PRUEBA DE HABILIDADES CCNA 2019

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Trabajo final cisco

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DEDICATORIA

Este trabajo es dedicado a Dios, mi Esposa, Hijas y Padres, que siempre apoyaron y facilitaron el proceso formativo a través del tiempo; quienes fueron la motivación necesaria para cumplir esta meta y las venideras.

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INTRODUCCIÓN

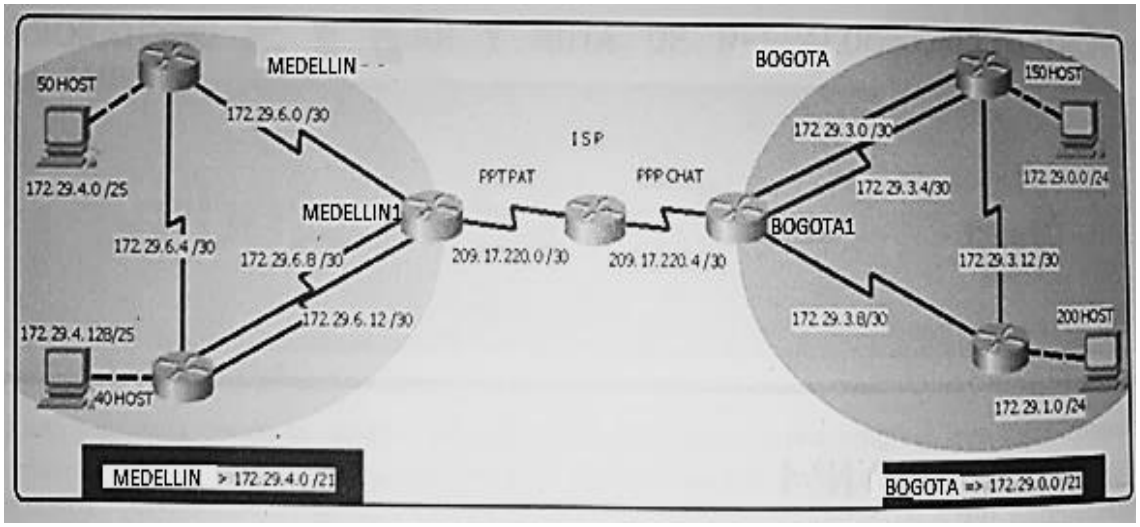
Este trabajo está enfocado en la puesta en práctica de los conocimientos adquiridos en el diplomado de profundización cisco (Diseño e implementación de soluciones integradas LAN/WAN). Aplicado a dos escenarios, que requieren una solución desde el punto administrativo de redes.

Además de ser un reto para los futuros profesionales, al realizar una actividad propia del ámbito de las redes, a su vez generara experiencia en la creación de soluciones de este campo de las comunicaciones.

El uso del software Packet Tracer, permitirá la simulación de los equipos ciscos, donde se realizarán las diferentes configuraciones, direccionamientos, requeridos para implementar en los diferentes escenarios; además de permitir aplicar los diferentes protocolos que permitirán crear las soluciones a las demandas de los clientes en los dos casos propuestos.

1 DESARROLLO 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.

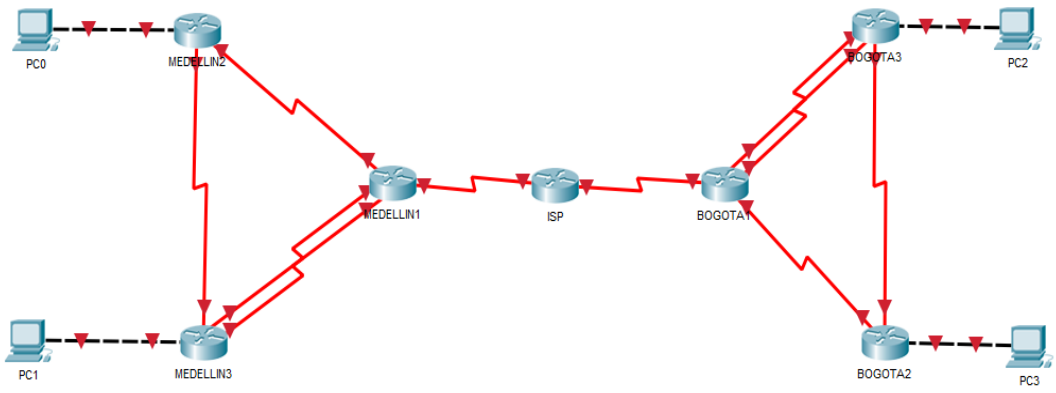
Los routers Bogota2 y medellin2 proporcionan el servicio DHCP a su propia red LAN y a los routers 3 de cada ciudad.

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

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

Desarrollo

Iniciamos creando la Topología de Red en Packet Tracer



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).

Realizamos la configuración inicial de todos los equipos, donde se restablecen, crean contraseñas cifradas, asignan nombres y mensajes de inicio:

```
Router#erase startup-config
Router#reload
Router>enable
Router#config term
Router(config)#hostname MEDELLIN2
MEDELLIN2(config)#no ip domain-lookup
MEDELLIN2(config)#enable secret class
MEDELLIN2(config)#line con 0
MEDELLIN2(config-line)#password cisco
MEDELLIN2(config-line)#login
MEDELLIN2(config-line)#logging synchronous
MEDELLIN2(config-line)#exit
MEDELLIN2(config)#line vty 0 4
MEDELLIN2(config-line)#password cisco
MEDELLIN2(config-line)#login
MEDELLIN2(config-line)#logging synchronous
MEDELLIN2(config-line)#exit
MEDELLIN2(config)#banner motd #prohibido el acceso a personal no autorizado#
MEDELLIN2(config)#service password-encryption
```

La configuración anterior es igual en todos los routers, solo cambia el nombre de cada equipo.

A continuación, se configuran las diferentes interfaces de cada router, siguiendo los direccionamientos correspondientes a cada red y subred:

MEDELLIN1

```
MEDELLIN1(config)#int s0/0/0
MEDELLIN1(config-if)#ip address 172.29.6.2 255.255.255.252
MEDELLIN1(config-if)#no shutdown
MEDELLIN1(config)#int s0/0/1
MEDELLIN1(config-if)#ip address 172.29.6.9 255.255.255.252
MEDELLIN1(config-if)#no shutdown
MEDELLIN1(config)#int s0/1/0
MEDELLIN1(config-if)#clock rate 128000
MEDELLIN1(config-if)#ip address 209.17.220.1 255.255.255.252
MEDELLIN1(config-if)#no shutdown
MEDELLIN1(config)#int s0/1/1
MEDELLIN1(config-if)#ip address 172.29.6.13 255.255.255.128
% 172.29.6.0 overlaps with Serial0/0/0
MEDELLIN1(config-if)#ip address 172.29.6.13 255.255.255.252
MEDELLIN1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
MEDELLIN1#
```

MEDELLIN2

```
MEDELLIN2(config)#int g0/0
MEDELLIN2(config-if)#ip address 172.29.4.2 255.255.255.128
MEDELLIN2(config-if)#no shutdown
MEDELLIN2(config)#int s0/0/0
MEDELLIN2(config-if)#clock rate 128000
MEDELLIN2(config-if)#ip address 172.29.6.1 255.255.255.252
MEDELLIN2(config-if)#no shutdown
MEDELLIN2(config)#int s0/0/1
MEDELLIN2(config-if)#ip address 172.29.6.5 255.255.255.252
MEDELLIN2(config-if)#no shutdown
MEDELLIN2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

MEDELLIN2#

MEDELLIN3

```
MEDELLIN3(config)#int g0/0
MEDELLIN3(config-if)#ip address 172.29.4.130 255.255.255.128
MEDELLIN3(config-if)#no shutdown
MEDELLIN3(config)#int s0/0/0
MEDELLIN3(config-if)#clock rate 128000
MEDELLIN3(config-if)#ip address 172.29.6.10 255.255.255.252
MEDELLIN3(config-if)#no shutdown
MEDELLIN3(config)#int 0/0/1
MEDELLIN3(config)#int s0/0/1
MEDELLIN3(config-if)#clock rate 128000
MEDELLIN3(config-if)#ip address 172.29.6.14 255.255.255.252
MEDELLIN3(config-if)#no shutdown
MEDELLIN3(config)#int s0/1/0
MEDELLIN3(config-if)#ip address 172.29.6.6 255.255.255.252
MEDELLIN3(config-if)#no shutdown
MEDELLIN3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
MEDELLIN3#
```

BOGOTA1

```
BOGOTA1(config)#int s0/0/0
BOGOTA1(config-if)#clock rate 128000
BOGOTA1(config-if)#ip address 209.17.220.6 255.255.255.252
BOGOTA1(config-if)#no shutdown
BOGOTA1(config)#int s0/0/1
BOGOTA1(config-if)#ip address 172.29.3.9 255.255.255.252
BOGOTA1(config-if)#no shutdown
BOGOTA1(config)#int s0/1/0
BOGOTA1(config-if)#ip address 172.29.3.1 255.255.255.252
BOGOTA1(config-if)#no shutdown
BOGOTA1(config)#int s0/1/1
BOGOTA1(config-if)#ip address 172.29.3.5 255.255.255.252
BOGOTA1(config-if)#no shutdown
BOGOTA1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
```

[OK]
BOGOTA1#

BOGOTA2

BOGOTA2(config)#int g0/0
BOGOTA2(config-if)#ip address 172.29.1.2 255.255.255.0
BOGOTA2(config-if)#no shutdown
BOGOTA2(config)#int s0/0/0
BOGOTA2(config-if)#clock rate 128000
BOGOTA2(config-if)#ip address 172.29.3.14 255.255.255.252
BOGOTA2(config-if)#no shutdown
BOGOTA2(config)#int s0/0/1
BOGOTA2(config-if)#ip address 172.29.3.10 255.255.255.252
BOGOTA2(config-if)#no shutdown
BOGOTA2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
BOGOTA2#

BOGOTA3

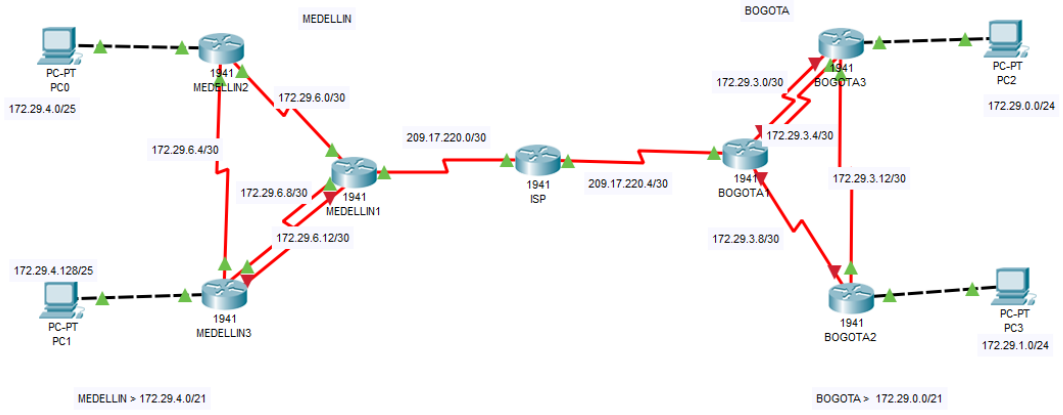
BOGOTA3(config)#int g0/0
BOGOTA3(config-if)#ip address 172.29.0.2 255.255.255.0
BOGOTA3(config-if)#no shutdown
BOGOTA3(config)#int s0/0/0
BOGOTA3(config-if)#clock rate 128000
BOGOTA3(config-if)#ip address 172.29.3.13 255.255.255.252
BOGOTA3(config-if)#no shutdown
BOGOTA3(config)#int s0/0/
BOGOTA3(config)#int s0/0/1
BOGOTA3(config-if)#clock rate 128000
BOGOTA3(config-if)#ip address 172.29.3.6 255.255.255.252
BOGOTA3(config-if)#no shutdown
BOGOTA3(config)#int s0/1/0
BOGOTA3(config-if)#clock rate 128000
BOGOTA3(config-if)#ip address 172.29.3.2 255.255.255.252
BOGOTA3(config-if)#no shutdown
BOGOTA3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
BOGOTA3#

ISP

```
ISP(config)#int s0/0/0
ISP(config-if)#clock rate 128000
This command applies only to DCE interfaces
ISP(config-if)#ip address 209.17.220.2 255.255.255.252
ISP(config-if)#no shutdown
ISP(config)#int s0/0/1
ISP(config-if)#ip address 209.17.220.5 255.255.255.252
ISP(config-if)#no shutdown
ISP#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
ISP#
```

- Realizar la conexión física de los equipos con base en la topología de red

Topología y Conexionado de los equipos.



1.1 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.

Realizamos en cada router la siguiente programación, donde indicamos las redes que usaran el protocolo RIP V2 y la desactivación de la sumarización automática:

MEDELLIN1

```
MEDELLIN1#config term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN1(config)#router rip
MEDELLIN1(config-router)#version 2
MEDELLIN1(config-router)#network 172.29.6.0
MEDELLIN1(config-router)#network 172.29.6.8
MEDELLIN1(config-router)#network 172.29.6.12
MEDELLIN1(config-router)#network 209.17.220.0
MEDELLIN1(config-router)#no auto-summary
MEDELLIN1(config-router)#end
```

MEDELLIN2

```
MEDELLIN2(config)#router rip
MEDELLIN2(config-router)#version 2
MEDELLIN2(config-router)#network 172.29.4.0
MEDELLIN2(config-router)#network 172.29.6.0
MEDELLIN2(config-router)#network 172.29.6.4
MEDELLIN2(config-router)#no auto-summary
MEDELLIN2(config-router)#end
```

MEDELLIN3

```
MEDELLIN3(config)#router rip
MEDELLIN3(config-router)#version 2
MEDELLIN3(config-router)#network 172.29.4.128
MEDELLIN3(config-router)#network 172.29.6.4
MEDELLIN3(config-router)#network 172.29.6.8
MEDELLIN3(config-router)#network 172.29.6.12
MEDELLIN3(config-router)#no auto-summary
MEDELLIN3(config-router)#end
```

BOGOTA1

```
BOGOTA1(config)#router rip
BOGOTA1(config-router)#version 2
BOGOTA1(config-router)#network 209.17.220.4
BOGOTA1(config-router)#network 172.29.3.0
BOGOTA1(config-router)#network 172.29.3.4
BOGOTA1(config-router)#network 172.29.3.8
BOGOTA1(config-router)#no auto-summary
BOGOTA1(config-router)#end
```

BOGOTA2

```
BOGOTA2(config)#router rip
BOGOTA2(config-router)#version 2
BOGOTA2(config-router)#network 172.29.3.8
BOGOTA2(config-router)#network 172.29.1.0
BOGOTA2(config-router)#network 172.29.3.12
BOGOTA2(config-router)#no auto-summary
BOGOTA2(config-router)#end
```

BOGOTA3

```
BOGOTA3(config)#router rip
BOGOTA3(config-router)#version 2
BOGOTA3(config-router)#network 172.29.0.0
BOGOTA3(config-router)#network 172.29.3.12
BOGOTA3(config-router)#network 172.29.3.0
BOGOTA3(config-router)#network 172.29.3.4
BOGOTA3(config-router)#no auto-summary
BOGOTA3(config-router)#end
```

ISP

```
ISP(config)#router rip
ISP(config-router)#version 2
ISP(config-router)#network 209.17.220.0
ISP(config-router)#network 209.17.220.4
ISP(config-router)#no auto summary
ISP(config-router)#end
```

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.

Se programa en los Router iniciales de cada ciudad una ruta por defecto a el Router ISP, y se configura su distribución en las publicaciones RIP, así:

```
MEDELLIN1(config)#ip route 0.0.0.0 0.0.0.0 s0/1/0
MEDELLIN1(config)#router rip
MEDELLIN1(config-router)#version 2
MEDELLIN1(config-router)#default-information originate
```

```
BOGOTA1(config)#ip route 0.0.0.0 0.0.0.0 s0/0/0
BOGOTA1(config)#router rip
BOGOTA1(config-router)#version 2
BOGOTA1(config-router)#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 sumarizan las subredes de cada uno a /22.

Iniciamos sumarizando cada conjunto de Redes teniendo en cuenta que la máscara de red será /22, así:

MEDELLIN

```
172.29.4.0/25    ---------    10101100.00011101.00000100.00000000
172.29.4.128/25  ---------    10101100.00011101.00000100.10000000
172.29.6.0/30    ---------    10101100.00011101.00000110.00000000
172.29.6.4/30    ---------    10101100.00011101.00000110.00000100
172.29.6.8/30    ---------    10101100.00011101.00000110.00001000
172.29.6.12/30   ---------    10101100.00011101.00000110.00001100
                              ------------------------------------------------------------
                              10101100.00011101.00000100.00000000
```

Entonces la red en decimal seria **172.29.8.0/22**

BOGOTA

172.29.3.0/30	----------	10101100.00011101.00000011.00000000
172.29.3.4/30	----------	10101100.00011101.00000011.00000100
172.29.3.8/30	----------	10101100.00011101.00000011.00001000
172.29.3.12/30	----------	10101100.00011101.00000011.00001100
172.29.0.0/24	----------	10101100.00011101.00000000.00000000
172.29.1.0/24	----------	10101100.00011101.00000001.00000000

		10101100.00011101.00000000.00000000

Entonces la red en decimal seria **172.29.0.0/22**

Configuramos cada router con la ruta estática así:

Para la red Medellín:

ISP(config)#ip route 172.29.8.0 255.255.252.0 209.17.220.1

Para la red Bogotá:

ISP(config)#ip route 172.29.0.0 255.255.252.0 209.17.220.6

1.2 Parte 2: Tabla de Enrutamiento.

Tabla 1. Direccionamiento interfaces.

