PRUEBA DE HABILIDADES PRACTICAS CCNA

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA UNAD

ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA

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Trabajo Final de Diplomado de profundización Cisco

Tutor

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CONTENIDO

INTRODUCCIÓN

En el presente documento se evidenciará el desarrollo de dos escenarios planteados de la evaluación final – prueba de habilidades practicas CCNA, de acuerdo con las tareas propuestas, se muestra los procesos con su respectiva descripción de cada uno.

En los escenarios propuestos se trabajó con el Packet Tracer para la configuración, el cual fue durante el curso la plataforma de aprendizaje para realizar las practicas del diplomado.

Entrando un poco más en detalle del desarrollo de los escenarios, se realiza la configuración y definen los lineamientos como administrador en este caso se establecen los protocolos de enrutamiento RIP, encapsulamiento, autenticación, entre otros servicios planteados en la guía, de acuerdo con los pasos de cada caso se evidencia el código de cada una de las configuraciones.

OBJETIVOS

OBJETIVO GENERAL

Solucionar los escenarios planteados en la prueba de habilidades con el fin de aplicar los conocimientos adquiridos durante el Diplomado de profundización de CISCO

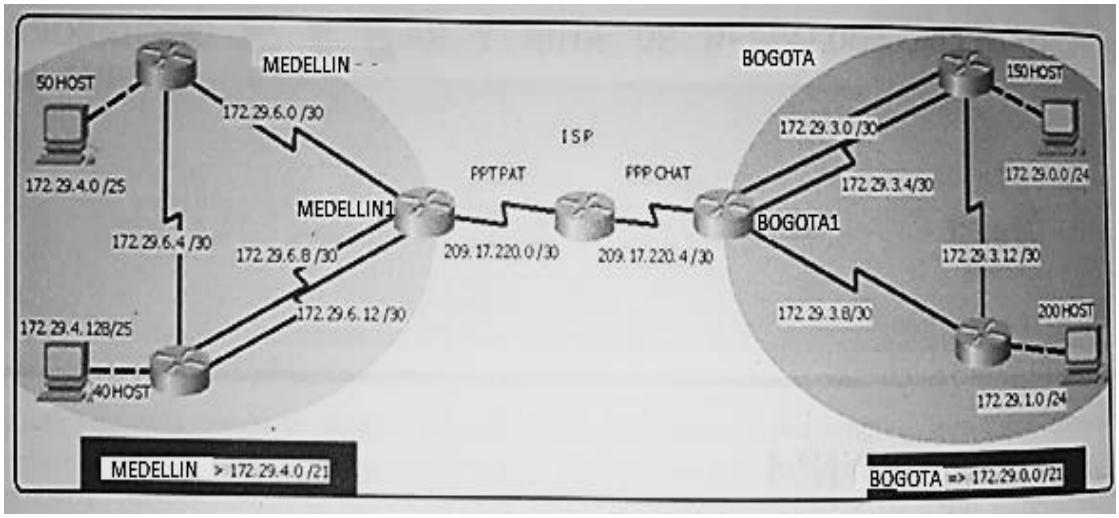
OBJETIVOS ESPECIFICOS

- Revisar con los escenarios planteados con el fin de determinar los requerimientos de los casos.
- Configurar las topologías de acuerdo los requerimientos con el fin de establecer comunicación.
- Utilizar los distintos comandos para verificar las configuraciones realizadas.

1. DESARROLLO ACTIVIDAD PARA EL 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.

Topología de red



Este escenario plantea el uso de RIP como protocolo de enrutamiento, considerando que se tendran rutas por defecto redistribuidas; asi mismo, 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.

1.1 EVIDENCIAS DE LA SOLUCIÓN DEL ESCENARIO 1

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).

Se procede a configurar de acuerdo con los nombres de los equipos y condiciones de seguridad:

Configuración ISP

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname ISP
ISP(config)#no ip domain-lookup
ISP(config)#enable secret class
ISP(config)#line console 0
ISP(config-line)#password cisco
ISP(config-line)#login
ISP(config-line)#exit
ISP(config)#line vty 0 4
ISP(config-line)#password cisco
ISP(config-line)#login
ISP(config-line)#exit
ISP(config)#service password-encryption
ISP(config)#banner motd #SOLO PERSONAL AUTORIZADO#
ISP(config)#EXIT
ISP#WR
Building configuration...
[OK]
```

Configuracion Medellin 1

