

**PRUEBA DE HABILIDADES CCNA 2019**

**EVALUACION FINAL**

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**Nota de aceptación:**

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**Firma Tutor**

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**Firma Jurado**

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## **INTRODUCCIÓN**

Mediante el presente trabajo el lector encontrara solución a los ejercicios relacionados como escenario1 y escenario 2 de la guía PRUEBA FINAL DE HABILIDADES PRÁCTICAS CCNA del diplomado de profundización CISCO de la UNAD.

A continuación encontrara las evidencias relacionadas con los pasos necesarios utilizados para resolver los escenarios mencionados anteriormente. Estas evidencias corresponderan a los códigos utilizados y las imágenes de pantalla que presentan los resultados de los comandos ping, traceroute, show ip route, etc utilizados con el fin de verificar los ajustes hechos a las redes propuestas.

## **OBJETIVOS**

### **OBJETIVO GENERAL**

Aplicar las destrezas aprendidas durante el curso de Redes CISCO CNNA 1 y CNNA 2 en la resolución de dos escenarios complejos basados en situaciones de la vida real.

### **OBJETIVOS ESPECÍFICOS**

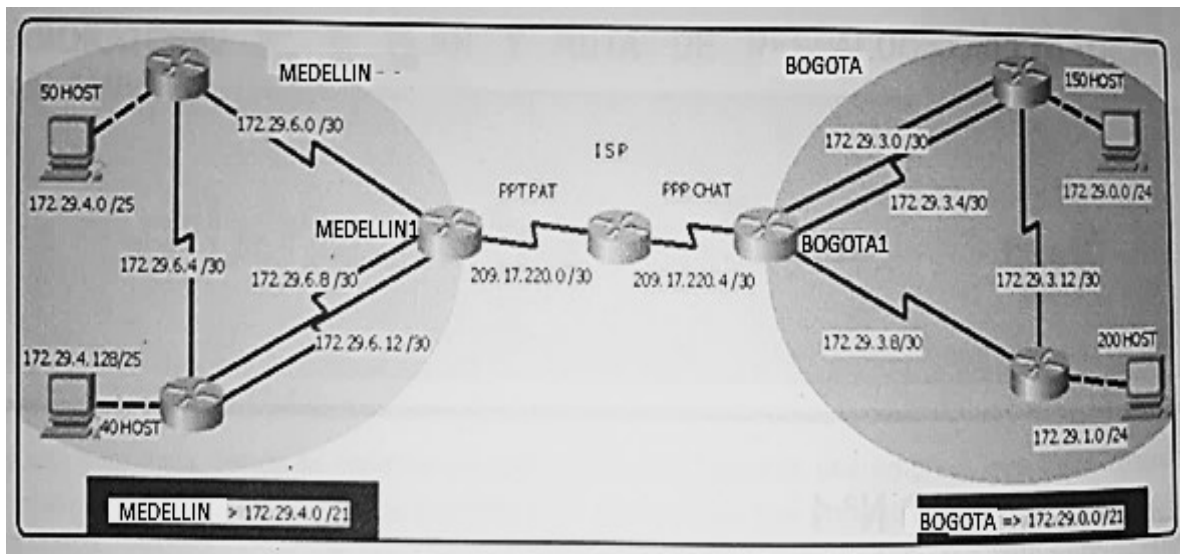
- Identificar los tipos de topologías existentes en los actuales entornos de red.
- Reconocer los diferentes dispositivos que pueden hacer parte de las diferentes tipologías de red.
- Realizar la configuración básica de dispositivos comunes de red tales como routers y switches.
- Completar los procedimientos necesarios para dotar a la red de servicios tales como DHCP, RIP, DNS, etc.
- Realizar las pruebas necesarias que permitan reconocer las causas de posibles problemas derivados de una incorrecta configuración.

## DESARROLLO DE LA ACTIVIDAD

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.

### ESCENARIO 1

#### Topología de red

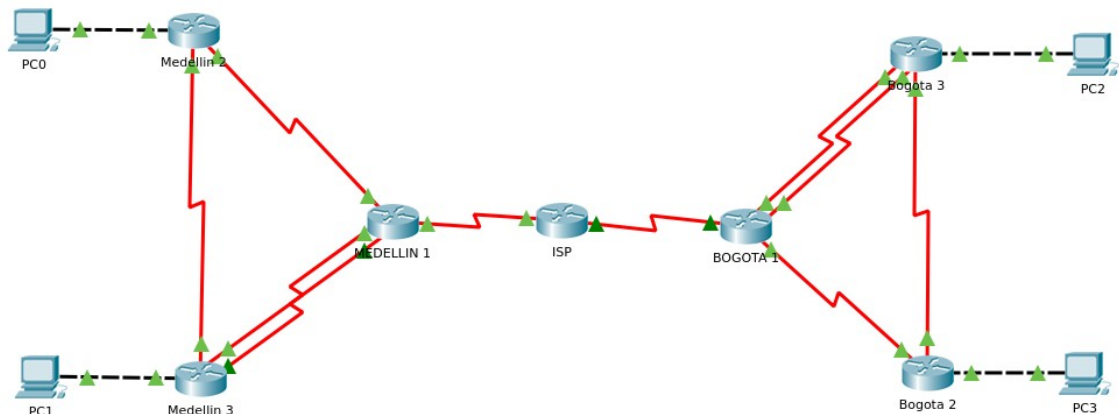


Este escenario plantea el uso de RIP como protocolo de enrutamiento, considerando que se tendrán rutas por defecto redistribuidas; asimismo, habilitar el encapsulamiento PPP y su autenticación. Los routers Bogota2 y medellin2 proporcionan el servicio DHCP a su propia red LAN y a los routers 3 de cada ciudad. Debe configurar PPP en los enlaces hacia el ISP, con autenticación. Debe habilitar NAT de sobrecarga en los routers Bogota1 y medellin1.

Como trabajo inicial se debe realizar lo siguiente:

- Realizar las rutinas de diagnóstico y dejar los equipos listos para su configuración (asignar nombres de equipos, asignar claves de seguridad, etc).
- Realizar la conexión física de los equipos con base en la topología de red

Router	ip	Mascara de sub-red	interfaz	tipo
Medellin 1	172.29.6.9	255.255.255.252	0/1/1	DCE
	172.29.6.13	255.255.255.252	0/0/1	DCE
	172.29.6.1	255.255.255.252	0/0/0	DCE
Medellin 2	209.17.200.2	255.255.255.252	0/1/0	DCE
	172.29.6.5	255.255.255.252	0/1/0	DCE
	172.29.6.2	255.255.255.252	0/0/0	DCE
Medellin 3	172.29.6.10	255.255.255.252	0/1/1	DCE
	172.29.6.14	255.255.255.252	0/0/1	DCE
	172.29.6.6	255.255.255.252	0/1/0	DCE
ISP	209.17.220.1	255.255.255.252	0/1/0	DCE
	209.17.220.5	255.255.255.252	0/0/0	DCE
Bogota 1	172.29.3.9	255.255.255.252	0/0/1	DCE
	172.29.3.1	255.255.255.252	0/1/0	DCE
	172.29.3.5	255.255.255.252	0/1/1	DCE
	209.17.220.6	255.255.255.252	0/0/0	DCE
Bogota 2	172.29.3.10	255.255.255.252	0/0/1	DCE
	172.29.3.13	255.255.255.252	0/0/0	DCE
	172.29.3.2	255.255.255.252	0/1/0	DCE
Bogota 3	172.29.3.6	255.255.255.252	0/1/1	DCE
	172.29.3.14	255.255.255.252	0/0/0	DCE



### [Medellin\_1]

*configure terminal*

*no ip domain-lookup*

*hostname Medellin\_1*

*service password-encryption*

```
enable password dharma_2
line console 0
logging synchronous
password dharma_1
login
interface s0/1/1
description link-1 Medellin_1 to Medellin_3
ip address 172.29.6.9 255.255.255.252
clock rate 128000
no shutdown
interface s0/0/1
description link-2 Medellin_1 to Medellin_3
ip address 172.29.6.13 255.255.255.252
```

```
clock rate 128000
no shutdown
interface s0/0/0
description link Medellin_1 to Medellin_2
ip address 172.29.6.1 255.255.255.252
clock rate 128000
no shutdown
interface s0/1/0
description link Medellin_1 to ISP
ip address 209.17.220.2 255.255.255.252
no shutdown
```

### **[Medellin\_2]**

```
configure terminal
no ip domain-lookup
hostname Medellin_2
service password-encryption
enable password dharma_2
```



```
line console 0
logging synchronous
password dharma_1
login
interface s0/1/0
description link Medellin_2 to Medellin_3
ip address 172.29.6.5 255.255.255.252
clock rate 128000
no shutdown
interface s0/0/0
description link Medellin_2 to Medellin_1
ip address 172.29.6.2 255.255.255.252
no shutdown
```

### **[Medellin\_3]**

```
configure terminal
no ip domain-lookup
hostname Medellin_3
service password-encryption
enable password dharma_2
line console 0
logging synchronous
password dharma_1
login
interface s0/1/1
description link Medellin_3 to Medellin_1
ip address 172.29.6.10 255.255.255.252
no shutdown
interface s0/0/1
description link Medellin_3 to Medellin_1
ip address 172.29.6.14 255.255.255.252
no shutdown
```

```
interface s0/1/0
description link Medellin_3 to Medellin_2
ip address 172.29.6.6 255.255.255.252
no shutdown
```

### **[ISP]**

```
configure terminal
no ip domain-lookup
hostname ISP
service password-encryption
enable password dharma_2
line console 0
logging synchronous
password dharma_1
login
interface s0/1/0
description link ISP to Medellin_1
ip address 209.17.220.1 255.255.255.252
clock rate 128000
no shutdown
interface s0/0/0
description link ISP to Bogota_1
ip address 209.17.220.5 255.255.255.252
clock rate 128000
no shutdown
```

### **[Bogota\_1]**

```
configure terminal
no ip domain-lookup
hostname Bogota_1
service password-encryption
enable password dharma_2
```

```
line console 0
logging synchronous
password dharma_1
login
interface s0/0/1
description link-1 Bogota_1 to Bogota_2
ip address 172.29.3.9 255.255.255.252
clock rate 128000
no shutdown
interface s0/1/0
description link-2 Bogota_1 to Bogota_3
ip address 172.29.3.1 255.255.255.252
clock rate 128000
no shutdown
interface s0/1/1
description link Bogota_1 to Bogota_3
ip address 172.29.3.5 255.255.255.252
clock rate 128000
no shutdown
interface s0/0/0
description link Bogota_1 to ISP
ip address 209.17.220.6 255.255.255.252
no shutdown
```

## **[Bogota\_2]**

```
configure terminal
no ip domain-lookup
hostname Bogota_2
service password-encryption
enable password dharma_2
line console 0
logging synchronous
```

```
password dharma_1
login
interface s0/0/1
description link-1 Bogota_2 to Bogota_1
ip address 172.29.3.10 255.255.255.252
no shutdown
interface s0/0/0
description link-1 Bogota_2 to Bogota_3
ip address 172.29.3.13 255.255.255.252
clock rate 128000
no shutdown
```

### **[Bogota\_3]**

```
configure terminal
no ip domain-lookup
hostname Bogota_3
service password-encryption
enable password dharma_2
line console 0
logging synchronous
password dharma_1
login
interface s0/1/0
description link Bogota_3 to Bogota_1
ip address 172.29.3.2 255.255.255.252
no shutdown
interface s0/1/1
description link Bogota_3 to Bogota_1
ip address 172.29.3.6 255.255.255.252
no shutdown
interface s0/0/0
description link Bogota_3 to Bogota_2
```

```
ip address 172.29.3.14 255.255.255.252  
no shutdown
```

## **Parte 1: Configuración del enrutamiento**

a) Configurar el enrutamiento en la red usando el protocolo RIP versión 2, declare la red principal, desactive la sumarización automática.

### **[Medellin\_1]**

```
router rip  
version 2  
network 172.29.0.0  
no auto-summary
```

### **[Medellin\_2]**

```
router rip  
version 2  
network 172.29.0.0  
no auto-summary
```

### **[Medellin\_3]**

```
router rip  
version 2  
network 172.29.0.0  
no auto-summary
```

### **[ISP]**

```
router rip  
version 2  
network 209.17.220.0  
no auto-summary
```

**[Bogota\_1]**

```
router rip
version 2
network 172.29.0.0
no auto-summary
```

**[Bogota\_2]**

```
router rip
version 2
network 172.29.0.0
no auto-summary
```

**[Bogota\_3]**

```
router rip
version 2
network 172.29.0.0
no auto-summary
```

b) Los routers Bogota1 y Medellín1 deberán añadir a su configuración de enrutamiento una ruta por defecto hacia el ISP y, a su vez, redistribuirla dentro de las publicaciones de RIP.

**[Bogota\_1]**

```
ip route 0.0.0.0 0.0.0.0 209.17.220.5
router rip
default-information originate
```

**[Medellin\_1]**

```
ip route 0.0.0.0 0.0.0.0 209.17.220.1
router rip
default-information originate
```

c) El router ISP deberá tener una ruta estática dirigida hacia cada red interna de Bogotá y Medellín para el caso se suman las subredes de cada uno a /22.

### [ISP]

```
ip route 172.29.4.128 255.255.255.128 s0/1/0
```

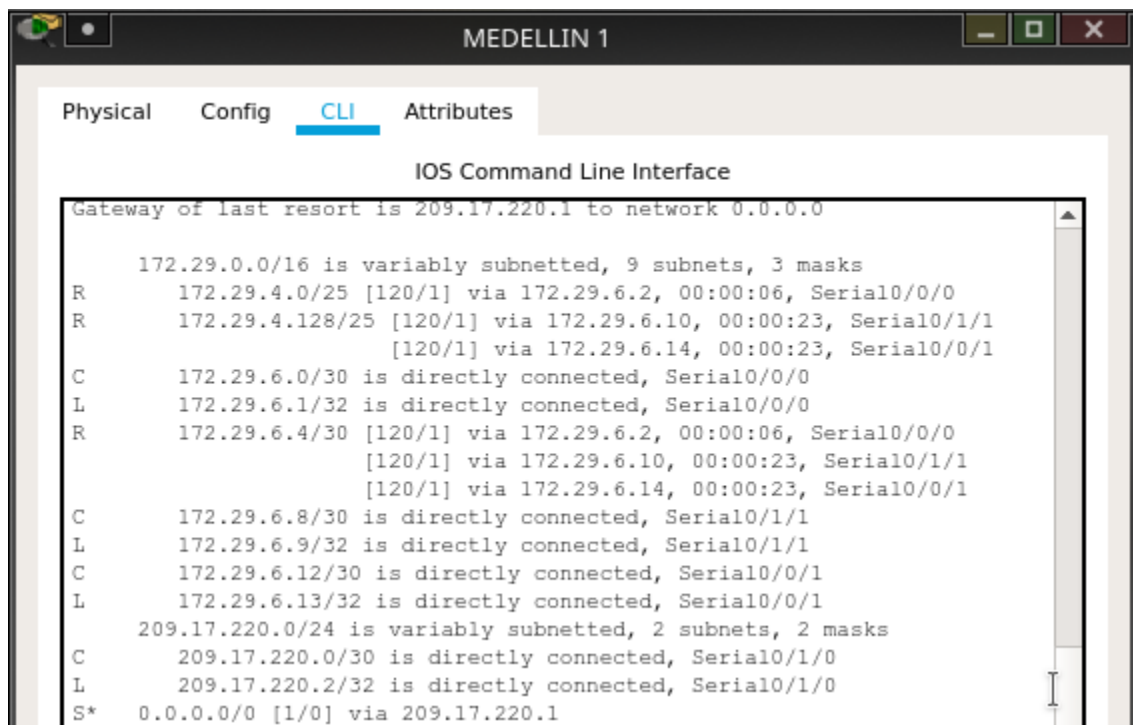
```
ip route 172.29.4.0 255.255.255.128 s0/1/0
```

```
ip route 172.29.1.0 255.255.255.0 s0/0/0
```

```
ip route 172.29.0.0 255.255.255.0 s0/0/0
```

### Parte 2: Tabla de Enrutamiento.

a) Verificar la tabla de enrutamiento en cada uno de los routers para comprobar las redes y sus rutas.



```
MEDELLIN 1
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, 00:00:06, Serial0/0/0
R   172.29.4.128/25 [120/1] via 172.29.6.10, 00:00:23, Serial0/1/1
    [120/1] via 172.29.6.14, 00:00:23, Serial0/0/1
C   172.29.6.0/30 is directly connected, Serial0/0/0
L   172.29.6.1/32 is directly connected, Serial0/0/0
R   172.29.6.4/30 [120/1] via 172.29.6.2, 00:00:06, Serial0/0/0
    [120/1] via 172.29.6.10, 00:00:23, Serial0/1/1
    [120/1] via 172.29.6.14, 00:00:23, Serial0/0/1
C   172.29.6.8/30 is directly connected, Serial0/1/1
L   172.29.6.9/32 is directly connected, Serial0/1/1
C   172.29.6.12/30 is directly connected, Serial0/0/1
L   172.29.6.13/32 is directly connected, Serial0/0/1
  209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C   209.17.220.0/30 is directly connected, Serial0/1/0
L   209.17.220.2/32 is directly connected, Serial0/1/0
S*  0.0.0.0/0 [1/0] via 209.17.220.1
```