Dispositivo	Interfaz	Dirección IP	Máscara de subred	Gateway predeterminado
MEDELLIN 1	SERIAL0/0/0	172.29.6.2	255.255.255.252	
	SERIAL0/0/1	172.29.6.9	255.255.255.252	
	SERIAL0/1/0 DCE	209.17.220.1	255.255.255.252	
	SERIAL0/1/1	172.29.6.13	255.255.255.252	
MEDELLIN 2	Gig0/0	172.29.4.2	255.255.255.128	
	SERIAL0/0/0 DCE	172.29.6.1	255.255.255.252	
	SERIAL0/0/1 DCE	172.29.6.5	255.255.255.252	
MEDELLIN 3	Gig0/0	172.29.4.130	255.255.255.128	
	SERIAL0/0/0 DCE	172.29.6.10	255.255.255.252	
	SERIAL0/0/1 DCE	172.29.6.14	255.255.255.252	
	SERIAL0/1/0	172.29.6.6	255.255.255.252	
BOGOTA1	SERIAL0/0/0 DCE	209.17.220.6	255.255.255.252	
	SERIAL0/0/1	172.29.3.9	255.255.255.252	
	SERIAL0/1/0	172.29.3.1	255.255.255.252	
	SERIAL0/1/1	172.29.3.5	255.255.255.252	
BOGOTA2	Gig0/0	172.29.1.2	255.255.255.0	
	SERIAL0/0/1 DCE	172.29.3.14	255.255.255.252	
	SERIAL0/0/0	172.29.3.10	255.255.255.252	
BOGOTA3	Gig0/0	172.29.0.2	255.255.255.0	

	SERIAL0/0/0 DCE	172.29.3.13	255.255.255.252	
	SERIAL0/0/1 DCE	172.29.3.6	255.255.255.252	
	SERIAL0/1/0 DCE	172.29.3.2	255.255.255.252	
PC0	Fa0	172.29.4.1	255.255.0.0	172.29.4.2
PC1	Fa0	172.29.4.129	255.255.0.0	172.29.4.130
PC2	Fa0	172.29.0.1	255.255.0.0	172.29.0.2
PC3	Fa0	172.29.1.1	255.255.0.0	172.29.1.2
ISP	SERIAL0/0/0	209.17.220.2	255.255.255.252	
	SERIAL0/0/1	209.17.220.5	255.255.255.252	

a. Verificar la tabla de enrutamiento en cada uno de los routers para comprobar las redes y sus rutas. Usamos el comando SHOW IP ROUTE

b. Verificar el balanceo de carga que presentan los routers.
Como se puede ver en las tablas, el router realiza el balanceo de carga de forma automática en el caso de tener varias trayectorias al mismo destino.

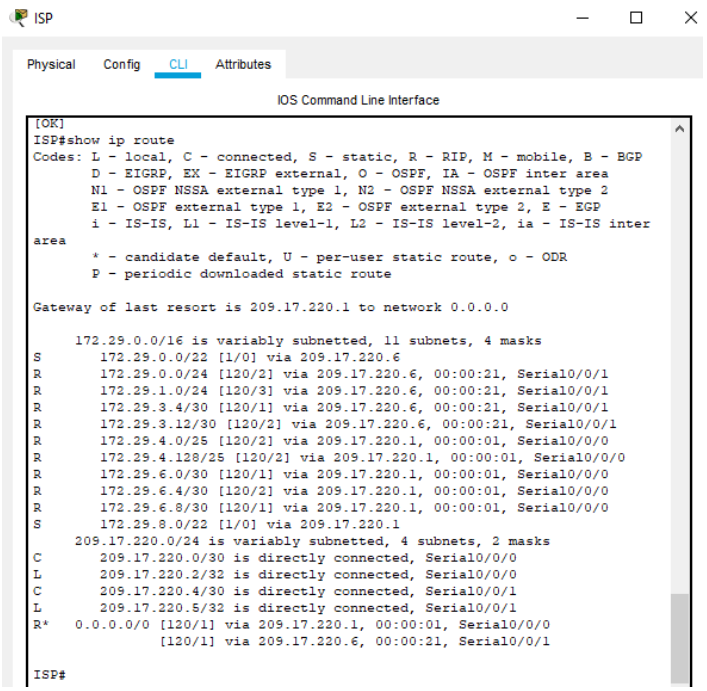
c. Obsérvese en los routers Bogotá1 y Medellín1 cierta similitud por su ubicación, por tener dos enlaces de conexión hacia otro router, y por la ruta por defecto que manejan.

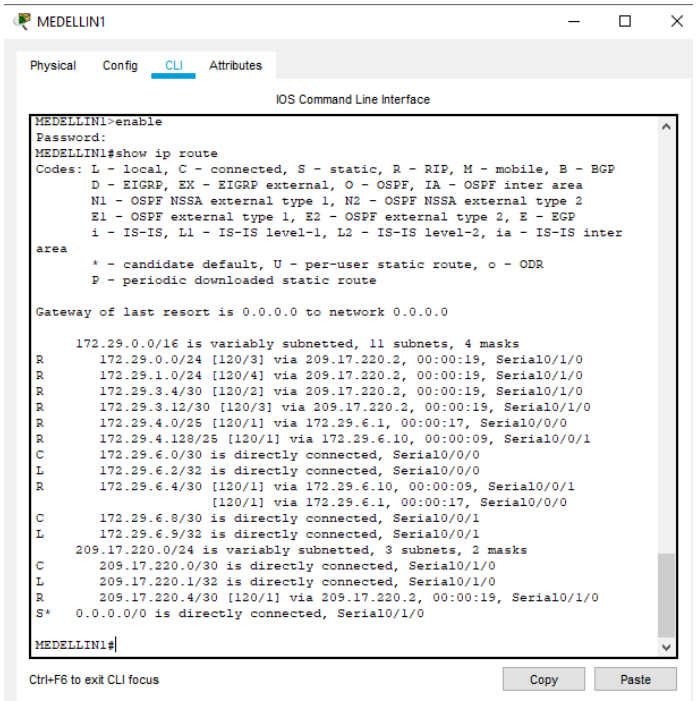
d. Los routers Medellín2 y Bogotá2 también presentan redes conectadas directamente y recibidas mediante RIP.

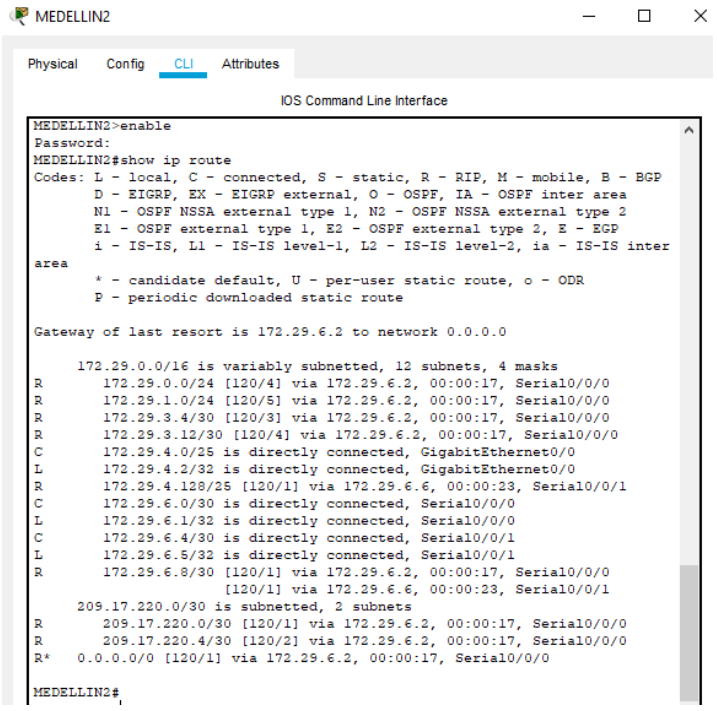
e. Las tablas de los routers restantes deben permitir visualizar rutas redundantes para el caso de la ruta por defecto.

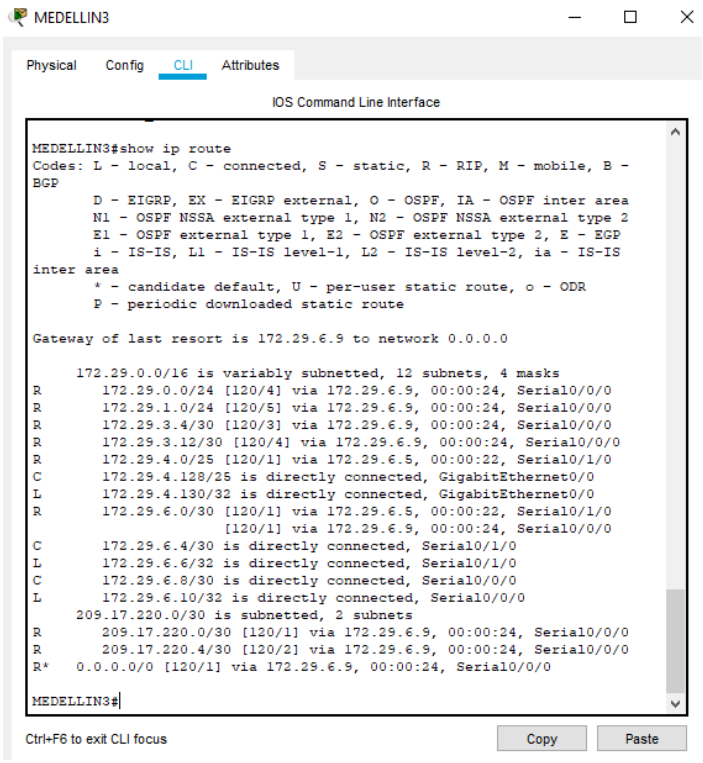
f. El router ISP solo debe indicar sus rutas estáticas adicionales a las directamente conectadas.

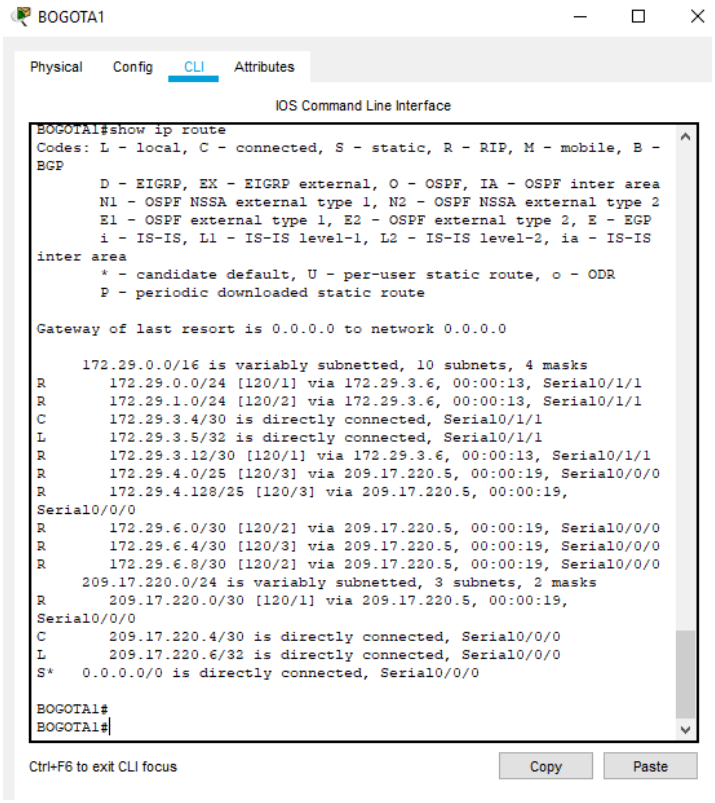
Todos los anteriores puntos se pueden ver en las siguientes evidencias, donde se muestra el resultado del comando SHOW IP ROUTE en cada router:

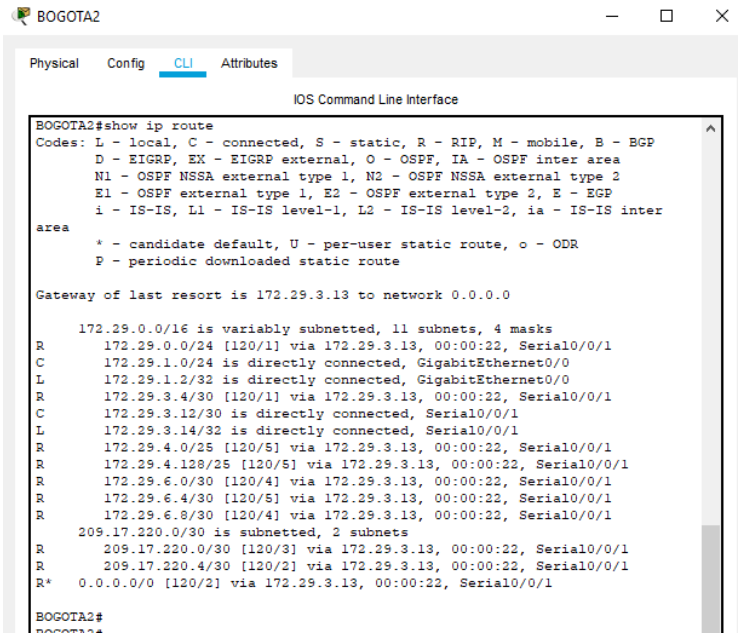


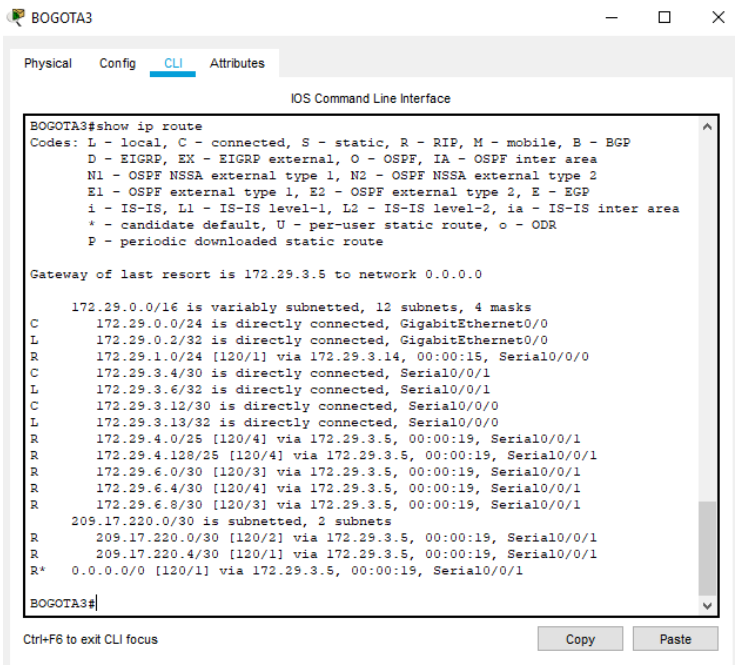



MEDELLIN2
Physical
Config
CLI
Attributes
IOS Command Line Interface
MEDELLIN2>enable
Password:
MEDELLIN2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is 172.29.6.2 to network 0.0.0.0
172.29.0.0/16 is variably subnetted, 12 subnets, 4 masks
R 172.29.0.0/24 [120/4] via 172.29.6.2, 00:00:17, Serial0/0/0
R 172.29.1.0/24 [120/5] via 172.29.6.2, 00:00:17, Serial0/0/0
R 172.29.3.4/30 [120/3] via 172.29.6.2, 00:00:17, Serial0/0/0
R 172.29.3.12/30 [120/4] via 172.29.6.2, 00:00:17, Serial0/0/0
C 172.29.4.0/25 is directly connected, GigabitEthernet0/0
L 172.29.4.2/32 is directly connected, GigabitEthernet0/0
R 172.29.4.128/25 [120/1] via 172.29.6.6, 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
C 172.29.6.4/30 is directly connected, Serial0/0/1
L 172.29.6.5/32 is directly connected, Serial0/0/1
R 172.29.6.8/30 [120/1] via 172.29.6.2, 00:00:17, Serial0/0/0
[120/1] via 172.29.6.6, 00:00:23, Serial0/0/1
209.17.220.0/30 is subnetted, 2 subnets
R 209.17.220.0/30 [120/1] via 172.29.6.2, 00:00:17, Serial0/0/0
R 209.17.220.4/30 [120/2] via 172.29.6.2, 00:00:17, Serial0/0/0
R* 0.0.0.0/0 [120/1] via 172.29.6.2, 00:00:17, Serial0/0/0
MEDELLIN2#


MEDELLIN3
Physical
Config
CLI
Attributes
IOS Command Line Interface
MEDELLIN3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is 172.29.6.9 to network 0.0.0.0
172.29.0.0/16 is variably subnetted, 12 subnets, 4 masks
R 172.29.0.0/24 [120/4] via 172.29.6.9, 00:00:24, Serial0/0/0
R 172.29.1.0/24 [120/5] via 172.29.6.9, 00:00:24, Serial0/0/0
R 172.29.3.4/30 [120/3] via 172.29.6.9, 00:00:24, Serial0/0/0
R 172.29.3.12/30 [120/4] via 172.29.6.9, 00:00:24, Serial0/0/0
R 172.29.4.0/25 [120/1] via 172.29.6.5, 00:00:22, Serial0/1/0
C 172.29.4.128/25 is directly connected, GigabitEthernet0/0
L 172.29.4.130/32 is directly connected, GigabitEthernet0/0
R 172.29.6.0/30 [120/1] via 172.29.6.5, 00:00:22, Serial0/1/0
[120/1] via 172.29.6.9, 00:00:24, Serial0/0/0
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, Serial0/0/0
L 172.29.6.10/32 is directly connected, Serial0/0/0
209.17.220.0/30 is subnetted, 2 subnets
R 209.17.220.0/30 [120/1] via 172.29.6.9, 00:00:24, Serial0/0/0
R 209.17.220.4/30 [120/2] via 172.29.6.9, 00:00:24, Serial0/0/0
R* 0.0.0.0/0 [120/1] via 172.29.6.9, 00:00:24, Serial0/0/0
MEDELLIN3#
Ctrl+F6 to exit CLI focus
Copy
Paste


BOGOTA1
Physical
Config
CLI
Attributes
IOS Command Line Interface
BOGOTA1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is 0.0.0.0 to network 0.0.0.0
172.29.0.0/16 is variably subnetted, 10 subnets, 4 masks
R 172.29.0.0/24 [120/1] via 172.29.3.6, 00:00:13, Serial0/1/1
R 172.29.1.0/24 [120/2] via 172.29.3.6, 00:00:13, Serial0/1/1
C 172.29.3.4/30 is directly connected, Serial0/1/1
L 172.29.3.5/32 is directly connected, Serial0/1/1
R 172.29.3.12/30 [120/1] via 172.29.3.6, 00:00:13, Serial0/1/1
R 172.29.4.0/25 [120/3] via 209.17.220.5, 00:00:19, Serial0/0/0
R 172.29.4.128/25 [120/3] via 209.17.220.5, 00:00:19, Serial0/0/0
R 172.29.6.0/30 [120/2] via 209.17.220.5, 00:00:19, Serial0/0/0
R 172.29.6.4/30 [120/3] via 209.17.220.5, 00:00:19, Serial0/0/0
R 172.29.6.8/30 [120/2] via 209.17.220.5, 00:00:19, Serial0/0/0
209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
R 209.17.220.0/30 [120/1] via 209.17.220.5, 00:00:19, Serial0/0/0
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 is directly connected, Serial0/0/0
BOGOTA1#
BOGOTA1#
Ctrl+F6 to exit CLI focus
Copy
Paste