```
Router#CONF T
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname medellin1
medellin1(config)#no ip domain-lookup
medellin1(config)#enable secret class
medellin1(config)#line console 0
medellin1(config-line)#password cisco
medellin1(config-line)#login
medellin1(config-line)#exit
medellin1(config)#line vty 0 4
medellin1(config-line)#password cisco
```

medellin1(config-line)#login
medellin1(config-line)#exit
medellin1(config)#service password-encryption
medellin1(config)#banner motd #SOLO PERSONAL AUTORIZADO#
medellin1(config)#exit
medellin1#wr
Building configuration...
[OK]

Configuracion Medellin 2

Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname medellin2
medellin2(config)#no ip domain-lookup
medellin2(config)#enable secret class
medellin2(config)#line console 0
medellin2(config-line)#password cisco
medellin2(config-line)#login
medellin2(config-line)#exit
medellin2(config)#line vty 0 4
medellin2(config-line)#password cisco
medellin2(config-line)#login
medellin2(config-line)#exit
medellin2(config)#service password-encryption
medellin2(config)#banner motd #SOLO PERSONAL AUTORIZADO#
medellin2(config)#exit
medellin2#wr
Building configuration...
[OK]

Configuracion Medellin 3

Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname medellin3
medellin3(config)#no ip domain-lookup
medellin3(config)#enable secret class
medellin3(config)#line console 0
medellin3(config-line)#password cisco
medellin3(config-line)#login
medellin3(config-line)#exit
medellin3(config)#line vty 0 4
medellin3(config-line)#password cisco
medellin3(config-line)#login

medellin3(config-line)#exit
medellin3(config)#service password-encryption
medellin3(config)#banner motd #SOLO PERSONAL AUTORIZADO#
medellin3(config)#EXIT
medellin3#wr
Building configuration...
[OK]

Configuracion Bogota 1
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname bogota1
bogota1(config)#no ip domain-lookup
bogota1(config)#enable secret class
bogota1(config)#line console 0
bogota1(config-line)#password cisco
bogota1(config-line)#login
bogota1(config-line)#exit
bogota1(config)#line vty 0 4
bogota1(config-line)#password cisco
bogota1(config-line)#login
bogota1(config-line)#exit
bogota1(config)#service password-encryption
bogota1(config)#banner motd #SOLO PERSONAL AUTORIZADO#
bogota1(config)#exit
bogota1#wr
Building configuration...
[OK]

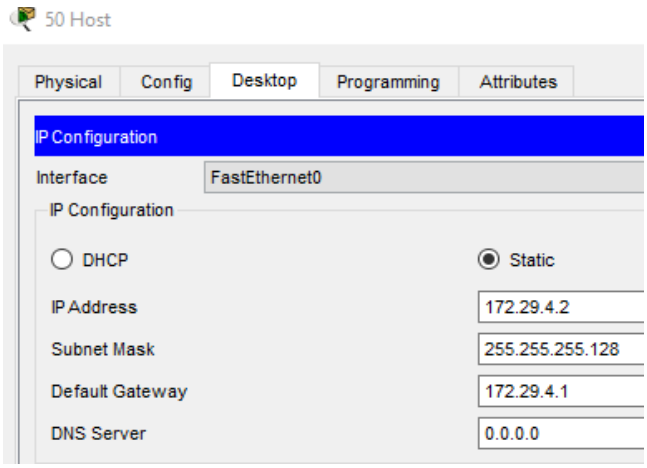
Configuracion Bogota 2
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname bogota2
bogota2(config)#no ip domain-lookup
bogota2(config)#enable secret class
bogota2(config)#line console 0
bogota2(config-line)#password cisco
bogota2(config-line)#login
bogota2(config-line)#exit
bogota2(config)#line vty 0 4
bogota2(config-line)#password cisco
bogota2(config-line)#login
bogota2(config-line)#exit
bogota2(config)#service password-encryption
bogota2(config)#banner motd #SOLO PERSONAL AUTORIZADO#

bogota2(config)#exit
bogota2#wr
Building configuration...
[OK]

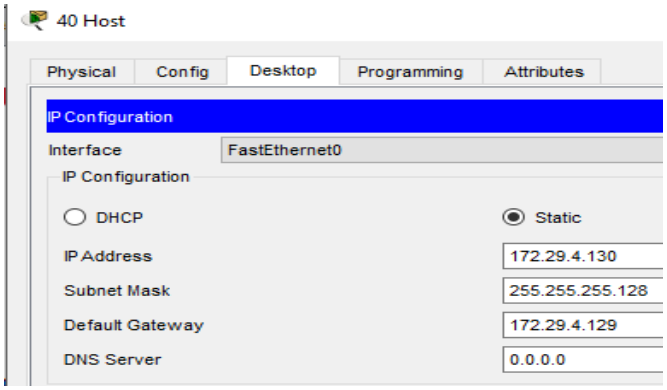
Configuracion Bogota 3

Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname bogota3
bogota3(config)#no ip domain-lookup
bogota3(config)#enable secret class
bogota3(config)#line console 0
bogota3(config-line)#password cisco
bogota3(config-line)#login
bogota3(config-line)#exit
bogota3(config)#line vty 0 4
bogota3(config-line)#password cisco
bogota3(config-line)#login
bogota3(config-line)#exit
bogota3(config)#service password-encryption
bogota3(config)#banner motd #SOLO PERSONAL AUTORIZADO#
bogota3(config)#exit
bogota3#wr
Building configuration...
[OK]

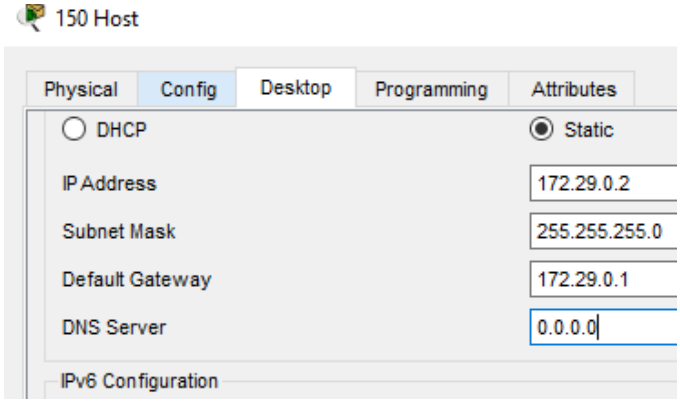
Configuracion pc 50 Host



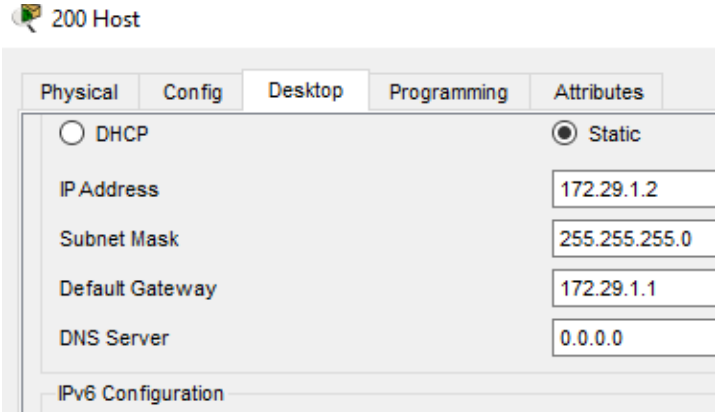
Configuracion pc 40 Host



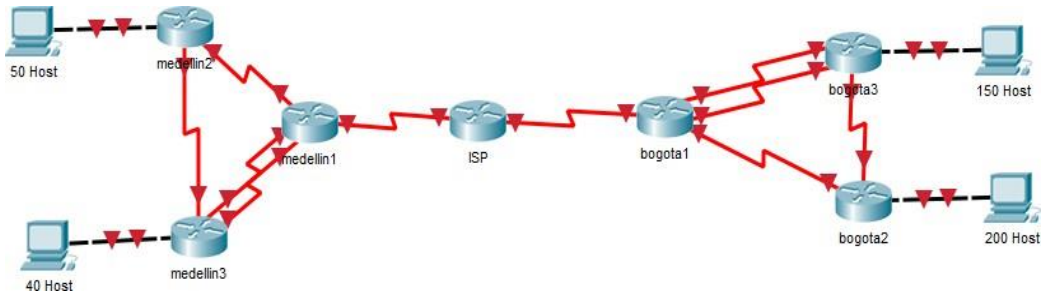
Configuracion pc 150 Host



Configuracion pc 200 Host



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



Configurar la topología de red, de acuerdo con las siguientes especificaciones.

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.

Configuración ISP