The screenshot shows the CLI of a router named 'ISP'. The 'CLI' tab is selected. The output of a command is as follows:

```
IOS Command Line Interface

172.29.0.0/16 is variably subnetted, 4 subnets, 2 masks
S   172.29.0.0/24 is directly connected, Serial0/0/0
S   172.29.1.0/24 is directly connected, Serial0/0/0
S   172.29.4.0/25 is directly connected, Serial0/1/0
S   172.29.4.128/25 is directly connected, Serial0/1/0
209.17.220.0/24 is variably subnetted, 4 subnets, 2 masks
C   209.17.220.0/30 is directly connected, Serial0/1/0
L   209.17.220.1/32 is directly connected, Serial0/1/0
C   209.17.220.4/30 is directly connected, Serial0/0/0
L   209.17.220.5/32 is directly connected, Serial0/0/0
```

The screenshot shows the CLI of a router named 'Medellin 2'. The 'CLI' tab is selected. The output of a command is as follows:

```
IOS Command Line Interface

Gateway of last resort is 172.29.6.1 to network 0.0.0.0

172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
C   172.29.4.0/25 is directly connected, GigabitEthernet0/0
L   172.29.4.1/32 is directly connected, GigabitEthernet0/0
R   172.29.4.128/25 [120/1] via 172.29.6.6, 00:00:15, Serial0/1/0
C   172.29.6.0/30 is directly connected, Serial0/0/0
L   172.29.6.2/32 is directly connected, Serial0/0/0
C   172.29.6.4/30 is directly connected, Serial0/1/0
L   172.29.6.5/32 is directly connected, Serial0/1/0
R   172.29.6.8/30 [120/1] via 172.29.6.1, 00:00:22, Serial0/0/0
    [120/1] via 172.29.6.6, 00:00:15, Serial0/1/0
R   172.29.6.12/30 [120/1] via 172.29.6.1, 00:00:22, Serial0/0/0
    [120/1] via 172.29.6.6, 00:00:15, Serial0/1/0
R*  0.0.0.0/0 [120/1] via 172.29.6.1, 00:00:22, Serial0/0/0
```



Medellin 3

Physical Config CLI Attributes

IOS Command Line Interface

```
Gateway of last resort is 172.29.6.9 to network 0.0.0.0

    172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks
R    172.29.4.0/25 [120/1] via 172.29.6.5, 00:00:16, Serial0/1/0
C    172.29.4.128/25 is directly connected, GigabitEthernet0/0
L    172.29.4.129/32 is directly connected, GigabitEthernet0/0
R    172.29.6.0/30 [120/1] via 172.29.6.9, 00:00:09, Serial0/1/1
    [120/1] via 172.29.6.13, 00:00:09, Serial0/0/1
    [120/1] via 172.29.6.5, 00:00:16, Serial0/1/0
C    172.29.6.4/30 is directly connected, Serial0/1/0
L    172.29.6.6/32 is directly connected, Serial0/1/0
C    172.29.6.8/30 is directly connected, Serial0/1/1
L    172.29.6.10/32 is directly connected, Serial0/1/1
C    172.29.6.12/30 is directly connected, Serial0/0/1
L    172.29.6.14/32 is directly connected, Serial0/0/1
R*  0.0.0.0/0 [120/1] via 172.29.6.9, 00:00:09, Serial0/1/1
    [120/1] via 172.29.6.13, 00:00:09, Serial0/0/1
```

BOGOTA 1

Physical Config CLI Attributes

IOS Command Line Interface

```
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, 00:00:29, 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 172.29.3.10, 00:00:29, Serial0/0/1
    [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
    209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C    209.17.220.4/30 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
```

```
Gateway of last resort is 172.29.3.9 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 172.29.3.14, 00:00:18, Serial0/0/0
C   172.29.1.0/24 is directly connected, GigabitEthernet0/0
L   172.29.1.1/32 is directly connected, GigabitEthernet0/0
R   172.29.3.0/30 [120/1] via 172.29.3.9, 00:00:20, Serial0/0/1
    [120/1] via 172.29.3.14, 00:00:18, Serial0/0/0
R   172.29.3.4/30 [120/1] via 172.29.3.9, 00:00:20, Serial0/0/1
    [120/1] via 172.29.3.14, 00:00:18, Serial0/0/0
C   172.29.3.8/30 is directly connected, Serial0/0/1
L   172.29.3.10/32 is directly connected, Serial0/0/1
C   172.29.3.12/30 is directly connected, Serial0/0/0
L   172.29.3.13/32 is directly connected, Serial0/0/0
R*  0.0.0.0/0 [120/1] via 172.29.3.9, 00:00:20, Serial0/0/1
```

```
Gateway of last resort is 172.29.3.5 to network 0.0.0.0

  172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks
C   172.29.0.0/24 is directly connected, GigabitEthernet0/0
L   172.29.0.1/32 is directly connected, GigabitEthernet0/0
R   172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:14, Serial0/0/0
C   172.29.3.0/30 is directly connected, Serial0/1/0
L   172.29.3.2/32 is directly connected, Serial0/1/0
C   172.29.3.4/30 is directly connected, Serial0/1/1
L   172.29.3.6/32 is directly connected, Serial0/1/1
R   172.29.3.8/30 [120/1] via 172.29.3.5, 00:00:09, Serial0/1/1
    [120/1] via 172.29.3.13, 00:00:14, Serial0/0/0
    [120/1] via 172.29.3.1, 00:00:09, Serial0/1/0
C   172.29.3.12/30 is directly connected, Serial0/0/0
L   172.29.3.14/32 is directly connected, Serial0/0/0
R*  0.0.0.0/0 [120/1] via 172.29.3.5, 00:00:09, Serial0/1/1
    [120/1] via 172.29.3.1, 00:00:09, Serial0/1/0
```

b) Verificar el balanceo de carga que presentan los routers.

*Se observa que los routers estan balanceados ya que reciben varias trayectorias con el mismo costo y la misma distancia administrativa del destino.*

c) Obsérvese en los routers Bogotá1 y Medellín1 cierta similitud por su ubicación, por tener dos enlaces de conexión hacia otro router y por la ruta por defecto que manejan.

### Bogota\_1

```

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, 00:00:29, Serial0/0/1
  
```

### Medellin\_1

```

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, 00:00:06, Serial0/0/0
R       172.29.4.128/25 [120/1] via 172.29.6.10, 00:00:23, Serial0/1/1
        [120/1] via 172.29.6.14, 00:00:23, Serial0/0/1
C       172.29.6.0/30 is directly connected, Serial0/0/0
  
```

d) Los routers Medellín2 y Bogotá2 también presentan redes conectadas directamente y recibidas mediante RIP.

### Medellin\_2

```

R       172.29.6.8/30 [120/1] via 172.29.6.1, 00:00:22, Serial0/0/0
        [120/1] via 172.29.6.6, 00:00:15, Serial0/1/0
R       172.29.6.12/30 [120/1] via 172.29.6.1, 00:00:22, Serial0/0/0
        [120/1] via 172.29.6.6, 00:00:15, Serial0/1/0
R*    0.0.0.0/0 [120/1] via 172.29.6.1, 00:00:22, Serial0/0/0
  
```

### Bogota\_2

```

R       172.29.0.0/24 [120/1] via 172.29.3.14, 00:00:18, Serial0/0/0
C       172.29.1.0/24 is directly connected, GigabitEthernet0/0
L       172.29.1.1/32 is directly connected, GigabitEthernet0/0
R       172.29.3.0/30 [120/1] via 172.29.3.9, 00:00:20, Serial0/0/1
        [120/1] via 172.29.3.14, 00:00:18, Serial0/0/0
R       172.29.3.4/30 [120/1] via 172.29.3.9, 00:00:20, Serial0/0/1
        [120/1] via 172.29.3.14, 00:00:18, Serial0/0/0
C       172.29.3.8/30 is directly connected, Serial0/0/1
L       172.29.3.10/32 is directly connected, Serial0/0/1
C       172.29.3.12/30 is directly connected, Serial0/0/0
L       172.29.3.13/32 is directly connected, Serial0/0/0
R*    0.0.0.0/0 [120/1] via 172.29.3.9, 00:00:20, Serial0/0/1
  
```

e) Las tablas de los routers restantes deben permitir visualizar rutas redundantes para el caso de la ruta por defecto.

### Medellin\_3

```
R      172.29.6.0/30 [120/1] via 172.29.6.9, 00:00:09, Serial0/1/1
      [120/1] via 172.29.6.13, 00:00:09, Serial0/0/1
      [120/1] via 172.29.6.5, 00:00:16, Serial0/1/0
```

### Bogota\_3

```
R      172.29.3.8/30 [120/1] via 172.29.3.5, 00:00:09, Serial0/1/1
      [120/1] via 172.29.3.13, 00:00:14, Serial0/0/0
      [120/1] via 172.29.3.1, 00:00:09, Serial0/1/0
```

f) El router ISP solo debe indicar sus rutas estáticas adicionales a las directamente conectadas.

```
172.29.0.0/16 is variably subnetted, 4 subnets, 2 masks
S      172.29.0.0/24 is directly connected, Serial0/0/0
S      172.29.1.0/24 is directly connected, Serial0/0/0
S      172.29.4.0/25 is directly connected, Serial0/1/0
S      172.29.4.128/25 is directly connected, Serial0/1/0
C      209.17.220.0/24 is variably subnetted, 4 subnets, 2 masks
C      209.17.220.0/30 is directly connected, Serial0/1/0
L      209.17.220.1/32 is directly connected, Serial0/1/0
C      209.17.220.4/30 is directly connected, Serial0/0/0
L      209.17.220.5/32 is directly connected, Serial0/0/0
```

**Nota:** Los pantallazos completos se encuentran al inicio

### Parte 3: Deshabilitar la propagación del protocolo RIP.

a) Para no propagar las publicaciones por interfaces que no lo requieran se debe deshabilitar la propagación del protocolo RIP, en la siguiente tabla se indican las interfaces de cada router que no necesitan desactivación.

ROUTER	INTERFAZ
Bogota1	SERIAL0/0/1; SERIAL0/1/0; SERIAL0/1/1
Bogota2	SERIAL0/0/0; SERIAL0/0/1
Bogota3	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0

<b>Medellín1</b>	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/1
<b>Medellín2</b>	SERIAL0/0/0; SERIAL0/0/1
<b>Medellín3</b>	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0
<b>ISP</b>	No lo requiere

**[Medellin\_2]**

*router rip*

*version 2*

*passive-interface g0/0*

**[Medellin\_3]**

*router rip*

*version 2*

*passive-interface g0/0*

**[Bogota\_2]**

*router rip*

*version 2*

*passive-interface g0/0*

**[Bogota\_3]**

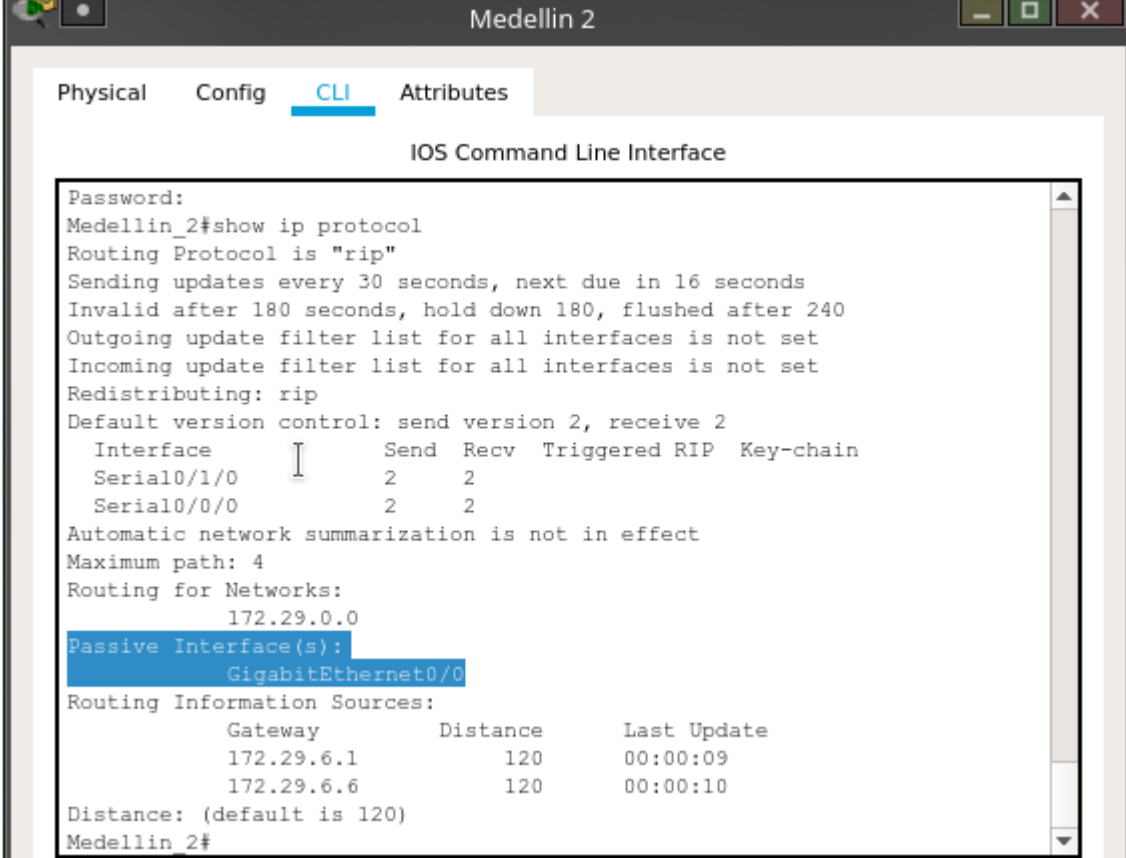
*router rip*

*version 2*

*passive-interface g0/0*

#### Parte 4: Verificación del protocolo RIP.

a) Verificar y documentar las opciones de enrutamiento configuradas en los routers, como el **passive interface** para la conexión hacia el ISP, la versión de RIP y las interfaces que participan de la publicación entre otros datos.



```
Medellin_2#show ip protocol
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 16 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
  Serial0/1/0         2    2
  Serial0/0/0         2    2
  Automatic network summarization is not in effect
  Maximum path: 4
  Routing for Networks:
    172.29.0.0
  Passive Interface(s):
    GigabitEthernet0/0
  Routing Information Sources:
    Gateway         Distance      Last Update
  172.29.6.1        120          00:00:09
  172.29.6.6        120          00:00:10
  Distance: (default is 120)
Medellin_2#
```

#### Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 16 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
Serial0/1/0	2	2		
Serial0/0/0	2	2		

Automatic network summarization is not in effect

Maximum path: 4

Routing for Networks:

172.29.0.0

**Passive Interface(s):**

**GigabitEthernet0/0**

Routing Information Sources:

Gateway	Distance	Last Update
172.29.6.1	120	00:00:09
172.29.6.6	120	00:00:10

```
Medellin_3>enable
Password:
Medellin_3#show ip protocol
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 19 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
  Serial0/1/1          2     2
  Serial0/0/1          2     2
  Serial0/1/0          2     2
  Automatic network summarization is not in effect
  Maximum path: 4
  Routing for Networks:
    172.29.0.0
  Passive Interface(s):
    GigabitEthernet0/0
  Routing Information Sources:
    Gateway          Distance    Last Update
  172.29.6.9         120         00:00:08
  172.29.6.13        120         00:00:08
  172.29.6.5         120         00:00:14
  Distance: (default is 120)
Medellin_3#
```

Routing Protocol is "rip"

## Redistributing: rip

Default version control: send **version 2, receive 2**

Interface	Send	Recv	Triggered RIP	Key-chain
Serial0/1/1	2	2		
Serial0/0/1	2	2		
Serial0/1/0	2	2		

Automatic network summarization is not in effect

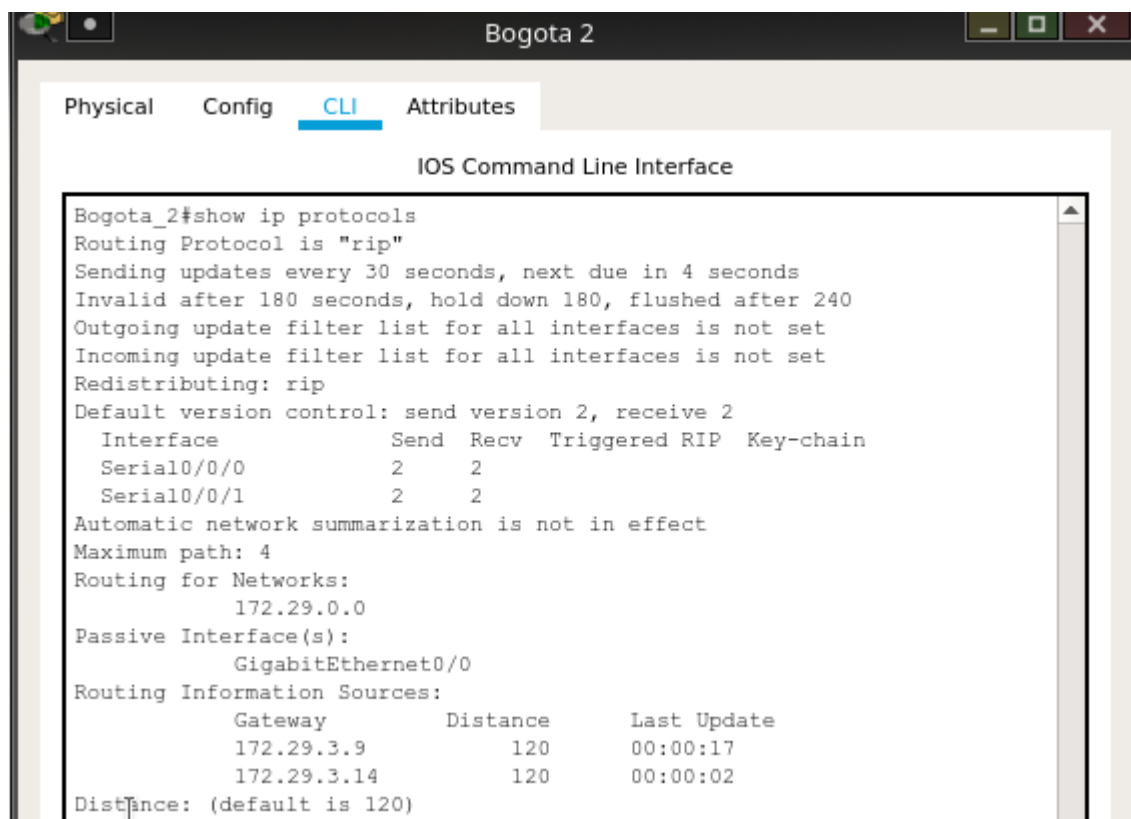
Maximum path: 4

Routing for Networks:

172.29.0.0

Passive Interface(s):

**GigabitEthernet0/0**



```
Bogota 2
Physical Config CLI Attributes
IOS Command Line Interface
Bogota_2#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 4 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:
  172.29.0.0
Passive Interface(s):
  GigabitEthernet0/0
Routing Information Sources:
  Gateway           Distance      Last Update
  172.29.3.9        120          00:00:17
  172.29.3.14       120          00:00:02
Distance: (default is 120)
```

Bogota\_2#show ip protocols

**Routing Protocol is "rip"**

Sending updates every 30 seconds, next due in 4 seconds

Invalid after 180 seconds, hold down 180, flushed after 240



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:

**172.29.0.0**

### Passive Interface(s):

**GigabitEthernet0/0**

### Routing Information Sources:

Gateway	Distance	Last Update
172.29.3.9	120	00:00:17
172.29.3.14	120	00:00:02

```
Bogota 3
Physical Config CLI Attributes
IOS Command Line Interface
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 27 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
  Serial0/1/1        2     2
  Serial0/0/0        2     2
  Serial0/1/0        2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  172.29.0.0
Passive Interface(s):
  GigabitEthernet0/0
Routing Information Sources:
  Gateway          Distance    Last Update
  172.29.3.5       120         00:00:25
  172.29.3.1       120         00:00:25
  172.29.3.13     120         00:00:02
Distance: (default is 120)
```

## Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 27 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
Serial0/1/1	2	2			
Serial0/0/0	2	2			
Serial0/1/0	2	2			

Automatic network summarization is not in effect

Maximum path: 4

Routing for Networks:

172.29.0.0

**Passive Interface(s):**

**GigabitEthernet0/0**

Routing Information Sources:

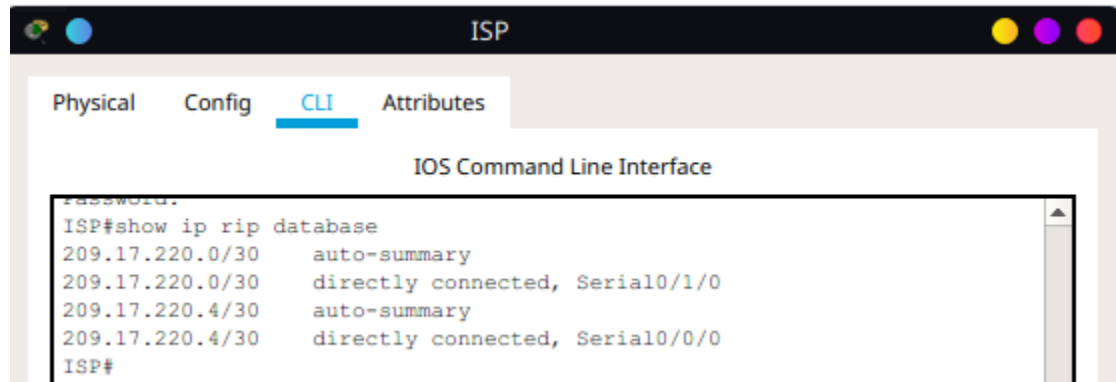
Gateway	Distance	Last Update
172.29.3.5	120	00:00:25
172.29.3.1	120	00:00:25
172.29.3.13	120	00:00:02

Distance: (default is 120)

b) Verificar y documentar la base de datos de RIP de cada router, donde se informa de manera detallada de todas las rutas hacia cada red.

Se procede a verificar y documentar la bse de datos Rip mediante el comando ***show ip rip database***

## ISP



```
ISP
Physical Config CLI Attributes
IOS Command Line Interface
Password:
ISP#show ip rip database
209.17.220.0/30    auto-summary
209.17.220.0/30    directly connected, Serial0/1/0
209.17.220.4/30    auto-summary
209.17.220.4/30    directly connected, Serial0/0/0
ISP#
```

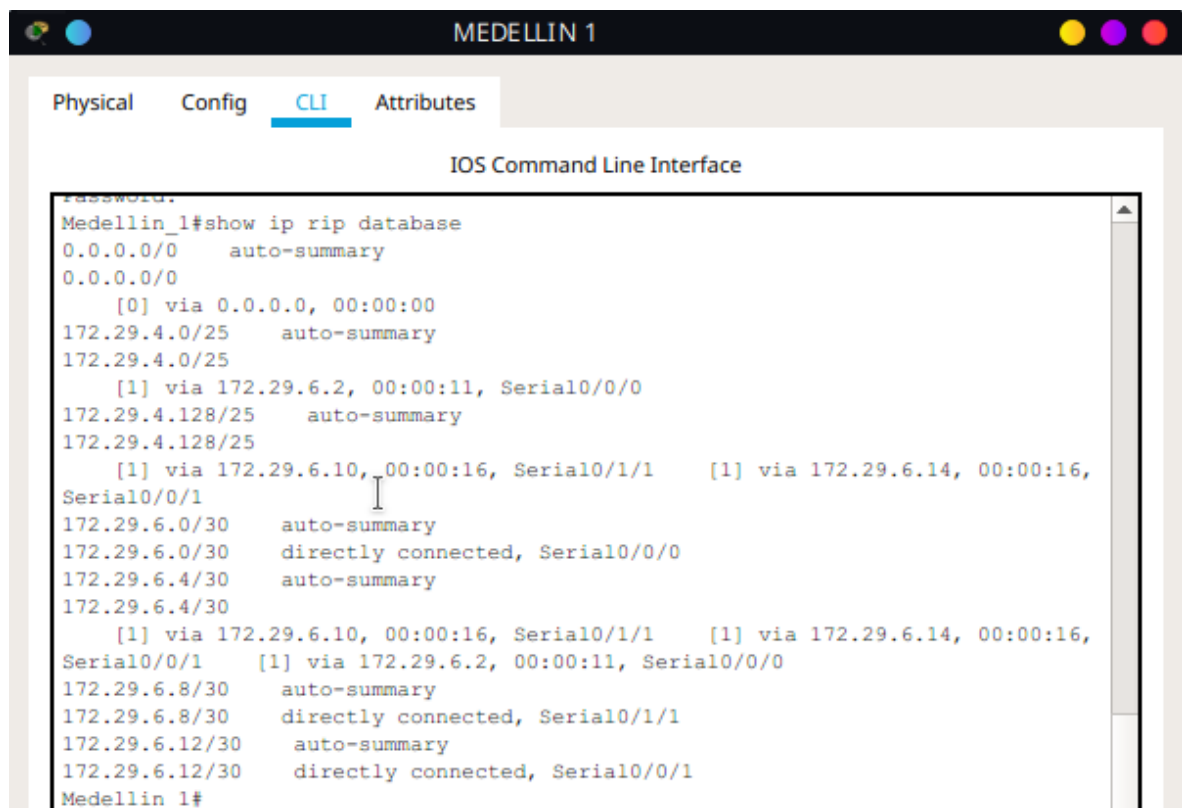
*209.17.220.0/30 auto-summary*

*209.17.220.0/30 directly connected, Serial0/1/0*

*209.17.220.4/30 auto-summary*

*209.17.220.4/30 directly connected, Serial0/0/0*

## Medellin 1



```
MEDELLIN 1
Physical Config CLI Attributes
IOS Command Line Interface
Password:
Medellin_1#show ip rip database
0.0.0.0/0    auto-summary
0.0.0.0/0
    [0] via 0.0.0.0, 00:00:00
172.29.4.0/25    auto-summary
172.29.4.0/25
    [1] via 172.29.6.2, 00:00:11, Serial0/0/0
172.29.4.128/25    auto-summary
172.29.4.128/25
    [1] via 172.29.6.10, 00:00:16, Serial0/1/1    [1] via 172.29.6.14, 00:00:16,
Serial0/0/1
172.29.6.0/30    auto-summary
172.29.6.0/30    directly connected, Serial0/0/0
172.29.6.4/30    auto-summary
172.29.6.4/30
    [1] via 172.29.6.10, 00:00:16, Serial0/1/1    [1] via 172.29.6.14, 00:00:16,
Serial0/0/1    [1] via 172.29.6.2, 00:00:11, Serial0/0/0
172.29.6.8/30    auto-summary
172.29.6.8/30    directly connected, Serial0/1/1
172.29.6.12/30    auto-summary
172.29.6.12/30    directly connected, Serial0/0/1
Medellin_1#
```

0.0.0.0/0 auto-summary  
0.0.0.0/0  
    [0] via 0.0.0.0, 00:00:00  
172.29.4.0/25 auto-summary  
172.29.4.0/25  
    [1] via 172.29.6.2, 00:00:11, Serial0/0/0  
172.29.4.128/25 auto-summary  
172.29.4.128/25  
    [1] via 172.29.6.10, 00:00:16, Serial0/1/1 [1] via 172.29.6.14, 00:00:16,  
Serial0/0/1  
172.29.6.0/30 auto-summary  
172.29.6.0/30 directly connected, Serial0/0/0  
172.29.6.4/30 auto-summary  
172.29.6.4/30  
    [1] via 172.29.6.10, 00:00:16, Serial0/1/1 [1] via 172.29.6.14, 00:00:16,  
Serial0/0/1 [1] via 172.29.6.2, 00:00:11, Serial0/0/0  
172.29.6.8/30 auto-summary  
172.29.6.8/30 directly connected, Serial0/1/1  
172.29.6.12/30 auto-summary  
172.29.6.12/30 directly connected, Serial0/0/1

## **Medellin 2**

0.0.0.0/0 auto-summary  
0.0.0.0/0  
    [1] via 172.29.6.1, 00:00:10, Serial0/0/0  
172.29.4.0/25 auto-summary  
172.29.4.0/25 directly connected, GigabitEthernet0/0  
172.29.4.128/25 auto-summary  
172.29.4.128/25  
    [1] via 172.29.6.6, 00:00:11, Serial0/1/0  
172.29.6.0/30 auto-summary  
172.29.6.0/30 directly connected, Serial0/0/0

172.29.6.4/30 auto-summary

172.29.6.4/30 directly connected, Serial0/1/0

172.29.6.8/30 auto-summary

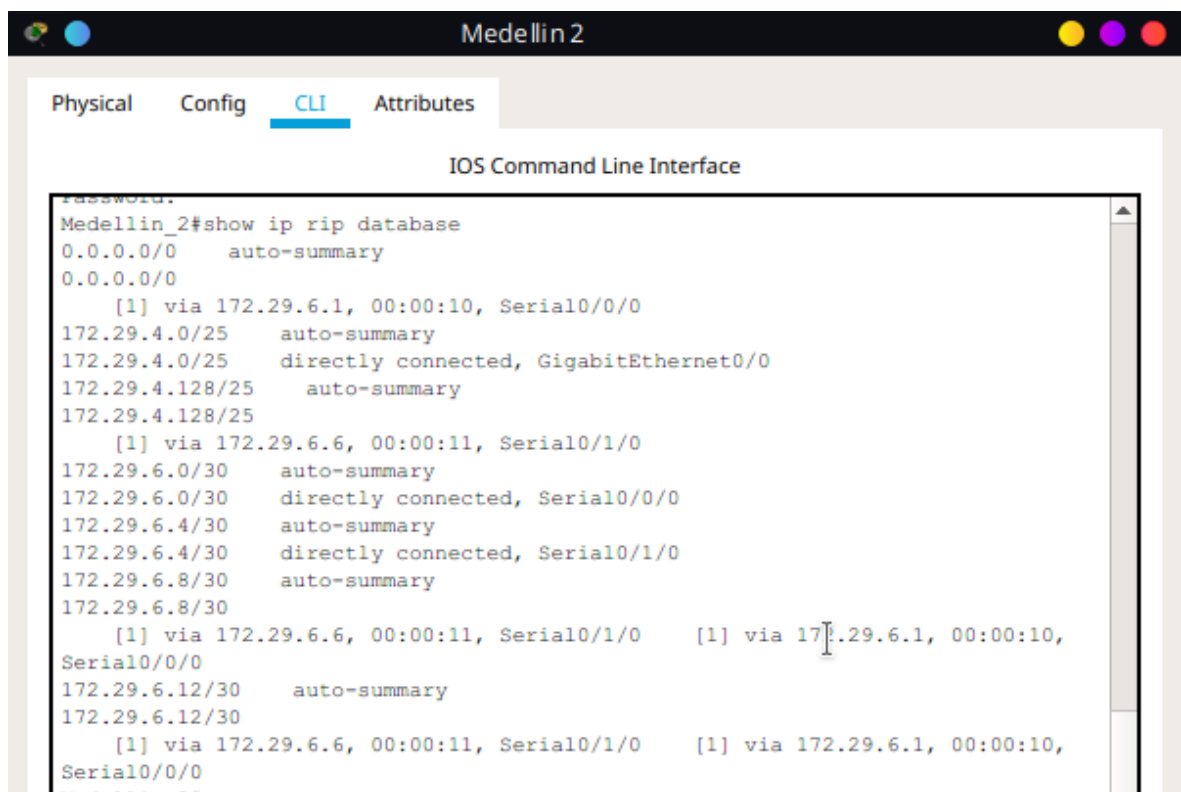
172.29.6.8/30

[1] via 172.29.6.6, 00:00:11, Serial0/1/0 [1] via 172.29.6.1, 00:00:10,  
Serial0/0/0

172.29.6.12/30 auto-summary

172.29.6.12/30

[1] via 172.29.6.6, 00:00:11, Serial0/1/0 [1] via 172.29.6.1, 00:00:10,  
Serial0/0/0



```
Medellin_2#show ip rip database
0.0.0.0/0 auto-summary
0.0.0.0/0
[1] via 172.29.6.1, 00:00:10, Serial0/0/0
172.29.4.0/25 auto-summary
172.29.4.0/25 directly connected, GigabitEthernet0/0
172.29.4.128/25 auto-summary
172.29.4.128/25
[1] via 172.29.6.6, 00:00:11, Serial0/1/0
172.29.6.0/30 auto-summary
172.29.6.0/30 directly connected, Serial0/0/0
172.29.6.4/30 auto-summary
172.29.6.4/30 directly connected, Serial0/1/0
172.29.6.8/30 auto-summary
172.29.6.8/30
[1] via 172.29.6.6, 00:00:11, Serial0/1/0 [1] via 172.29.6.1, 00:00:10,
Serial0/0/0
172.29.6.12/30 auto-summary
172.29.6.12/30
[1] via 172.29.6.6, 00:00:11, Serial0/1/0 [1] via 172.29.6.1, 00:00:10,
Serial0/0/0
```

### Medellin 3

0.0.0.0/0 auto-summary

0.0.0.0/0

[1] via 172.29.6.9, 00:00:28, Serial0/1/1 [1] via 172.29.6.13, 00:00:28,  
Serial0/0/1

