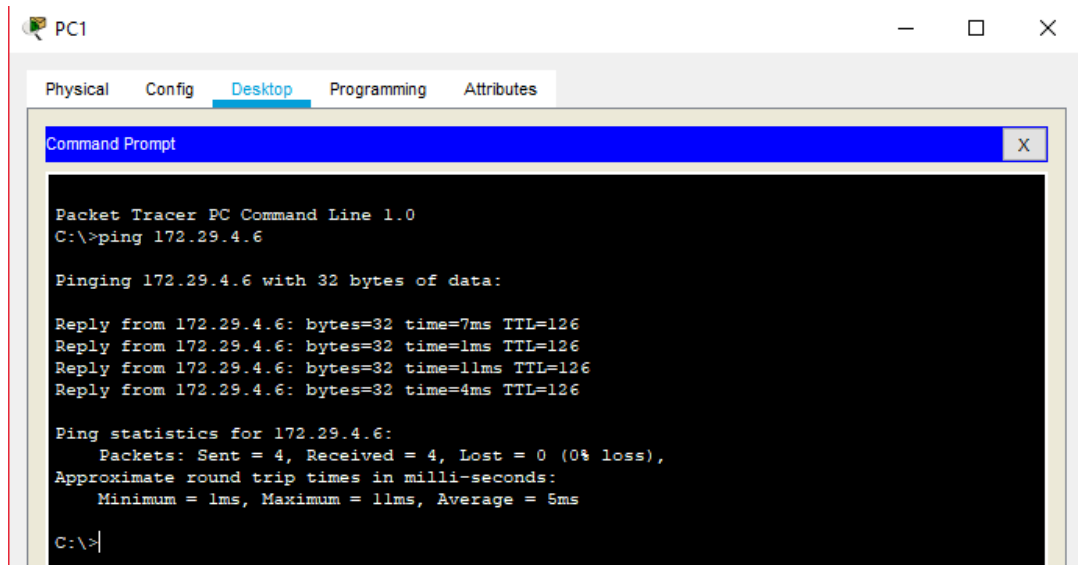
Pinging 172.29.4.134 with 32 bytes of data:

Request timed out.
Reply from 172.29.4.134: bytes=32 time=1ms TTL=126
Reply from 172.29.4.134: bytes=32 time=1ms TTL=126
Reply from 172.29.4.134: bytes=32 time=2ms TTL=126

Ping statistics for 172.29.4.134:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>
```

Hacer ping de PC1 a PC0



```
PC1
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 172.29.4.6

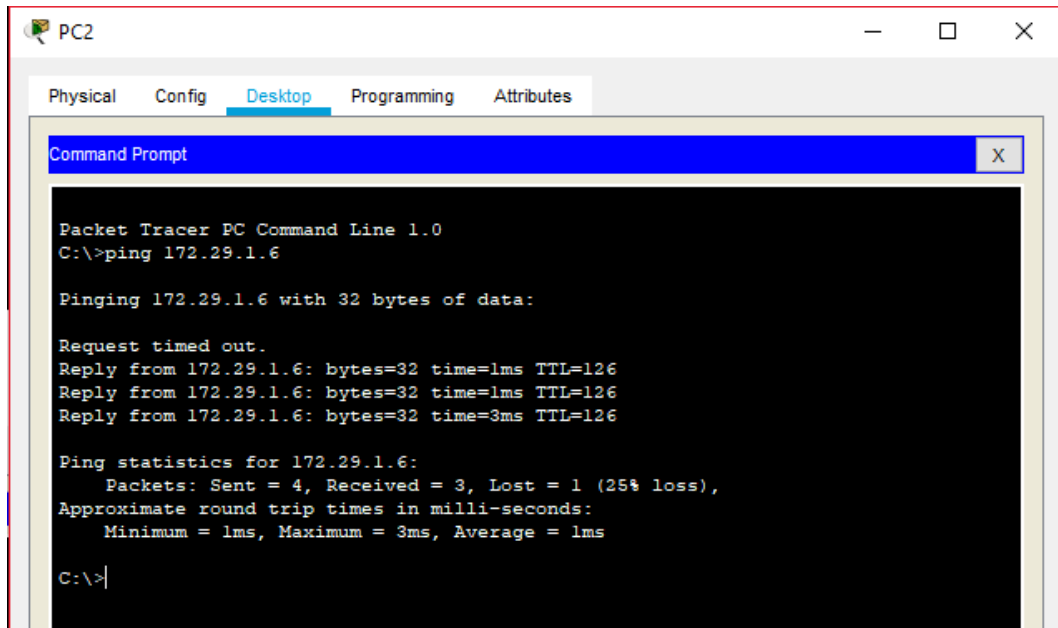
Pinging 172.29.4.6 with 32 bytes of data:

Reply from 172.29.4.6: bytes=32 time=7ms TTL=126
Reply from 172.29.4.6: bytes=32 time=1ms TTL=126
Reply from 172.29.4.6: bytes=32 time=11ms TTL=126
Reply from 172.29.4.6: bytes=32 time=4ms TTL=126

Ping statistics for 172.29.4.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 11ms, Average = 5ms

C:\>
```

Hacer ping de PC2 a PC3



```
Packet Tracer PC Command Line 1.0
C:\>ping 172.29.1.6

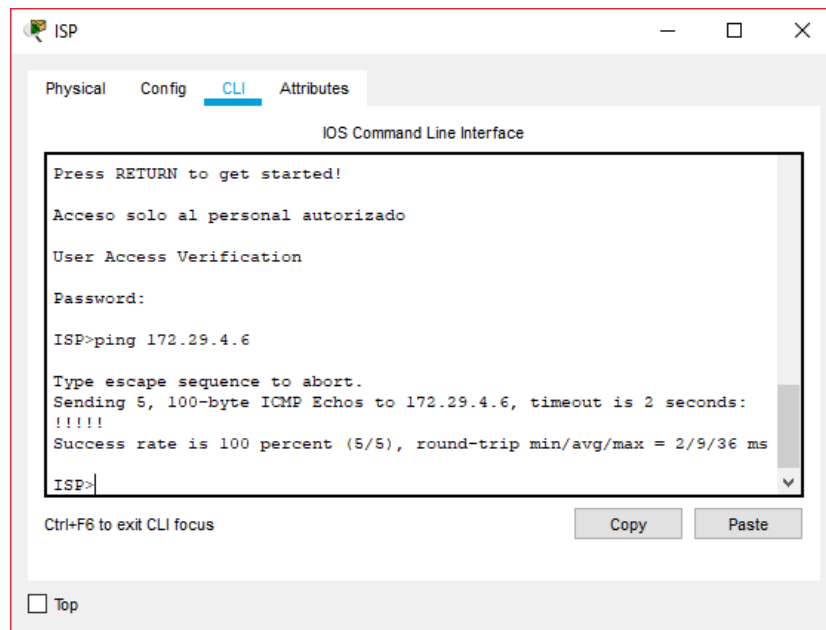
Pinging 172.29.1.6 with 32 bytes of data:

Request timed out.
Reply from 172.29.1.6: bytes=32 time=1ms TTL=126
Reply from 172.29.1.6: bytes=32 time=1ms TTL=126
Reply from 172.29.1.6: bytes=32 time=3ms TTL=126

Ping statistics for 172.29.1.6:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms

C:\>
```

Hacer ping de ISP a PC0



```
IOS Command Line Interface

Press RETURN to get started!