BOGOTA2
Physical
Config
CLI
Attributes
IOS Command Line Interface
BOGOTA2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is 172.29.3.13 to network 0.0.0.0
172.29.0.0/16 is variably subnetted, 11 subnets, 4 masks
R 172.29.0.0/24 [120/1] via 172.29.3.13, 00:00:22, Serial0/0/1
C 172.29.1.0/24 is directly connected, GigabitEthernet0/0
L 172.29.1.2/32 is directly connected, GigabitEthernet0/0
R 172.29.3.4/30 [120/1] via 172.29.3.13, 00:00:22, Serial0/0/1
C 172.29.3.12/30 is directly connected, Serial0/0/1
L 172.29.3.14/32 is directly connected, Serial0/0/1
R 172.29.4.0/25 [120/5] via 172.29.3.13, 00:00:22, Serial0/0/1
R 172.29.4.128/25 [120/5] via 172.29.3.13, 00:00:22, Serial0/0/1
R 172.29.6.0/30 [120/4] via 172.29.3.13, 00:00:22, Serial0/0/1
R 172.29.6.4/30 [120/5] via 172.29.3.13, 00:00:22, Serial0/0/1
R 172.29.6.8/30 [120/4] via 172.29.3.13, 00:00:22, Serial0/0/1
209.17.220.0/30 is subnetted, 2 subnets
R 209.17.220.0/30 [120/3] via 172.29.3.13, 00:00:22, Serial0/0/1
R 209.17.220.4/30 [120/2] via 172.29.3.13, 00:00:22, Serial0/0/1
R* 0.0.0.0/0 [120/2] via 172.29.3.13, 00:00:22, Serial0/0/1
BOGOTA2#


BOGOTA3
Physical
Config
CLI
Attributes
IOS Command Line Interface
BOGOTA3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is 172.29.3.5 to network 0.0.0.0
172.29.0.0/16 is variably subnetted, 12 subnets, 4 masks
C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
L 172.29.0.2/32 is directly connected, GigabitEthernet0/0
R 172.29.1.0/24 [120/1] via 172.29.3.14, 00:00:15, Serial0/0/0
C 172.29.3.4/30 is directly connected, Serial0/0/1
L 172.29.3.6/32 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 172.29.4.0/25 [120/4] via 172.29.3.5, 00:00:19, Serial0/0/1
R 172.29.4.128/25 [120/4] via 172.29.3.5, 00:00:19, Serial0/0/1
R 172.29.6.0/30 [120/3] via 172.29.3.5, 00:00:19, Serial0/0/1
R 172.29.6.4/30 [120/4] via 172.29.3.5, 00:00:19, Serial0/0/1
R 172.29.6.8/30 [120/3] via 172.29.3.5, 00:00:19, Serial0/0/1
209.17.220.0/30 is subnetted, 2 subnets
R 209.17.220.0/30 [120/2] via 172.29.3.5, 00:00:19, Serial0/0/1
R 209.17.220.4/30 [120/1] via 172.29.3.5, 00:00:19, Serial0/0/1
R* 0.0.0.0/0 [120/1] via 172.29.3.5, 00:00:19, Serial0/0/1
BOGOTA3#
Ctrl+F6 to exit CLI focus
Copy
Paste

1.3 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
Medellín1	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/1
Medellín2	SERIAL0/0/0; SERIAL0/0/1
Medellín3	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0
ISP	No lo requiere

Para evitar propagar el protocolo RIP a interfaces innecesarias y optimizar los servicios, se desactiva en los router así:

MEDELLIN1(config-router)#passive-interface g0/0

MEDELLIN1(config-router)#passive-interface g0/1

MEDELLIN2(config-router)#passive-interface g0/0

MEDELLIN2(config-router)#passive-interface g0/1

MEDELLIN3(config-router)#passive-interface g0/0

MEDELLIN3(config-router)#passive-interface g0/1

MEDELLIN3(config-router)#passive-interface s0/1/1

BOGOTA1(config-router)#passive-interface g0/0

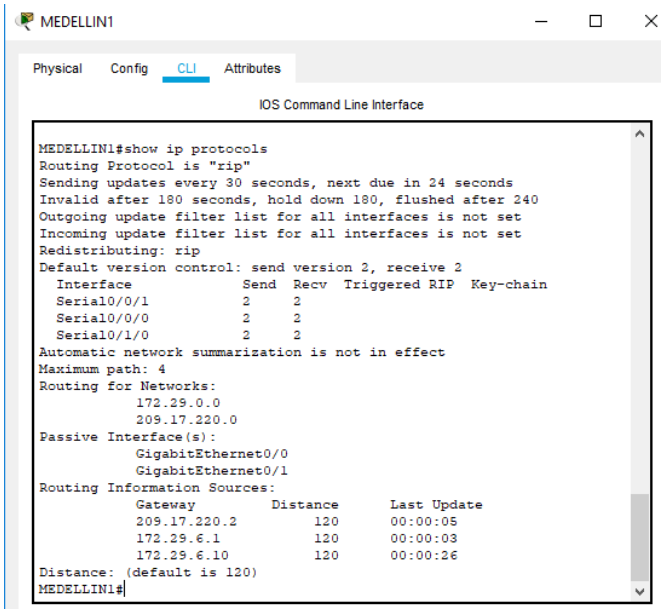
BOGOTA1(config-router)#passive-interface g0/1

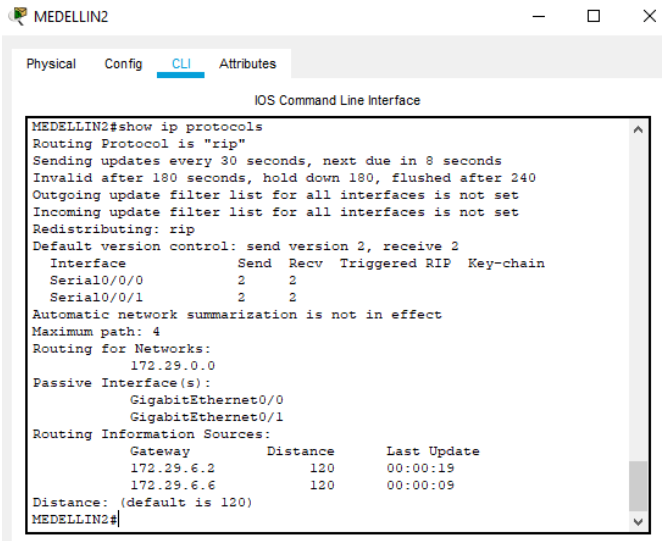
```
BOGOTA2(config-router)#passive-interface g0/0
BOGOTA2(config-router)#passive-interface g0/1
BOGOTA3(config-router)#passive-interface g0/0
BOGOTA3(config-router)#passive-interface g0/1
BOGOTA3(config-router)#passive-interface s0/1/1
```

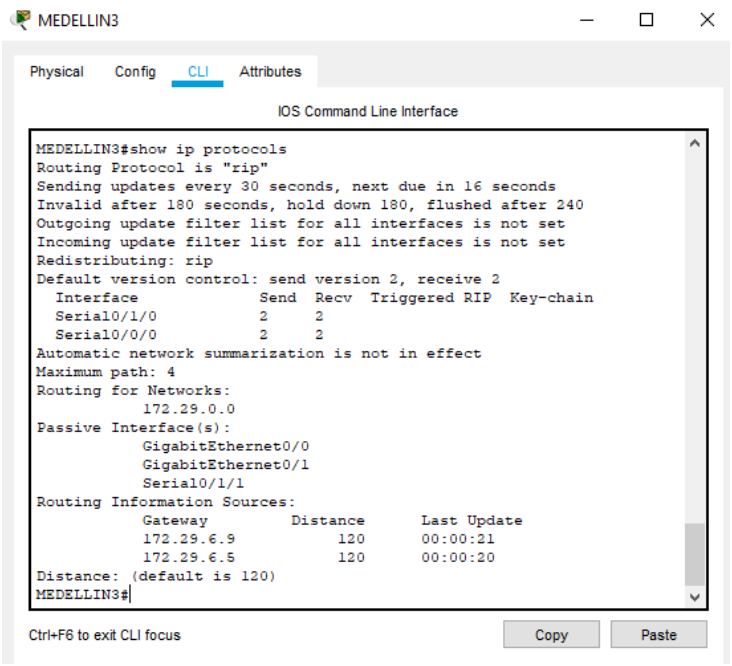
1.4 Parte 4: Verificación del protocolo RIP.

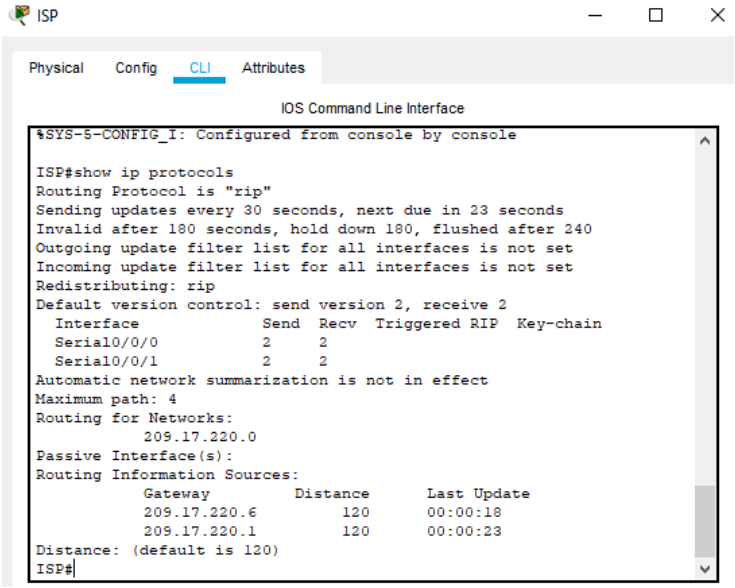
a. Verificar y documentar las opciones de enrutamiento configuradas en los routers, como el passive interface para la conexión hacia el ISP, la versión de RIP y las interfaces que participan de la publicación entre otros datos.

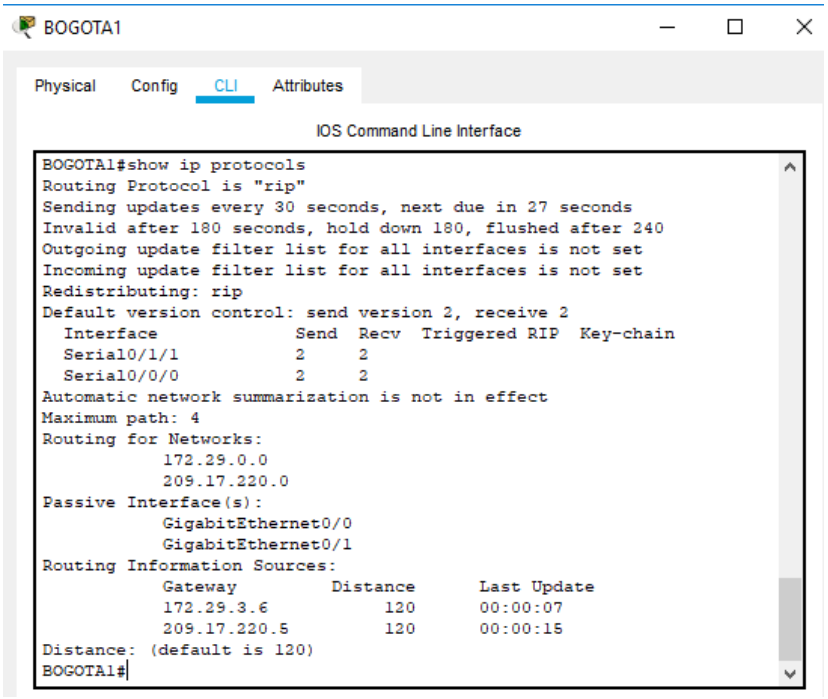
Se toma la información mediante el uso del comando SHOW IP PROTOCOLS

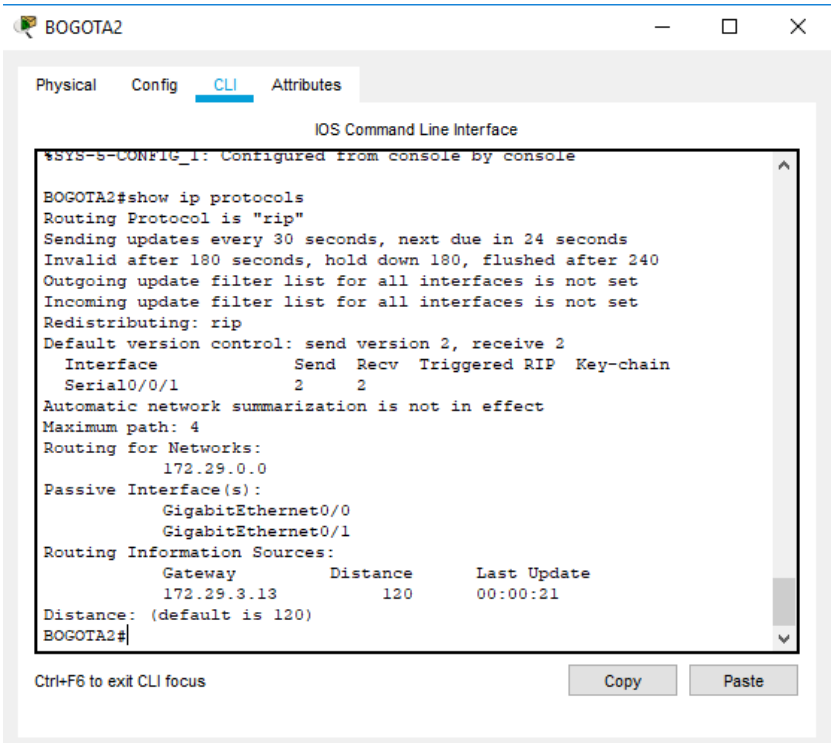


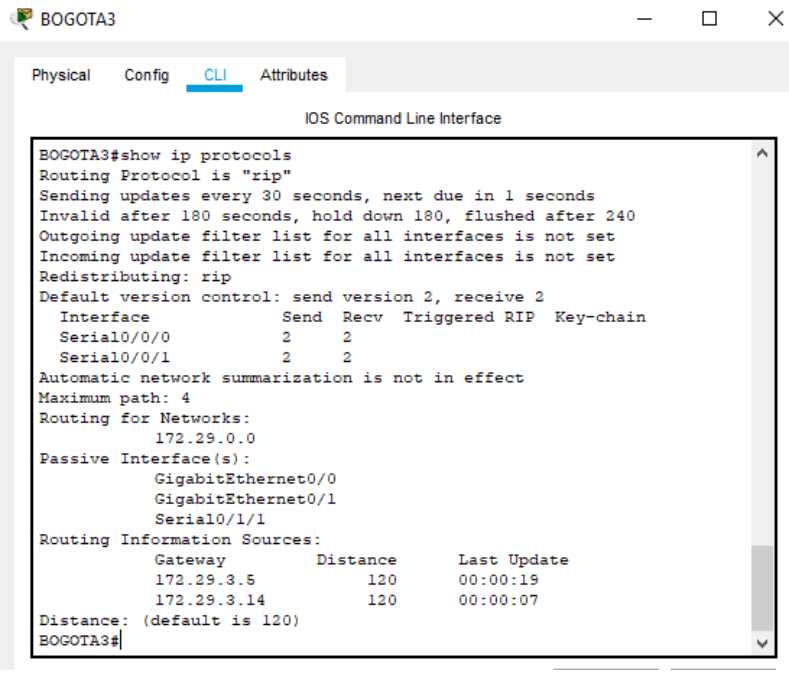



MEDELLIN3
Physical
Config
CLI
Attributes
IOS Command Line Interface
MEDELLIN3#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 16 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming 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
GigabitEthernet0/1
Serial0/1/1
Routing Information Sources:
Gateway Distance Last Update
172.29.6.9 120 00:00:21
172.29.6.5 120 00:00:20
Distance: (default is 120)
MEDELLIN3#
Ctrl+F6 to exit CLI focus
Copy
Paste


ISP
Physical
Config
CLI
Attributes
IOS Command Line Interface
%SYS-5-CONFIG_I: Configured from console by console
ISP#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 23 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/0/0 2 2
Serial0/0/1 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
209.17.220.0
Passive Interface(s):
Routing Information Sources:
Gateway Distance Last Update
209.17.220.6 120 00:00:18
209.17.220.1 120 00:00:23
Distance: (default is 120)
ISP#

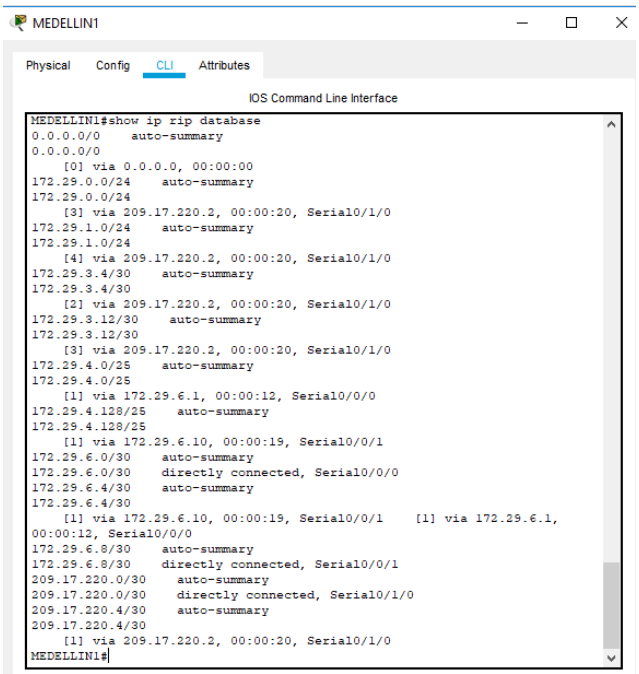

BOGOTA1
Physical
Config
CLI
Attributes
IOS Command Line Interface
BOGOTA1#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 27 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming 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
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
172.29.0.0
209.17.220.0
Passive Interface(s):
GigabitEthernet0/0
GigabitEthernet0/1
Routing Information Sources:
Gateway Distance Last Update
172.29.3.6 120 00:00:07
209.17.220.5 120 00:00:15
Distance: (default is 120)
BOGOTA1#