172.29.4.0/25 auto-summary

172.29.4.0/25

[1] via 172.29.6.5, 00:00:20, Serial0/1/0

172.29.4.128/25 auto-summary

172.29.4.128/25 directly connected, GigabitEthernet0/0

172.29.6.0/30 auto-summary

172.29.6.0/30

[1] via 172.29.6.9, 00:00:28, Serial0/1/1 [1] via 172.29.6.13, 00:00:28,

Serial0/0/1 [1] via 172.29.6.5, 00:00:20, Serial0/1/0

172.29.6.4/30 auto-summary

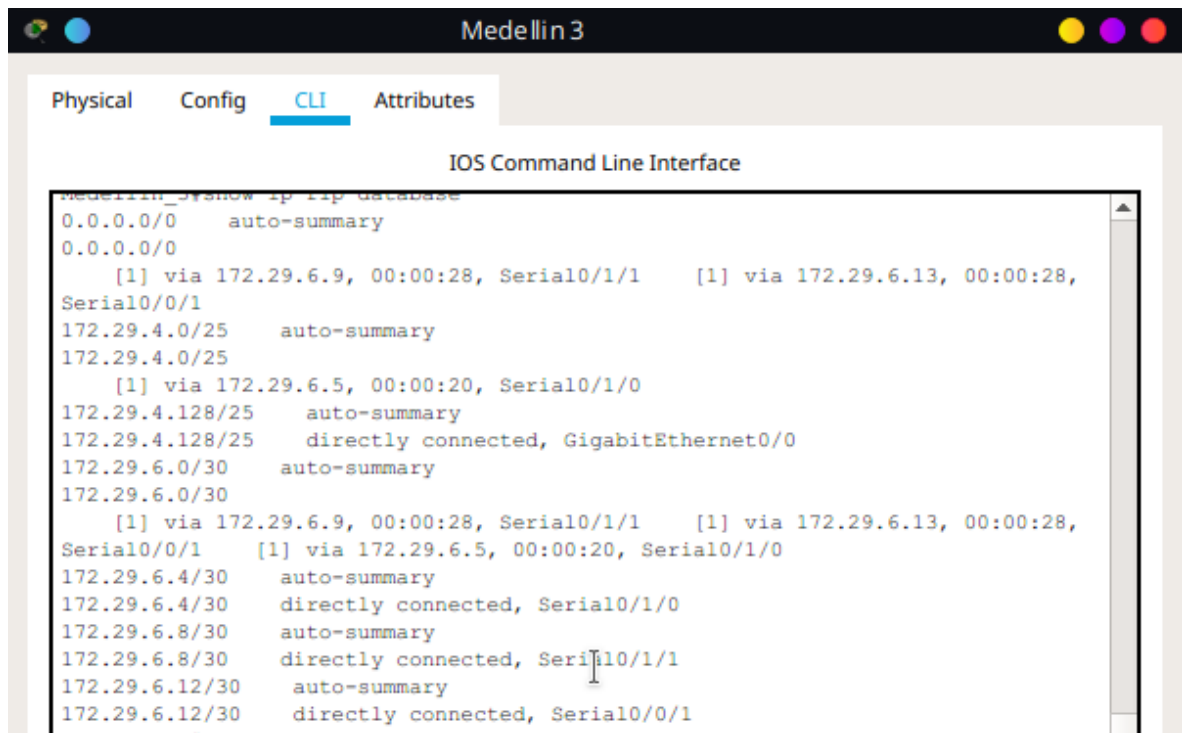
172.29.6.4/30 directly connected, Serial0/1/0

172.29.6.8/30 auto-summary

172.29.6.8/30 directly connected, Serial0/1/1

172.29.6.12/30 auto-summary

172.29.6.12/30 directly connected, Serial0/0/1



The screenshot shows a terminal window titled "Medellin 3" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the output of the command "show ip ip database". The output lists various IP addresses and their associated configurations, including auto-summary, directly connected, and via statements with next-hop IP addresses and MAC addresses.

```
Medellin_3#show ip ip database
0.0.0.0/0 auto-summary
0.0.0.0/0
  [1] via 172.29.6.9, 00:00:28, Serial0/1/1 [1] via 172.29.6.13, 00:00:28,
Serial0/0/1
172.29.4.0/25 auto-summary
172.29.4.0/25
  [1] via 172.29.6.5, 00:00:20, Serial0/1/0
172.29.4.128/25 auto-summary
172.29.4.128/25 directly connected, GigabitEthernet0/0
172.29.6.0/30 auto-summary
172.29.6.0/30
  [1] via 172.29.6.9, 00:00:28, Serial0/1/1 [1] via 172.29.6.13, 00:00:28,
Serial0/0/1 [1] via 172.29.6.5, 00:00:20, Serial0/1/0
172.29.6.4/30 auto-summary
172.29.6.4/30 directly connected, Serial0/1/0
172.29.6.8/30 auto-summary
172.29.6.8/30 directly connected, Serial0/1/1
172.29.6.12/30 auto-summary
172.29.6.12/30 directly connected, Serial0/0/1
```

### Bogota 1

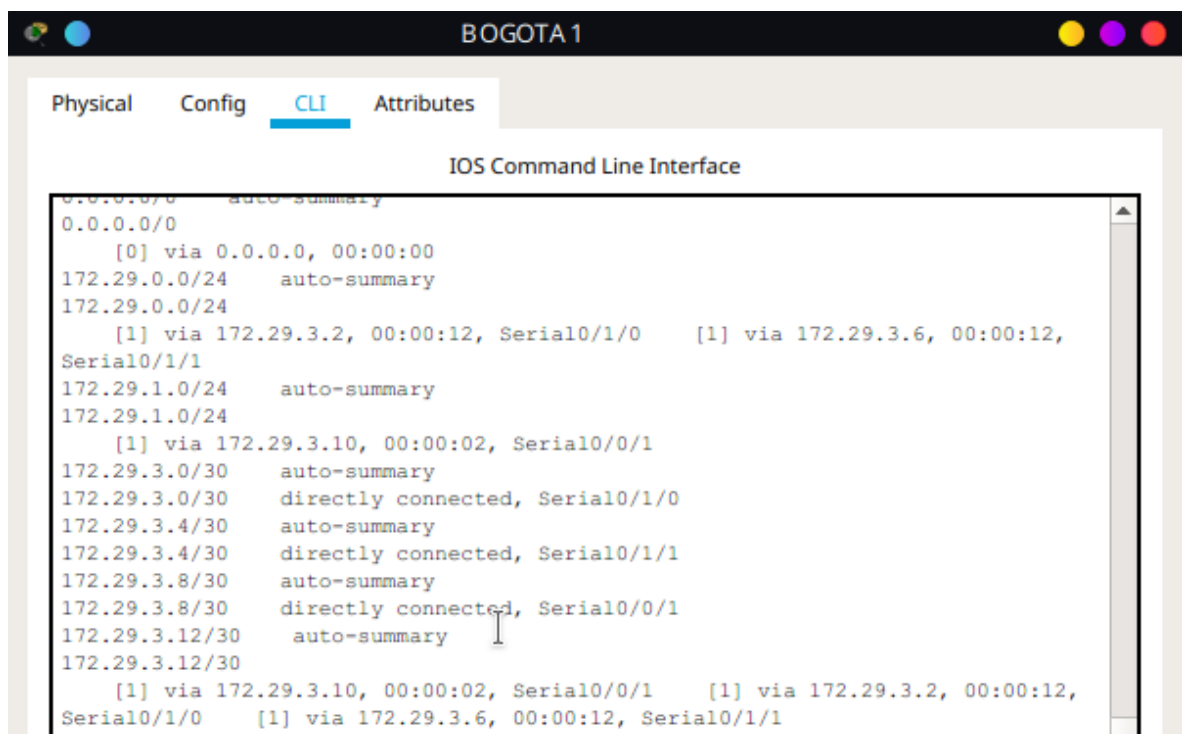
0.0.0.0/0 auto-summary

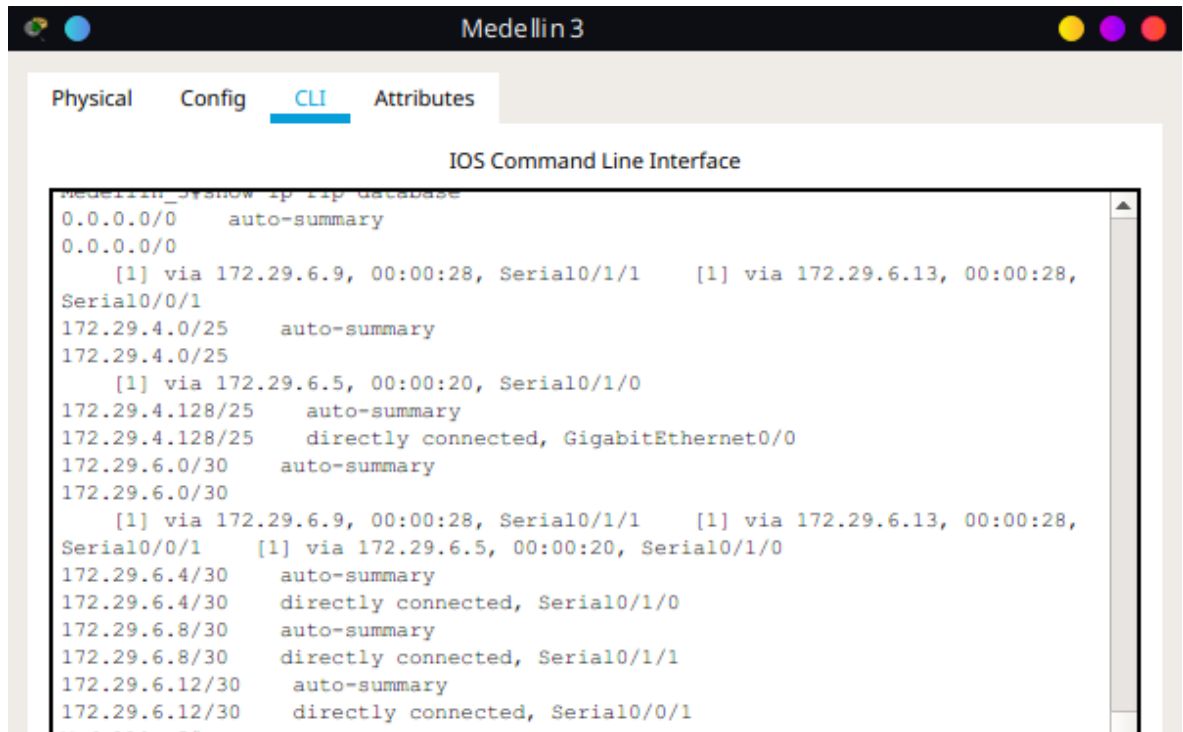
0.0.0.0/0

```

    [0] via 0.0.0.0, 00:00:00
172.29.0.0/24  auto-summary
172.29.0.0/24
    [1] via 172.29.3.2, 00:00:12, Serial0/1/0  [1] via 172.29.3.6, 00:00:12,
Serial0/1/1
172.29.1.0/24  auto-summary
172.29.1.0/24
    [1] via 172.29.3.10, 00:00:02, Serial0/0/1
172.29.3.0/30  auto-summary
172.29.3.0/30  directly connected, Serial0/1/0
172.29.3.4/30  auto-summary
172.29.3.4/30  directly connected, Serial0/1/1
172.29.3.8/30  auto-summary
172.29.3.8/30  directly connected, Serial0/0/1
172.29.3.12/30 auto-summary
172.29.3.12/30
    [1] via 172.29.3.10, 00:00:02, Serial0/0/1  [1] via 172.29.3.2, 00:00:12,
Serial0/1/0  [1] via 172.29.3.6, 00:00:12, Serial0/1/1

```





## Bogota 2

0.0.0.0/0 auto-summary

0.0.0.0/0

[1] via 172.29.3.9, 00:00:23, Serial0/0/1

172.29.0.0/24 auto-summary

172.29.0.0/24

[1] via 172.29.3.14, 00:00:19, Serial0/0/0

172.29.1.0/24 auto-summary

172.29.1.0/24 directly connected, GigabitEthernet0/0

172.29.3.0/30 auto-summary

172.29.3.0/30

[1] via 172.29.3.9, 00:00:23, Serial0/0/1 [1] via 172.29.3.14, 00:00:19,  
Serial0/0/0

172.29.3.4/30 auto-summary

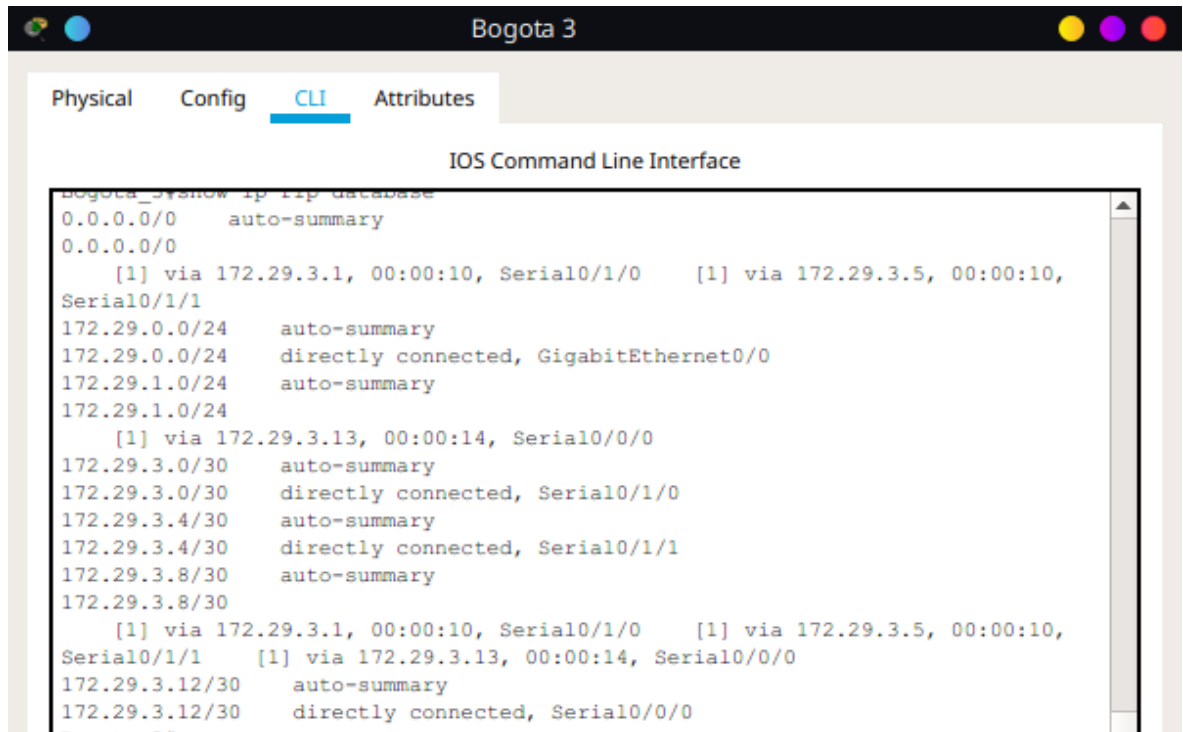
172.29.3.4/30

[1] via 172.29.3.9, 00:00:23, Serial0/0/1 [1] via 172.29.3.14, 00:00:19,  
Serial0/0/0



```
172.29.3.8/30 auto-summary
172.29.3.8/30 directly connected, Serial0/0/1
172.29.3.12/30 auto-summary
172.29.3.12/30 directly connected, Serial0/0/0
```

### Bogota 3



```
Bogota 3
Physical Config CLI Attributes
IOS Command Line Interface
Bogota_3#show ip ip database
0.0.0.0/0 auto-summary
0.0.0.0/0
    [1] via 172.29.3.1, 00:00:10, Serial0/1/0    [1] via 172.29.3.5, 00:00:10,
Serial0/1/1
172.29.0.0/24 auto-summary
172.29.0.0/24 directly connected, GigabitEthernet0/0
172.29.1.0/24 auto-summary
172.29.1.0/24
    [1] via 172.29.3.13, 00:00:14, Serial0/0/0
172.29.3.0/30 auto-summary
172.29.3.0/30 directly connected, Serial0/1/0
172.29.3.4/30 auto-summary
172.29.3.4/30 directly connected, Serial0/1/1
172.29.3.8/30 auto-summary
172.29.3.8/30
    [1] via 172.29.3.1, 00:00:10, Serial0/1/0    [1] via 172.29.3.5, 00:00:10,
Serial0/1/1    [1] via 172.29.3.13, 00:00:14, Serial0/0/0
172.29.3.12/30 auto-summary
172.29.3.12/30 directly connected, Serial0/0/0
```

```
0.0.0.0/0 auto-summary
0.0.0.0/0
    [1] via 172.29.3.1, 00:00:10, Serial0/1/0    [1] via 172.29.3.5, 00:00:10,
Serial0/1/1
172.29.0.0/24 auto-summary
172.29.0.0/24 directly connected, GigabitEthernet0/0
172.29.1.0/24 auto-summary
172.29.1.0/24
    [1] via 172.29.3.13, 00:00:14, Serial0/0/0
172.29.3.0/30 auto-summary
172.29.3.0/30 directly connected, Serial0/1/0
172.29.3.4/30 auto-summary
```

```
172.29.3.4/30 directly connected, Serial0/1/1
172.29.3.8/30 auto-summary
172.29.3.8/30
    [1] via 172.29.3.1, 00:00:10, Serial0/1/0    [1] via 172.29.3.5, 00:00:10,
Serial0/1/1  [1] via 172.29.3.13, 00:00:14, Serial0/0/0
172.29.3.12/30 auto-summary
172.29.3.12/30 directly connected, Serial0/0/0
```

### **Parte 5: Configurar encapsulamiento y autenticación PPP.**

a) Según la topología se requiere que el enlace Medellín1 con ISP sea configurado con autenticación PAT.

Se ajustan los parámetros necesarios en los routers ISP, Medellín 1 y Bogotá 1 con el fin de que configurar el encapsulamiento y la autenticación PPP

#### **[ISP]**

```
interface s0/1/0
encapsulation ppp
no shutdown
```

```
interface s0/0/0
encapsulation ppp
no shutdown
```

#### **[Medellin 1]**

```
interface s0/1/0
encapsulation PPP
no shutdown
```

#### **[Bogota 1]**

```
interface s0/0/0
encapsulation PPP
no shutdown
```

Configuración de enlace Medellin\_1 – ISP con autenticación PAP.

**[ISP]**

```
username Medellin_1 secret Medellin_1
interface s0/1/0
ppp authentication pap
ppp pap sent-username ISP password ISP
```

**[Medellin\_1]**

```
username ISP secret ISP
interface s0/1/0
ppp authentication pap
ppp pap sent-username Medellin_1 password Medellin_1
```

b) El enlace Bogotá1 con ISP se debe configurar con autenticación CHAT.