Acceso solo al personal autorizado

User Access Verification

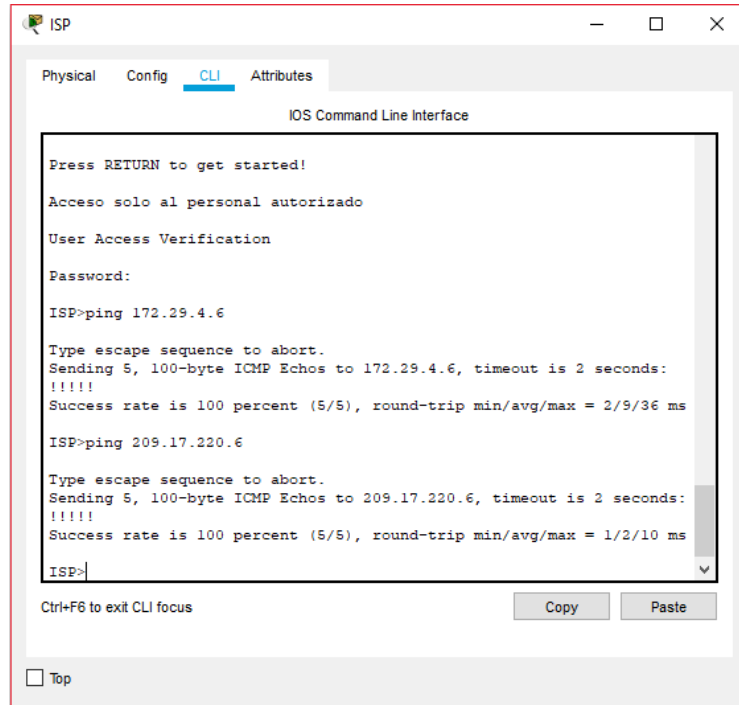
Password:

ISP>ping 172.29.4.6

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.29.4.6, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/9/36 ms

ISP>
```

Hacer ping de ISP a BOGOTA1

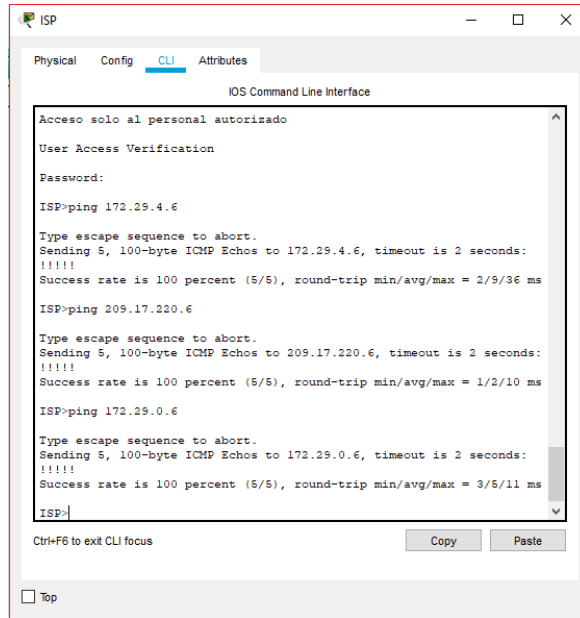


The screenshot shows a window titled "ISP" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The interface shows the following text:

```
Press RETURN to get started!  
Acceso solo al personal autorizado  
User Access Verification  
Password:  
ISP>ping 172.29.4.6  
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 172.29.4.6, timeout is 2 seconds:  
!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/9/36 ms  
ISP>ping 209.17.220.6  
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 209.17.220.6, timeout is 2 seconds:  
!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/10 ms  
ISP>
```

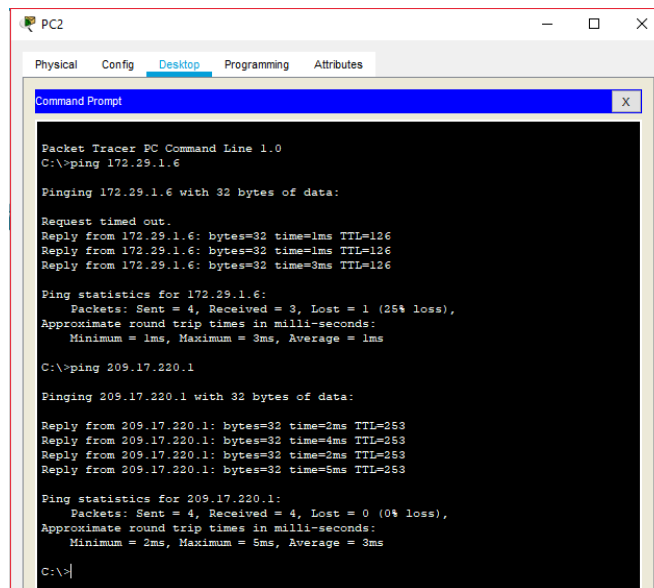
At the bottom of the window, there is a "Ctrl+F6 to exit CLI focus" label, "Copy" and "Paste" buttons, and a "Top" button.

## Hacer ping de ISP a PC2



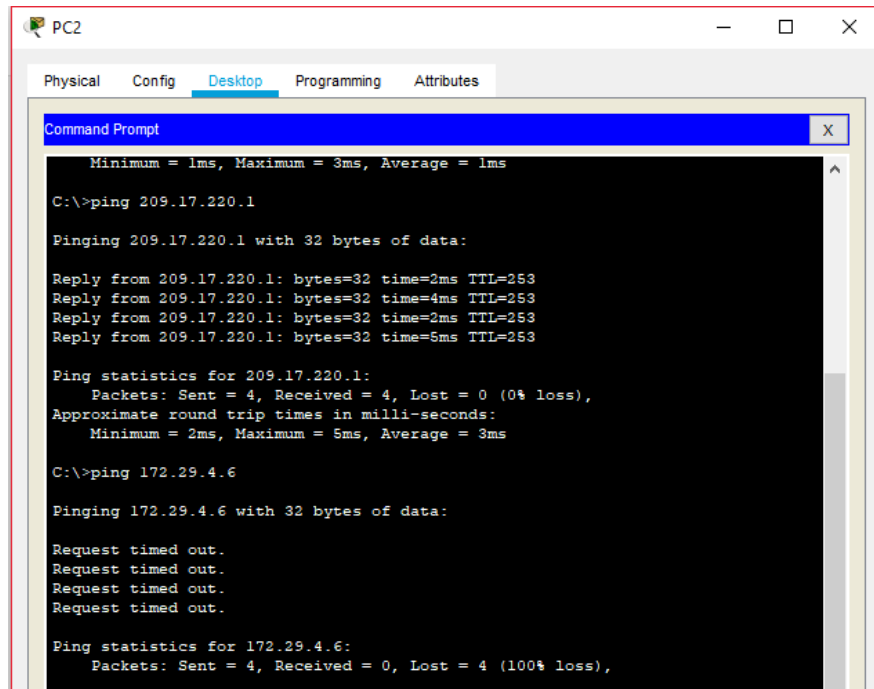
```
ISP
Physical Config CLI Attributes
IOS Command Line Interface
Acceso solo al personal autorizado
User Access Verification
Password:
ISP>ping 172.29.4.6
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.29.4.6, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/9/36 ms
ISP>ping 209.17.220.6
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.17.220.6, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/10 ms
ISP>ping 172.29.0.6
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.29.0.6, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/5/11 ms
ISP>
```

## Hacer ping de PC2 a ISP



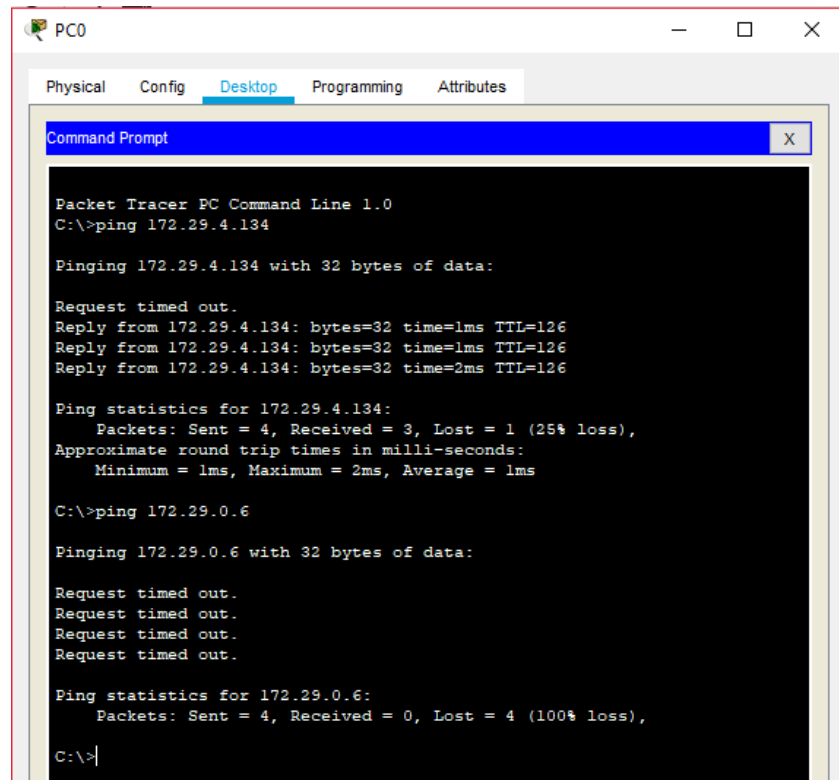
```
PC2
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 172.29.1.6
Pinging 172.29.1.6 with 32 bytes of data:
Request timed out.
Reply from 172.29.1.6: bytes=32 time=1ms TTL=126
Reply from 172.29.1.6: bytes=32 time=1ms TTL=126
Reply from 172.29.1.6: bytes=32 time=3ms TTL=126
Ping statistics for 172.29.1.6:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms
C:\>ping 209.17.220.1
Pinging 209.17.220.1 with 32 bytes of data:
Reply from 209.17.220.1: bytes=32 time=2ms TTL=253
Reply from 209.17.220.1: bytes=32 time=4ms TTL=253
Reply from 209.17.220.1: bytes=32 time=2ms TTL=253
Reply from 209.17.220.1: bytes=32 time=5ms TTL=253
Ping statistics for 209.17.220.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 5ms, Average = 3ms
C:\>
```

Hacer ping de PC2 a PC0