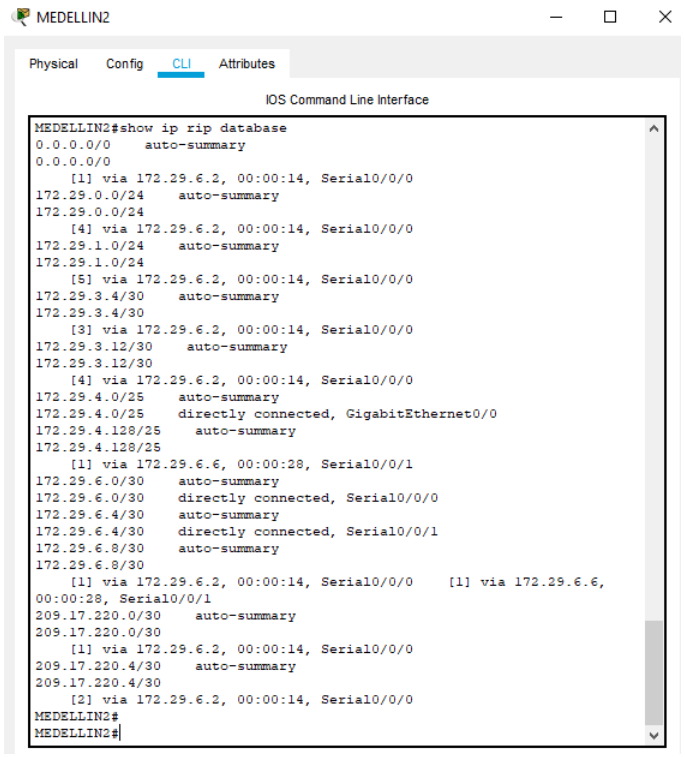

BOGOTA2
Physical
Config
CLI
Attributes
IOS Command Line Interface
%SYS-5-CONFIG_I: Configured from console by console
BOGOTA2#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 24 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update 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
Serial0/0/1 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
172.29.0.0
Passive Interface(s):
GigabitEthernet0/0
GigabitEthernet0/1
Routing Information Sources:
Gateway Distance Last Update
172.29.3.13 120 00:00:21
Distance: (default is 120)
BOGOTA2#
Ctrl+F6 to exit CLI focus
Copy
Paste

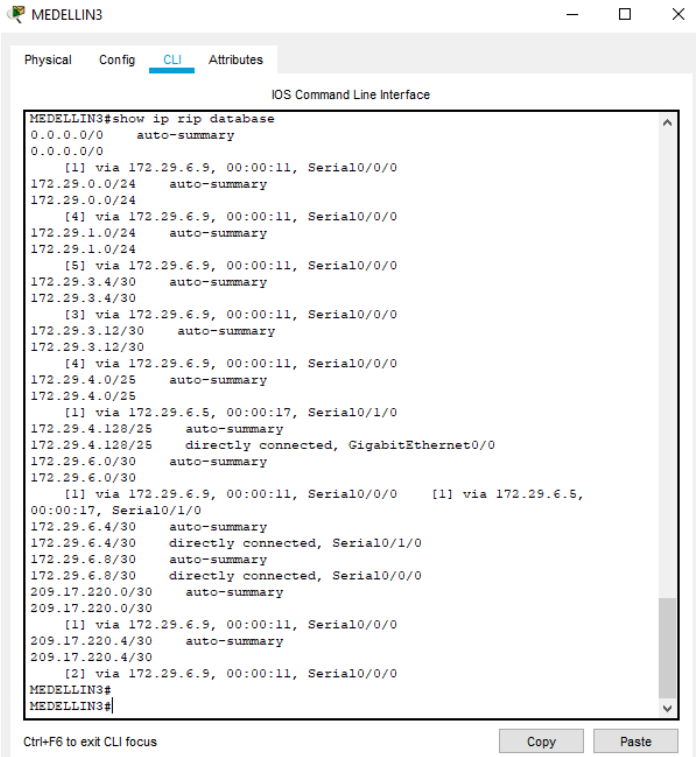


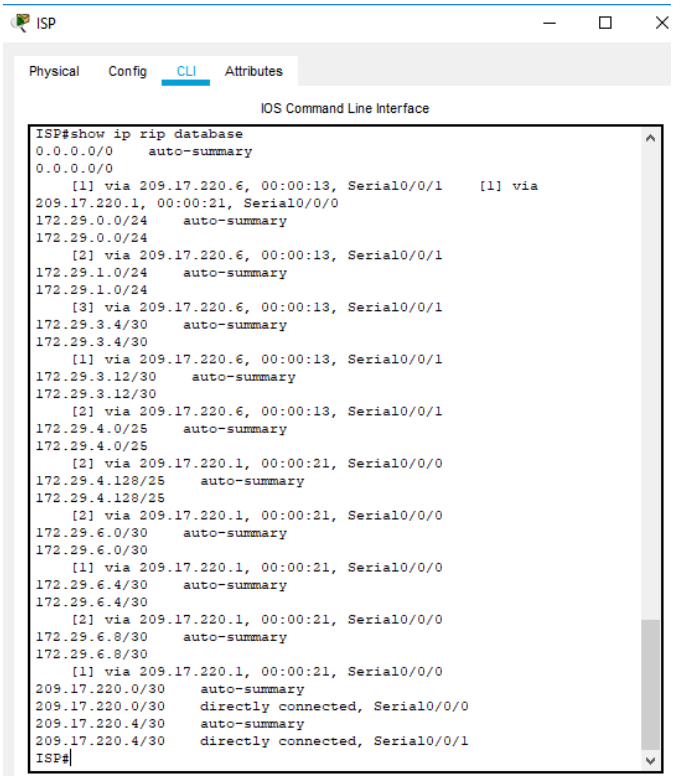
b. Verificar y documentar la base de datos de RIP de cada router, donde se informa de manera detallada de todas las rutas hacia cada red.

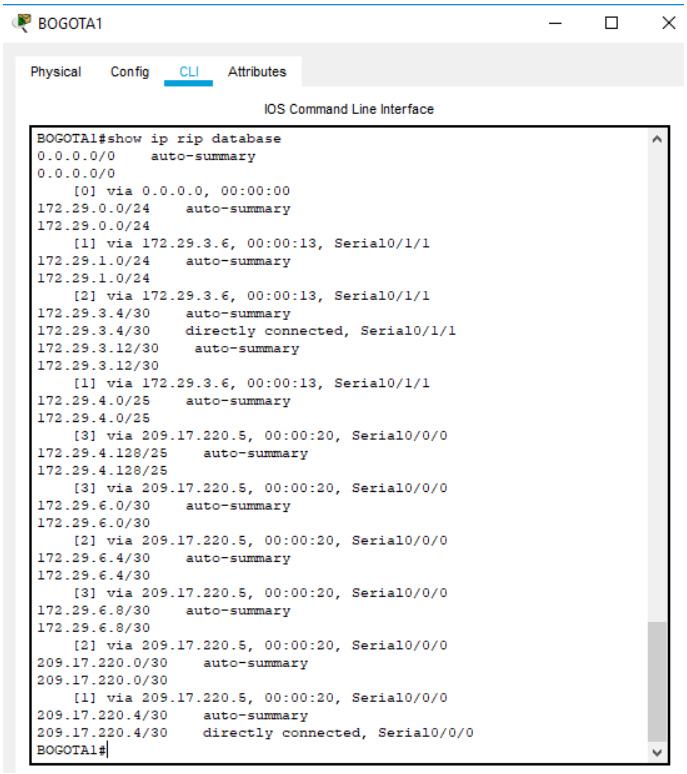
Para esto usamos el comando SHOW IP RIP DATABASE




MEDELLIN2
Physical
Config
CLI
Attributes
IOS Command Line Interface
MEDELLIN2#show ip rip database
0.0.0.0/0 auto-summary
0.0.0.0/0
[1] via 172.29.6.2, 00:00:14, Serial0/0/0
172.29.0.0/24 auto-summary
172.29.0.0/24
[4] via 172.29.6.2, 00:00:14, Serial0/0/0
172.29.1.0/24 auto-summary
172.29.1.0/24
[5] via 172.29.6.2, 00:00:14, Serial0/0/0
172.29.3.4/30 auto-summary
172.29.3.4/30
[3] via 172.29.6.2, 00:00:14, Serial0/0/0
172.29.3.12/30 auto-summary
172.29.3.12/30
[4] via 172.29.6.2, 00:00:14, 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, 00:00:28, 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 directly connected, Serial0/0/1
172.29.6.8/30 auto-summary
172.29.6.8/30
[1] via 172.29.6.2, 00:00:14, Serial0/0/0 [1] via 172.29.6.6,
00:00:28, Serial0/0/1
209.17.220.0/30 auto-summary
209.17.220.0/30
[1] via 172.29.6.2, 00:00:14, Serial0/0/0
209.17.220.4/30 auto-summary
209.17.220.4/30
[2] via 172.29.6.2, 00:00:14, Serial0/0/0
MEDELLIN2#
MEDELLIN2#


MEDELLIN3
Physical
Config
CLI
Attributes
IOS Command Line Interface
MEDELLIN3#show ip rip database
0.0.0.0/0 auto-summary
0.0.0.0/0
[1] via 172.29.6.9, 00:00:11, Serial0/0/0
172.29.0.0/24 auto-summary
172.29.0.0/24
[4] via 172.29.6.9, 00:00:11, Serial0/0/0
172.29.1.0/24 auto-summary
172.29.1.0/24
[5] via 172.29.6.9, 00:00:11, Serial0/0/0
172.29.3.4/30 auto-summary
172.29.3.4/30
[3] via 172.29.6.9, 00:00:11, Serial0/0/0
172.29.3.12/30 auto-summary
172.29.3.12/30
[4] via 172.29.6.9, 00:00:11, Serial0/0/0
172.29.4.0/25 auto-summary
172.29.4.0/25
[1] via 172.29.6.5, 00:00:17, 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, 00:00:11, Serial0/0/0 [1] via 172.29.6.5,
00:00:17, 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, Serial0/0/0
209.17.220.0/30 auto-summary
209.17.220.0/30
[1] via 172.29.6.9, 00:00:11, Serial0/0/0
209.17.220.4/30 auto-summary
209.17.220.4/30
[2] via 172.29.6.9, 00:00:11, Serial0/0/0
MEDELLIN3#
MEDELLIN3#
Ctrl+F6 to exit CLI focus
Copy
Paste


ISP
Physical
Config
CLI
Attributes
IOS Command Line Interface
ISP#show ip rip database
0.0.0.0/0   auto-summary
0.0.0.0/0
    [1] via 209.17.220.6, 00:00:13, Serial0/0/1   [1] via
209.17.220.1, 00:00:21, Serial0/0/0
172.29.0.0/24   auto-summary
172.29.0.0/24
    [2] via 209.17.220.6, 00:00:13, Serial0/0/1
172.29.1.0/24   auto-summary
172.29.1.0/24
    [3] via 209.17.220.6, 00:00:13, Serial0/0/1
172.29.3.4/30   auto-summary
172.29.3.4/30
    [1] via 209.17.220.6, 00:00:13, Serial0/0/1
172.29.3.12/30   auto-summary
172.29.3.12/30
    [2] via 209.17.220.6, 00:00:13, Serial0/0/1
172.29.4.0/25   auto-summary
172.29.4.0/25
    [2] via 209.17.220.1, 00:00:21, Serial0/0/0
172.29.4.128/25   auto-summary
172.29.4.128/25
    [2] via 209.17.220.1, 00:00:21, Serial0/0/0
172.29.6.0/30   auto-summary
172.29.6.0/30
    [1] via 209.17.220.1, 00:00:21, Serial0/0/0
172.29.6.4/30   auto-summary
172.29.6.4/30
    [2] via 209.17.220.1, 00:00:21, Serial0/0/0
172.29.6.8/30   auto-summary
172.29.6.8/30
    [1] via 209.17.220.1, 00:00:21, Serial0/0/0
209.17.220.0/30   auto-summary
209.17.220.0/30   directly connected, Serial0/0/0
209.17.220.4/30   auto-summary
209.17.220.4/30   directly connected, Serial0/0/1
ISP#


BOGOTA1
Physical
Config
CLI
Attributes
IOS Command Line Interface
BOGOTA1#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
172.29.0.0/24   auto-summary
172.29.0.0/24
    [1] via 172.29.3.6, 00:00:13, Serial0/1/1
172.29.1.0/24   auto-summary
172.29.1.0/24
    [2] via 172.29.3.6, 00:00:13, Serial0/1/1
172.29.3.4/30   auto-summary
172.29.3.4/30   directly connected, Serial0/1/1
172.29.3.12/30   auto-summary
172.29.3.12/30
    [1] via 172.29.3.6, 00:00:13, Serial0/1/1
172.29.4.0/25   auto-summary
172.29.4.0/25
    [3] via 209.17.220.5, 00:00:20, Serial0/0/0
172.29.4.128/25   auto-summary
172.29.4.128/25
    [3] via 209.17.220.5, 00:00:20, Serial0/0/0
172.29.6.0/30   auto-summary
172.29.6.0/30
    [2] via 209.17.220.5, 00:00:20, Serial0/0/0
172.29.6.4/30   auto-summary
172.29.6.4/30
    [3] via 209.17.220.5, 00:00:20, Serial0/0/0
172.29.6.8/30   auto-summary
172.29.6.8/30
    [2] via 209.17.220.5, 00:00:20, Serial0/0/0
209.17.220.0/30   auto-summary
209.17.220.0/30
    [1] via 209.17.220.5, 00:00:20, Serial0/0/0
209.17.220.4/30   auto-summary
209.17.220.4/30   directly connected, Serial0/0/0
BOGOTA1#

BOGOTA2
Physical
Config
CLI
Attributes
IOS Command Line Interface
BOGOTA2#show ip rip database
0.0.0.0/0   auto-summary
0.0.0.0/0
    [2] via 172.29.3.13, 00:00:04, Serial0/0/1
172.29.0.0/24   auto-summary
172.29.0.0/24
    [1] via 172.29.3.13, 00:00:04, Serial0/0/1
172.29.1.0/24   auto-summary
172.29.1.0/24   directly connected, GigabitEthernet0/0
172.29.3.4/30   auto-summary
172.29.3.4/30
    [1] via 172.29.3.13, 00:00:04, Serial0/0/1
172.29.3.12/30   auto-summary
172.29.3.12/30   directly connected, Serial0/0/1
172.29.4.0/25   auto-summary
172.29.4.0/25
    [5] via 172.29.3.13, 00:00:04, Serial0/0/1
172.29.4.128/25   auto-summary
172.29.4.128/25
    [5] via 172.29.3.13, 00:00:04, Serial0/0/1
172.29.6.0/30   auto-summary
172.29.6.0/30
    [4] via 172.29.3.13, 00:00:04, Serial0/0/1
172.29.6.4/30   auto-summary
172.29.6.4/30
    [5] via 172.29.3.13, 00:00:04, Serial0/0/1
172.29.6.8/30   auto-summary
172.29.6.8/30
    [4] via 172.29.3.13, 00:00:04, Serial0/0/1
209.17.220.0/30   auto-summary
209.17.220.0/30
    [3] via 172.29.3.13, 00:00:04, Serial0/0/1
209.17.220.4/30   auto-summary
209.17.220.4/30
    [2] via 172.29.3.13, 00:00:04, Serial0/0/1
BOGOTA2#

BOGOTA3
Physical
Config
CLI
Attributes
IOS Command Line Interface
BOGOTA3#show ip rip database
0.0.0.0/0   auto-summary
0.0.0.0/0
    [1] via 172.29.3.5, 00:00:15, Serial0/0/1
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 172.29.3.14, 00:00:14, Serial0/0/0
172.29.3.4/30   auto-summary
172.29.3.4/30   directly connected, Serial0/0/1
172.29.3.12/30   auto-summary
172.29.3.12/30   directly connected, Serial0/0/0
172.29.4.0/25   auto-summary
172.29.4.0/25
    [4] via 172.29.3.5, 00:00:15, Serial0/0/1
172.29.4.128/25   auto-summary
172.29.4.128/25
    [4] via 172.29.3.5, 00:00:15, Serial0/0/1
172.29.6.0/30   auto-summary
172.29.6.0/30
    [3] via 172.29.3.5, 00:00:15, Serial0/0/1
172.29.6.4/30   auto-summary
172.29.6.4/30
    [4] via 172.29.3.5, 00:00:15, Serial0/0/1
172.29.6.8/30   auto-summary
172.29.6.8/30
    [3] via 172.29.3.5, 00:00:15, Serial0/0/1
209.17.220.0/30   auto-summary
209.17.220.0/30
    [2] via 172.29.3.5, 00:00:15, Serial0/0/1
209.17.220.4/30   auto-summary
209.17.220.4/30
    [1] via 172.29.3.5, 00:00:15, Serial0/0/1
BOGOTA3#

1.5 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 configura de la siguiente manera:

```
MEDELLIN1(config)#access-list 1 permit 172.29.4.0 0.0.7.255
MEDELLIN1(config)#ip nat inside source list 1 int s0/1/0 overload
MEDELLIN1(config)#int s0/0/0
MEDELLIN1(config-if)#ip nat inside
MEDELLIN1(config-if)#exit
MEDELLIN1(config)#int s0/0/1
MEDELLIN1(config-if)#ip nat inside
MEDELLIN1(config-if)#exit
MEDELLIN1(config)#int s0/1/1
MEDELLIN1(config-if)#ip nat inside
MEDELLIN1(config-if)#exit
MEDELLIN1(config)#int s0/1/0
MEDELLIN1(config-if)#ip nat outside
MEDELLIN1(config-if)#exit
MEDELLIN1(config)#
MEDELLIN1#debug ip nat
IP NAT debugging is on
```

b. El enlace Bogotá1 con ISP se debe configurar con autenticación CHAP.

Se configura de la siguiente manera:

BOGOTA1(config)#username ISP pass 1234

BOGOTA1(config)#int s0/0/0

BOGOTA1(config-if)#encapsulation ppp

BOGOTA1(config-if)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to down

BOGOTA1(config-if)#ppp authentication chap

BOGOTA1(config-if)#exit

BOGOTA1(config)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

BOGOTA1(config)#

ISP(config)#username BOGOTA1 pass 1234

ISP(config)#int s0/0/1

ISP(config-if)#encapsulation ppp

ISP(config-if)#ppp authentication chap

ISP(config-if)#exit

ISP(config)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

ISP(config)#

1.6 Parte 6: Configuración de PAT.

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.