**[ISP]**

```
username Bogota_1 secret Bogota_1
interface s0/0/0
ppp authentication chap
```

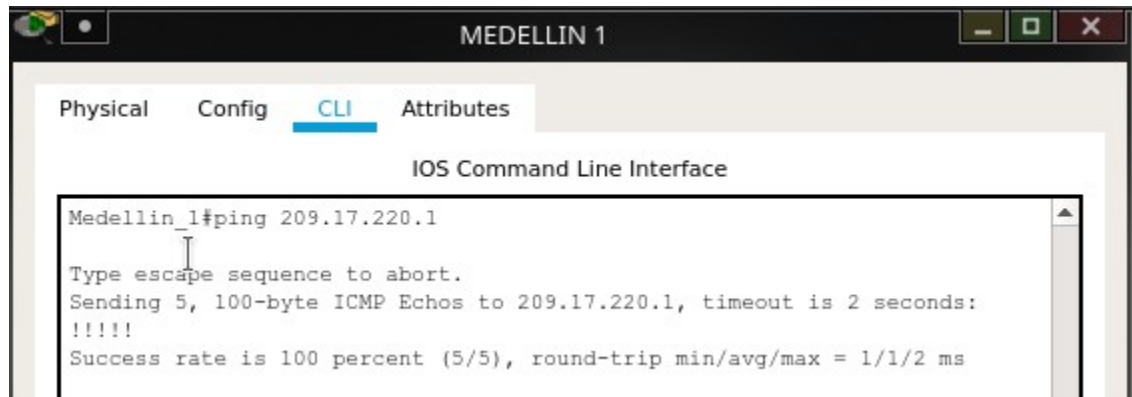
**[Bogota\_1]**

```
username ISP secret Bogota_1
interface s0/0/0
ppp authentication chap
```

**Parte 6: Configuración de NAT.**

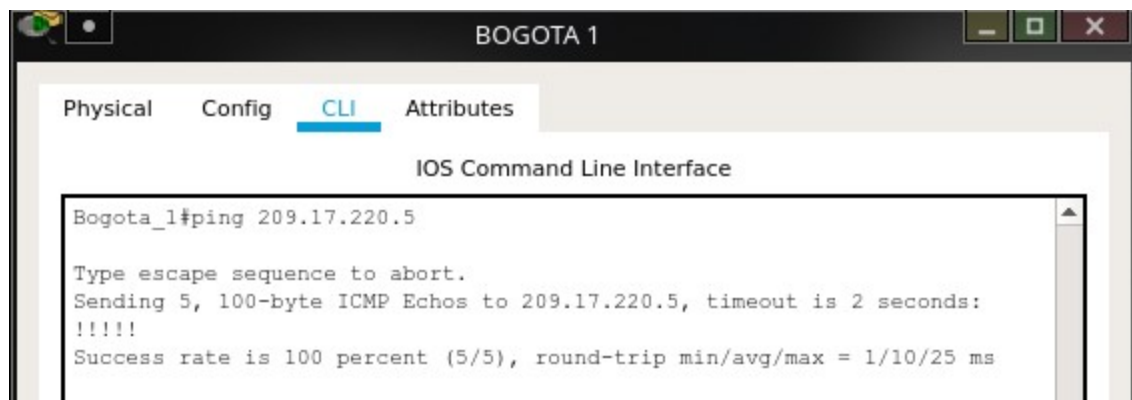
a) En la topología, si se activa NAT en cada equipo de salida (Bogotá1 y Medellín1), los routers internos de una ciudad no podrán llegar hasta los routers internos en el otro extremo, sólo existirá comunicación hasta los routers Bogotá1, ISP y Medellín1.

Verificando autenticación PAP entre Medellin\_1 e ISP



```
MEDELLIN 1
Physical  Config  CLI  Attributes
IOS Command Line Interface
Medellin_1#ping 209.17.220.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.17.220.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

Verificando autenticación CHAP entre Bogota\_1 e ISP



```
BOGOTA 1
Physical  Config  CLI  Attributes
IOS Command Line Interface
Bogota_1#ping 209.17.220.5
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.17.220.5, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/10/25 ms
```

b) Después de verificar lo indicado en el paso anterior proceda a configurar el NAT en el router Medellín1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/0 del router Medellín1, cómo diferente puerto.

**Nota:** Se realiza ping entre PC0 e ISP (se da a PC0 una IP provisional)

### [Medellin\_1]

```
ip access-list standar range_ip
permit 172.29.4.0 0.0.0.255
ip nat inside source list range_ip interface s0/1/0 overload
interface s0/1/0
ip nat outside
```

```
interface s0/1/1
```

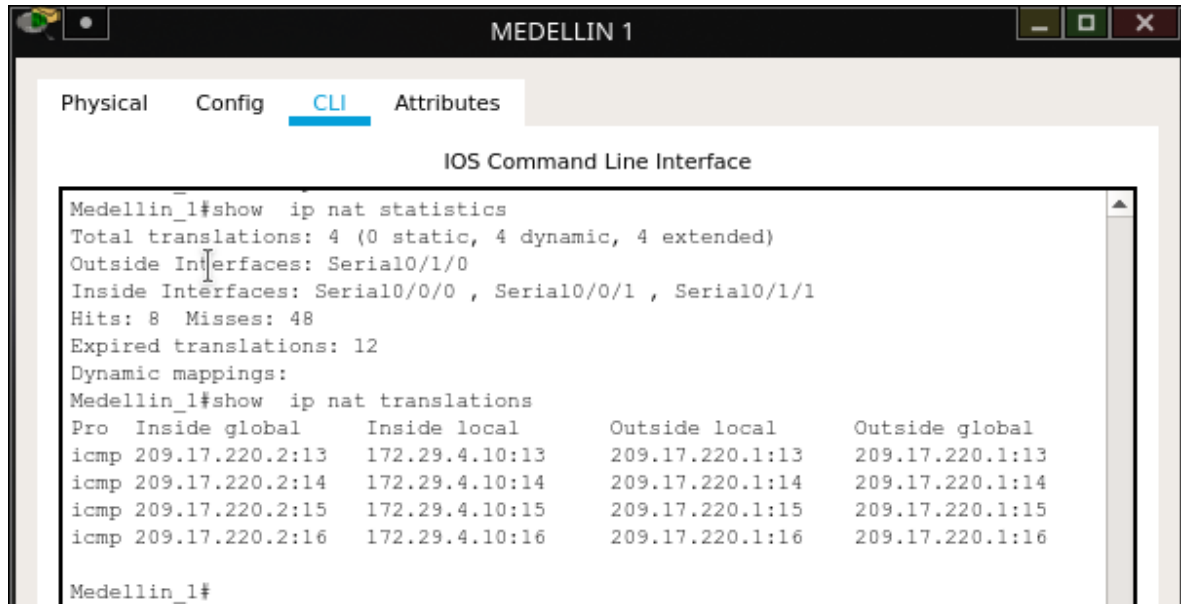
```
ip nat inside
```

```
interface s0/0/1
```

```
ip nat inside
```

```
interface s0/0/0
```

```
ip nat inside
```



The screenshot shows a Cisco IOS CLI window for a device named 'MEDELLIN 1'. The 'CLI' tab is selected. The user has entered the command 'show ip nat statistics', which displays the following output:

```
Medellin_1#show ip nat statistics
Total translations: 4 (0 static, 4 dynamic, 4 extended)
Outside Interfaces: Serial0/1/0
Inside Interfaces: Serial0/0/0 , Serial0/0/1 , Serial0/1/1
Hits: 8 Misses: 48
Expired translations: 12
Dynamic mappings:
Medellin_1#show ip nat translations
```

Pro	Inside global	Inside local	Outside local	Outside global
icmp	209.17.220.2:13	172.29.4.10:13	209.17.220.1:13	209.17.220.1:13
icmp	209.17.220.2:14	172.29.4.10:14	209.17.220.1:14	209.17.220.1:14
icmp	209.17.220.2:15	172.29.4.10:15	209.17.220.1:15	209.17.220.1:15
icmp	209.17.220.2:16	172.29.4.10:16	209.17.220.1:16	209.17.220.1:16

The prompt 'Medellin\_1#' is visible at the bottom of the window.

c) Proceda a configurar el NAT en el router Bogotá1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/0 (En este caso la interfaz s0/0/0) del router Bogotá1, cómo diferente puerto.

**Nota:** Se realiza ping entre PC3 e ISP (se da a PC3 una IP provisional)

### [Bogota\_1]

```
ip access-list standar range_ip
```

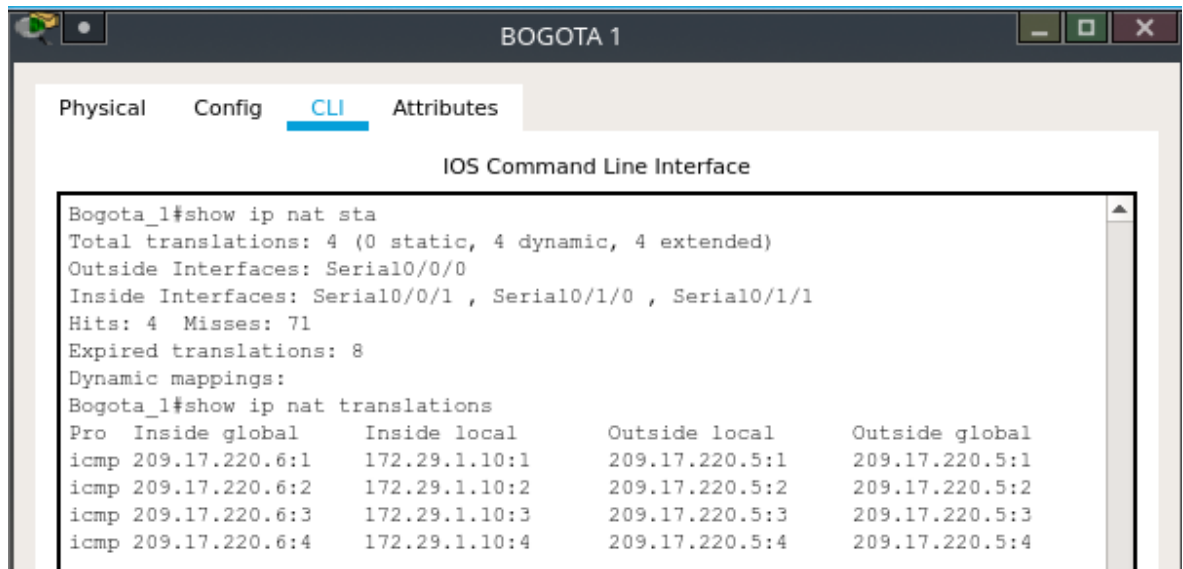
```
permit 172.29.0.0 0.0.0.255
```

```
permit 172.29.1.0 0.0.0.255
```

```
ip nat inside source list range_ip interface s0/0/0 overload
```

```
interface s0/0/0
```

```
ip nat outside
interface s0/0/1
ip nat inside
interface s0/1/0
ip nat inside
interface s0/1/1
ip nat inside
```



The screenshot shows a CLI window for a device named 'BOGOTA 1'. The window has tabs for 'Physical', 'Config', 'CLI', and 'Attributes', with 'CLI' selected. The main content area is titled 'IOS Command Line Interface' and displays the output of the command 'show ip nat sta'. The output shows 4 total translations (0 static, 4 dynamic, 4 extended) with outside interfaces Serial0/0/0 and inside interfaces Serial0/0/1, Serial0/1/0, and Serial0/1/1. It also shows 4 hits, 71 misses, and 8 expired translations. Below this, the command 'show ip nat translations' is executed, displaying a table of dynamic mappings for ICMP traffic.

```
Bogota_1#show ip nat sta
Total translations: 4 (0 static, 4 dynamic, 4 extended)
Outside Interfaces: Serial0/0/0
Inside Interfaces: Serial0/0/1 , Serial0/1/0 , Serial0/1/1
Hits: 4 Misses: 71
Expired translations: 8
Dynamic mappings:
Bogota_1#show ip nat translations
Pro  Inside global      Inside local      Outside local     Outside global
icmp 209.17.220.6:1     172.29.1.10:1    209.17.220.5:1   209.17.220.5:1
icmp 209.17.220.6:2     172.29.1.10:2    209.17.220.5:2   209.17.220.5:2
icmp 209.17.220.6:3     172.29.1.10:3    209.17.220.5:3   209.17.220.5:3
icmp 209.17.220.6:4     172.29.1.10:4    209.17.220.5:4   209.17.220.5:4
```

## Parte 7: Configuración del servicio DHCP.

a) Configurar la red Medellín2 y Medellín3 donde el router Medellín 2 debe ser el servidor DHCP para ambas redes Lan.

### [Medellin\_2]

```
ip dhcp excluded-address 172.29.4.1 172.20.4.6
ip dhcp excluded-address 172.29.4.129 172.29.4.134
ip dhcp pool Medellin_2
network 172.29.4.0 255.255.255.128
default-router 172.29.4.1
dns-server 6.6.6.6
ip dhcp pool Medellin_3
network 172.29.4.128 255.255.255.128
```

*default-router 172.29.4.129*

*dns-server 6.6.6.6*

b) El router Medellín3 deberá habilitar el paso de los mensajes broadcast hacia la IP del router Medellín2.

**[Medellin\_3]**

*interface g0/0*

*ip helper-address 172.29.6.5*

c) Configurar la red Bogotá2 y Bogotá3 donde el router Bogota2 debe ser el servidor DHCP para ambas redes Lan.

**[Bogota\_2]**

*ip dhcp excluded-address 172.29.0.1 172.29.0.6*

*ip dhcp excluded-address 172.29.1.1 172.29.1.6*

*ip dhcp pool Bogota\_2*

*network 172.29.1.0 255.255.255.0*

*default-router 172.29.1.1*

*dns-server 6.6.6.6*

*ip dhcp pool Bogota\_3*

*network 172.29.0.0 255.255.255.0*

*default-router 172.29.0.1*

*dns-server 6.6.6.6*

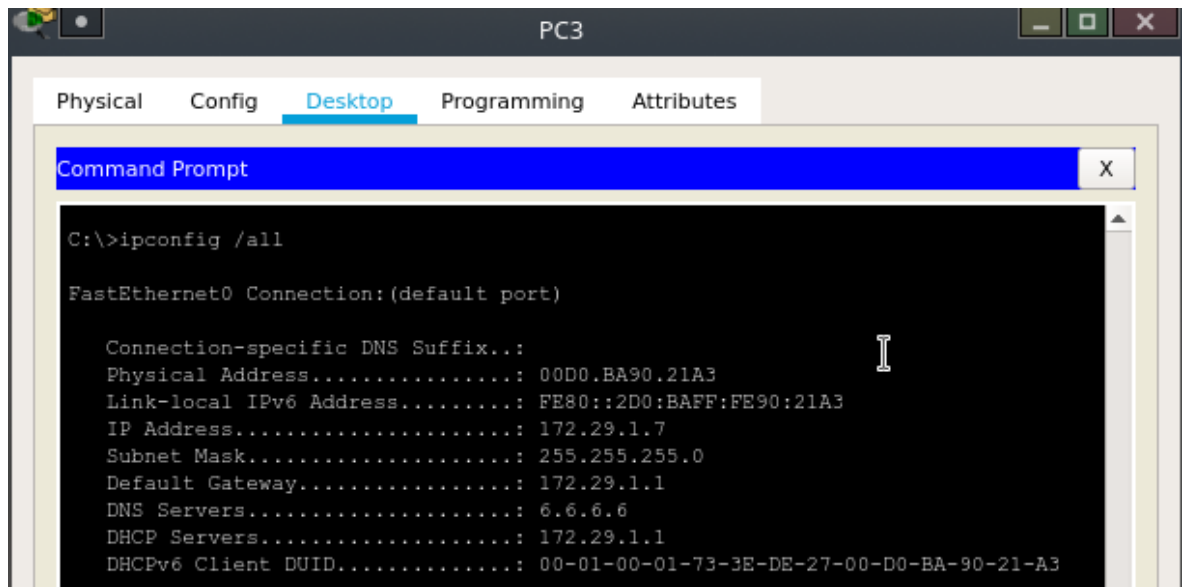
d) Configure el router Bogotá3 para que habilite el paso de los mensajes Broadcast hacia la IP del router Bogotá2.

**[Bogota\_3]**

*interface g0/0*

*ip helper-address 172.29.3.13*

## Verificar configuración DHCP en red Bogota



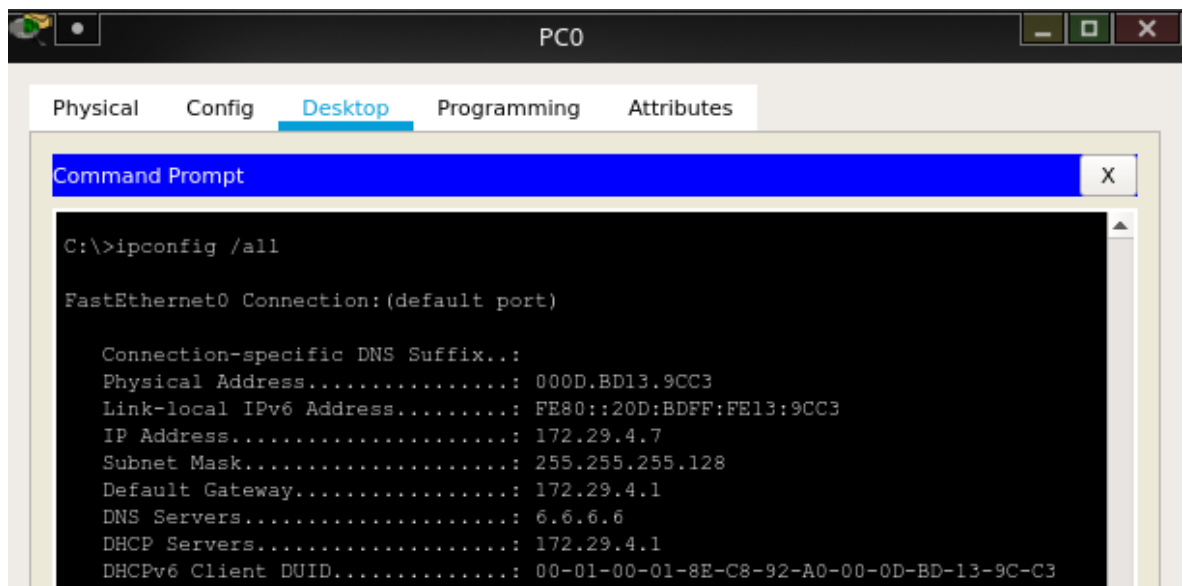
The screenshot shows a virtual machine window titled 'PC3' with a 'Desktop' tab selected. A 'Command Prompt' window is open, displaying the output of the 'ipconfig /all' command. The output shows the configuration for 'FastEthernet0 Connection:(default port)' with the following details:

```
C:\>ipconfig /all

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix.:
Physical Address.....: 00D0.BA90.21A3
Link-local IPv6 Address.....: FE80::2D0:BAFF:FE90:21A3
IP Address.....: 172.29.1.7
Subnet Mask.....: 255.255.255.0
Default Gateway.....: 172.29.1.1
DNS Servers.....: 6.6.6.6
DHCP Servers.....: 172.29.1.1
DHCPv6 Client DUID.....: 00-01-00-01-73-3E-DE-27-00-D0-BA-90-21-A3
```

## Verificar configuración DHCP en red Medellin



The screenshot shows a virtual machine window titled 'PC0' with a 'Desktop' tab selected. A 'Command Prompt' window is open, displaying the output of the 'ipconfig /all' command. The output shows the configuration for 'FastEthernet0 Connection:(default port)' with the following details:

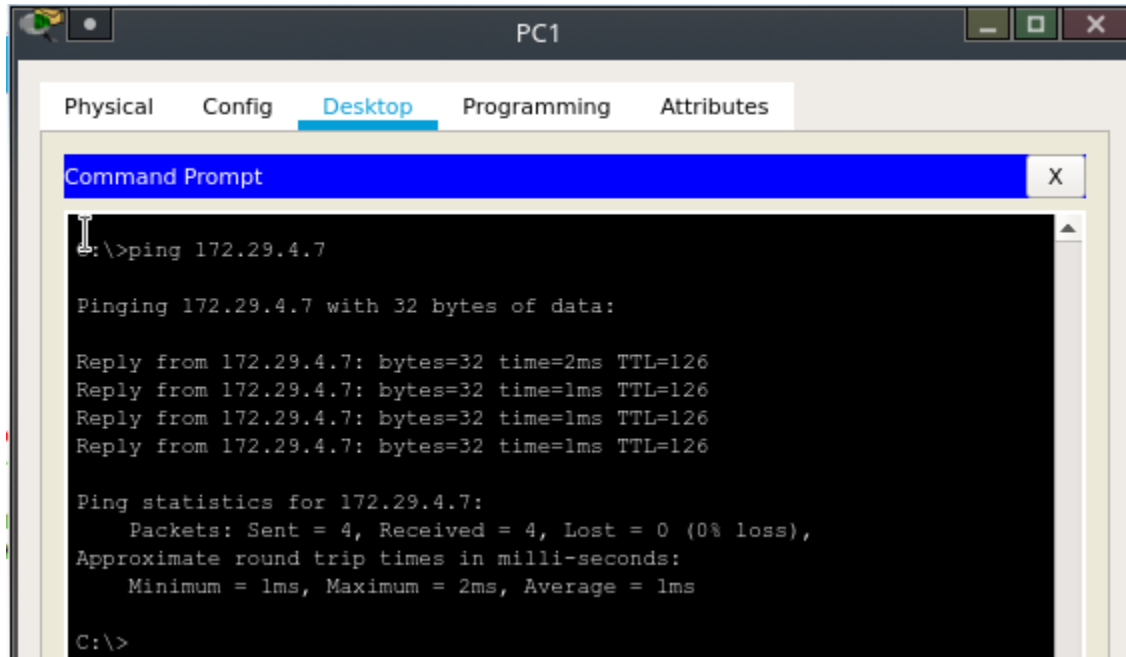
```
C:\>ipconfig /all

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix.:
Physical Address.....: 000D.BD13.9CC3
Link-local IPv6 Address.....: FE80::20D:BDFF:FE13:9CC3
IP Address.....: 172.29.4.7
Subnet Mask.....: 255.255.255.128
Default Gateway.....: 172.29.4.1
DNS Servers.....: 6.6.6.6
DHCP Servers.....: 172.29.4.1
DHCPv6 Client DUID.....: 00-01-00-01-8E-C8-92-A0-00-0D-BD-13-9C-C3
```



## Realizando Ping desde PC1 a PC0



The screenshot shows a window titled "PC1" with tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Desktop" tab is active, and a "Command Prompt" window is open. The command prompt shows the execution of the command "ping 172.29.4.7". The output indicates that the ping was successful, with 4 packets sent and received, 0% loss, and round trip times ranging from 1ms to 2ms.

```
C:\>ping 172.29.4.7

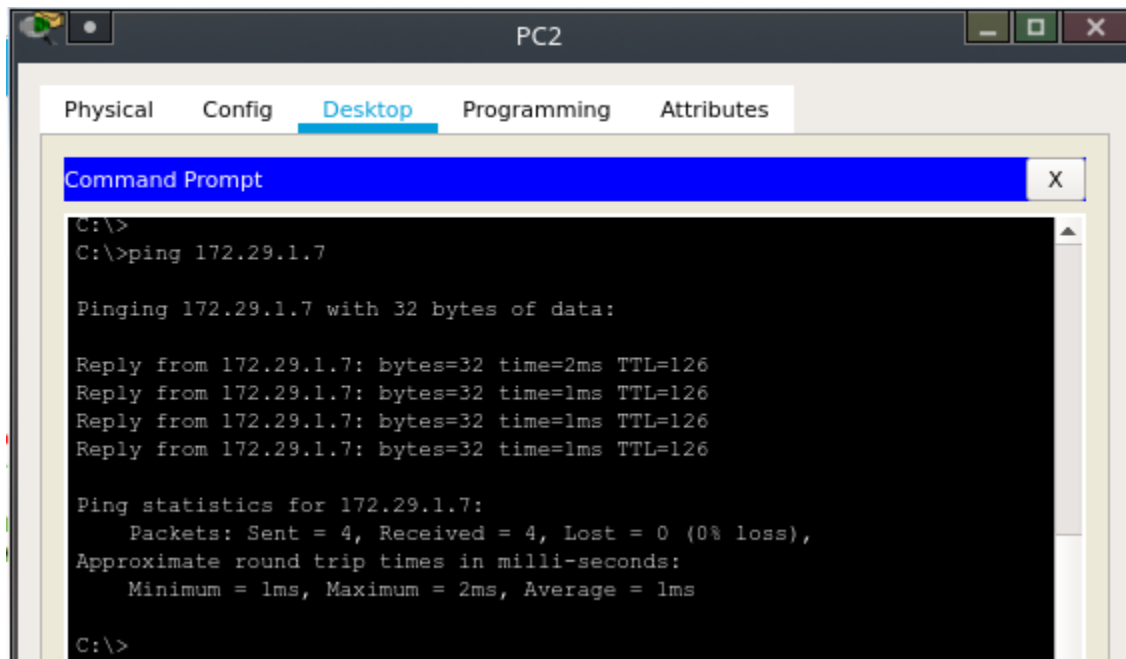
Pinging 172.29.4.7 with 32 bytes of data:

Reply from 172.29.4.7: bytes=32 time=2ms TTL=126
Reply from 172.29.4.7: bytes=32 time=1ms TTL=126
Reply from 172.29.4.7: bytes=32 time=1ms TTL=126
Reply from 172.29.4.7: bytes=32 time=1ms TTL=126

Ping statistics for 172.29.4.7:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>
```

## Realizando Ping desde PC2 a PC3



The screenshot shows a window titled "PC2" with tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Desktop" tab is active, and a "Command Prompt" window is open. The command prompt shows the execution of the command "ping 172.29.1.7". The output indicates that the ping was successful, with 4 packets sent and received, 0% loss, and round trip times ranging from 1ms to 2ms.

```
C:\>
C:\>ping 172.29.1.7

Pinging 172.29.1.7 with 32 bytes of data:

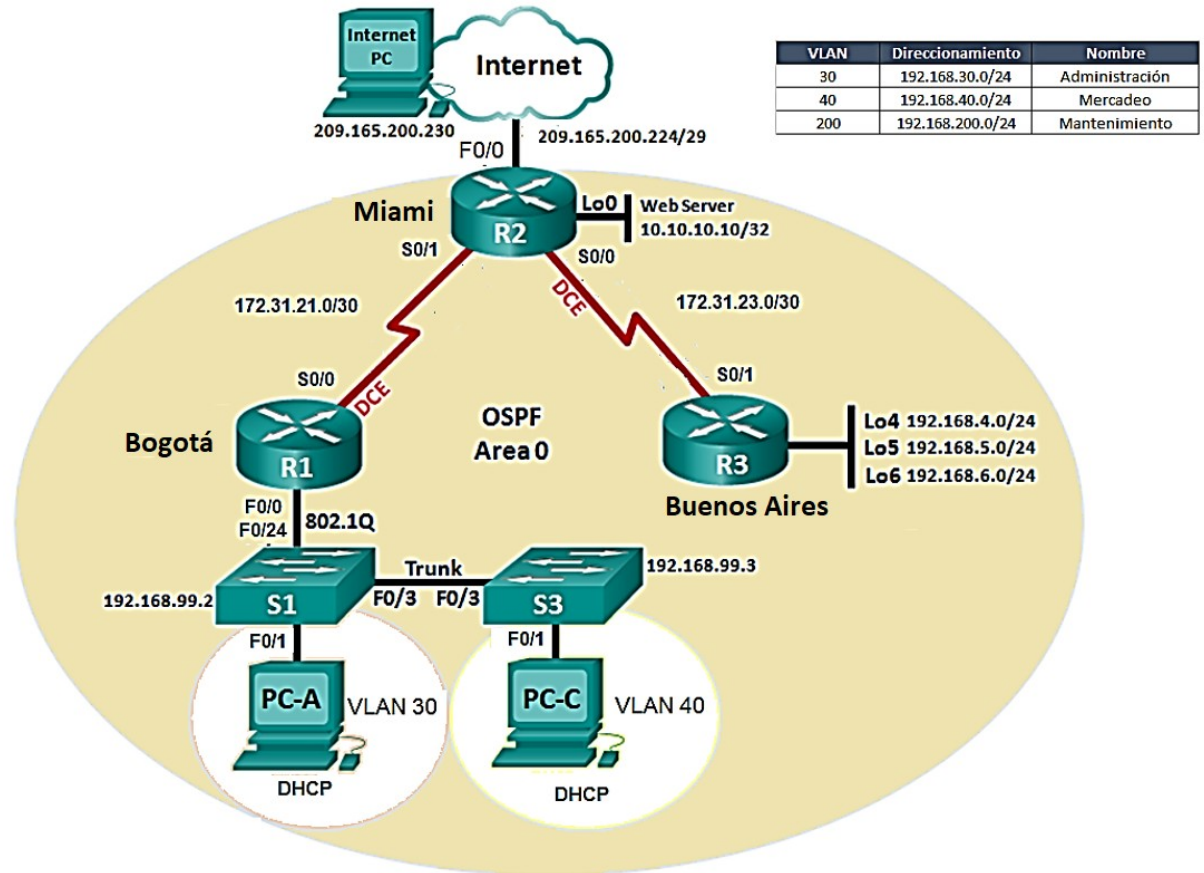
Reply from 172.29.1.7: bytes=32 time=2ms TTL=126
Reply from 172.29.1.7: bytes=32 time=1ms TTL=126
Reply from 172.29.1.7: bytes=32 time=1ms TTL=126
Reply from 172.29.1.7: bytes=32 time=1ms TTL=126

Ping statistics for 172.29.1.7:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>
```

## Escenario 2

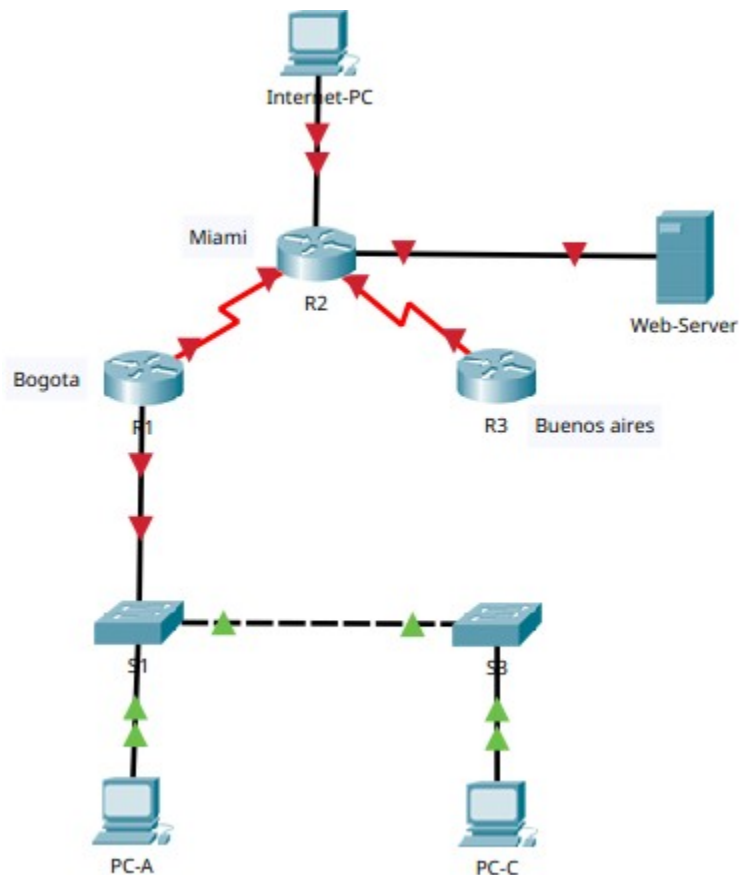
### Topología de red



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.

1. Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario

Router	ip	Mascara de sub-red	interfaz	tipo
Bogota R1	172.31.21.1	255.255.255.252	s0/0/0	DCE
	192.168.1.1	255.255.255.0	g0/0	
	192.168.30.1	255.255.255.0	g0/0.30	
	192.168.40.1	255.255.255.0	g0/0.40	
	192.168.200.1	255.255.255.0	g0/0.200	
Miami R2	172.31.21.2	255.255.255.252	s0/0/1	DCE
	172.31.23.1	255.255.255.252	s0/0/0	
	209.165.200.225	255.255.255.248	g0/0	
	10.10.10.1	255.255.255.0	g0/1	
Buenos Aires R3	172.31.23.2	255.255.255.252	s0/0/1	
	192.168.4.1	255.255.255.0	lo	
	192.168.5.1	255.255.255.0	lo	
	192.168.6.1	255.255.255.0	lo	
S1	192.168.99.2	255.255.255.0	V	
S2	192.168.99.3	255.255.255.0	V	
PC-A	192.168.30.2	255.255.255.0	f0	
PC-B	192.168.40.2	255.255.255.0	f0	
Internet PC	209.165.200.230	255.255.255.248	f0	
Web-Server	10.10.10.10	255.255.255.0	f0	



**[Bogota R1]**  
*configure terminal*  
*no ip domain-lookup*

```
hostname R1
service password-encryption
enable password dharma_2
line console 0
logging synchronous
password dharma_1
login
interface s0/0/0
description conexion R1-R2
ip address 172.31.21.1 255.255.255.252
clock rate 56000
no shutdown
interface g0/0
ip address 192.168.1.1 255.255.255.0
no shutdown
```

### **[Miami R2]**

```
configure terminal
no ip domain-lookup
hostname R2
service password-encryption
enable password dharma_2
line console 0
logging synchronous
password dharma_1
login
interface s0/0/1
description conexion R2-R1
ip address 172.31.21.2 255.255.255.252
no shutdown
interface s0/0/0
```

```
description conexion R2-R3
ip address 172.31.23.1 255.255.255.252
clock rate 56000
no shutdown
interface g0/0
ip address 209.165.200.225 255.255.255.248
no shutdown
interface g0/1
ip address 10.10.10.1 255.255.255.0
no shutdown
```

### **[Buenos Aires]**

```
configure terminal
no ip domain-lookup
hostname R3
service password-encryption
enable password dharmax_2
line console 0
logging synchronous
password dharmax_1
login
interface s0/0/1
description conexion R3-R2
ip address 172.31.23.2 255.255.255.252
no shutdown
interface lo4
ip address 192.168.4.1 255.255.255.0
no shutdown
interface lo5
ip address 192.168.5.1 255.255.255.0
no shutdown
interface lo6
ip address 192.168.6.1 255.255.255.0
```

*no shutdown*

**[S1]**

*configure terminal*  
*no ip domain-lookup*  
*hostname S1*  
*service password-encryption*  
*enable password dharma\_2*  
*line console 0*  
*logging synchronous*  
*password dharma\_1*  
*login*

**[S3]**

*configure terminal*  
*no ip domain-lookup*  
*hostname S3*  
*service password-encryption*  
*enable password dharma\_2*  
*line console 0*  
*logging synchronous*  
*password dharma\_1*  
*login*

2. Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:

<b>Configuration Item or Task</b>	<b>Specific ation</b>
Router ID R1	1.1.1.1
Router ID R2	5.5.5.5
Router ID R3	8.8.8.8
Configurar todas las interfaces LAN como pasivas	
Establecer el ancho de banda para enlaces seriales en	256 Kb/s
Ajustar el costo en la métrica de S0/0 a	9500

## **[Bogota]**