```
PC2
Physical Config Desktop Programming Attributes
Command Prompt
Minimum = 1ms, Maximum = 3ms, Average = 1ms
C:\>ping 209.17.220.1
Pinging 209.17.220.1 with 32 bytes of data:
Reply from 209.17.220.1: bytes=32 time=2ms TTL=253
Reply from 209.17.220.1: bytes=32 time=4ms TTL=253
Reply from 209.17.220.1: bytes=32 time=2ms TTL=253
Reply from 209.17.220.1: bytes=32 time=5ms TTL=253
Ping statistics for 209.17.220.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 5ms, Average = 3ms
C:\>ping 172.29.4.6
Pinging 172.29.4.6 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 172.29.4.6:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Hacer ping de PC0 a PC2



```
PC0
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 172.29.4.134
Pinging 172.29.4.134 with 32 bytes of data:
Request timed out.
Reply from 172.29.4.134: bytes=32 time=1ms TTL=126
Reply from 172.29.4.134: bytes=32 time=1ms TTL=126
Reply from 172.29.4.134: bytes=32 time=2ms TTL=126
Ping statistics for 172.29.4.134:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
C:\>ping 172.29.0.6
Pinging 172.29.0.6 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 172.29.0.6:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>
```

## 1.1.6 PRUEBAS EXTREMO A EXTREMO CON TRACERT ROUTE.

Tracert route de PC2 a PC0

```
C:\>tracert 172.29.4.6

Tracing route to 172.29.4.6 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    172.29.0.1
  1  3 ms    1 ms    2 ms    172.29.3.1
  2  2 ms    2 ms    2 ms    209.17.220.5
  3  2 ms    3 ms    6 ms    209.17.220.2
  4  3 ms    1 ms    1 ms    172.29.6.2
  5  3 ms    1 ms    2 ms    172.29.4.6

Trace complete.

C:\>
```

Tracert route de PC2 a PC1.

```
C:\>
C:\>tracert 172.29.4.134

Tracing route to 172.29.4.134 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    172.29.0.1
  1  0 ms    1 ms    1 ms    172.29.3.5
  2  2 ms    1 ms    1 ms    209.17.220.5
  3  2 ms    4 ms    4 ms    209.17.220.2
  4  1 ms    3 ms    2 ms    172.29.6.10
  5  *      0 ms    1 ms    172.29.4.134

Trace complete.

C:\>
```