```
ISP(config)#int s0/0/0
ISP(config-if)#ip add 209.17.220.1 255.255.255.252
ISP(config-if)#clock rate 128000
ISP(config-if)#no shutdown
ISP(config-if)#exit
ISP(config)#int s0/0/1
ISP(config-if)#ip add 209.17.220.5 255.255.255.255
Bad mask /32 for address 209.17.220.5
ISP(config-if)#ip add 209.17.220.5 255.255.255.252
ISP(config-if)#clock rate 128000
ISP(config-if)#no shutdown
ISP(config-if)#exit
ISP(config)#router rip
ISP(config-router)#version 2
ISP(config-router)#network 209.17.220.0
ISP(config-router)#network 172.29.0.0
ISP(config-router)#no auto-summary
ISP(config-router)#exit
ISP(config)#exit
ISP#wr
Building configuration...
[OK]
```

Configuración Medellin 1

```
medellin1(config)#int s0/0/0
medellin1(config-if)#ip add 209.17.220.13 255.255.255.252
medellin1(config-if)#clock rate 128000
medellin1(config-if)#no shutdown
medellin1(config-if)#exit
medellin1(config-if)#exit
medellin1(config)#int s0/0/1
medellin1(config-if)#ip add 172.29.6.1 255.255.255.252
medellin1(config-if)#clock rate 128000
medellin1(config-if)#no shutdown
medellin1(config-if)#
medellin1(config-if)#exit
medellin1(config)#int s0/1/0
medellin1(config-if)#ip add 172.29.6.9 255.255.255.252
medellin1(config-if)#clock rate 128000
medellin1(config-if)#no shutdown
medellin1(config-if)#exit
medellin1(config)#int s0/1/1
medellin1(config-if)#ip add 172.29.6.13 255.255.255.252
medellin1(config-if)#clock rate 128000
medellin1(config-if)#no shutdown
medellin1(config-if)#exit
medellin1(config)#router rip
medellin1(config-router)#version 2
medellin1(config-router)#network 172.29.0.0
medellin1(config-router)#network 209.17.220.0
medellin1(config-router)#no auto-summary
medellin1(config-router)#exit
medellin1(config)#exit
medellin1#wr
Building configuration...
[OK]
```

Configuración Medellin 2

```
medellin2(config)#int s0/0/1
medellin2(config-if)#ip add 172.29.6.2 255.255.255.252
medellin2(config-if)#clock rate 128000
medellin2(config-if)#no shutdown
medellin2(config-if)#exit
medellin2(config)#int s0/0/0
medellin2(config-if)#ip add 172.29.6.6 255.255.255.252
```

```
medellin2(config-if)#clock rate 128000
medellin2(config-if)#no shutdown
medellin2(config-if)#exit
medellin2(config)#int g0/0
medellin2(config-if)#ip add 172.29.4.1 255.255.255.128
medellin2(config-if)#no shutdown
medellin2(config-if)#exit
medellin2(config)#router rip
medellin2(config-router)#version 2
medellin2(config-router)#network 172.29.0.0
medellin2(config-router)#no auto-summary
medellin2(config-router)#exit
```

Configuración Medellin 3

```
medellin3(config)#int s0/0/0
medellin3(config-if)#ip add 172.29.6.5 255.255.255.252
medellin3(config-if)#clock rate 128000
medellin3(config-if)#no shutdown
medellin3(config-if)#int s0/1/0
medellin3(config-if)#ip add 172.29.6.10 255.255.255.252
medellin3(config-if)#clock rate 128000
medellin3(config-if)#no shutdown
medellin3(config-if)#int s0/1/1
medellin3(config-if)#ip add 172.29.6.14 255.255.255.252
medellin3(config-if)#clock rate 128000
medellin3(config-if)#no shutdown
medellin3(config-if)#exit
medellin3(config)#int g0/0
medellin3(config-if)#ip add 172.29.4.129 255.255.255.128
medellin3(config-if)#no shutdown
medellin3(config-if)#exit
medellin3(config)#router rip
medellin3(config-router)#version 2
medellin3(config-router)#network 172.29.0.0
medellin3(config-router)#exit
medellin3(config)#exit
medellin3#wr
Building configuration...
[OK]
```

Configuración Bogota 1

```
bogota1(config)#int s0/0/1
bogota1(config-if)#ip add 209.17.220.6 255.255.255.252
bogota1(config-if)#clock rate 128000
bogota1(config-if)#no shutdown
bogota1(config-if)#exit
bogota1(config)#int s0/1/1
bogota1(config-if)#ip add 172.29.3.1 255.255.255.252
bogota1(config-if)#clock rate 128000
bogota1(config-if)#no shutdown
bogota1(config-if)#exit
bogota1(config)#int s0/1/0
bogota1(config-if)#ip add 172.29.3.5 255.255.255.252
bogota1(config-if)#clock rate 128000
bogota1(config-if)#no shutdown
bogota1(config-if)#exit
bogota1(config)#int s0/0/0
bogota1(config-if)#ip add 172.29.3.9 255.255.255.252
bogota1(config-if)#clock rate 128000
bogota1(config-if)#no shutdown
bogota1(config-if)#exit
bogota1(config)#router rip
bogota1(config-router)#version 2
bogota1(config-router)#network 172.29.0.0
bogota1(config-router)#network 209.17.220.0
bogota1(config-router)#no auto-summary
bogota1(config-router)#exit
bogota1(config)#exit
Building configuration...
[OK]
```

Configuración Bogota 2