```
configure terminal
router ospf 1
router-id 1.1.1.1
network 172.31.21.0 0.0.0.3 area 0
network 192.168.30.0 0.0.0.255 area 0
network 192.168.40.0 0.0.0.255 area 0
network 192.168.200.0 0.0.0.255 area 0
passive-interface default
no passive-interface s0/0/0
exit
interface s0/0/0
bandwidth 256
ip ospf cost 9500
```

## **[Miami]**

```
configure terminal
router ospf 1
router-id 5.5.5.5
network 172.31.21.0 0.0.0.3 area 0
network 172.31.23.0 0.0.0.3 area 0
network 10.10.10.0 0.0.0.255 area 0
passive-interface g0/1
exit
interface s0/0/0
bandwidth 256
ip ospf cost 9500
interface s0/0/1
bandwidth 256
ip ospf cost 9500
```

## [Buenos aires]

*configure terminal*

*router ospf 1*

*router-id 8.8.8.8*

*network 173.31.23.0 0.0.0.3 area 0*

*network 192.168.4.0 0.0.3.255 area 0*

*passive-interface lo4*

*passive-interface lo5*

*passive-interface lo6*

*exit*

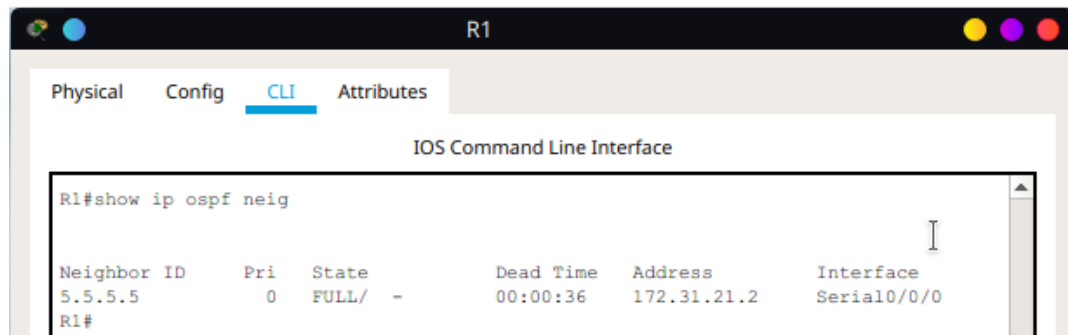
*interface s0/0/1*

*bandwidth 256*

*ip ospf cost 9500*

## Verificar información de OSPF

Visualizar tablas de enrutamiento y routers conectados por OSPFv2



R1

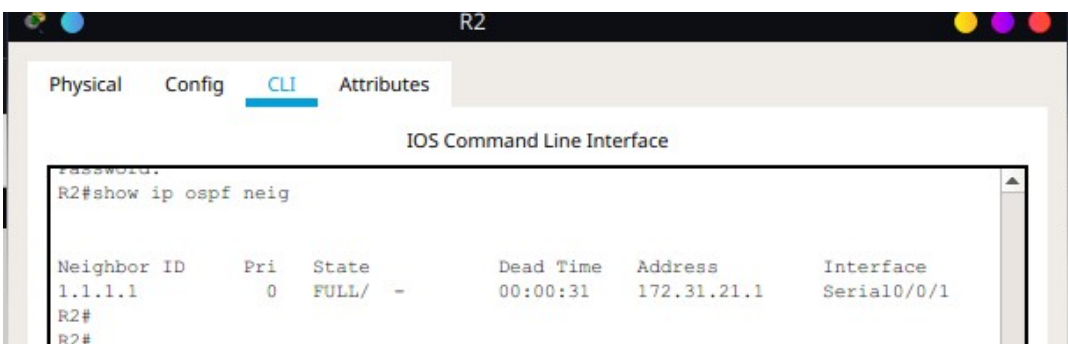
Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1#show ip ospf neig
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
5.5.5.5	0	FULL/ -	00:00:36	172.31.21.2	Serial0/0/0

R1#



R2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R2#show ip ospf neig
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
1.1.1.1	0	FULL/ -	00:00:31	172.31.21.1	Serial0/0/1

R2#

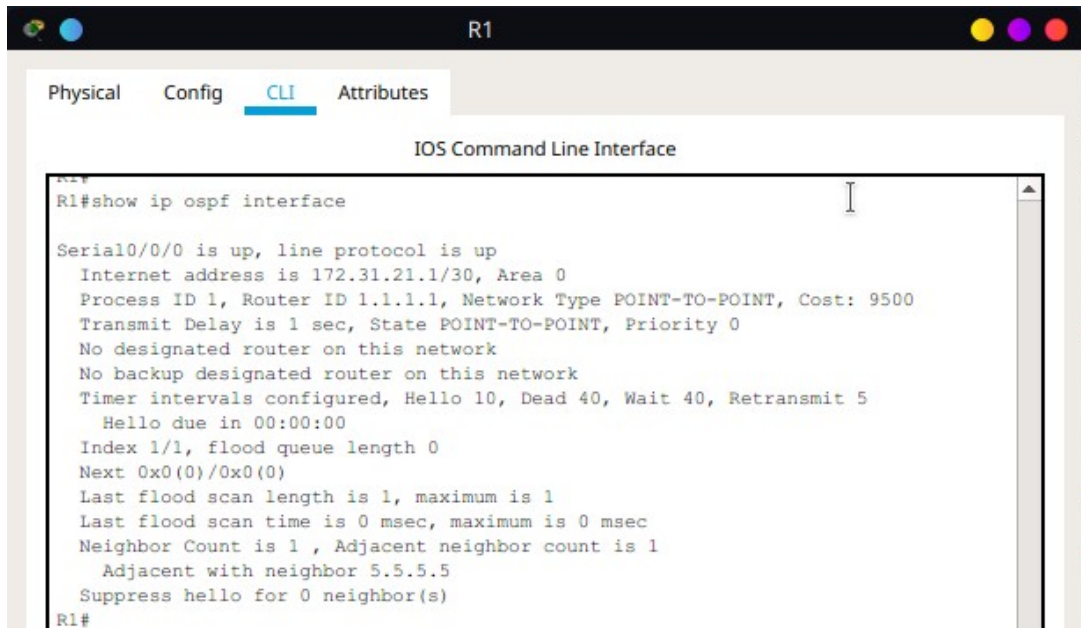


```
R1
Physical Config CLI Attributes
IOS Command Line Interface
Gateway of last resort is not set
10.0.0.0/24 is subnetted, 1 subnets
O 10.10.10.0/24 [110/9501] via 172.31.21.2, 00:13:24, Serial10/0/0
172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
C 172.31.21.0/30 is directly connected, Serial10/0/0
L 172.31.21.1/32 is directly connected, Serial10/0/0
O 172.31.23.0/30 [110/19000] via 172.31.21.2, 00:13:24, Serial10/0/0
```

```
R2
Physical Config CLI Attributes
IOS Command Line Interface
Gateway of last resort is not set
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.10.10.0/24 is directly connected, GigabitEthernet0/1
L 10.10.10.1/32 is directly connected, GigabitEthernet0/1
172.31.0.0/16 is variably subnetted, 4 subnets, 2 masks
C 172.31.21.0/30 is directly connected, Serial10/0/1
L 172.31.21.2/32 is directly connected, Serial10/0/1
C 172.31.23.0/30 is directly connected, Serial10/0/0
L 172.31.23.1/32 is directly connected, Serial10/0/0
209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C 209.165.200.224/29 is directly connected, GigabitEthernet0/0
L 209.165.200.225/32 is directly connected, GigabitEthernet0/0
R2#
```

```
R3
Physical Config CLI Attributes
IOS Command Line Interface
Gateway of last resort is not set
172.31.0.0/16 is variably subnetted, 2 subnets, 2 masks
C 172.31.23.0/30 is directly connected, Serial10/0/1
L 172.31.23.2/32 is directly connected, Serial10/0/1
192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.4.0/24 is directly connected, Loopback4
L 192.168.4.1/32 is directly connected, Loopback4
192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.5.0/24 is directly connected, Loopback5
L 192.168.5.1/32 is directly connected, Loopback5
192.168.6.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.6.0/24 is directly connected, Loopback6
L 192.168.6.1/32 is directly connected, Loopback6
```

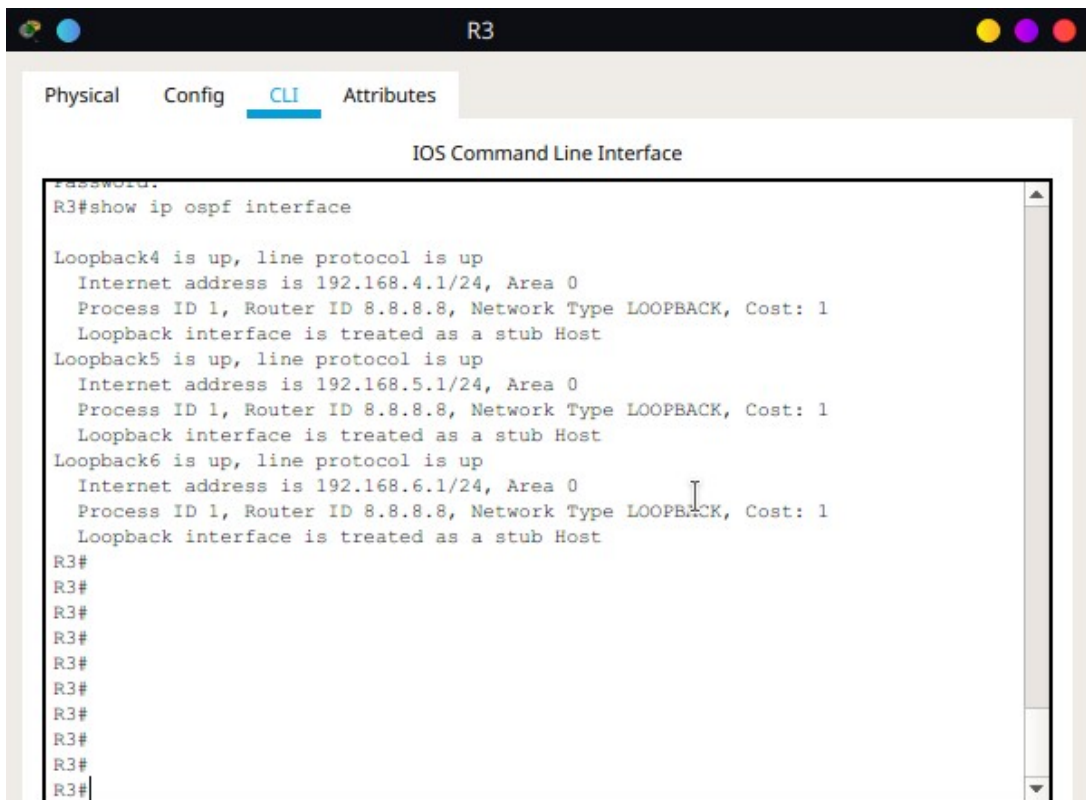
Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface



The screenshot shows the CLI of router R1. The 'CLI' tab is selected. The command 'show ip ospf interface' has been executed, displaying the following output:

```
R1#show ip ospf interface

Serial0/0/0 is up, line protocol is up
 Internet address is 172.31.21.1/30, Area 0
 Process ID 1, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 9500
 Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:00
 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 5.5.5.5
 Suppress hello for 0 neighbor(s)
R1#
```



The screenshot shows the CLI of router R3. The 'CLI' tab is selected. The command 'show ip ospf interface' has been executed, displaying the following output:

```
R3#show ip ospf interface

Loopback4 is up, line protocol is up
 Internet address is 192.168.4.1/24, Area 0
 Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
 Loopback interface is treated as a stub Host
Loopback5 is up, line protocol is up
 Internet address is 192.168.5.1/24, Area 0
 Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
 Loopback interface is treated as a stub Host
Loopback6 is up, line protocol is up
 Internet address is 192.168.6.1/24, Area 0
 Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
 Loopback interface is treated as a stub Host
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
```

```
IOS Command Line Interface

GigabitEthernet0/1 is up, line protocol is up
  Internet address is 10.10.10.1/24, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State WAITING, Priority 1
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    No Hellos (Passive interface)
  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 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.23.1/30, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 9500
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:09
  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
  Suppress hello for 0 neighbor(s)
Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.21.2/30, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 9500
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
--More--
```

Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.

R1

Physical Config CLI Attributes

IOS Command Line Interface

```
R1#show ip protocols

Routing Protocol is "ospf 1"
  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
    192.168.30.0 0.0.0.255 area 0
    192.168.40.0 0.0.0.255 area 0
    192.168.200.0 0.0.0.255 area 0
  Passive Interface(s):
    Vlan1
    GigabitEthernet0/0
    GigabitEthernet0/1
    Serial0/0/1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:20:27
    5.5.5.5          110          00:20:28
  Distance: (default is 110)
```

R2

Physical Config CLI Attributes

IOS Command Line Interface

```
R2#show ip protocols

Routing Protocol is "ospf 1"
  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:
    172.31.21.0 0.0.0.3 area 0
    172.31.23.0 0.0.0.3 area 0
    10.10.10.0 0.0.0.255 area 0
  Passive Interface(s):
    GigabitEthernet0/1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:23:27
    5.5.5.5          110          00:23:27
  Distance: (default is 110)
```

The screenshot shows a terminal window titled "R3" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The terminal output shows the command "R3#show ip protocols" and its results:

```
password.  
R3#show ip protocols  
  
Routing Protocol is "ospf 1"  
  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:  
    173.31.23.0 0.0.0.3 area 0  
    192.168.4.0 0.0.3.255 area 0  
  Passive Interface(s):  
    Loopback4  
    Loopback5  
    Loopback6  
  Routing Information Sources:  
    Gateway         Distance      Last Update  
    8.8.8.8          110          00:02:47  
  Distance: (default is 110)
```

3. Configurar VLANs, Puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad en los Switches acorde a la topología de red establecida.

**[S1]**

*configure terminal*

*vlan 30*

*name Administracion*

*vlan 40*

*name Mercadeo*

*vlan 200*

*name Mantenimiento*

*exit*

*interface vlan 99*

*ip address 192.168.99.2 255.255.255.0*

*no shutdown*

*exit*

*ip default-gateway 192.168.30.1*

*interface f0/3*

*switchport mode trunk*

*switchport trunk native vlan 1*

*interface f0/24*

*switchport mode trunk*

*switchport trunk native vlan 1*

*interface range f0/2, f0/4-23, g0/1-2*

*shutdown*

*interface f0/24*

*no shutdown*

*interface f0/1*

*switchport mode access*

*switchport access vlan 30*

**[S3]**

*vlan 30*

*name Administracion*

*vlan 40*

*name Mercadeo*

*vlan 200*

*name Mantenimiento*

*vlan 99*

*exit*

*interface vlan 99*

*ip address 192.168.99.3 255.255.255.0*

*no shutdown*

*exit*

*ip default-gateway 192.168.40.1*

*interface f0/3*

*switchport mode trunk*

```
switchport trunk native vlan 1
interface range f0/2, f0/4-24, g0/1-2
```

```
shutdown
exit
interface f0/1
no shutdown
switchport mode access
switchport access vlan 40
exit
```

### **[R1]**

```
interface g0/0.30
description Administracion
encapsulation dot1q 30
ip address 192.168.30.1 255.255.255.0
exit
interface g0/0.40
description Mercadeo
encapsulation dot1q 40
ip address 192.168.40.1 255.255.255.0
exit
interface g0/0.200
description Mantenimiento
encapsulation dot1q 200
ip address 192.168.200.1 255.255.255.0
exit
interface g0/0.99
encapsulation dot1q 99
ip address 192.168.99.1 255.255.255.0
exit
interface g0/0
```

*no shutdown*

4. En el Switch 3 deshabilitar DNS lookup

**[R3]**

*configure terminal*

*no ip domain-lookup*

5. Asignar direcciones IP a los Switches acorde a los lineamientos.

**[S1]**

*ip address 192.168.99.2 255.255.255.0*

*no shutdown*

**[S3]**

*ip address 192.168.99.3 255..255.255.0*

*no shutdown*

6. Desactivar todas las interfaces que no sean utilizadas en el esquema de red.

**[S1]**

*interface range f0/2, f0/4-23, g0/1-2*

*shutdown*

**[S3]**

*interface range f0/2, f0/4-24, g0/1-2*

*shutdown*



## Implementar DHCP y NAT para Ipv4

Configurar DHCP pool para VLAN 30	Name: ADMINISTRACION DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.
Configurar DHCP pool para VLAN 40	Name: MERCADEO DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.

Configurar R1 como servidor DHCP para las VLANs 30 y 40.

7. Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.

### **[R1]**