Se realiza la parametrización solicitada y se prueba realizando los respectivos ping´s

BOGOTA1(config)#access-list 1 permit 172.29.0.0 0.0.7.255

BOGOTA1(config)#ip nat inside source list 1 int s0/0/0 overload

BOGOTA1(config)#int s0/0/0

BOGOTA1(config-if)#ip nat outside

BOGOTA1(config-if)#exit

BOGOTA1(config)#int s0/0/1

BOGOTA1(config-if)#ip nat inside

BOGOTA1(config-if)#exit

BOGOTA1(config)#int s0/1/0

BOGOTA1(config-if)#ip nat inside

BOGOTA1(config-if)#exit

BOGOTA1(config)#int s0/1/1

BOGOTA1(config-if)#ip nat inside

BOGOTA1(config-if)#exit

BOGOTA1(config)#end

BOGOTA1#

%SYS-5-CONFIG_I: Configured from console by console

BOGOTA1#debug ip nat

IP NAT debugging is on

BOGOTA1#

BOGOTA2#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 = 4/6/10 ms

BOGOTA2#ping 172.29.6.1

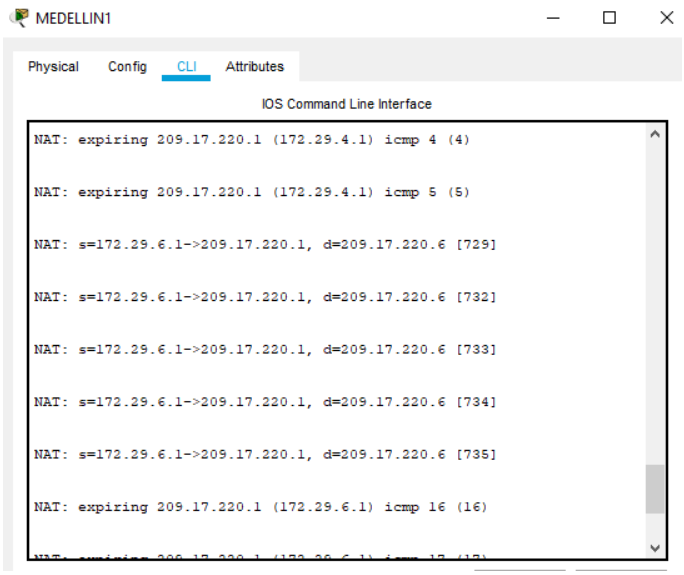
Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 172.29.6.1, timeout is 2 seconds:

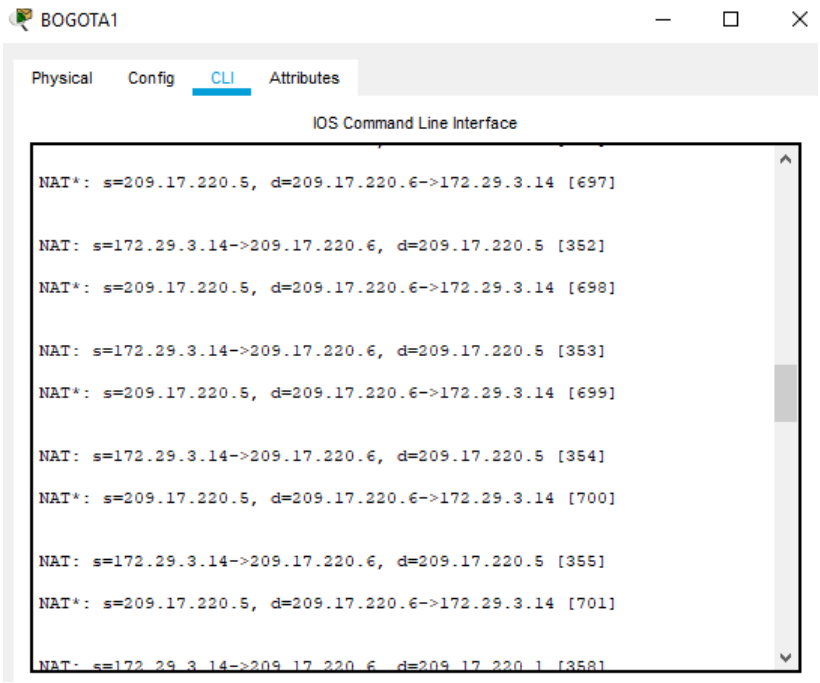
.....

Success rate is 0 percent (0/5)

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.



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 del router Bogotá1, cómo diferente puerto.



1.7 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.

```
MEDELLIN2(config)#ip dhcp pool MEDELLIN2
MEDELLIN2(dhcp-config)#default-router 172.29.4.2
MEDELLIN2(dhcp-config)#network 172.29.6.4 255.255.255.252
MEDELLIN2(dhcp-config)#exit
MEDELLIN2(config)#ip dhcp pool MEDELLIN3
MEDELLIN2(dhcp-config)#default-router 172.29.4.130
MEDELLIN2(dhcp-config)#network 172.29.4.0 255.255.255.128
MEDELLIN2(dhcp-config)#exit
MEDELLIN2(config)#
```

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

```
MEDELLIN3(config)#int g0/0
MEDELLIN3(config-if)#ip helper-address 172.29.6.5
MEDELLIN3(config-if)#exit
```

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

```
BOGOTA2(config)#ip dhcp pool BOGOTA2
```

BOGOTA2(dhcp-config)#default-router 172.29.1.2

BOGOTA2(dhcp-config)#network 172.29.1.0 255.255.255.0

BOGOTA2(dhcp-config)#exit

BOGOTA2(config)#ip dhcp pool BOGOTA3

BOGOTA2(dhcp-config)#default-router 172.29.0.2

BOGOTA2(dhcp-config)#network 172.29.3.12 255.255.255.252

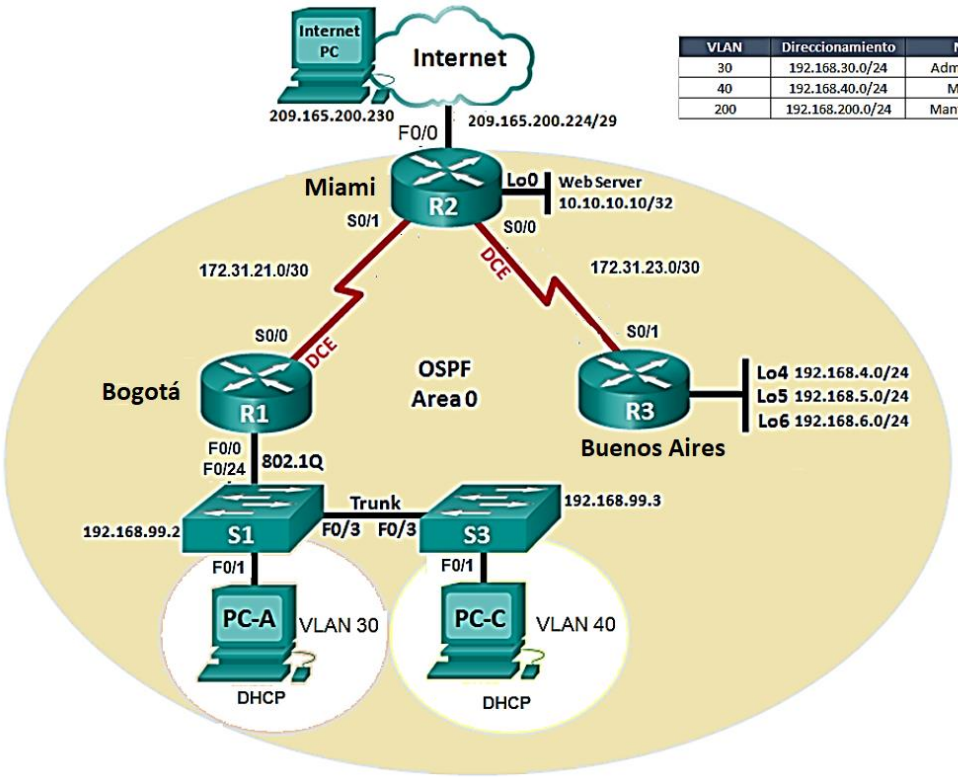
BOGOTA2(dhcp-config)#exit

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

BOGOTA3(config)#int g0/0
BOGOTA3(config-if)#ip helper-address 172.29.3.14
BOGOTA3(config-if)#end

2. DESARROLLO ESCENARIO 2

Escenario: 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.



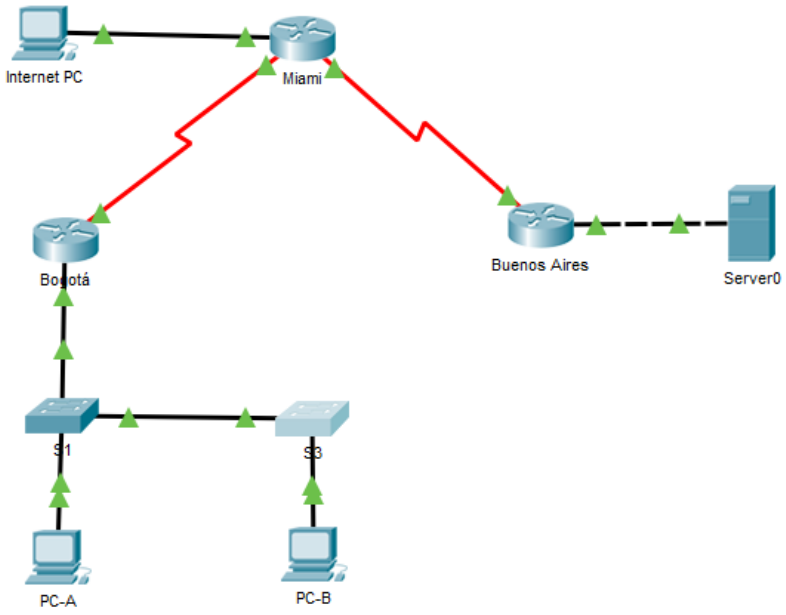
VLAN	Direccionamiento	Nombre
30	192.168.30.0/24	Administración
40	192.168.40.0/24	Mercadeo
200	192.168.200.0/24	Mantenimiento

Dispositivo	Interfaz	Dirección IP	Máscara de subred	Gateway predeterminado
Miami	s0/0	172.31.23.1	225.255.255.252	
	s0/1	172.31.21.1	255.255.255.252	
	g0/1	10.10.10.10	255.255.255.255	
	g0/0	209.165.200.225	255.255.255.248	
Buenos Aires	s0/1	172.31.23.2	255.255.255.252	
	lo4	192.168.4.1	255.255.255.0	
	lo5	192.168.5.1	255.255.255.0	
	lo6	192.168.6.1	255.255.255.0	
Bogotá	g0/0	192.168.99.1	255.255.255.248	
	s0/0 DCE	172.31.21.2	255.255.255.252	
	vlan 200	192.168.99.3	255.255.255.0	
Internet PC		209.165.200.230	255.255.255.248	209.165.200.225
Administración	VLAN30	192.168.30.0/24	255.255.255.0	
Mercadeo	VLAN40	192.168.40.0/24	255.255.255.0	
Mantenimiento	VLAN200	192.168.200.0/24	255.255.255.0	

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

Debido a que los routers en Packt tracer no permiten el uso del comando “ip http server” se instala un servidor adicional a la topología.

Router#ip http server
^
% Invalid input detected at '^' marker.



Se realiza la configuración inicial de cada equipo, al igual que el direccionamiento de cada una de sus interfaces:

MIAMI

Router(config)#hostname MIAMI
MIAMI(config)#no ip domain-lookup
MIAMI(config)#enable secret class
MIAMI(config)#line con 0
MIAMI(config-line)#password cisco
MIAMI(config-line)#login
MIAMI(config-line)#logging synchronous
MIAMI(config-line)#exit
MIAMI(config)#line vty 0 4
MIAMI(config-line)#password cisco
MIAMI(config-line)#login
MIAMI(config-line)#logging synchronous
MIAMI(config-line)#exit
MIAMI(config)#banner motd #prohibido el acceso a personal no autorizado#

MIAMI(config)#service password-encryption

```
MIAMI(config)#int s0/0/0
MIAMI(config-if)#description connection to BUENOS_AIRES
MIAMI(config-if)#ip address 172.31.23.1 255.255.255.252
MIAMI(config-if)#clock rate 128000
MIAMI(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
MIAMI(config-if)#exit
MIAMI(config)#int s0/0/1
MIAMI(config-if)#description connection to BOGOTA
MIAMI(config-if)#ip address 172.31.21.1 255.255.255.252

MIAMI(config-if)#no shutdown

MIAMI(config)#int g0/0
MIAMI(config-if)#ip address 209.165.200.225 255.255.255.248

MIAMI(config-if)#no shutdown

MIAMI(config)#int g0/1
MIAMI(config-if)#ip address 10.10.10.10 255.255.255.0

MIAMI(config-if)#no shutdown
```

BOGOTA

```
Router(config)#hostname BOGOTA
BOGOTA(config)#no ip domain-lookup
BOGOTA(config)#enable secret class
BOGOTA(config)#line con 0
BOGOTA(config-line)#password cisco
BOGOTA(config-line)#login
BOGOTA(config-line)#logging synchronous
BOGOTA(config-line)#exit
BOGOTA(config)#line vty 0 4
BOGOTA(config-line)#password cisco
BOGOTA(config-line)#login
BOGOTA(config-line)#logging synchronous
BOGOTA(config-line)#exit
BOGOTA(config)#banner motd #Prohibido el acceso a personal no autorizado#
BOGOTA(config)#service password-encryption
BOGOTA(config)#
```

BOGOTA(config)#int s0/0/0
BOGOTA(config-if)#description connetion to MIAMI
BOGOTA(config-if)#ip address 172.31.21.2 255.255.255.252
BOGOTA(config-if)#clock rate 128000
BOGOTA(config-if)#no shutdown
BOGOTA(config)#ip route 0.0.0.0 0.0.0.0 s0/0/0
%Default route without gateway, if not a point-to-point interface, may impact performance

BOGOTA(config)#int g0/0.30
BOGOTA(config-subif)#description accounting LAN
BOGOTA(config-subif)#encapsulation dot1q 30
BOGOTA(config-subif)#ip address 192.168.30.1 255.255.255.0
BOGOTA(config-subif)#int g0/0.40
BOGOTA(config-subif)#description accounting LAN
BOGOTA(config-subif)#encapsulation dot1q 40
BOGOTA(config-subif)#ip address 192.168.40.1 255.255.255.0
BOGOTA(config-subif)#int g0/0.200
BOGOTA(config-subif)#description accounting LAN
BOGOTA(config-subif)#encapsulation dot1q 200
BOGOTA(config-subif)#ip address 192.168.200.1 255.255.255.0

BOGOTA(config)#int g0/0
BOGOTA(config-if)#no shutdown
BOGOTA(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINK-5-CHANGED: Interface GigabitEthernet0/0.30, changed state to up

%LINK-5-CHANGED: Interface GigabitEthernet0/0.40, changed state to up

%LINK-5-CHANGED: Interface GigabitEthernet0/0.200, changed state to up

BOGOTA(config-if)#

BUENOS AIRES

Router(config)#hostname BUENOS_AIRES
BUENOS_AIRES(config)#no ip domain-lookup
BUENOS_AIRES(config)#enable secret class
BUENOS_AIRES(config)#line con 0

```
BUENOS_AIRES(config-line)#password cisco
BUENOS_AIRES(config-line)#login
BUENOS_AIRES(config-line)#logging synchronous
BUENOS_AIRES(config-line)#exit
BUENOS_AIRES(config)#line vty 0 4
BUENOS_AIRES(config-line)#password cisco
BUENOS_AIRES(config-line)#login
BUENOS_AIRES(config-line)#logging synchronous
BUENOS_AIRES(config-line)#exit
BUENOS_AIRES(config)#banner motd #Prohibido el acceso a personal no
autorizado#
BUENOS_AIRES(config)#service password-encryption
BUENOS_AIRES(config)#

BUENOS_AIRES(config)#int s0/0/1
BUENOS_AIRES(config-if)#description connection to MIAMI
BUENOS_AIRES(config-if)#ip address 172.31.23.2 255.255.255.252
BUENOS_AIRES(config-if)#no shutdown
BUENOS_AIRES(config)#int g0/0
BUENOS_AIRES(config-if)#ip address 10.10.10.1 255.255.255.0
BUENOS_AIRES(config-if)#no shutdown

BUENOS_AIRES(config)#int lo4
BUENOS_AIRES(config-if)#
BUENOS_AIRES(config-if)#ip address 192.168.4.1 255.255.255.0
BUENOS_AIRES(config-if)#no shutdown
BUENOS_AIRES(config-if)#int lo5
BUENOS_AIRES(config-if)#
BUENOS_AIRES(config-if)#ip address 192.168.5.1 255.255.255.0
BUENOS_AIRES(config-if)#no shutdown
BUENOS_AIRES(config-if)#exit
BUENOS_AIRES(config)#int lo6
BUENOS_AIRES(config-if)#
BUENOS_AIRES(config-if)#ip address 192.168.6.1 255.255.255.0
BUENOS_AIRES(config-if)#no shutdown
BUENOS_AIRES(config-if)#
```

S1

```
Switch(config)#hostname S1
S1(config)#no ip domain-lookup
S1(config)#enable secret class
S1(config)#line con 0
S1(config-line)#password cisco
S1(config-line)#login
```

S1(config-line)#banner motd #Prohibido el acceso a personal no autorizado#
S1(config)#service password-encryption
S1(config)#end

S1(config)#vlan 30
S1(config-vlan)#name Administracion
S1(config-vlan)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)#exit
S1(config)#int f0/24
S1(config-if)#switchport mode trunk
S1(config-if)#
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#int f0/3
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#no shutdown

S1(config-if)#int range f0/1-2, f0/4-24, g0/1-2
S1(config-if-range)#switchport mode access
S1(config-if-range)#exit
S1(config)#int f0/1
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 30
S1(config-if)#int range f0/2, f0/4-24, g0/1-2
S1(config-if-range)#shutdown

S1(config)#int vlan 200
S1(config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed state to up

S1(config-if)#exit
S1(config)#int vlan 200
S1(config-if)#ip address 192.168.99.2 255.255.255.0

S3

Switch(config)#hostname S3
S3(config)#no ip domain-lookup
S3(config)#enable secret class
S3(config)#line con 0
S3(config-line)#pasword cisco
S3(config-line)#password cisco
S3(config-line)#login
S3(config-line)#banner motd #Prohibido el acceso a personal no autorizado#
S3(config)#service password-encryption
S3(config)#exit

S3(config)#vlan 30
S3(config-vlan)#name Administracion
S3(config-vlan)#vlan 40
S3(config-vlan)#name mercadeo
S3(config-vlan)#vlan 200
S3(config-vlan)#name Mantenimiento
S3(config-vlan)#exit
S3(config)#int vlan 200
S3(config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed state to up

S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#exit
S3(config)#ip default-gateway 192.168.99.1
S3(config)#int f0/3
S3(config-if)#switchport mode trunk
S3(config-if)#switchport trunk native vlan 1
S3(config-if)#int range f0/1-2, f0/4-24, g0/1-2
S3(config-if-range)#switchport mode access
S3(config-if-range)#exit
S3(config)#int f0/1
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 40
S3(config-if)#int range f0/2, f0/4-24, g0/1-2
S3(config-if-range)#shutdown

Hacemos ping para verificar conexión, la cual no debe ser exitosa, ya que faltan configuraciones.