## 1.1.7 CONFIGURACIÓN DE AUTENTICACIÓN PAP

### Configuración Básica ISP

Hostname ISP

### Configuración Básica MEDELLIN1

Hostname MEDELLIN

## **Configuración Básica BOGOTA1**

Hostname BOGOTA

### **Autenticación PPP PAP EN ISP**

Username MEDELLIN password cisco

Interface s0/0/0

Encapsulation ppp

Ppp authentication pap

Ppp pap sent-username ISP password cisco

### **Autenticación PPP PAP EN MEDELLIN1**

Username ISP password cisco

Interface s0/0/0

Encapsulation ppp

Ppp authentication pap

Ppp pap sent-username MEDELLIN password cisco

## 1.1.8 CONFIGURACIÓN DE AUTENTICACIÓN CHAP

### **Autenticación PPP CHAP EN ISP**

Username BOGOTA password cisco

Interface s0/0/1

Encapsulation ppp

Ppp authentication chap

### **Autenticación PPP CHAP EN BOGOTA1**

Username ISP password cisco

Interface s0/0/0

Encapsulation ppp

Ppp authentication chap

### 1.1.9 CONFIGURACIÓN DHCP

#### **Configuración DHCP EN MEDELLIN2**

Ip dhcp excluded-address 172.29.4.1 172.29.4.5

Ip dhcp excluded-address 172.29.4.129 172.29.4.133

#### **Ip dhcp pool MED2**

Network 172.29.4.0 255.255.255.128

Default-router 172.29.4.1

Dns-server 8.8.8.8

#### **Ip dhcp pool MED3**

Network 172.29.4.128 255.255.255.128

Default-router 172.29.4.129

Dns-server 8.8.8.8

### **Configuración DHCP EN MEDELLIN3**

Configure terminal

Interface g0/0

Ip helper-address 172.29.6.5

### **Configuración DHCP EN BOGOTA2**

Ip dhcp excluded-address 172.29.1.1 172.29.1.5

Ip dhcp excluded-address 172.29.0.1 172.29.0.5

Ip dhcp pool BOG2

Network 172.29.1.0 255.255.255.0

Default-router 172.29.1.1

Dns-server 8.8.8.8

Ip dhcp pool BOG3

Network 172.29.0.0 255.255.255.0

Default-router 172.29.0.1

Dns-server 8.8.8.8

### **Configuración DHCP EN BOGOTA3**

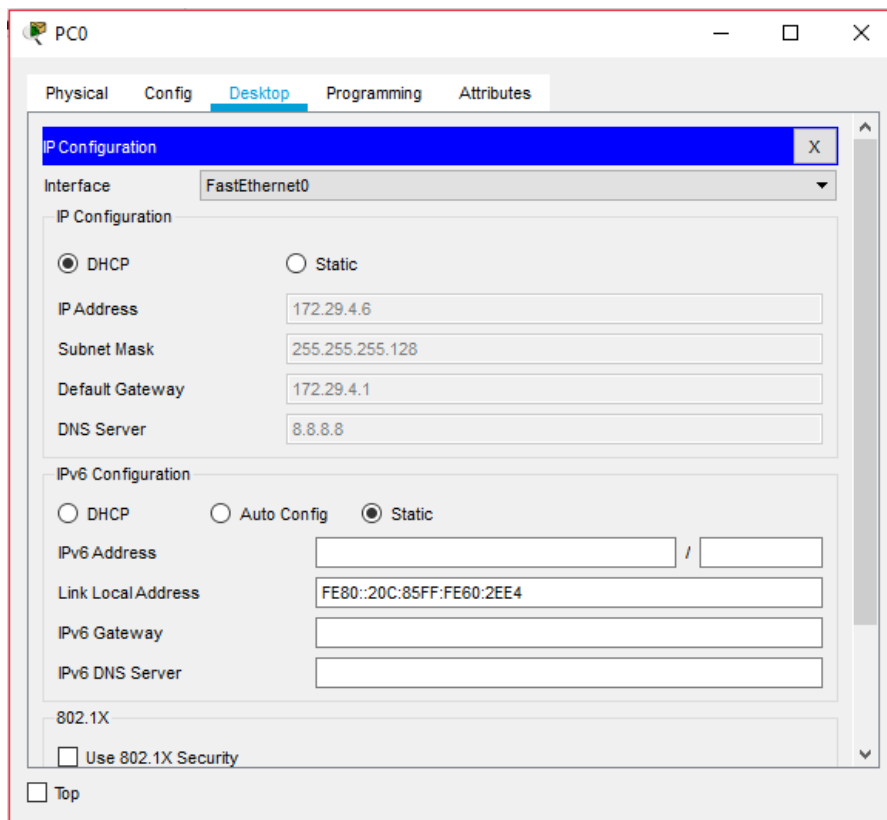
Configure terminal

Interface g0/0

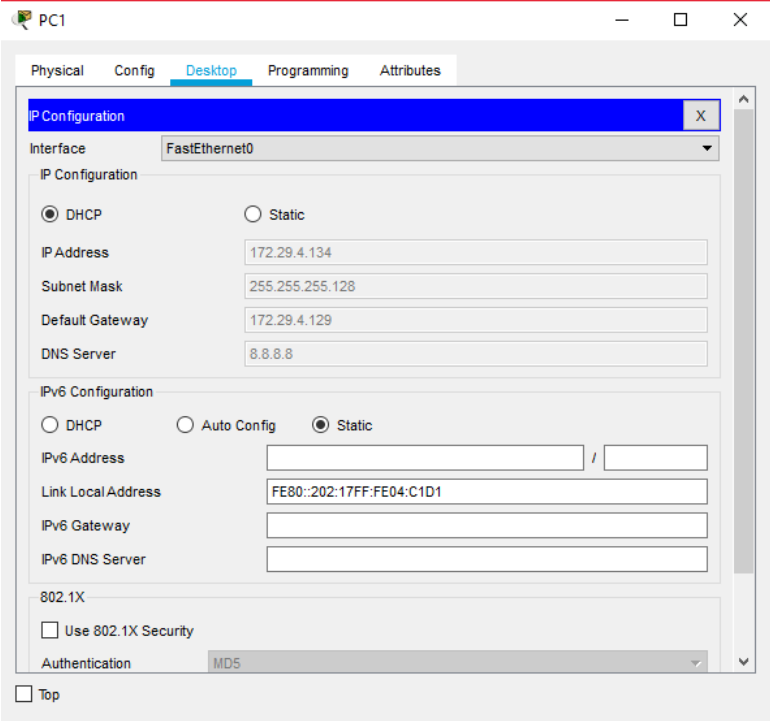
Ip helper-address 172.29.3.13

### 1.1.10 VERIFICACIÓN DEL SERVICIO DHCP EN FUNCIONAMIENTO EN AMBOS EXTREMOS.

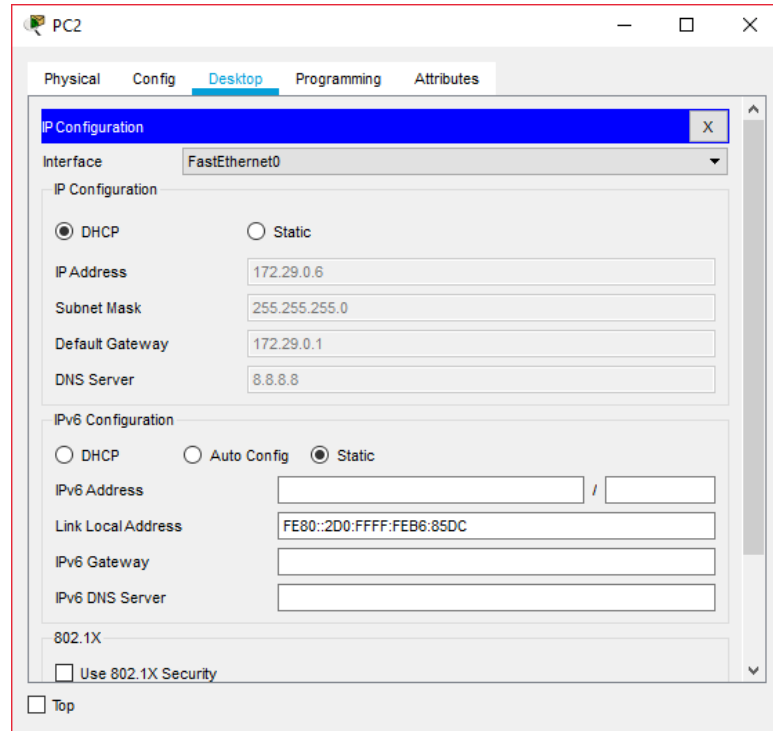
Verificación del servicio DHCP en funcionamiento en PC0



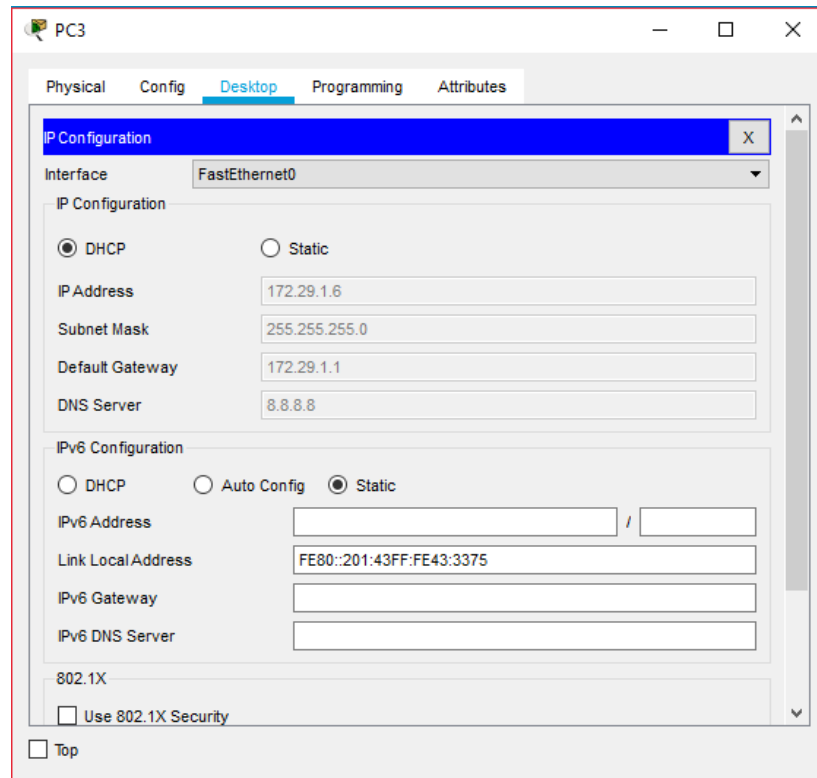
# Verificación del servicio DHCP en funcionamiento en PC1



## Verificación del servicio DHCP en funcionamiento en PC2



## Verificación del servicio DHCP en funcionamiento en PC3



### 1.1.11 CONFIGURACIÓN DE NAT

#### **NAT en MEDELLIN1**

Configure terminal

```
Ip nat inside source list 1 interface s0/0/0 overload
```

```
Access-list 1 permit 172.29.4.0 0.0.3.255
```

```
Int s0/0/0
```

```
Ip nat outside
```

Int s0/0/1

Ip nat inside

Int s0/1/0

Ip nat inside

Int s0/1/1

Ip nat inside

### **NAT en BOGOTA1**

Configure terminal

Ip nat inside source list 1 interface s0/0/0 overload

Access-list 1 permit 172.29.0.0 0.0.3.255

Int s0/0/0

Ip nat outside

Int s0/0/1

Ip nat inside

Int s0/1/0

Ip nat inside

Int s0/1/1

Ip nat inside

## Ping pc2 a ISP

```
C:\>
C:\>tracert 172.29.4.134

Tracing route to 172.29.4.134 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    172.29.0.1
  1  0 ms    1 ms    1 ms    172.29.3.5
  2  2 ms    1 ms    1 ms    209.17.220.5
  3  2 ms    4 ms    4 ms    209.17.220.2
  4  1 ms    3 ms    2 ms    172.29.6.10
  5  *        0 ms    1 ms    172.29.4.134

Trace complete.

C:\>
C:\>ping 209.17.220.5

Pinging 209.17.220.5 with 32 bytes of data:

Reply from 209.17.220.5: bytes=32 time=27ms TTL=253
Reply from 209.17.220.5: bytes=32 time=14ms TTL=253
Reply from 209.17.220.5: bytes=32 time=2ms TTL=253
Reply from 209.17.220.5: bytes=32 time=2ms TTL=253

Ping statistics for 209.17.220.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 27ms, Average = 11ms

C:\>
```