```
bogota2(config)#int s0/0/0
bogota2(config-if)#ip add 172.29.3.10 255.255.255.252
bogota2(config-if)#clock rate 128000
bogota2(config-if)#no shutdown
bogota2(config-if)#exit
bogota2(config)#int s0/0/1
bogota2(config-if)#ip add 172.29.3.14 255.255.255.252
bogota2(config-if)#clock rate 128000
bogota2(config-if)#no shutdown
```

```
bogota2(config-if)#exit
bogota2(config)#int g0/0
bogota2(config-if)#ip add 172.29.1.1 255.255.255.0
bogota2(config-if)#no shutdown

bogota2(config)#router rip
bogota2(config-router)#version 2
bogota2(config-router)#network 172.29.0.0
bogota2(config-router)#no auto-summary
bogota2(config-router)#exit
bogota2(config)#exit
bogota2#wr
 [OK]
```

Configuración Bogota 3

```
bogota3(config)#int s0/1/1
bogota3(config-if)#ip add 172.29.3.2 255.255.255.252
bogota3(config-if)#clock rate 128000
bogota3(config-if)#no shutdown
bogota3(config-if)#exit
bogota3(config)#int s0/1/0
bogota3(config-if)#ip add 172.29.3.6 255.255.255.252
bogota3(config-if)#clock rate 128000
bogota3(config-if)#no shutdown
bogota3(config-if)#exit
bogota3(config)#int s0/0/1
bogota3(config-if)#ip add 172.29.3.13 255.255.255.252
bogota3(config-if)#clock rate 128000
bogota3(config-if)#no shutdown
bogota3(config-if)#exit
bogota3(config)#int g0/0
bogota3(config-if)#ip add 172.29.0.1 255.255.255.0
bogota3(config-if)#no shutdown
bogota3(config-if)#exit
bogota3(config)#router rip
bogota3(config-router)#version 2
bogota3(config-router)#network 172.29.0.0
bogota3(config-router)#no auto-summary
bogota3(config-router)#exit
bogota3(config)#exit
bogota3#wr
 [OK]
```

b. Los routers Bogota1 y Medellín 1 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.

```
medellin1(config)# ip route 0.0.0.0 0.0.0.0 209.17.220.1
medellin1(config)#router rip
medellin1(config-router)#default-information originate
medellin1(config-router)#exit
medellin1(config)#exit
bogota1(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.5
bogota1(config)#router rip
bogota1(config-router)#default-information originate
bogota1(config-router)#exit
bogota1(config)#exit
```

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.