S1#ping 192.168.30.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.30.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

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

OSPFv2 area 0

Configuration Item or Task	Specification
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(config)#router ospf 1
BOGOTA(config-router)#router-id 1.1.1.1
BOGOTA(config-router)#network 172.31.21.0 0.0.0.3 area 0
BOGOTA(config-router)#network 192.168.30.0 0.0.0.255 area 0
BOGOTA(config-router)#network 192.168.40.0 0.0.0.255 area 0

BOGOTA(config-router)#network 192.168.200.0 0.0.0.255 area 0

BOGOTA(config-router)#passive-interface g0/0.30
BOGOTA(config-router)#passive-interface g0/0.40
BOGOTA(config-router)#passive-interface g0/0.200
BOGOTA(config-router)#exit
BOGOTA(config)#int s0/0/0
BOGOTA(config-if)#bandwidth 256

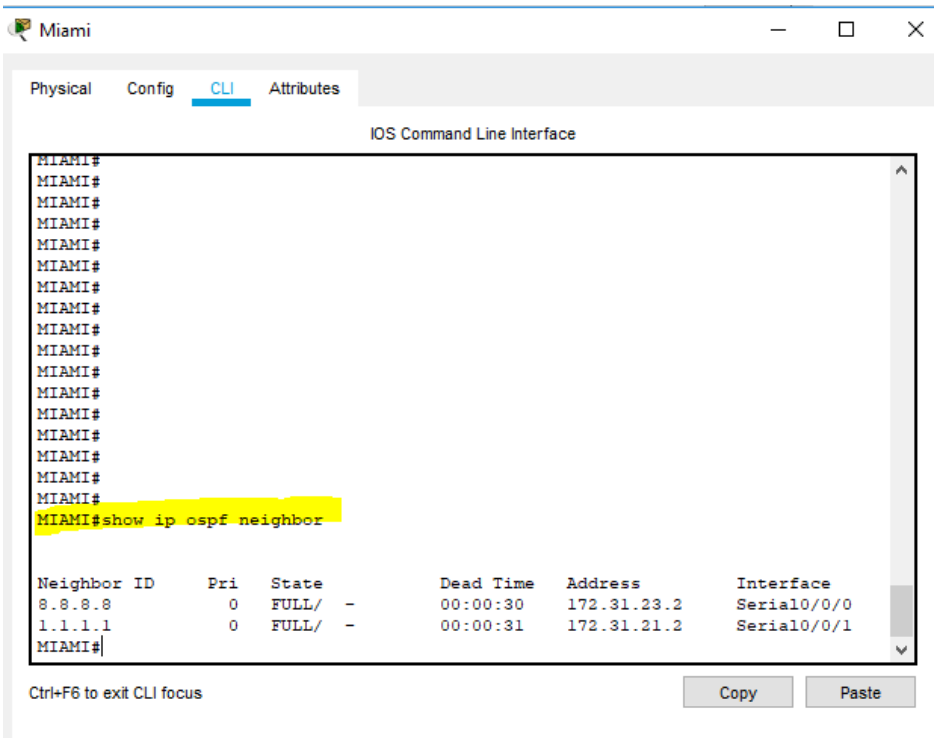
BOGOTA(config-if)#ip ospf cost 9500

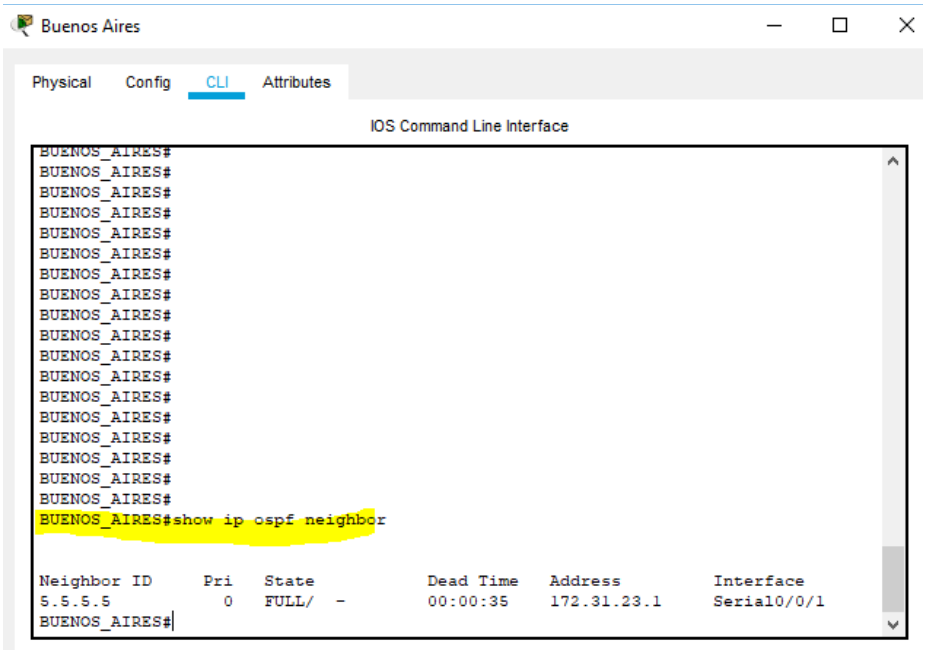
```
MIAMI(config)#router ospf 1
MIAMI(config-router)#router-id 5.5.5.5
MIAMI(config-router)#network 172.31.21.0 0.0.0.3 area 0
MIAMI(config-router)#
02:18:36: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/1 from
LOADING to FULL, Loading Done

MIAMI(config-router)#network 172.31.23.0 0.0.0.3 area 0
MIAMI(config-router)#network 172.31.21.0 0.0.0.3 area 0
MIAMI(config-router)#network 10.10.10.0 0.0.0.255 area 0
MIAMI(config-router)#passive-interface g0/1
MIAMI(config-router)#int s0/0/0
MIAMI(config-if)#bandwidth 256
MIAMI(config-if)#ip ospf cost 9500
```

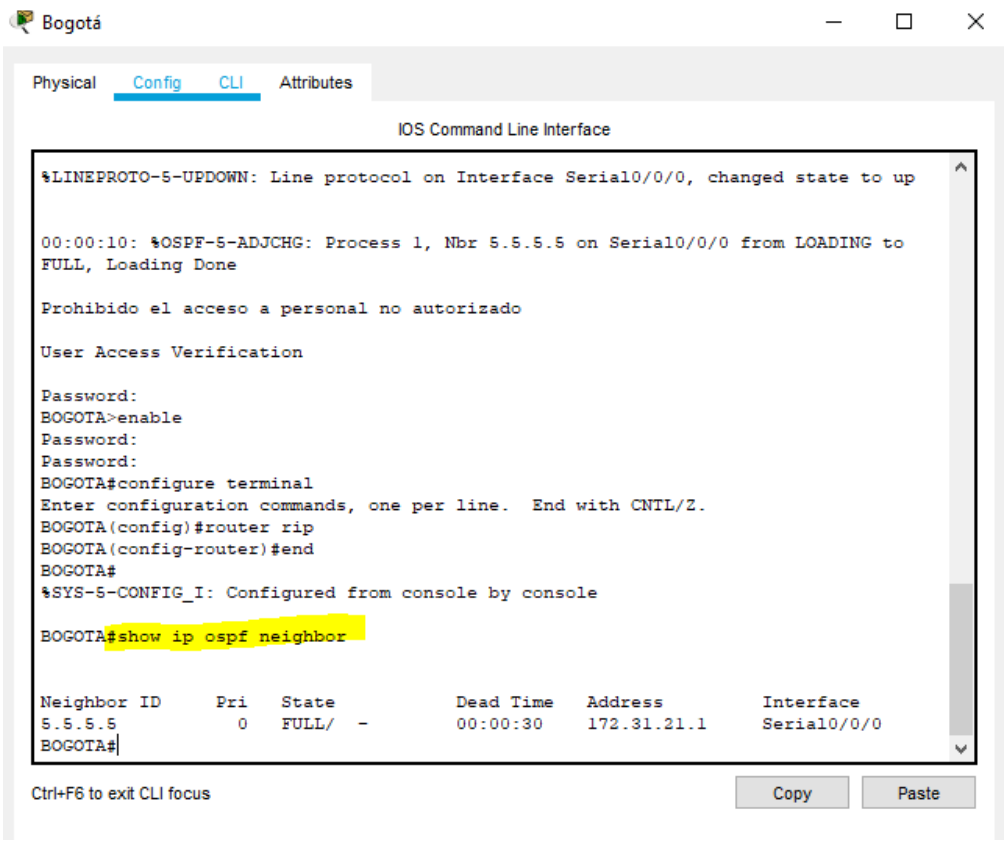
```
BUENOS_AIRES(config)#router ospf 1
BUENOS_AIRES(config-router)#router-id 8.8.8.8
BUENOS_AIRES(config-router)#network 172.31.23.0 0.0.0.3 area 0
BUENOS_AIRES(config-router)#
00:05:10: %OSPF-5-ADJCHG: Process 1, Nbr 5.5.5.5 on Serial0/0/1 from
LOADING to FULL, Loading Done

BUENOS_AIRES(config-router)#network 192.168.4.0 0.0.3.255 area 0
BUENOS_AIRES(config-router)#passive-interface lo4
BUENOS_AIRES(config-router)#passive-interface lo5
BUENOS_AIRES(config-router)#passive-interface lo6
BUENOS_AIRES(config-router)#exit
BUENOS_AIRES(config)#int s0/0/1
BUENOS_AIRES(config-if)#bandwidth 256
BUENOS_AIRES(config-if)#ip ospf cost 9500
BUENOS_AIRES(config-if)#end
```

Verificar información de OSPF

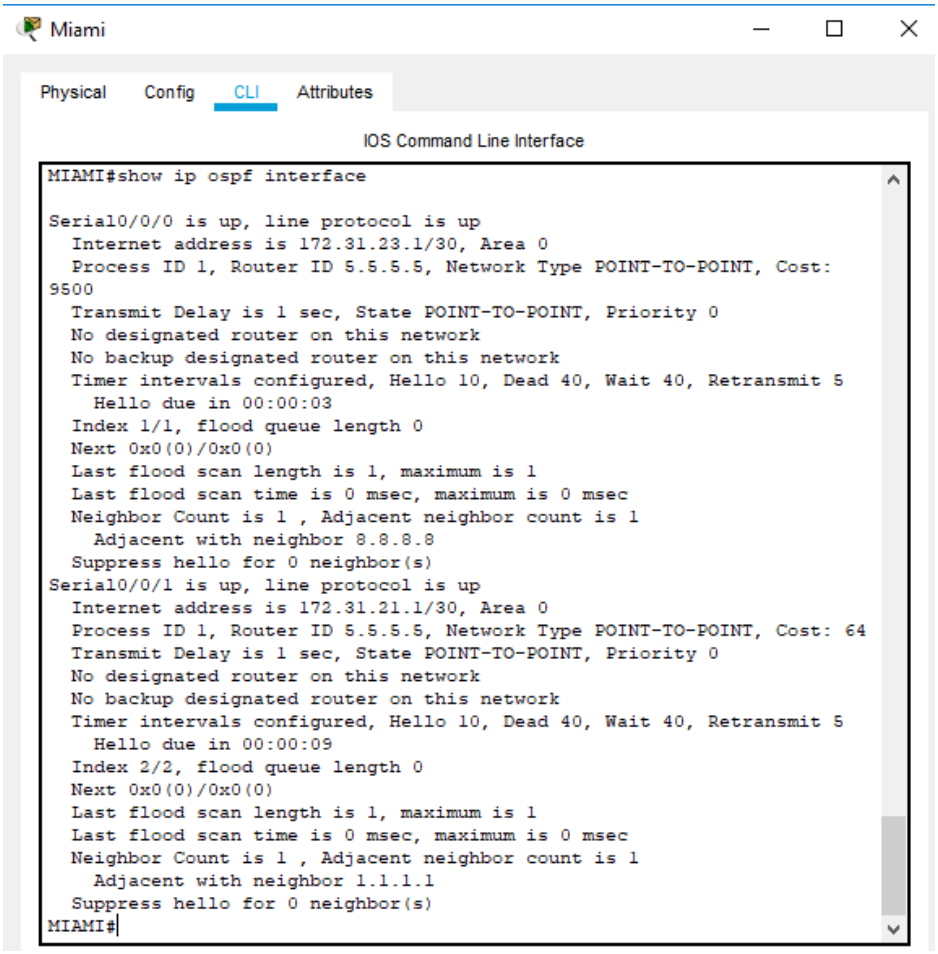
- Visualizar tablas de enrutamiento y routers conectados por OSPF

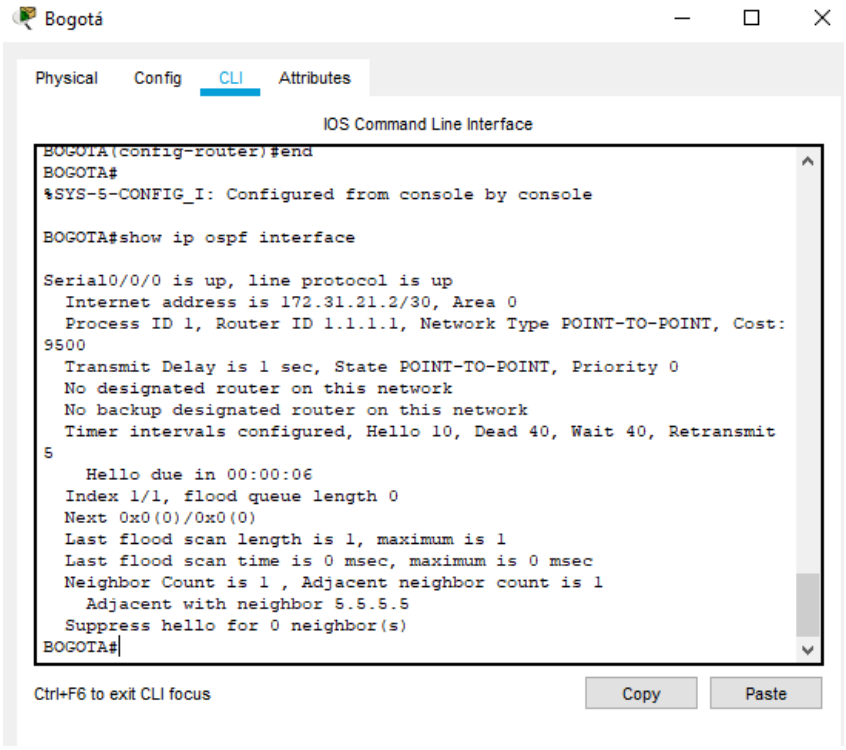


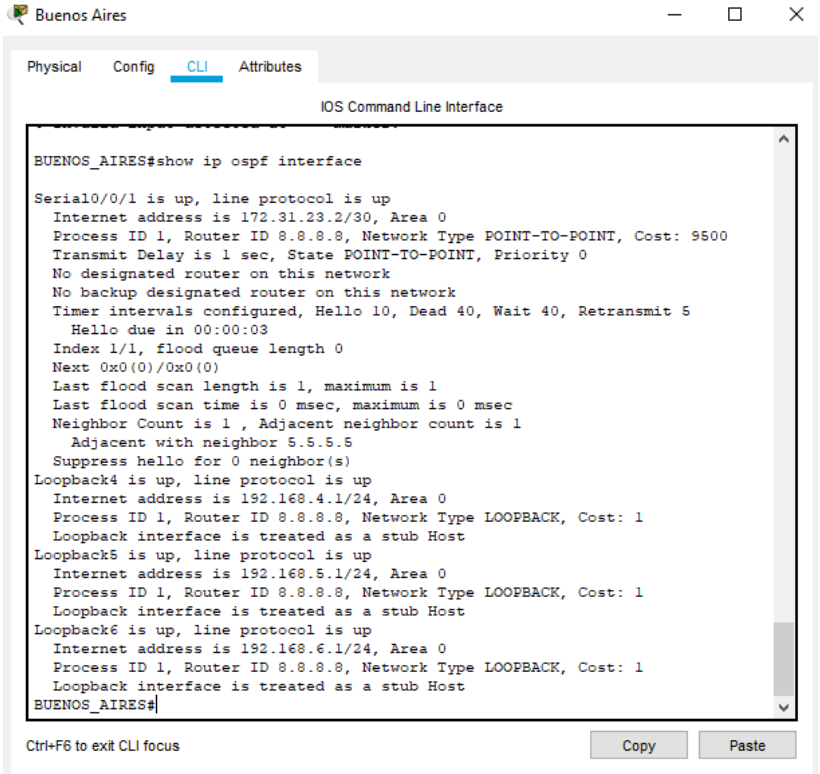



Bogotá
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
00:00:10: %OSPF-5-ADJCHG: Process 1, Nbr 5.5.5.5 on Serial0/0/0 from LOADING to FULL, Loading Done
Prohibido el acceso a personal no autorizado
User Access Verification
Password:
BOGOTA>enable
Password:
Password:
BOGOTA#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#router rip
BOGOTA(config-router)#end
BOGOTA#
%SYS-5-CONFIG_I: Configured from console by console
BOGOTA#show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
5.5.5.5 0 FULL/ - 00:00:30 172.31.21.1 Serial0/0/0
BOGOTA#
Ctrl+F6 to exit CLI focus
Copy
Paste

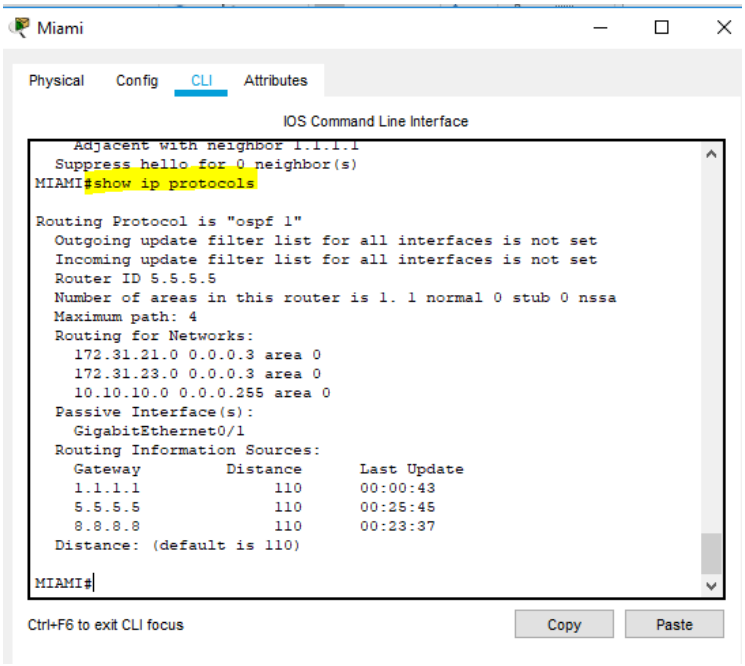
- Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface

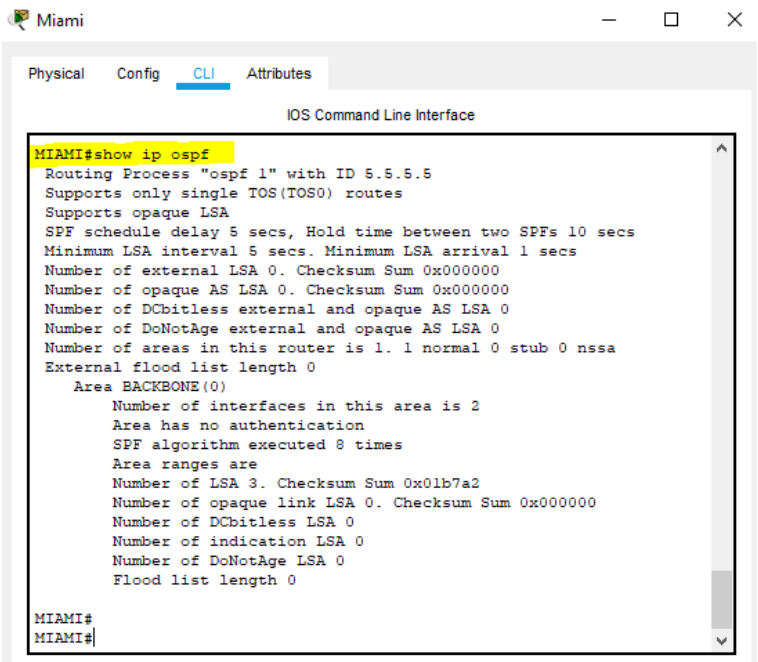


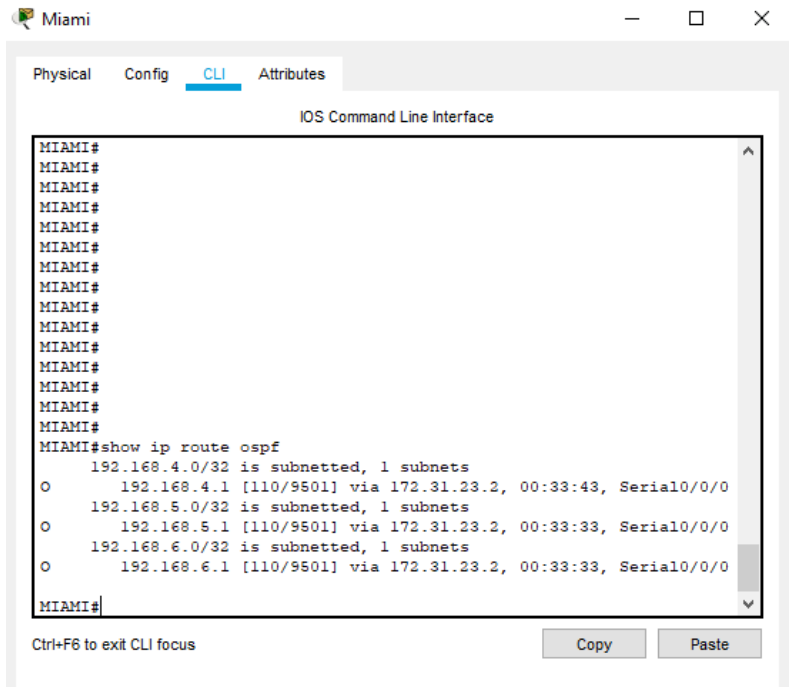

Bogotá
Physical
Config
CLI
Attributes
IOS Command Line Interface
BOGOTA(config-router)#end
BOGOTA#
%SYS-5-CONFIG_I: Configured from console by console
BOGOTA#show ip ospf interface
Serial0/0/0 is up, line protocol is up
Internet address is 172.31.21.2/30, Area 0
Process ID 1, Router ID 1.1.1.1, Network 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 00:00:06
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)
BOGOTA#
Ctrl+F6 to exit CLI focus
Copy
Paste

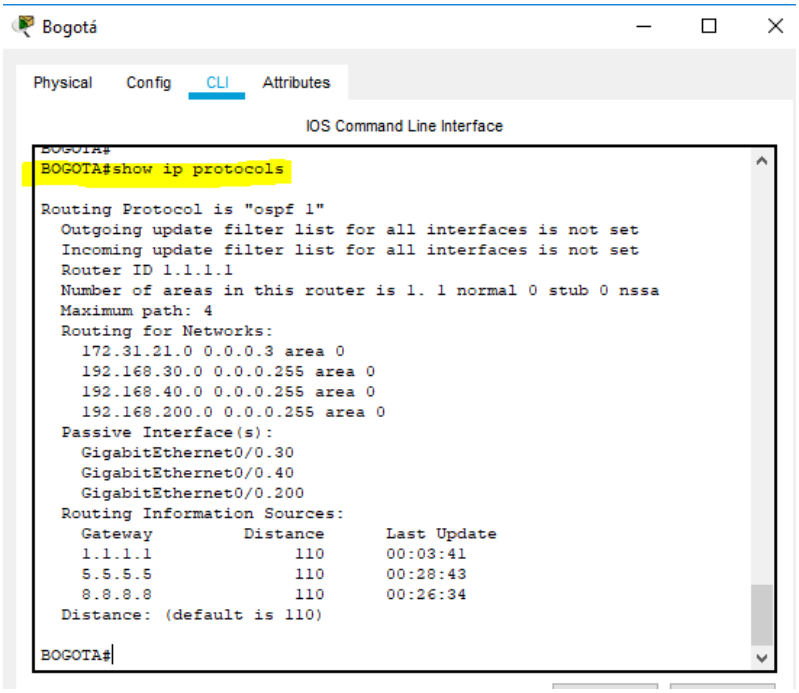

Buenos Aires
Physical
Config
CLI
Attributes
IOS Command Line Interface
BUENOS_AIRES#show ip ospf interface
Serial0/0/1 is up, line protocol is up
Internet address is 172.31.23.2/30, Area 0
Process ID 1, Router ID 8.8.8.8, Network Type POINT-TO-POINT, Cost: 9500
Transmit Delay is 1 sec, State POINT-TO-POINT, 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 00:00:03
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)
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
BUENOS_AIRES#
Ctrl+F6 to exit CLI focus
Copy
Paste

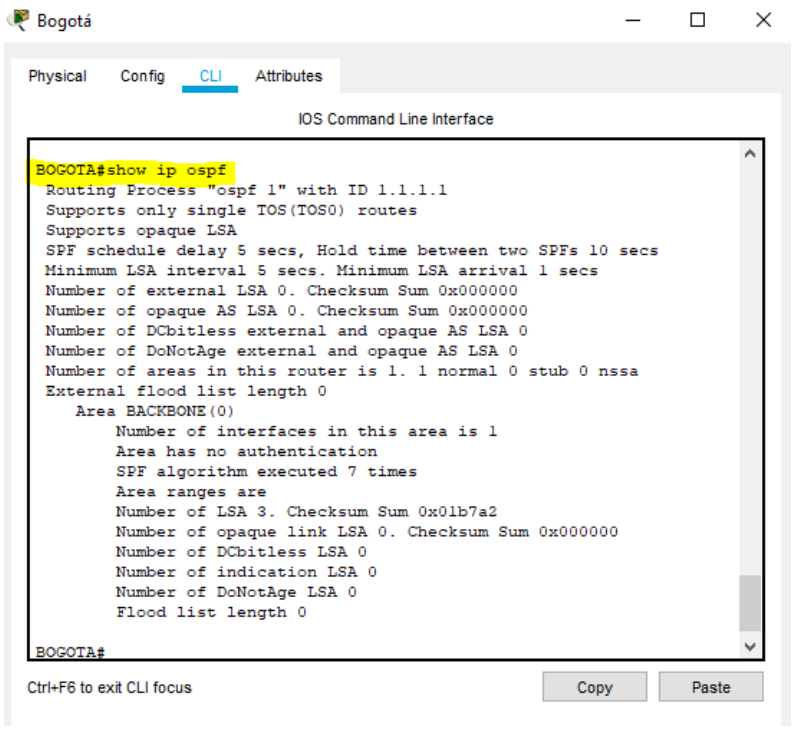
- Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.

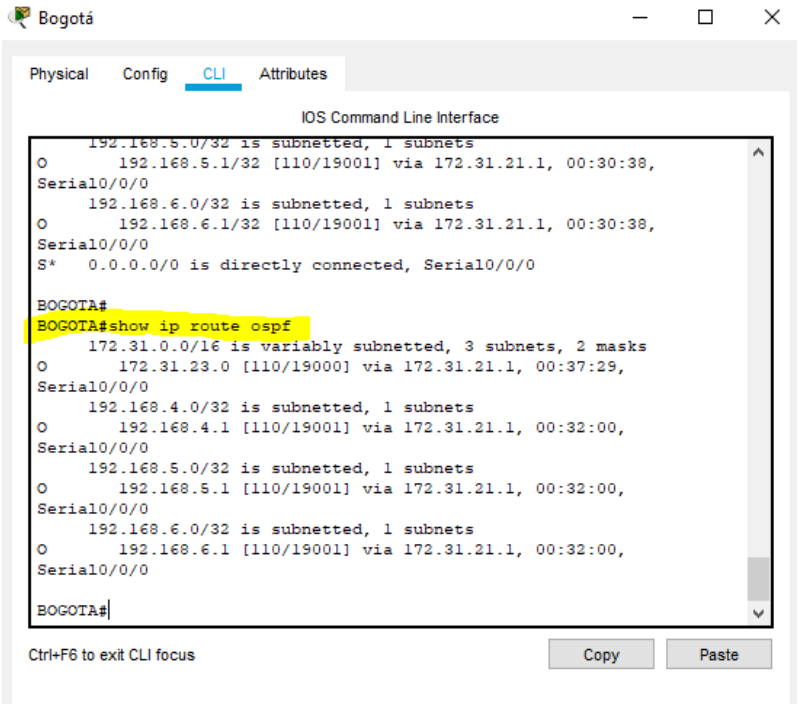


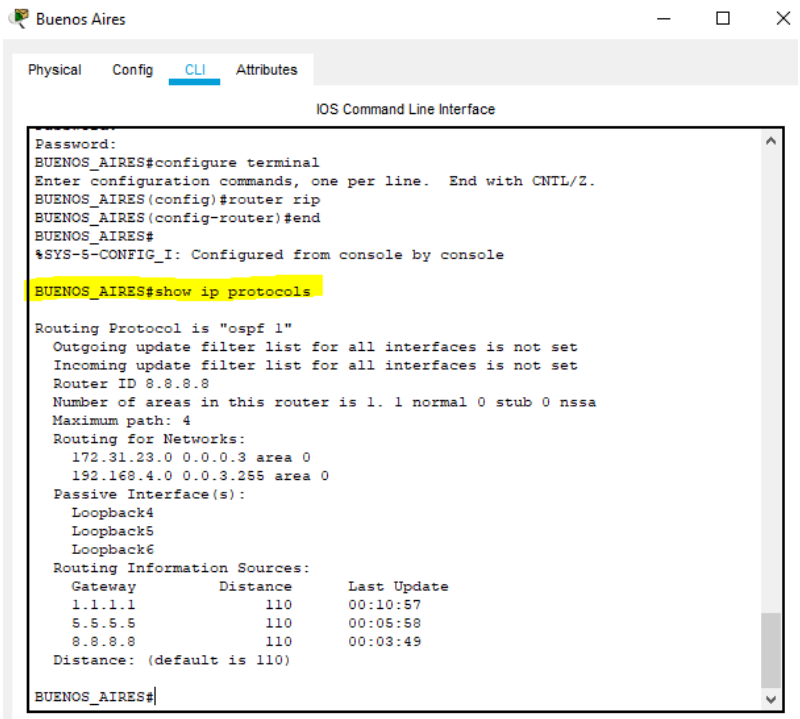


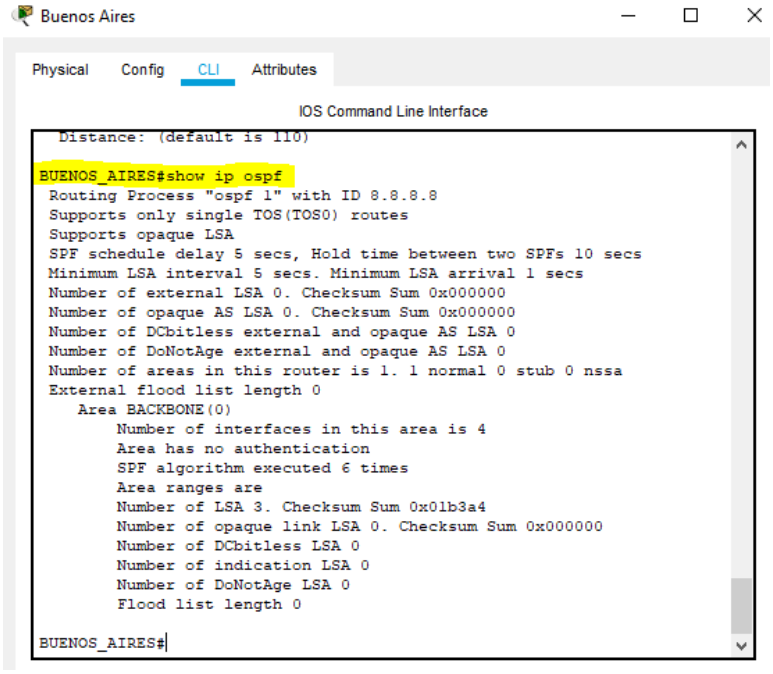

Miami
Physical
Config
CLI
Attributes
IOS Command Line Interface
MIAMI#
MIAMI#
MIAMI#
MIAMI#
MIAMI#
MIAMI#
MIAMI#
MIAMI#
MIAMI#
MIAMI#
MIAMI#
MIAMI#
MIAMI#
MIAMI#
MIAMI#show ip route ospf
192.168.4.0/32 is subnetted, 1 subnets
O 192.168.4.1 [110/9501] via 172.31.23.2, 00:33:43, Serial0/0/0
192.168.5.0/32 is subnetted, 1 subnets
O 192.168.5.1 [110/9501] via 172.31.23.2, 00:33:33, Serial0/0/0
192.168.6.0/32 is subnetted, 1 subnets
O 192.168.6.1 [110/9501] via 172.31.23.2, 00:33:33, Serial0/0/0
MIAMI#
Ctrl+F6 to exit CLI focus
Copy
Paste

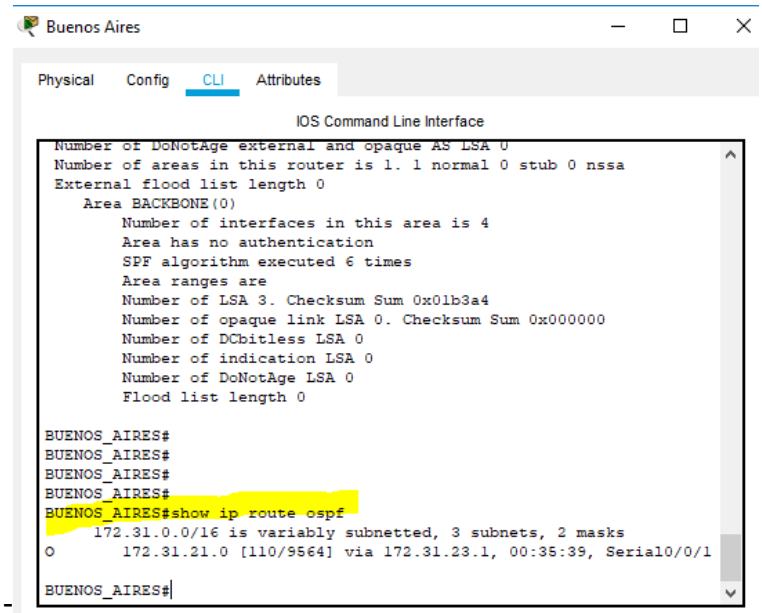

Bogotá
Physical
Config
CLI
Attributes
IOS Command Line Interface
BOGOTA#show ip protocols
Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 1.1.1.1
Number of areas in this router is 1. 1 normal 0 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):
GigabitEthernet0/0.30
GigabitEthernet0/0.40
GigabitEthernet0/0.200
Routing Information Sources:
Gateway Distance Last Update
1.1.1.1 110 00:03:41
5.5.5.5 110 00:28:43
8.8.8.8 110 00:26:34
Distance: (default is 110)
BOGOTA#


Bogotá
Physical
Config
CLI
Attributes
IOS Command Line Interface
BOGOTA#show ip ospf
Routing Process "ospf 1" with ID 1.1.1.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
Number of external LSA 0. Checksum Sum 0x000000
Number of opaque AS LSA 0. Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
External flood list length 0
Area BACKBONE(0)
Number of interfaces in this area is 1
Area has no authentication
SPF algorithm executed 7 times
Area ranges are
Number of LSA 3. Checksum Sum 0x01b7a2
Number of opaque link LSA 0. Checksum Sum 0x000000
Number of DCbitless LSA 0
Number of indication LSA 0
Number of DoNotAge LSA 0
Flood list length 0
BOGOTA#
Ctrl+F6 to exit CLI focus
Copy
Paste


Bogotá
Physical
Config
CLI
Attributes
IOS Command Line Interface
192.168.5.0/32 is subnetted, 1 subnets
O 192.168.5.1/32 [110/19001] via 172.31.21.1, 00:30:38,
Serial0/0/0
192.168.6.0/32 is subnetted, 1 subnets
O 192.168.6.1/32 [110/19001] via 172.31.21.1, 00:30:38,
Serial0/0/0
S* 0.0.0.0/0 is directly connected, Serial0/0/0
BOGOTA#
BOGOTA#show ip route ospf
172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
O 172.31.23.0 [110/19000] via 172.31.21.1, 00:37:29,
Serial0/0/0
192.168.4.0/32 is subnetted, 1 subnets
O 192.168.4.1 [110/19001] via 172.31.21.1, 00:32:00,
Serial0/0/0
192.168.5.0/32 is subnetted, 1 subnets
O 192.168.5.1 [110/19001] via 172.31.21.1, 00:32:00,
Serial0/0/0
192.168.6.0/32 is subnetted, 1 subnets
O 192.168.6.1 [110/19001] via 172.31.21.1, 00:32:00,
Serial0/0/0
BOGOTA#
Ctrl+F6 to exit CLI focus
Copy
Paste


Buenos Aires
Physical
Config
CLI
Attributes
IOS Command Line Interface
Password:
BUENOS_AIRES#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
BUENOS_AIRES(config)#router rip
BUENOS_AIRES(config-router)#end
BUENOS_AIRES#
%SYS-5-CONFIG_I: Configured from console by console
BUENOS_AIRES#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:
172.31.23.0 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
1.1.1.1 110 00:10:57
5.5.5.5 110 00:05:58
8.8.8.8 110 00:03:49
Distance: (default is 110)
BUENOS_AIRES#


Buenos Aires
Physical
Config
CLI
Attributes
IOS Command Line Interface
Distance: (default is 110)
BUENOS_AIRES#show ip ospf
Routing Process "ospf 1" with ID 8.8.8.8
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
Number of external LSA 0. Checksum Sum 0x000000
Number of opaque AS LSA 0. Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
External flood list length 0
Area BACKBONE(0)
Number of interfaces in this area is 4
Area has no authentication
SPF algorithm executed 6 times
Area ranges are
Number of LSA 3. Checksum Sum 0x01b3a4
Number of opaque link LSA 0. Checksum Sum 0x000000
Number of DCbitless LSA 0
Number of indication LSA 0
Number of DoNotAge LSA 0
Flood list length 0
BUENOS_AIRES#



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

4. En el Switch 3 deshabilitar DNS lookup

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

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

Nota: los anteriores incisos se realizaron en la configuración inicial de cada router, para no ser repetitivo se pueden evidenciar allá.