## Ping PC0 a ISP

```
Physical  Config  Desktop  Programming  Attributes

Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 172.29.0.6

Pinging 172.29.0.6 with 32 bytes of data:

Reply from 172.29.0.6: bytes=32 time=9ms TTL=123
Reply from 172.29.0.6: bytes=32 time=4ms TTL=123
Reply from 172.29.0.6: bytes=32 time=4ms TTL=123
Reply from 172.29.0.6: bytes=32 time=4ms TTL=123

Ping statistics for 172.29.0.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 9ms, Average = 5ms

C:\>ping 209.17.220.1

Pinging 209.17.220.1 with 32 bytes of data:

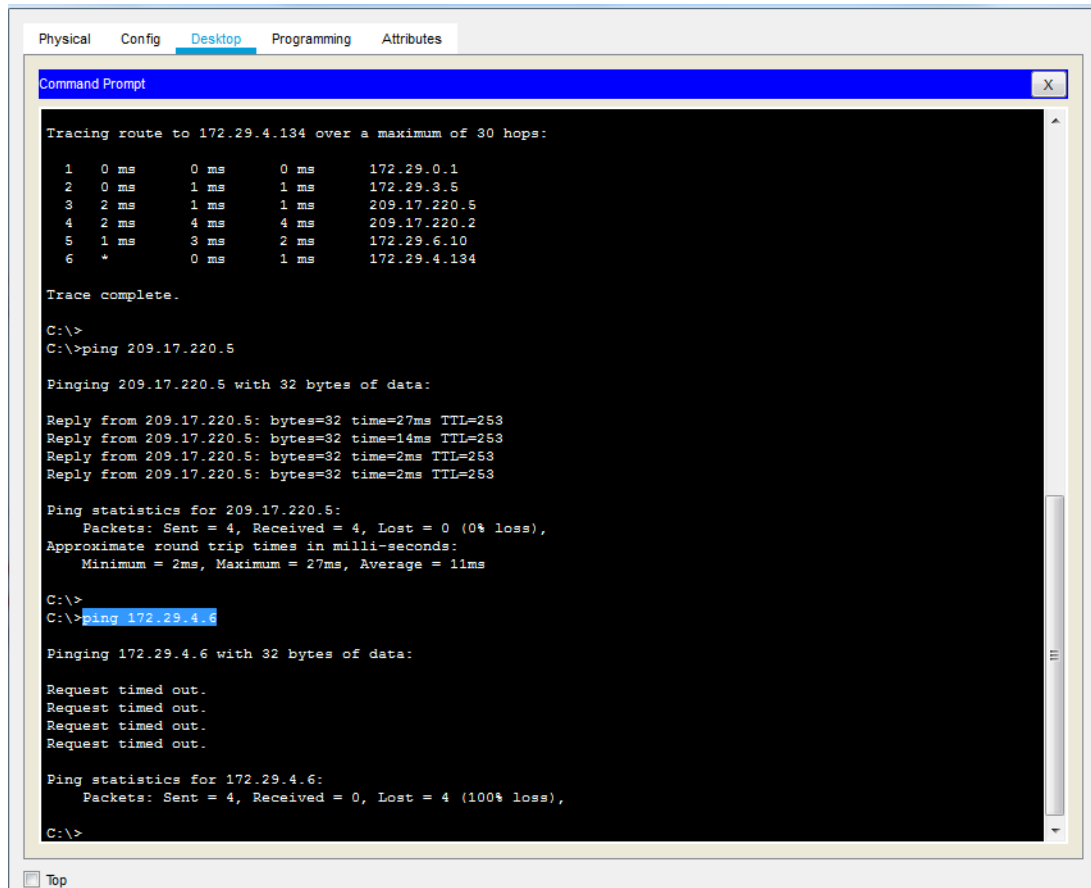
Reply from 209.17.220.1: bytes=32 time=2ms TTL=253
Reply from 209.17.220.1: bytes=32 time=2ms TTL=253
Reply from 209.17.220.1: bytes=32 time=3ms TTL=253
Reply from 209.17.220.1: bytes=32 time=2ms TTL=253

Ping statistics for 209.17.220.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 3ms, Average = 2ms

C:\>
```

Ping es satisfactorio

## Ping de PC2 a PC0



The screenshot shows a Command Prompt window with the following text:

```
Physical  Config  Desktop  Programming  Attributes

Command Prompt

Tracing route to 172.29.4.134 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    172.29.0.1
  1  0 ms    1 ms    1 ms    172.29.3.5
  2  2 ms    1 ms    1 ms    209.17.220.5
  3  2 ms    4 ms    4 ms    209.17.220.2
  4  1 ms    3 ms    2 ms    172.29.6.10
  5  *      0 ms    1 ms    172.29.4.134

Trace complete.

C:\>
C:\>ping 209.17.220.5

Pinging 209.17.220.5 with 32 bytes of data:

Reply from 209.17.220.5: bytes=32 time=27ms TTL=253
Reply from 209.17.220.5: bytes=32 time=14ms TTL=253
Reply from 209.17.220.5: bytes=32 time=2ms TTL=253
Reply from 209.17.220.5: bytes=32 time=2ms TTL=253

Ping statistics for 209.17.220.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 27ms, Average = 11ms

C:\>
C:\>ping 172.29.4.6

Pinging 172.29.4.6 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 172.29.4.6:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

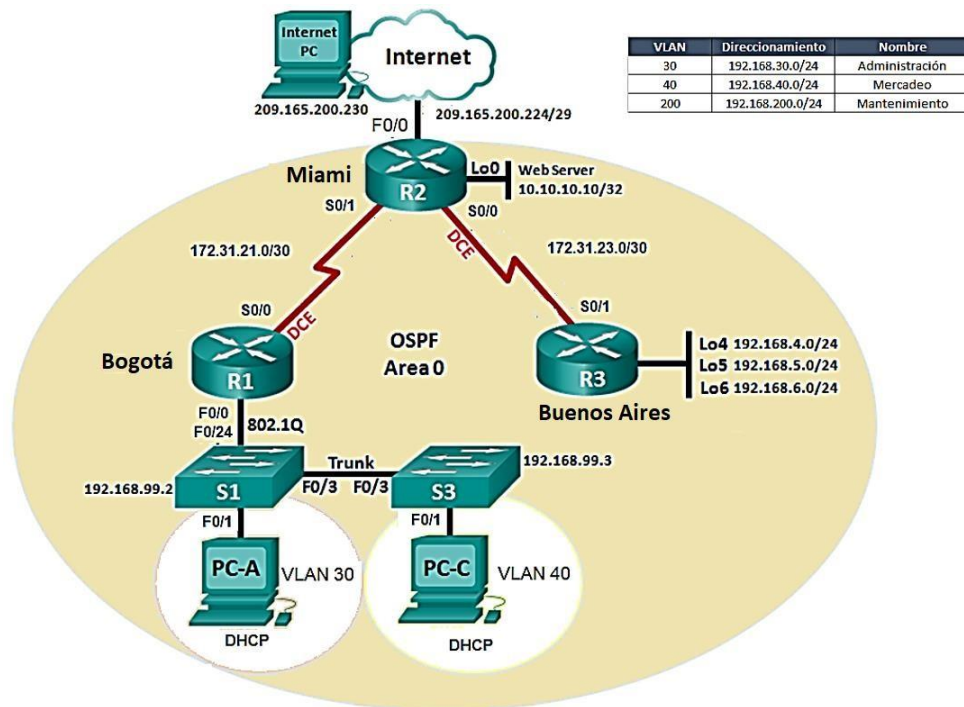
Ping no es satisfactorio porque NAT lo bloquea.

## 2.0 DESCRIPCIÓN DEL ESCENARIO 2

Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Miami, Bogotá y Buenos Aires, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.

## 2.1 SOLUCION DEL ESCENARIO 2

### 2.1.1 Topología



Dispositivo	Interface	Direccion IP	Masdca de Subred	Puerta de enlace predeterminada
R1	G0/0	192.168.99.1	255.255.255.0	
	S0/0/0	172.31.21.1	255.255.255.252	
R2	S0/1/0	172.31.21.2	255.255.255.252	
	S0/1/1	172.31.23.1	255.255.255.252	
	G0/1	10.10.10.10	255.255.255.255	
R3	S0/1/0	172.32.23.2	255.255.255.252	
	Lo4	192.168.4.1	255.255.255.255	
	Lo5	192.168.5.1	255.255.255.255	
Lo6	192.168.6.1	255.255.255.255		
PC-A	NIC	DHCP	DCHP	DHCP
PC-B	NIC	DHCP	DHCP	DHC
PC Internet	NIC	209.165.200.230	255.255.255.248	209.168.200.225

## 2.1.2 CONFIGURACIÓN BÁSICA ROUTER R1.

Enable

Configure terminal

Hostname R1

Enable secret: cisco

Service password-encryption

Banner motd "Acceso solo al personal autorizado"

Password Línea de consola: cisco

Password Líneas VTY: cisco

### **Configuración del direccionamiento para Router R1.**

Interface s0/0/0

Description Bogota

Ip address 172.31.21.0/30

Clock rate 128000

No shutdown

### **Interface F0/0**

Interface F0/0

Ip address 192.168.99.1 (esta red habilitará la LAN).

No shutdown

## **2.1.3 CONFIGURACIÓN BÁSICA ROUTER R2.**

Enable

Configure terminal

Hostname R2

Enable secret: cisco

Service password-encryption

Banner motd "Acceso solo al personal autorizado"

Password Línea de consola: cisco

Password Líneas VTY: cisco

## **Configuración del direccionamiento para Router R2.**

### **Interface fa0/0 (interface g0/0 – Internet).**

Description Internet

Ip address 209.165.200.225 255.255.255.248

Dúplex auto

Speed auto

No shutdown

### **Interface Lo0 (WEB SERVER).**

Configure terminal

Interface loopback 0

Ip address 10.10.10.10 255.255.255.255

Description conexión a Web Server.

No shutdown.

### **Interface s0/0/0.**

Interface s0/0/0.

Ip address 172.31.23.2 255.255.255.252

Clock rate 128000

No shutdown.

### **Interface s0/0/1.**

Interface s0/0/1.

Ip address 172.31.21.2 255.255.255.252

No shutdown

### **2.1.4 CONFIGURACIÓN BÁSICA ROUTER R3.**

Enable

Configure terminal

Hostname R3

Enable secret: cisco

Service password-encryption

Banner motd "Acceso solo al personal autorizado"

Password Línea de consola: cisco

Password Líneas VTY: cisco

### **Configuración del direccionamiento para Router R3.**

#### **Interface s0/0/1**

Interface s0/0/1

Ip address 172.31.23.1 255.255.255.252

#### **Interface loopback4**

Ip address 192.168.4.1 255.255.255.0

Exit

#### **Interface loopback5**

Ip address 192.168.5.1 255.255.255.0

Exit.

#### **Interface loopback6**

Ip address 192.168.6.1 255.255.255.0

Exit

### **2.1.5 CONFIGURACIÓN BÁSICA SWITCH S1.**

Enable

Configure terminal

Hostname S1

Enable secret: cisco

Service password-encryption

Banner motd "Acceso solo al personal autorizado"

Password Línea de consola: cisco

Password Líneas VTY: cisco

## 2.1.6 CONFIGURACIÓN BÁSICA SWITCH S3.

Enable

Configure terminal

Hostname S3

Enable secret: cisco

Service password-encryption

Banner motd "Acceso solo al personal autorizado"

Password Línea de consola: cisco

Password Líneas VTY: cisco

## 2.1.7 CONFIGURACIÓN DEL PROTOCOLO DE ENRUTAMIENTO OSPFV2

### Router R1

Configure terminal

Router ospf 2

Network 172.31.21.0 0.0.0.3 area 0

Router-id 1.1.1.1 – **luego se recarga el dispositivo para que los cambios surjan efectos.**

Configure terminal

Router ospf 2

Passive-interface g0/0