```
ip dhcp excluded-address 192.168.30.1 192.168.30.30
```

```
ip dhcp excluded-address 192.168.40.1 192.168.40.40
```

```
ip dhcp pool ADMINISTRACION
```

```
network 192.168.30.0 255.255.255.0
```

```
default-router 192.168.30.1
```

```
dns-server 10.10.10.11
```

```
ip domain-name ccna-unad.com
```

```
exit
```

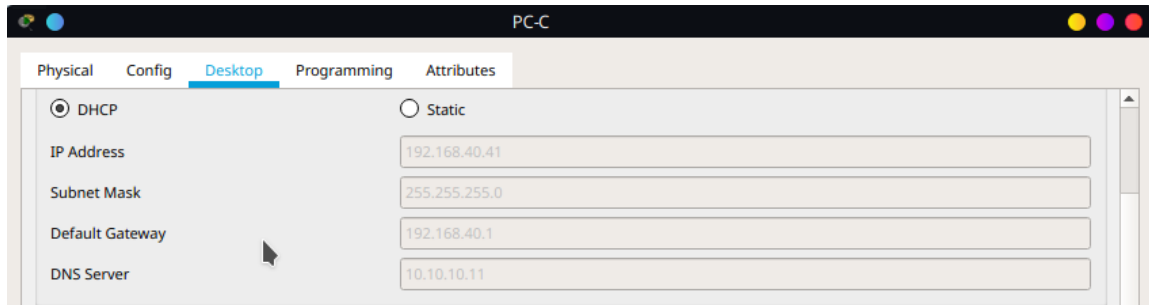
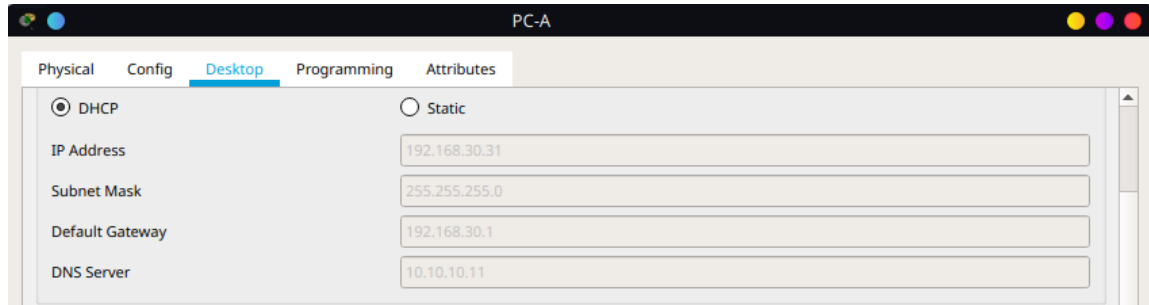
```
ip dhcp pool MERCADEO
```

```
network 192.168.40.0 255.255.255.0
```

```
default-router 192.168.40.1
```

```
dns-server 10.10.10.11
```

```
ip domain-name ccna-unad.com
```



8. Configurar NAT en R2 para permitir que los host puedan salir a internet  
**[R2]**

*configure terminal*

*ip nat inside source list 1 interface g0/0 overload*

*access-list 1 permit host 10.10.10.10*

*access-list 1 permit 172.31.21.0 0.0.0.3*

*access-list 1 permit 172.31.23.0 0.0.0.3*

*access-list 1 permit 192.168.30.0 0.0.0.255*

*access-list 1 permit 192.168.40.0 0.0.0.255*

*access-list 1 permit 192.168.200.0 0.0.0.255*

*access-list 1 permit 192.168.4.0 0.0.0.255*

*access-list 1 permit 192.168.5.0 0.0.0.255*

*access-list 1 permit 192.168.6.0 0.0.0.255*

*interface s0/0/0*

*ip nat inside*

*interface s0/0/1*

*ip nat inside*

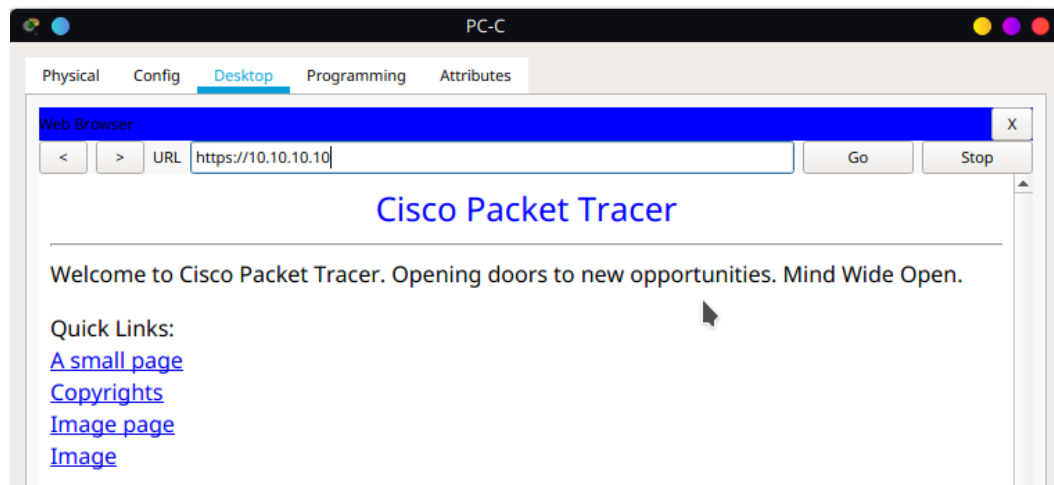
*interface g0/0*

*ip nat outside*

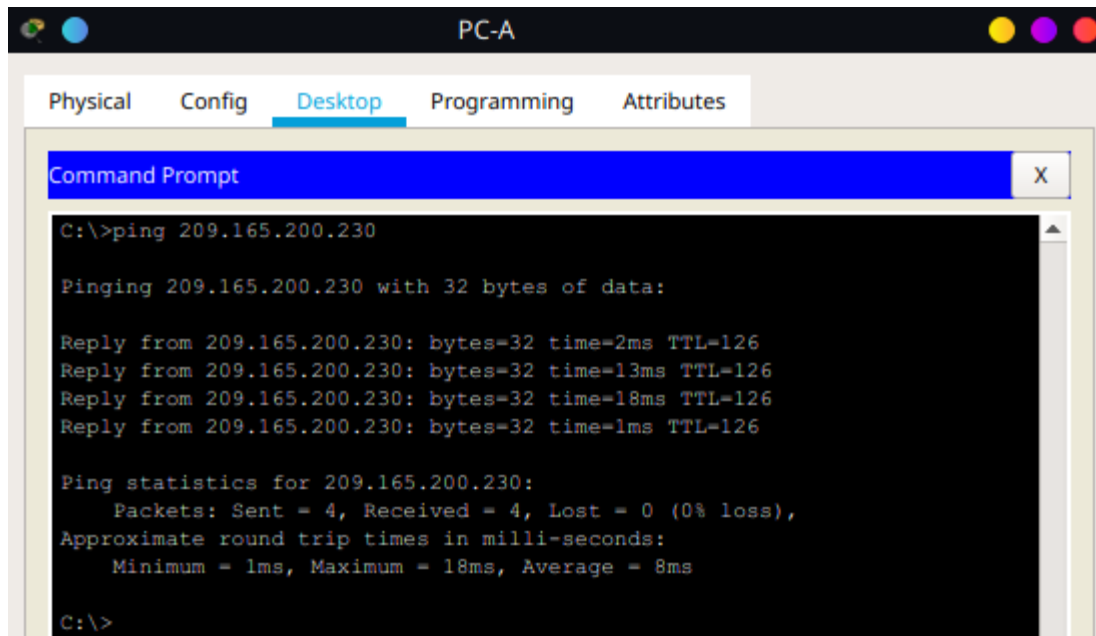
*interface g0/1*

*ip nat inside*

### Acceso web desde PC-C a web server 10.10.10



### Ping desde PC-A a Internet-PC



9. Configurar al menos dos listas de acceso de tipo estándar a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

### **Acces list 2**

Denegar tráfico desde la red 192.168.5.0 al exterior

#### **[R3]**

```
access-list 2 deny 192.168.5.0 0.0.0.255
access-list 2 permit host 0.0.0.0
exit
interface serial 0/0/1
ip access-group 2 out
```

### **Acces list 2**

Denegar tráfico desde la red 192.168.6.0 al exterior

#### **[R3]**

```
access-list 2 deny 192.168.6.0 0.0.0.255
access-list 2 permit host 0.0.0.0
interface serial 0/0/1
ip access-group 2 out
```

10. Configurar al menos dos listas de acceso de tipo extendido o nombradas a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

### **Access list 4**

Permitir tráfico icmp a red 192.168..4.0

#### **[R3]**

```
access-list 4 permit icmp any any echo-reply
interface s0/0/1
ip access-group 4 in
```

## Access list 4

Permitir todo tipo de tráfico entrante a red 192.168.5.0

### [R3]

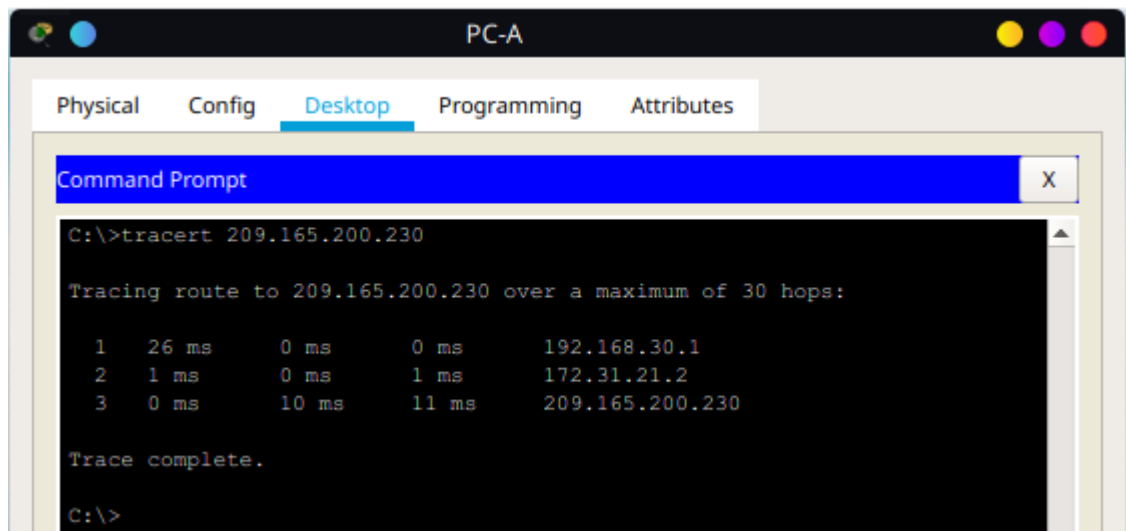
```
access list 4 permit any any
```

```
interface s0/0/1
```

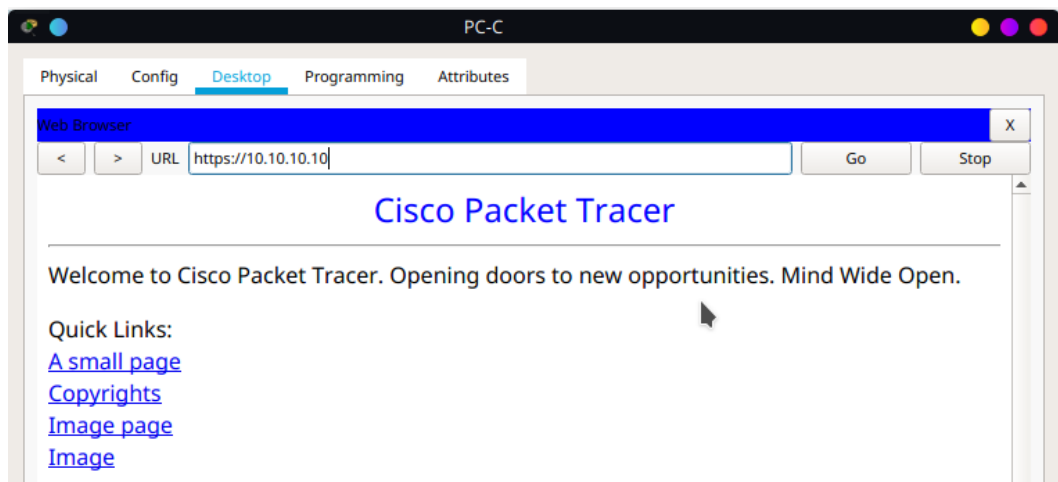
```
ip access-group 4 in
```

11. Verificar procesos de comunicación y redireccionamiento de tráfico en los routers mediante el uso de Ping y Traceroute.

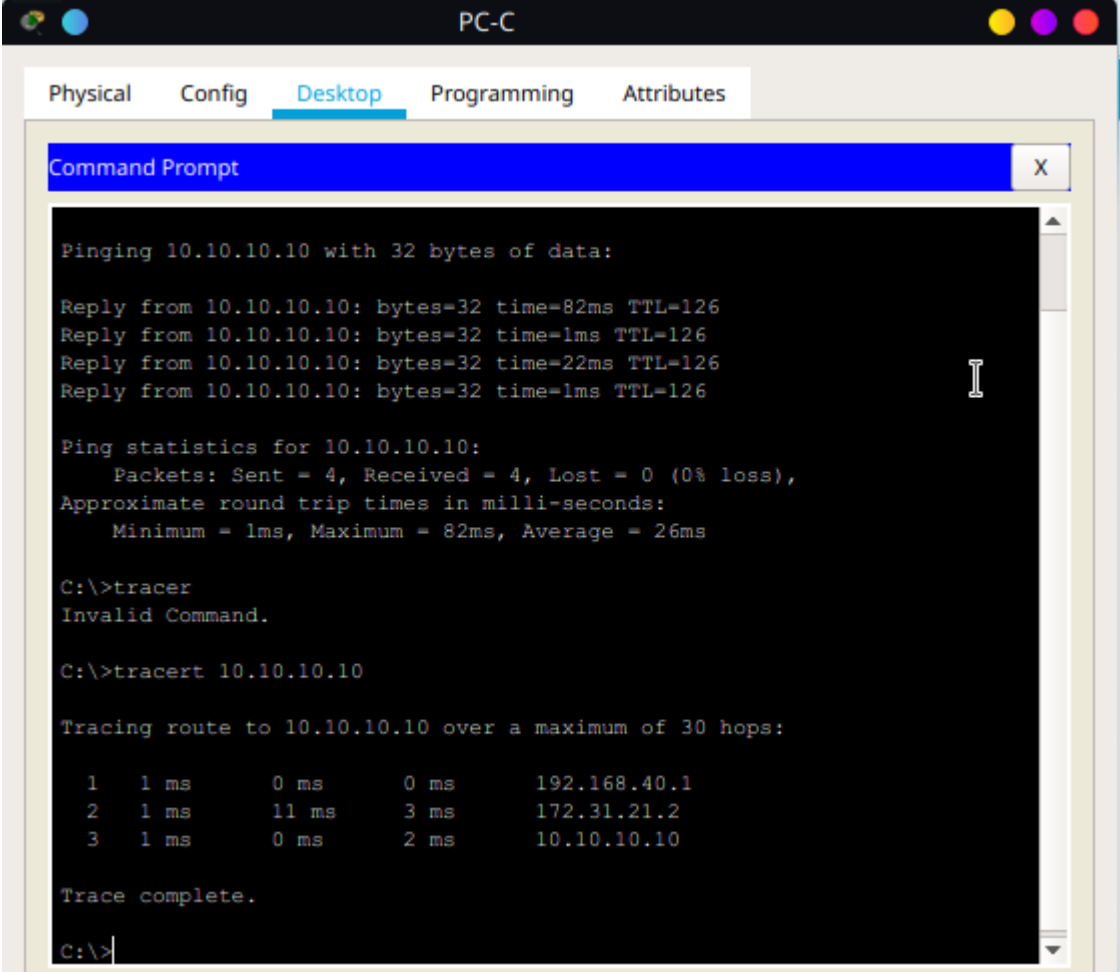
## Tracroute desde PC-A a Internet-PC



## Web Server



## Tracert y ping desde PC-C a 10.10.10.10



The screenshot shows a desktop window titled "PC-C" with tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Desktop" tab is active, displaying a "Command Prompt" window. The window contains the following text:

```
Pinging 10.10.10.10 with 32 bytes of data:  
  
Reply from 10.10.10.10: bytes=32 time=82ms TTL=126  
Reply from 10.10.10.10: bytes=32 time=1ms TTL=126  
Reply from 10.10.10.10: bytes=32 time=22ms TTL=126  
Reply from 10.10.10.10: bytes=32 time=1ms TTL=126  
  
Ping statistics for 10.10.10.10:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 1ms, Maximum = 82ms, Average = 26ms  
  
C:\>tracert  
Invalid Command.  
  
C:\>tracert 10.10.10.10  
  
Tracing route to 10.10.10.10 over a maximum of 30 hops:  
  
  0  1 ms    0 ms    0 ms    192.168.40.1  
  1  1 ms    11 ms   3 ms    172.31.21.2  
  2  1 ms    0 ms    2 ms    10.10.10.10  
  
Trace complete.  
  
C:\>
```

## **Conclusiones**

El curso ccna brinda al estudiante la oportunidad de simular redes ip de comunicaciones. Desde los modelos de redes mas simples hasta los más complejos el estudiante ha tenido la oportunidad de simular diversos ambientes de red exponiéndolo a simulaciones de situaciones reales. Mediante este curso se reconocieron los diversos dispositivos de red, terminales y su debida configuración. Se enfatizó además en el modelo OSI, se estudio el direccionamiento IP y de dio un vistazo general a diversos protocolos de las capas 1,2,3 y 4.

El curso ccna en modalidad de diplomado de profundización le permite al estudiante de ingeniería electrónica expandir sus conocimientos, proporcionándole mejores herramientas y un espectro de posibilidades laborales mas amplio

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