7. Implemente DHCP and NAT for IPv4

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

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

10. Configurar NAT en R2 para permitir que los host puedan salir a internet

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.

Los ejercicios del 7 al 10 se resuelven en las siguientes configuraciones de cada router, buscando uniformidad en el informe y una presentación mas amigable al lector.

```
BOGOTA(config)#ip dhcp pool ADMINISTRACION
BOGOTA(dhcp-config)#domain-name ccna-unad.com
BOGOTA(dhcp-config)#defaul-router 192.168.30.1
^
% Invalid input detected at '^' marker.
BOGOTA(dhcp-config)#default-router 192.168.30.1
BOGOTA(dhcp-config)#network 192.168.30.0 255.255.255.0
BOGOTA(dhcp-config)#exit
BOGOTA(config)#ip dchp pool MERCADEO
^
% Invalid input detected at '^' marker.
BOGOTA(config)#ip dhcp pool MERCADEO
BOGOTA(dhcp-config)#dns-server 10.10.10.11
BOGOTA(dhcp-config)#default-router 192.168.40.1
BOGOTA(dhcp-config)#network 192.168.40.0 255.255.255.0
BOGOTA(dhcp-config)#
```

```
MIAMI(config)#ip nat inside source static 10.10.10.10 209.165.200.229
MIAMI(config)#int g0/0
MIAMI(config-if)#ip nat outside
MIAMI(config-if)#int g0/1
MIAMI(config-if)#ip nat inside
MIAMI(config-if)#
```

MIAMI(config-if)#exit
MIAMI(config)#access-list 1 permit 192.168.30.0 0.0.0.255
MIAMI(config)#access-list 1 permit 192.168.40.0 0.0.0.255

MIAMI(config)#access-list 1 permit 192.168.4.0 0.0.3.255

MIAMI(config)#ip nat pool INTERNET 209.165.200.225 209.165.200.229 netmask 255.255.255.248

MIAMI(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
MIAMI(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30

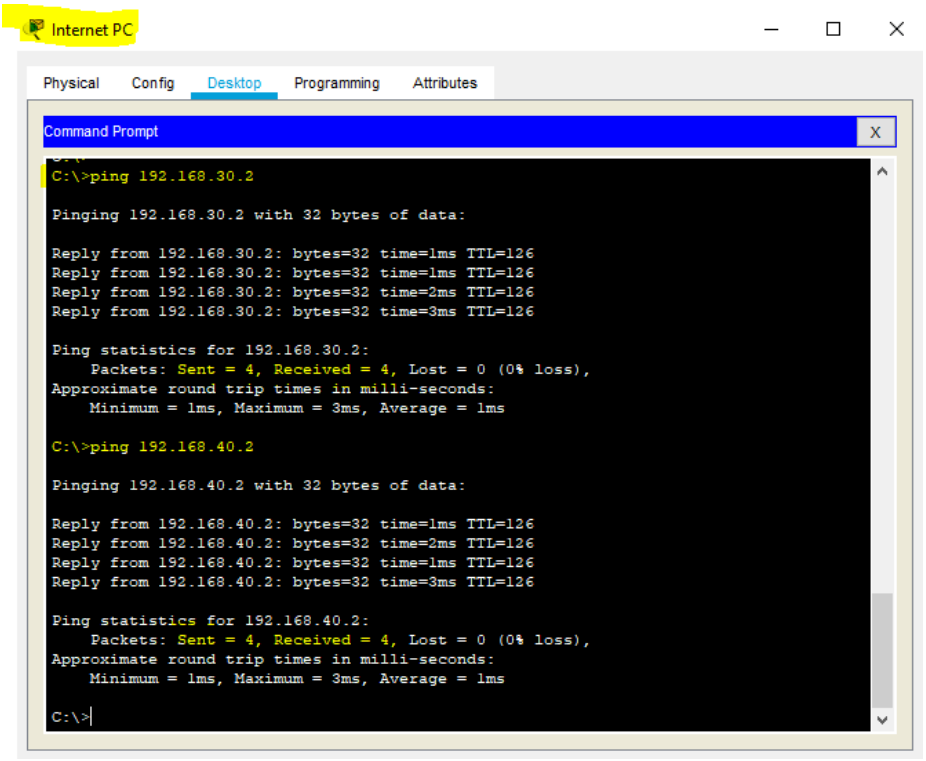
11. Configurar al menos dos listas de acceso de tipo estándar a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

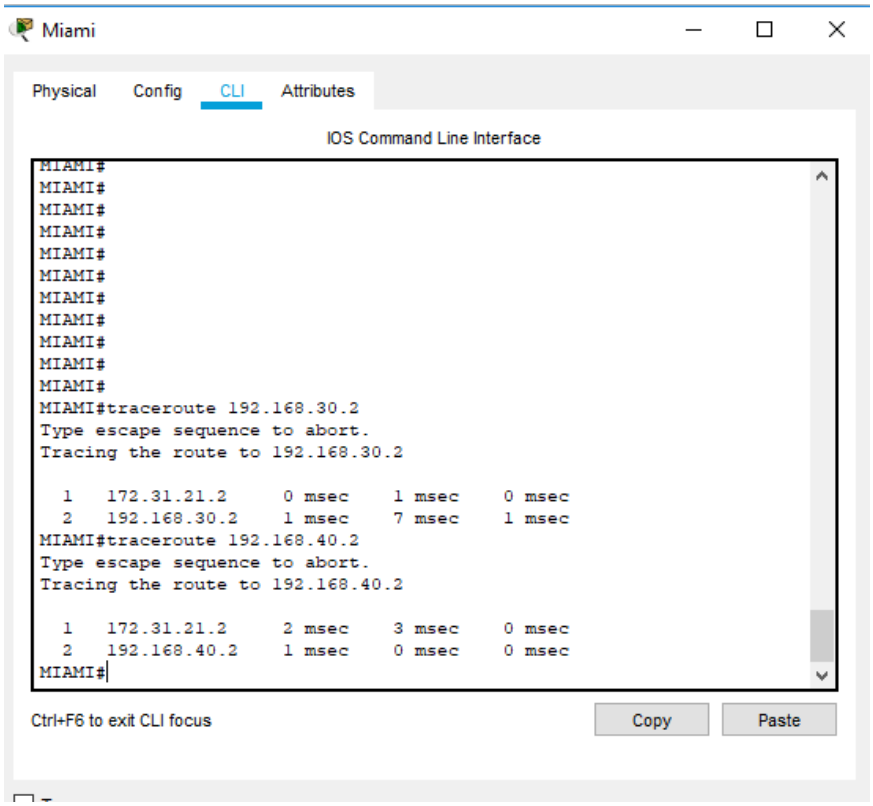
MIAMI(config)#ip access-list standard ADMIN
MIAMI(config-std-nacl)#permit host 172.31.21.1
MIAMI(config-std-nacl)#exit
MIAMI(config)#line vty 0 4
MIAMI(config-line)#access-class ADMIN in
MIAMI(config-line)#

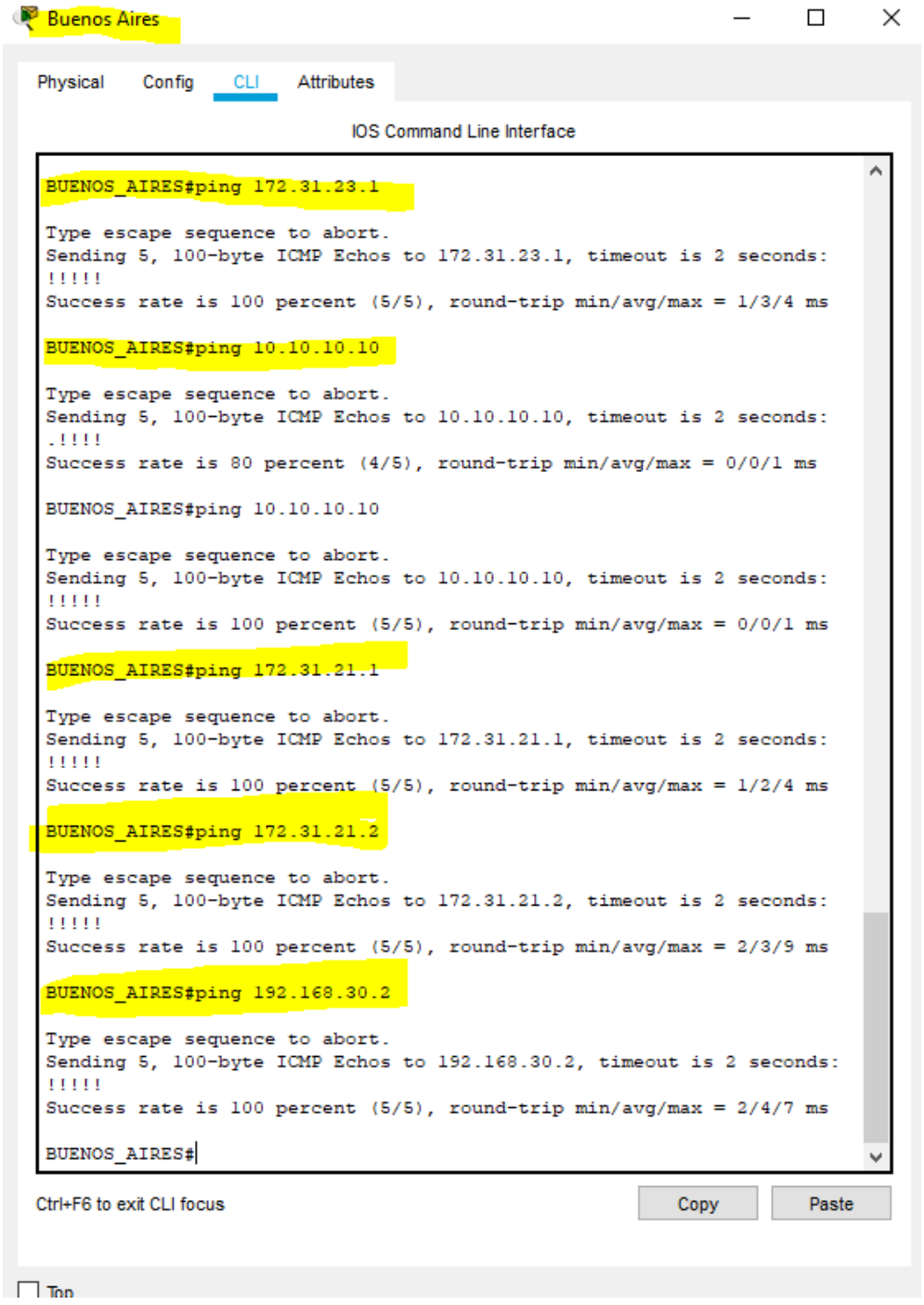
12. Configurar al menos dos listas de acceso de tipo extendido o nombradas a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

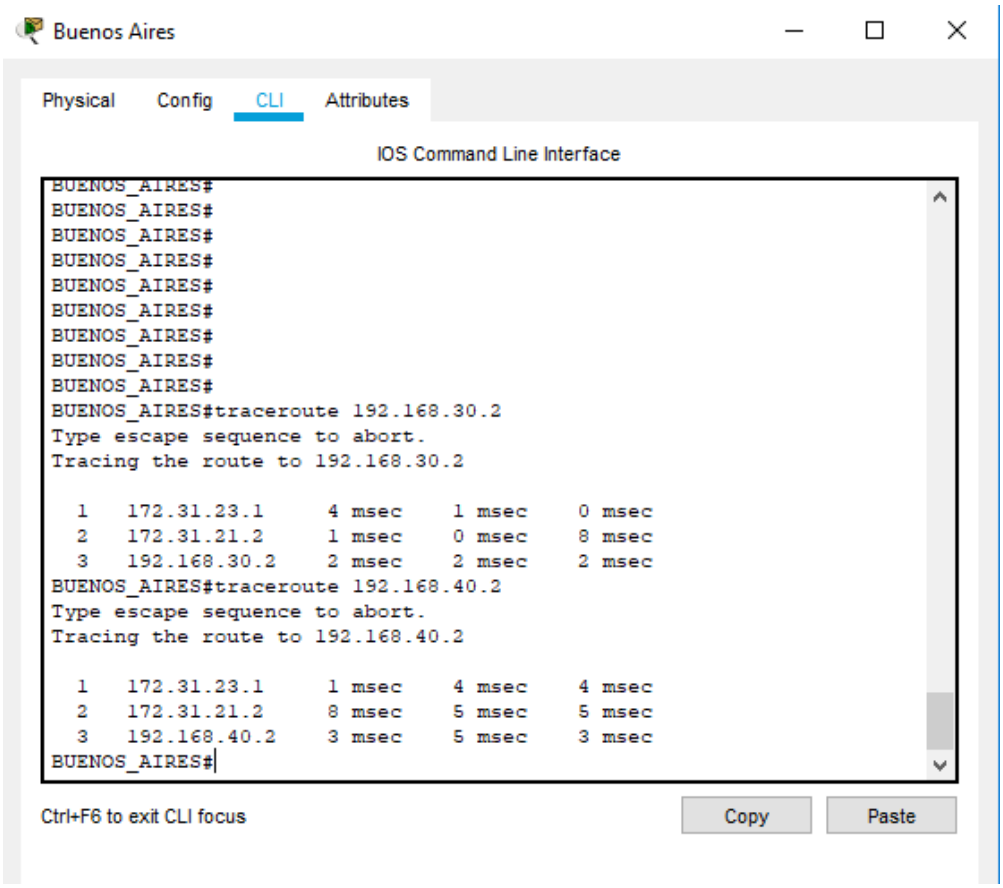
MIAMI(config)#access-list 100 permit tcp any host 209.165.200.229 eq www
MIAMI(config)#access-list 100 permit icmp any any echo-reply

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


Internet PC
Physical
Config
Desktop
Programming
Attributes
Command Prompt
C:\>ping 192.168.30.2
Pinging 192.168.30.2 with 32 bytes of data:
Reply from 192.168.30.2: bytes=32 time=1ms TTL=126
Reply from 192.168.30.2: bytes=32 time=1ms TTL=126
Reply from 192.168.30.2: bytes=32 time=2ms TTL=126
Reply from 192.168.30.2: bytes=32 time=3ms TTL=126
Ping statistics for 192.168.30.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 3ms, Average = 1ms
C:\>ping 192.168.40.2
Pinging 192.168.40.2 with 32 bytes of data:
Reply from 192.168.40.2: bytes=32 time=1ms TTL=126
Reply from 192.168.40.2: bytes=32 time=2ms TTL=126
Reply from 192.168.40.2: bytes=32 time=1ms TTL=126
Reply from 192.168.40.2: bytes=32 time=3ms TTL=126
Ping statistics for 192.168.40.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 3ms, Average = 1ms
C:\>


Miami
Physical
Config
CLI
Attributes
IOS Command Line Interface
MIAMI#
MIAMI#traceroute 192.168.30.2
Type escape sequence to abort.
Tracing the route to 192.168.30.2
1 172.31.21.2 0 msec 1 msec 0 msec
2 192.168.30.2 1 msec 7 msec 1 msec
MIAMI#traceroute 192.168.40.2
Type escape sequence to abort.
Tracing the route to 192.168.40.2
1 172.31.21.2 2 msec 3 msec 0 msec
2 192.168.40.2 1 msec 0 msec 0 msec
MIAMI#
Ctrl+F6 to exit CLI focus
Copy
Paste


Buenos Aires
Physical
Config
CLI
Attributes
IOS Command Line Interface
BUENOS_AIRES#ping 172.31.23.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.23.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/4 ms
BUENOS_AIRES#ping 10.10.10.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.10.10.10, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/1 ms
BUENOS_AIRES#ping 10.10.10.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.10.10.10, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
BUENOS_AIRES#ping 172.31.21.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
BUENOS_AIRES#ping 172.31.21.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/3/9 ms
BUENOS_AIRES#ping 192.168.30.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.30.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/4/7 ms
BUENOS_AIRES#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


Buenos Aires
Physical
Config
CLI
Attributes
IOS Command Line Interface
BUENOS_AIRES#
BUENOS_AIRES#
BUENOS_AIRES#
BUENOS_AIRES#
BUENOS_AIRES#
BUENOS_AIRES#
BUENOS_AIRES#
BUENOS_AIRES#
BUENOS_AIRES#
BUENOS_AIRES#traceroute 192.168.30.2
Type escape sequence to abort.
Tracing the route to 192.168.30.2
1 172.31.23.1 4 msec 1 msec 0 msec
2 172.31.21.2 1 msec 0 msec 8 msec
3 192.168.30.2 2 msec 2 msec 2 msec
BUENOS_AIRES#traceroute 192.168.40.2
Type escape sequence to abort.
Tracing the route to 192.168.40.2
1 172.31.23.1 1 msec 4 msec 4 msec
2 172.31.21.2 8 msec 5 msec 5 msec
3 192.168.40.2 3 msec 5 msec 3 msec
BUENOS_AIRES#
Ctrl+F6 to exit CLI focus
Copy
Paste

CONCLUSIONES

Se logró crear las soluciones a los escenarios propuestos a desarrollar en este trabajo final, permitiendo el uso de Packet tracer para simular la topología de las redes; y así mismo configurar las diferentes interfaces y equipos, mediante los comandos y protocolos necesarios para construir la solución ingenieril.

Con el uso del protocolo RIP, se logró realizar un direccionamiento automático y fácil de aplicar; para después usar un enrutamiento estático de redes sumarizadas, evidenciando el balanceo de las redes, y como los routers eligen la mejor ruta para realizar las comunicaciones.

Fue necesario deshabilitar el protocolo Rip en las interfaces que no lo requerían, para lograr mejorar la eficiencia de los router; por otro lado, se realizó la configuración PPP, que nos permitió enviar por medio de ISP las direcciones privadas traducidas a direcciones públicas.

Aplicando las soluciones, se determinó que packet tracer no permite el uso de los comandos “ip http server”, por lo que fue necesario usar un server como alternativa.

También fue un éxito lograr crear las VLAN’s que permitieron realizar las comunicaciones mediante la misma red con varias subredes; permitiendo el uso del protocolo OSPF y DHCP.

En general fue una experiencia gratificante que permitió consolidar los conocimientos adquiridos durante el Diplomado de Cisco; permitiendo que el Profesional que está a punto de iniciar su etapa productiva, tenga una mejor visión del campo de las comunicaciones y las redes.

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