```
shutdown
!
interface Serial0/0/0
description Bogota
ip address 172.31.21.1 255.255.255.252
clock rate 128000
!
interface Serial0/0/1
no ip address
clock rate 2000000
shutdown
!
interface Vlan1
no ip address
shutdown
!
router ospf 2
router-id 1.1.1.1
log-adjacency-changes
passive-interface GigabitEthernet0/0
network 172.31.21.0 0.0.0.3 area 0
!
ip classless
!
--More--
```

Evidencia del funcionamiento del protocolo ospf 2

## Configuración pasiva de la LAN

Router ospf 2

Passive-interface g0/0

Passive-interface g0/1

## Ancho de banda de enlace serial de 256 Kb/S

Interface s0/0/0

Bandwidth 256

Interface s0/0/1

Bandwidth 256

### **Costo de la métrica**

```
int s0/0/0
```

```
ip ospf cost 9500
```

### **Router R2**

Configure terminal

```
Router ospf2
```

```
Network 172.31.23.0 0.0.0.255 area 0
```

```
Network 172.31.21.0 0.0.0.255 area 0
```

```
Router-id 5.5.5.5
```

### **Configuración pasiva de la LAN**

```
Router ospf 2
```

```
Passive-interface g0/0
```

```
Passive-interface g0/1
```

### **Ancho de banda de enlace serial de 256 Kb/S**

```
Interface s0/0/0
```

```
Bandwidth 256
```

```
Interface s0/0/1
```

Bandwidth 256

### **Costo de la métrica**

Interface s0/0/0

Ip ospf cost 9500

### **Router R3**

Configure terminal

Router ospf2

Network 192.31.23.0 0.0.0.3 area 0

Router-id 8.8.8.8

### **Configuración pasiva de la LAN**

Router ospf 2

Passive-interface g0/0

Passive-interface g0/1

### **Ancho de banda de enlace serial de 256 Kb/S**

Interface s0/0/0

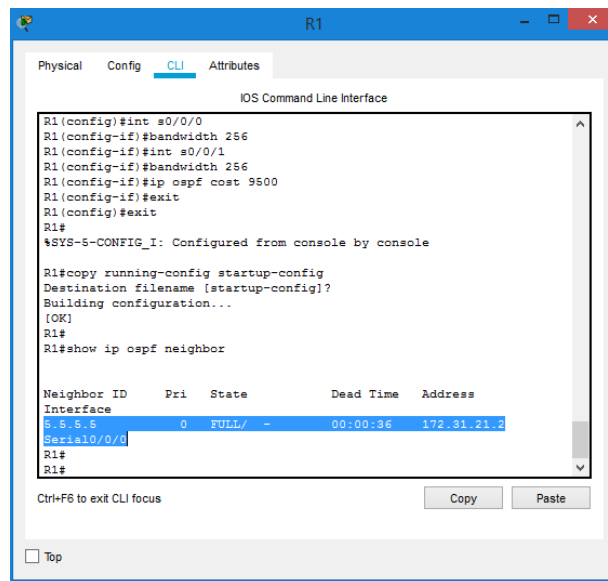
Bandwidth 256

Interface s0/0/1

Bandwidth 256

## 2.1.8 VISUALIZACIÓN DE TABLAS DE ENRUTAMIENTO Y ROUTERS CONECTADOS POR OSPFV2

En R1



The screenshot shows the CLI of router R1. The user has configured interfaces s0/0/0 and s0/0/1 with bandwidth 256 and cost 9500. They have also copied the running configuration to the startup configuration. The output of the 'show ip ospf neighbor' command is as follows:

```
R1(config)#int s0/0/0
R1(config-if)#bandwidth 256
R1(config-if)#int s0/0/1
R1(config-if)#bandwidth 256
R1(config-if)#ip ospf cost 9500
R1(config-if)#exit
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console