```
ISP(config)#ip route 172.29.4.0 255.255.255.0 209.17.220.2
ISP(config)#ip route 172.29.4.128 255.255.255.255 209.17.220.2
ISP(config)#ip route 172.29.0.0 255.255.255.0 209.17.220.6
ISP(config)#ip route 172.29.1.0 255.255.255.0 209.17.220.6
```

Parte 2: Tabla de Enrutamiento.

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

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

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.

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

     172.29.0.0/16 is variably subnetted, 16 subnets, 4 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 172.29.3.14, 00:00:11, Serial0/0/1
C       172.29.3.0/30 is directly connected, Serial0/1/1
L       172.29.3.2/32 is directly connected, Serial0/1/1
C       172.29.3.4/30 is directly connected, Serial0/1/0
L       172.29.3.6/32 is directly connected, Serial0/1/0
R       172.29.3.8/30 [120/1] via 172.29.3.5, 00:00:12, Serial0/1/0
                      [120/1] via 172.29.3.1, 00:00:12, Serial0/1/1
                      [120/1] via 172.29.3.14, 00:00:11, Serial0/0/1
C       172.29.3.12/30 is directly connected, Serial0/0/1
L       172.29.3.13/32 is directly connected, Serial0/0/1
R       172.29.4.0/25 [120/4] via 172.29.3.5, 00:00:12, Serial0/1/0
                      [120/4] via 172.29.3.1, 00:00:12, Serial0/1/1
R       172.29.4.128/25 [120/4] via 172.29.3.5, 00:00:12, Serial0/1/0
                        [120/4] via 172.29.3.1, 00:00:12, Serial0/1/1
R       172.29.6.0/30 [120/3] via 172.29.3.5, 00:00:12, Serial0/1/0
                      [120/3] via 172.29.3.1, 00:00:12, Serial0/1/1
R       172.29.6.4/30 [120/4] via 172.29.3.5, 00:00:12, Serial0/1/0
                      [120/4] via 172.29.3.1, 00:00:12, Serial0/1/1
R       172.29.6.8/30 [120/3] via 172.29.3.5, 00:00:12, Serial0/1/0
                      [120/3] via 172.29.3.1, 00:00:12, Serial0/1/1
R       172.29.6.12/30 [120/3] via 172.29.3.5, 00:00:12, Serial0/1/0
                       [120/3] via 172.29.3.1, 00:00:12, Serial0/1/1
     209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
R       209.17.220.0/24 is possibly down, routing via 172.29.3.14, Serial0/0/1
R       209.17.220.0/30 [120/2] via 172.29.3.5, 00:00:12, Serial0/1/0
                        [120/2] via 172.29.3.1, 00:00:12, Serial0/1/1
R       209.17.220.4/30 [120/1] via 172.29.3.5, 00:00:12, Serial0/1/0
                        [120/1] via 172.29.3.1, 00:00:12, Serial0/1/1
R*   0.0.0.0/0 [120/1] via 172.29.3.5, 00:00:12, Serial0/1/0
               [120/1] via 172.29.3.1, 00:00:12, Serial0/1/1

bogota3#
```

```
bogota2#sh 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 172.29.3.9 to network 0.0.0.0

     172.29.0.0/16 is variably subnetted, 15 subnets, 4 masks
R       172.29.0.0/24 [120/1] via 172.29.3.13, 00:00:17, Serial0/0/1
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, Serial0/0/0
                      [120/1] via 172.29.3.13, 00:00:17, Serial0/0/1
R       172.29.3.4/30 [120/1] via 172.29.3.9, 00:00:20, Serial0/0/0
                      [120/1] via 172.29.3.13, 00:00:17, Serial0/0/1
C       172.29.3.8/30 is directly connected, Serial0/0/0
L       172.29.3.10/32 is directly connected, Serial0/0/0
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 [120/4] via 172.29.3.9, 00:00:20, Serial0/0/0
R       172.29.4.128/25 [120/4] via 172.29.3.9, 00:00:20, Serial0/0/0
R       172.29.6.0/30 [120/3] via 172.29.3.9, 00:00:20, Serial0/0/0
R       172.29.6.4/30 [120/4] via 172.29.3.9, 00:00:20, Serial0/0/0
R       172.29.6.8/30 [120/3] via 172.29.3.9, 00:00:20, Serial0/0/0
R       172.29.6.12/30 [120/3] via 172.29.3.9, 00:00:20, Serial0/0/0
     209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
R       209.17.220.0/24 is possibly down, routing via 172.29.3.9, Serial0/0/0
R       209.17.220.0/30 [120/2] via 172.29.3.9, 00:00:20, Serial0/0/0
R       209.17.220.4/30 [120/1] via 172.29.3.9, 00:00:20, Serial0/0/0
R*   0.0.0.0/0 [120/1] via 172.29.3.9, 00:00:20, Serial0/0/0
```

```
bogota1#
bogota1#sh 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 209.17.220.5 to network 0.0.0.0

     172.29.0.0/16 is variably subnetted, 15 subnets, 4 masks
R       172.29.0.0/24 [120/1] via 172.29.3.6, 00:00:10, Serial0/1/0
                      [120/1] via 172.29.3.2, 00:00:10, Serial0/1/1
R       172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:09, Serial0/0/0
C       172.29.3.0/30 is directly connected, Serial0/1/1
L       172.29.3.1/32 is directly connected, Serial0/1/1
C       172.29.3.4/30 is directly connected, Serial0/1/0
L       172.29.3.5/32 is directly connected, Serial0/1/0
C       172.29.3.8/30 is directly connected, Serial0/0/0
L       172.29.3.9/32 is directly connected, Serial0/0/0
R       172.29.3.12/30 [120/1] via 172.29.3.10, 00:00:09, Serial0/0/0
                       [120/1] via 172.29.3.6, 00:00:10, Serial0/1/0
                       [120/1] via 172.29.3.2, 00:00:10, Serial0/1/1
R       172.29.4.0/25 [120/3] via 209.17.220.5, 00:00:02, Serial0/0/1
R       172.29.4.128/25 [120/3] via 209.17.220.5, 00:00:02, Serial0/0/1
R       172.29.6.0/30 [120/2] via 209.17.220.5, 00:00:02, Serial0/0/1
R       172.29.6.4/30 [120/3] via 209.17.220.5, 00:00:02, Serial0/0/1
R       172.29.6.8/30 [120/2] via 209.17.220.5, 00:00:02, Serial0/0/1
R       172.29.6.12/30 [120/2] via 209.17.220.5, 00:00:02, Serial0/0/1
    209.17.220.0/24 is variably subnetted, 4 subnets, 3 masks
R       209.17.220.0/24 is possibly down, routing via 172.29.3.6, Serial0/1/0
R       209.17.220.0/30 [120/1] via 209.17.220.5, 00:00:02, Serial0/0/1
C       209.17.220.4/30 is directly connected, Serial0/0/1
L       209.17.220.6/32 is directly connected, Serial0/0/1
S*   0.0.0.0/0 [1/0] via 209.17.220.5
```

```
ISP#sh 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 209.17.220.2 to network 0.0.0.0

     172.29.0.0/16 is variably subnetted, 14 subnets, 4 masks
S       172.29.0.0/24 [1/0] via 209.17.220.6
S       172.29.1.0/24 [1/0] via 209.17.220.6
R       172.29.3.0/30 [120/1] via 209.17.220.6, 00:00:08, Serial0/0/1
R       172.29.3.4/30 [120/1] via 209.17.220.6, 00:00:08, Serial0/0/1
R       172.29.3.8/30 [120/1] via 209.17.220.6, 00:00:08, Serial0/0/1
R       172.29.3.12/30 [120/2] via 209.17.220.6, 00:00:08, Serial0/0/1
S       172.29.4.0/24 [1/0] via 209.17.220.2
R       172.29.4.0/25 [120/2] via 209.17.220.2, 00:00:07, Serial0/0/0
R       172.29.4.128/25 [120/2] via 209.17.220.2, 00:00:07, Serial0/0/0
S       172.29.4.128/32 [1/0] via 209.17.220.2
R       172.29.6.0/30 [120/1] via 209.17.220.2, 00:00:07, Serial0/0/0
R       172.29.6.4/30 [120/2] via 209.17.220.2, 00:00:07, Serial0/0/0
R       172.29.6.8/30 [120/1] via 209.17.220.2, 00:00:07, Serial0/0/0
R       172.29.6.12/30 [120/1] via 209.17.220.2, 00:00:07, Serial0/0/0
    209.17.220.0/24 is variably subnetted, 5 subnets, 3 masks
R       209.17.220.0/24 [120/10] via 209.17.220.6, 00:00:01, Serial0/0/1
C       209.17.220.0/30 is directly connected, Serial0/0/0
L       209.17.220.1/32 is directly connected, Serial0/0/0
C       209.17.220.4/30 is directly connected, Serial0/0/1
L       209.17.220.5/32 is directly connected, Serial0/0/1
R*   0.0.0.0/0 [120/1] via 209.17.220.2, 00:00:07, Serial0/0/0
               [120/1] via 209.17.220.6, 00:00:08, Serial0/0/1
```

```
medellin1#sh 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 209.17.220.1 to network 0.0.0.0

     172.29.0.0/16 is variably subnetted, 15 subnets, 4 masks
R       172.29.0.0/24 [120/3] via 209.17.220.1, 00:00:05, Serial0/0/0
R       172.29.1.0/24 [120/3] via 209.17.220.1, 00:00:05, Serial0/0/0
R       172.29.3.0/30 [120/2] via 209.17.220.1, 00:00:05, Serial0/0/0
R       172.29.3.4/30 [120/2] via 209.17.220.1, 00:00:05, Serial0/0/0
R       172.29.3.8/30 [120/2] via 209.17.220.1, 00:00:05, Serial0/0/0
R       172.29.3.12/30 [120/3] via 209.17.220.1, 00:00:05, Serial0/0/0
R       172.29.4.0/25 [120/1] via 172.29.6.2, 00:00:05, Serial0/0/1
R       172.29.4.128/25 [120/1] via 172.29.6.10, 00:00:14, Serial0/1/0
                        [120/1] via 172.29.6.14, 00:00:14, Serial0/1/1
C       172.29.6.0/30 is directly connected, Serial0/0/1
L       172.29.6.1/32 is directly connected, Serial0/0/1
R       172.29.6.4/30 [120/1] via 172.29.6.2, 00:00:05, Serial0/0/1
                      [120/1] via 172.29.6.10, 00:00:14, Serial0/1/0
                      [120/1] via 172.29.6.14, 00:00:14, Serial0/1/1
C       172.29.6.8/30 is directly connected, Serial0/1/0
L       172.29.6.9/32 is directly connected, Serial0/1/0
C       172.29.6.12/30 is directly connected, Serial0/1/1
L       172.29.6.13/32 is directly connected, Serial0/1/1
    209.17.220.0/24 is variably subnetted, 4 subnets, 3 masks
R       209.17.220.0/24 is possibly down, routing via 209.17.220.1, Serial0/0/0
C       209.17.220.0/30 is directly connected, Serial0/0/0
L       209.17.220.2/32 is directly connected, Serial0/0/0
R       209.17.220.4/30 [120/1] via 209.17.220.1, 00:00:05, Serial0/0/0
S*   0.0.0.0/0 [1/0] via 209.17.220.1
```

```
medellin2#sh 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 172.29.6.1 to network 0.0.0.0

     172.29.0.0/16 is variably subnetted, 15 subnets, 4 masks
R       172.29.0.0/24 [120/4] via 172.29.6.1, 00:00:03, Serial0/0/1
R       172.29.1.0/24 [120/4] via 172.29.6.1, 00:00:03, Serial0/0/1
R       172.29.3.0/30 [120/3] via 172.29.6.1, 00:00:03, Serial0/0/1
R       172.29.3.4/30 [120/3] via 172.29.6.1, 00:00:03, Serial0/0/1
R       172.29.3.8/30 [120/3] via 172.29.6.1, 00:00:03, Serial0/0/1
R       172.29.3.12/30 [120/4] via 172.29.6.1, 00:00:03, Serial0/0/1
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 172.29.6.5, 00:00:26, Serial0/0/0
C       172.29.6.0/30 is directly connected, Serial0/0/1
L       172.29.6.2/32 is directly connected, Serial0/0/1
C       172.29.6.4/30 is directly connected, Serial0/0/0
L       172.29.6.6/32 is directly connected, Serial0/0/0
R       172.29.6.8/30 [120/1] via 172.29.6.1, 00:00:03, Serial0/0/1
                      [120/1] via 172.29.6.5, 00:00:26, Serial0/0/0
R       172.29.6.12/30 [120/1] via 172.29.6.1, 00:00:03, Serial0/0/1
                       [120/1] via 172.29.6.5, 00:00:26, Serial0/0/0
     209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
R       209.17.220.0/24 is possibly down, routing via 172.29.6.5, Serial0/0/0
R       209.17.220.0/30 [120/1] via 172.29.6.1, 00:00:03, Serial0/0/1
R       209.17.220.4/30 [120/2] via 172.29.6.1, 00:00:03, Serial0/0/1
R*   0.0.0.0/0 [120/1] via 172.29.6.1, 00:00:03, Serial0/0/1
```

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

     172.29.0.0/16 is variably subnetted, 16 subnets, 4 masks
R       172.29.0.0/24 [120/4] via 172.29.6.9, 00:00:03, Serial0/1/0
                      [120/4] via 172.29.6.13, 00:00:03, Serial0/1/1
R       172.29.1.0/24 [120/4] via 172.29.6.13, 00:00:03, Serial0/1/1
                      [120/4] via 172.29.6.9, 00:00:03, Serial0/1/0
R       172.29.3.0/30 [120/3] via 172.29.6.9, 00:00:03, Serial0/1/0
                      [120/3] via 172.29.6.13, 00:00:03, Serial0/1/1
R       172.29.3.4/30 [120/3] via 172.29.6.9, 00:00:03, Serial0/1/0
                      [120/3] via 172.29.6.13, 00:00:03, Serial0/1/1
R       172.29.3.8/30 [120/3] via 172.29.6.9, 00:00:03, Serial0/1/0
                      [120/3] via 172.29.6.13, 00:00:03, Serial0/1/1
R       172.29.3.12/30 [120/4] via 172.29.6.13, 00:00:03, Serial0/1/1
                       [120/4] via 172.29.6.9, 00:00:03, Serial0/1/0
R       172.29.4.0/25 [120/1] via 172.29.6.6, 00:00:15, Serial0/0/0
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, 00:00:03, Serial0/1/0
                      [120/1] via 172.29.6.6, 00:00:15, Serial0/0/0
                      [120/1] via 172.29.6.13, 00:00:03, Serial0/1/1
C       172.29.6.4/30 is directly connected, Serial0/0/0
L       172.29.6.5/32 is directly connected, Serial0/0/0
C       172.29.6.8/30 is directly connected, Serial0/1/0
L       172.29.6.10/32 is directly connected, Serial0/1/0
C       172.29.6.12/30 is directly connected, Serial0/1/1
L       172.29.6.14/32 is directly connected, Serial0/1/1
     209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
R       209.17.220.0/24 is possibly down, routing via 172.29.6.13, Serial0/1/1
R       209.17.220.0/30 [120/1] via 172.29.6.9, 00:00:03, Serial0/1/0
                        [120/1] via 172.29.6.13, 00:00:03, Serial0/1/1
R       209.17.220.4/30 [120/2] via 172.29.6.9, 00:00:03, Serial0/1/0
                        [120/2] via 172.29.6.13, 00:00:03, Serial0/1/1
R*   0.0.0.0/0 [120/1] via 172.29.6.9, 00:00:03, Serial0/1/0
               [120/1] via 172.29.6.13, 00:00:03, Serial0/1/1

medellin3#
```

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

bogota1(config)#route rip
bogota1(config-router)#version 2
bogota1(config-router)#passive-int g0/0
bogota1(config-router)#passive-int g0/1
bogota2(config)#router rip
bogota2(config-router)#version 2
bogota2(config-router)#passive-int g0/1
bogota2(config-router)#passive-int s0/1/0
bogota2(config-router)#passive-int s0/1/1
bogota3(config)#router rip
bogota3(config-router)#version 2
bogota3(config-router)#passive-int g0/1
bogota3(config-router)#passive-int s0/0/0
medellin1(config)#router rip
medellin1(config-router)#version 2
medellin1(config-router)#passive-int g0/0
medellin1(config-router)#passive-int g0/1
medellin2(config)#router rip
medellin2(config-router)#version 2
medellin2(config-router)#passive-int g0/1
medellin2(config-router)#passive-int s0/1/0
medellin2(config-router)#passive-int s0/1/1
medellin3(config)#router rip
medellin3(config-router)#version 2
medellin3(config-router)#passive-int g0/1medellin3(config-router)#passive-int s0/0/1

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.