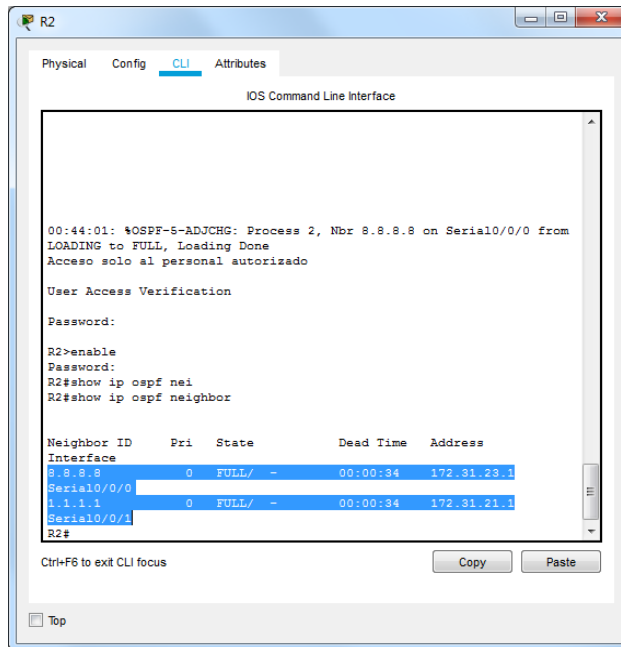
R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R1#
R1#show ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address
-----
Interface
3.3.3.3         0    FULL/ -         00:00:36   172.31.21.2
Serial0/0/0
R1#
R1#
```

Neighbor ID	Pri	State	Dead Time	Address
3.3.3.3	0	FULL/ -	00:00:36	172.31.21.2

Aparece la interfaz 5.5.5.5 correspondiente al R2.

**En R2.**



The screenshot shows the CLI of router R2. The output of the command 'show ip ospf neighbor' is as follows:

```
00:44:01: %OSPF-5-ADJCHG: Process 2, Nbr 8.8.8.8 on Serial0/0/0 from
LOADING to FULL, Loading Done
Acceso solo al personal autorizado

User Access Verification

Password:

R2>enable
Password:
R2#show ip ospf nei
R2#show ip ospf neighbor
```

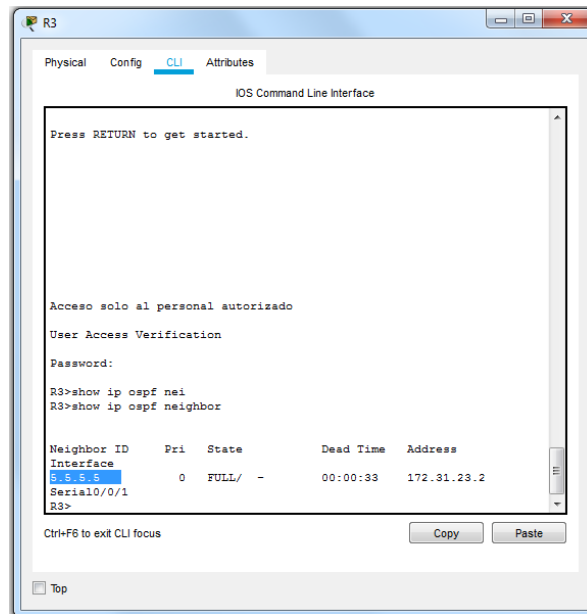
Neighbor ID	Pri	State	Dead Time	Address
8.8.8.8	0	FULL/ -	00:00:34	172.31.23.1
1.1.1.1	0	FULL/ -	00:00:34	172.31.21.1

The interface Serial0/0/0 is highlighted in blue in the original image.

Muestra la interfaz 8.8.8.8 correspondiente al R3.

Muestra la interfaz 1.1.1.1 correspondiente al R1.

**En R3.**



```
Press RETURN to get started.

Acceso solo al personal autorizado
User Access Verification
Password:
R3>show ip ospf nei
R3>show ip ospf neighbor

Neighbor ID    Pri   State           Dead Time   Address
Interface
5.5.5.5        0    FULL/-         00:00:33   172.31.23.2
Serial0/0/1
R3>
```

Muestra la interfaz 5.5.5.5 correspondiente al R2.

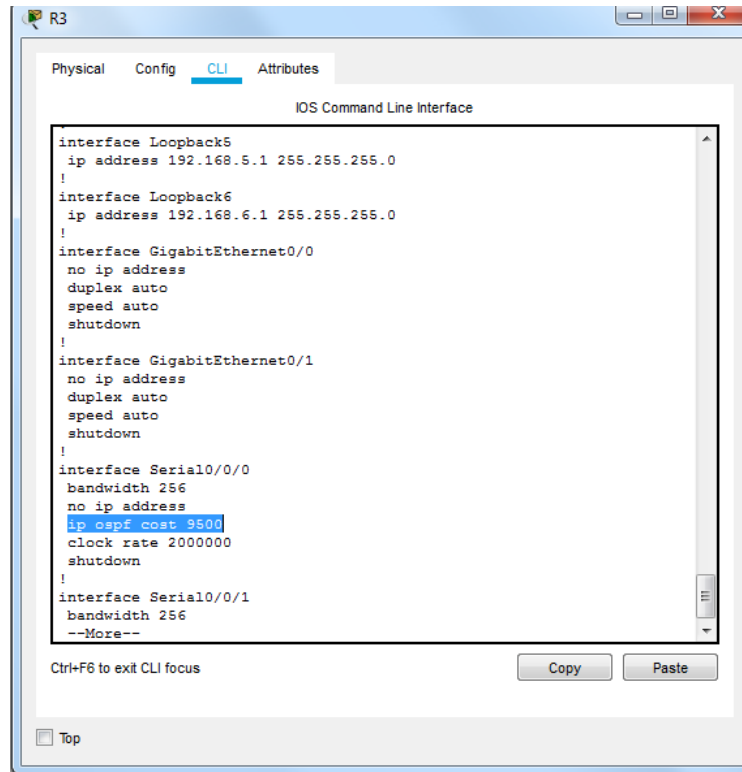
### 2.1.9 VISUALIZAR LISTA RESUMIDA DE INTERFACES POR OSPF EN DONDE SE ILUSTRE EL COSTO DE CADA INTERFAZ

El costo de las métricas fue aplicado a las interfaces s0/0/0 de cada router, como lo solicita la guía.

**En R1.**



En R3.



```
interface Loopback5
ip address 192.168.5.1 255.255.255.0
!
interface Loopback6
ip address 192.168.6.1 255.255.255.0
!
interface GigabitEthernet0/0
no ip address
duplex auto
speed auto
shutdown
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial10/0/0
bandwidth 256
no ip address
ip ospf cost 9500
clock rate 2000000
shutdown
!
interface Serial10/0/1
bandwidth 256
--More--
```

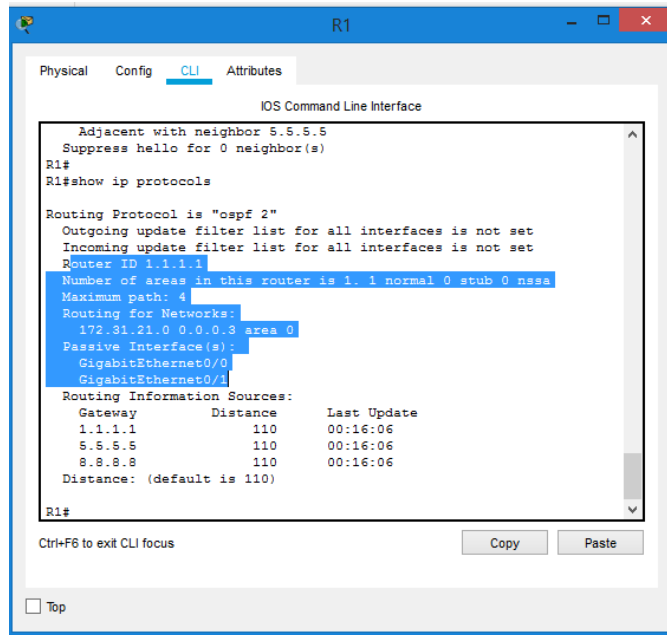
Ctrl+F6 to exit CLI focus

Copy Paste

Top

**2.1.10 VISUALIZAR EL OSPF PROCESS ID, ROUTER ID, ADDRESS SUMMARIZATIONS, ROUTING NETWORKS, AND PASSIVE INTERFACES CONFIGURADAS EN CADA ROUTER.**

En R1. (show ip protocols).



The screenshot shows the CLI of router R1. The command 'show ip protocols' has been executed, displaying the following information:

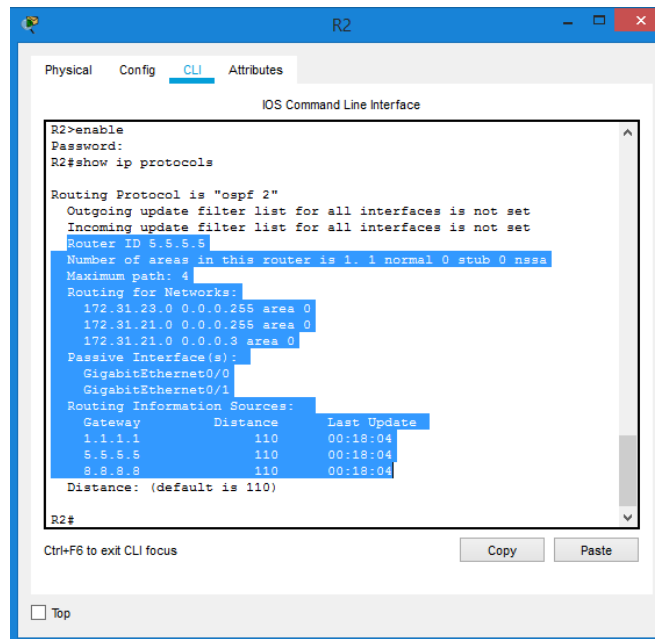
```
IOS Command Line Interface