```
bogota3>sh ip protocols
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
  GigabitEthernet0/0     2     2
  Serial0/0/1            2     2
  Serial0/1/0            2     2
  Serial0/1/1            2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
          172.29.0.0
Passive Interface(s):
          GigabitEthernet0/1
          Serial0/0/0
Routing Information Sources:
          Gateway         Distance      Last Update
          172.29.3.5            120      00:00:23
          172.29.3.1            120      00:00:23
          172.29.3.14           120      00:00:19
Distance: (default is 120)
```

```
bogota2#sh ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 9 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
  GigabitEthernet0/0     2     2
  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):
          GigabitEthernet0/1
          Serial0/1/0
          Serial0/1/1
Routing Information Sources:
          Gateway         Distance      Last Update
          172.29.3.9            120      00:00:28
          172.29.3.13           120      00:00:13
Distance: (default is 120)
```

```
bogotal#sh ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 5 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
  Serial0/0/0            2     2
  Serial0/1/1            2     2
  Serial0/1/0            2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
           172.29.0.0
           209.17.220.0
Passive Interface(s):
           GigabitEthernet0/0
           GigabitEthernet0/1
Routing Information Sources:
           Gateway         Distance      Last Update
           172.29.3.6           120      00:00:06
           172.29.3.2           120      00:00:06
           172.29.3.10          120      00:00:12
           209.17.220.5         120      00:00:03
Distance: (default is 120)
```

```
ISP#sh ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 5 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
           209.17.220.0
Passive Interface(s):
Routing Information Sources:
           Gateway         Distance      Last Update
           209.17.220.2         120      00:00:16
           209.17.220.6         120      00:00:15
Distance: (default is 120)
```

```
medellin1#sh ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 22 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
  Serial0/1/0            2     2
  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
           209.17.220.1         120      00:00:13
           172.29.6.2           120      00:00:13
           172.29.6.10          120      00:00:26
           172.29.6.14          120      00:00:26
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.

```
bogota3(config-router)#do sh ip route connected
 C    172.29.0.0/24  is directly connected, GigabitEthernet0/0
 C    172.29.3.0/30  is directly connected, Serial0/1/1
 C    172.29.3.4/30  is directly connected, Serial0/1/0
 C    172.29.3.12/30  is directly connected, Serial0/0/1
```

```
bogota2(config-router)#do sh ip route connected
 C    172.29.1.0/24  is directly connected, GigabitEthernet0/0
 C    172.29.3.8/30  is directly connected, Serial0/0/0
 C    172.29.3.12/30  is directly connected, Serial0/0/1
```

```
bogota1(config-router)#do sh ip route connected
 C    172.29.3.0/30  is directly connected, Serial0/1/1
 C    172.29.3.4/30  is directly connected, Serial0/1/0
 C    172.29.3.8/30  is directly connected, Serial0/0/0
 C    209.17.220.4/30  is directly connected, Serial0/0/1
```

```
ISP(config-router)#do sh ip route connected
 C    209.17.220.0/30  is directly connected, Serial0/0/0
 C    209.17.220.4/30  is directly connected, Serial0/0/1
```

```
medellin1(config-router)#do sh ip route connected
 C    172.29.6.0/30  is directly connected, Serial0/0/1
 C    172.29.6.8/30  is directly connected, Serial0/1/0
 C    172.29.6.12/30  is directly connected, Serial0/1/1
 C    209.17.220.0/30  is directly connected, Serial0/0/0
```

```
medellin2(config-router)# do sh ip route connected
 C    172.29.4.0/25  is directly connected, GigabitEthernet0/0
 C    172.29.6.0/30  is directly connected, Serial0/0/1
 C    172.29.6.4/30  is directly connected, Serial0/0/0
```

```
medellin3(config-router)#do sh ip route connected
 C    172.29.4.128/25  is directly connected, GigabitEthernet0/0
 C    172.29.6.4/30  is directly connected, Serial0/0/0
 C    172.29.6.8/30  is directly connected, Serial0/1/0
 C    172.29.6.12/30  is directly connected, Serial0/1/1
```

Parte 5: Configurar encapsulamiento y autenticación PPP.

Antes de inicias la configuración las autenticaciones PAT y CHAP, realizaremos encapsulado PPP

```
ISP(config)#int s0/0/0
ISP(config-if)#encapsulation ppp
ISP(config-if)#no shutdown
ISP(config-if)#exit
ISP(config)#int s0/0/1
ISP(config-if)#encapsulation ppp
ISP(config-if)#no shutdown

bogota1(config)#int s0/0/1
bogota1(config-if)#encapsulation ppp
bogota1(config-if)#no shutdown
medellin1(config)#int s0/0/0
medellin1(config-if)#encapsulation ppp
medellin1(config-if)#no shutdown
```

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

```
ISP(config)#username medellin1 secret cisco
ISP(config)#int s0/0/0
ISP(config-if)#ppp authentication pap
ISP(config-if)#ppp pap sent-username isp password cisco
ISP(config-if)#exit

medellin1(config)#username ISP secret cisco
medellin1(config)#int s0/0/0
medellin1(config-if)#ppp authentication pap
medellin1(config-if)#ppp pap sent-username medellin1 password cisco
medellin1(config-if)#exit
```

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

```
ISP(config)#username bogota1 secret class
ISP(config)#int s0/0/1
ISP(config-if)#ppp authentication chap
ISP(config-if)#no shutdown
```

```
bogota1(config)#username ISP secret class
bogota1(config)#int s0/0/1
bogota1(config-if)#ppp authentication chap
bogota1(config-if)#no shutdown
```