Adjacent with neighbor 5.5.5.5
Suppress hello for 0 neighbor(s)
R1#
R1#show ip protocols

Routing Protocol is "ospf 2"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 1.1.1.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.21.0 0.0.0.3 area 0
  Passive Interface(s):
    GigabitEthernet0/0
    GigabitEthernet0/1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:16:06
    5.5.5.5          110          00:16:06
    8.8.8.8          110          00:16:06
  Distance: (default is 110)

R1#
```

En R2. (show ip protocols).



The screenshot shows the CLI of router R2. The command 'show ip protocols' has been executed, displaying the following information:

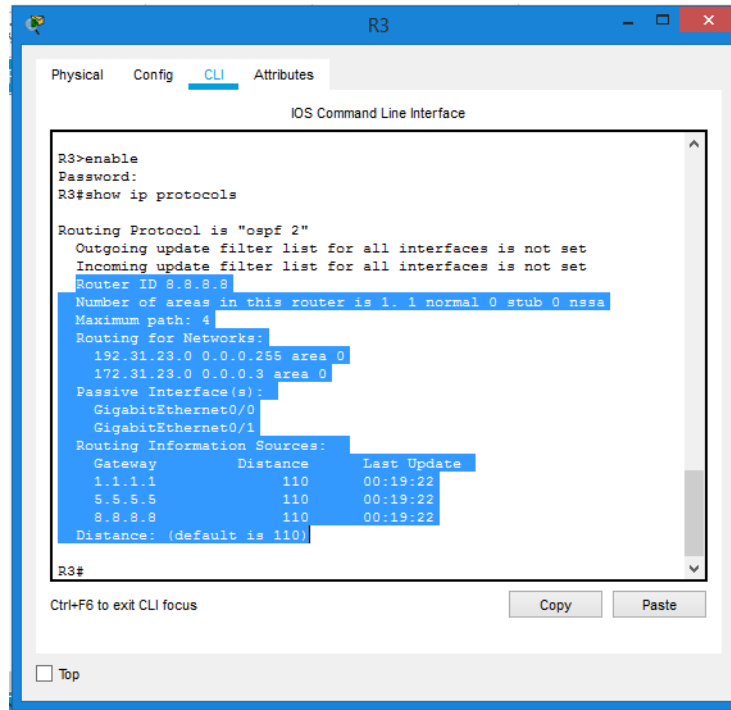
```
IOS Command Line Interface

R2>enable
Password:
R2#show ip protocols

Routing Protocol is "ospf 2"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 5.5.5.5
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.23.0 0.0.0.255 area 0
    172.31.21.0 0.0.0.255 area 0
    172.31.21.0 0.0.0.3 area 0
  Passive Interface(s):
    GigabitEthernet0/0
    GigabitEthernet0/1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:18:04
    5.5.5.5          110          00:18:04
    8.8.8.8          110          00:18:04
  Distance: (default is 110)

R2#
```

En R3. (show ip protocols).



```
R3>enable
Password:
R3#show ip protocols

Routing Protocol is "ospf 2"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 8.8.8.8
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    192.31.23.0 0.0.0.255 area 0
    172.31.23.0 0.0.0.3 area 0
  Passive Interface(s):
    GigabitEthernet0/0
    GigabitEthernet0/1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:19:22
    5.5.5.5          110          00:19:22
    8.8.8.8          110          00:19:22
  Distance: (default is 110)

R3#
```

### 2.1.11 CONFIGURACIÓN DE PUERTOS TRONCALES

**S3:** En el puerto fa 0/3 del S3, estableciendo un enlace troncal con el Switch S2.

Interface fa 0/3

Sw mo tr

**S1:** En el puerto fa 0/3 del S1, estableciendo un enlace troncal con el Switch S3.

Interface fa 0/3

Sw mo tr

## 2.1.12 CONFIGURACIÓN DE VLANS

### **Vlan 30 en S1**

Configure terminal

Vlan 30

Name Administracion

Exit

Interface fa 0/1

Sw acc vlan 30

### **Vlan 40 en S3**

Configure terminal

Vlan 40

Name mercadeo

Exit

Int fa 0/1

Sw acc vlan 40

## 2.1.13 SEGURIDAD EN LOS SWITCHES

### **S1.**

#### **Interface fa 0/1**

Switchport mode Access

Switchport port-security

Switchport port-security maximum 1

Switchport port-security violation shutdown

Switchport port-security mac-address sticky

### **Interface fa 0/3**

Switchport mode Access

Switchport port-security

Switchport port-security maximum 1

Switchport port-security violation shutdown

Switchport port-security mac-address sticky

### **Interface fa 0/24**

Switchport mode Access

Switchport port-security

Switchport port-security maximum 1

Switchport port-security violation shutdown

Switchport port-security mac-address sticky

### **S3.**

#### **Interface fa 0/1**

Switchport mode Access

Switchport port-security

Switchport port-security maximum 1

Switchport port-security violation shutdown

Switchport port-security mac-address sticky

### **Interface fa 0/3**

Switchport mode Access

Switchport port-security

Switchport port-security maximum 1

Switchport port-security violation shutdown

Switchport port-security mac-address sticky

### **2.1.14 DESHABILITACIÓN DNS LOOKUP EN SWITCH3**

Config t

No ip domain-lookup

### **2.1.15 ASIGNAR DIRECCIONES IP A LOS SWITCHES ACORDE A LOS LINEAMIENTOS**

**S1**

Interface vlan 99

Ip address 192.168.99.2 255.255.255.0

**S3**

Interface vlan 99

Ip address 192.168.99.3 255.255.255.0

### **2.1.16 DESACTIVAR TODAS LAS INTERFACES QUE NO SEAN UTILIZADAS EN EL ESQUEMA DE RED**

**S3.**

Interface ra fa 0/2

Sh

Interface ra fa 04/-24

Sh

**S1.**

Interface f0/2

Sh

Interface ra fa 04/-23

Sh

### **2.1.17 CONFIGURAR R1 COMO SERVIDOR DHCP PARA LAS VLANS 30 Y 40**

Ip dhcp excluded-address 192.168.30.1

Ip dhcp excluded-address 192.168.40.1

Ip dhcp pool Administracion

Network 192.168.30.0 255.255.255.0

default-router 192.168.30.1 255.255.255.0

dns-server 10.10.10.11

Ip dhcp pool Mercadeo

Network 192.168.40.0 255.255.255.0

default-router 192.168.40.1 255.255.255.0

dns-server 10.10.10.11

ip domain-name ccna-unad.com

## **CONCLUSIÓN**

El uso de las computadoras en todos los lugares y cada vez con mayor frecuencia hace fácil el tráfico de la información dejando obsoletas algunas herramientas tradicionales, Iniciándose una nueva época en la que el trabajo físico va siendo reemplazado por el trabajo mental, a partir de eso surgen nuevas necesidades como aprender el manejo y funcionamiento de las nuevas tecnologías, Finalmente tenemos que la tecnología es un gran respaldo en nuestra vida diaria y un gran indicador de avance para una sociedad. Sin embargo, este fenómeno que cada vez se desarrolla más y más, nos incita a caer en el abuso y en el exceso poniendo en riesgo así nuestra salud mental.

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