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.
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.

```
bogota1(config)#access-list 1 permit 172.29.0.0 0.0.3.255
bogota1(config)#int s0/0/1
bogota1(config-if)#ip nat outside
bogota1(config-if)#int s0/1/1
bogota1(config-if)#ip nat inside
bogota1(config-if)#int s0/1/0
bogota1(config-if)#ip nat inside
bogota1(config-if)#int s0/0/0
bogota1(config-if)#ip nat inside
```

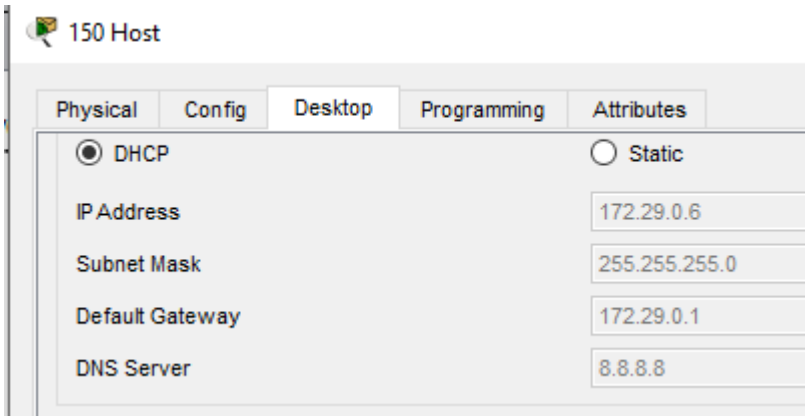
```
medellin1(config)#ip nat inside source list 1 int s0/0/0 overload
medellin1(config)#access-list 1 permit 172.29.0.0 0.0.3.255
medellin1(config)#int s0/0/0
medellin1(config-if)#ip nat outside
medellin1(config-if)#int s0/0/1
medellin1(config-if)#ip nat inside
medellin1(config-if)#int s0/1/0
medellin1(config-if)#ip nat inside
medellin1(config-if)#int s0/1/1
medellin1(config-if)#ip nat inside
```

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.
b. El router Medellín3 deberá habilitar el paso de los mensajes broadcast hacia la IP del router Medellín2.
c. Configurar la red Bogotá2 y Bogotá3 donde el router bogota2 debe ser el servidor DHCP para ambas redes Lan.
d. Configure el router Bogotá1 para que habilite el paso de los mensajes Broadcast hacia la IP del router Bogotá2.

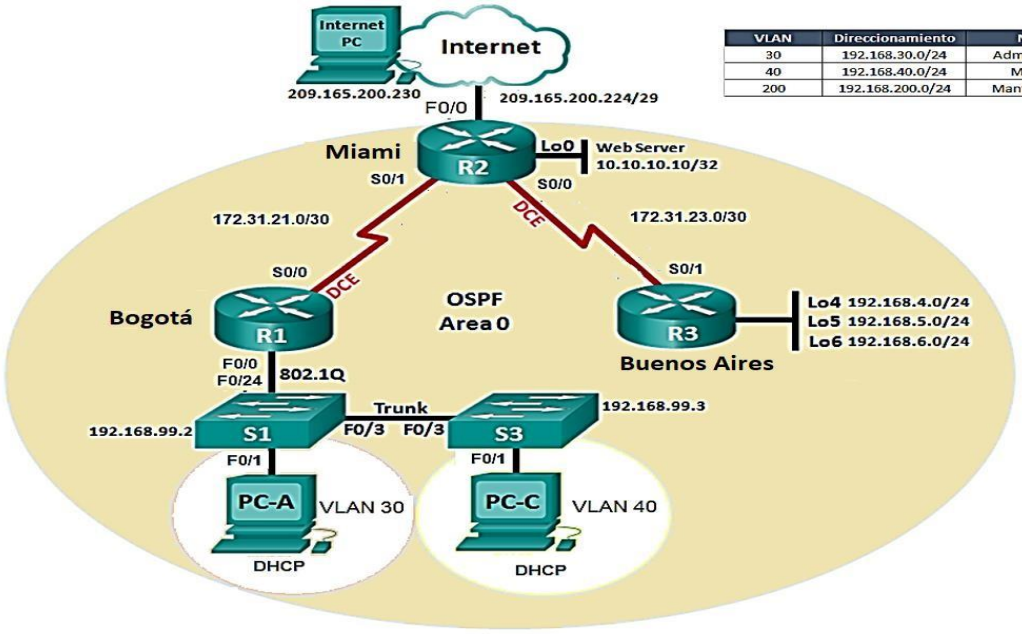
```
medellin2(config)#ip dhcp excluded-add 172.29.4.1 172.29.4.5
medellin2(config)#ip dhcp excluded-add 172.29.4.129 172.29.4.133
medellin2(config)#ip dhcp pool medellin2
medellin2(dhcp-config)#network 172.29.4.0 255.255.255.128
medellin2(dhcp-config)#default-router 172.29.4.1
medellin2(dhcp-config)#dns-server 8.8.8.8
medellin2(dhcp-config)#exit
medellin2(config)#ip dhcp pool medellin3
medellin2(dhcp-config)#network 172.29.4.128 255.255.255.128
medellin2(dhcp-config)#default-router 172.29.4.129
medellin2(dhcp-config)#dns-server 8.8.8.8

medellin3(config)#int g0/0
medellin3(config-if)#ip helper-add 172.29.6.5
medellin3(config-if)#exit

bogota3(config)#ip dhcp excluded-add 172.29.1.1 172.29.1.5
bogota3(config)#ip dhcp excluded-add 172.29.0.1 172.29.0.5
bogota3(config)#ip dhcp pool bogota2
bogota3(dhcp-config)#network 172.27.1.0 255.255.255.0
bogota3(dhcp-config)#default-router 172.27.1.1
bogota3(dhcp-config)#dns-server 8.8.8.8
bogota3(dhcp-config)#exit
bogota3(config)#ip dhcp pool bogota3
bogota3(dhcp-config)#network 172.29.0.0 255.255.255.0
bogota3(dhcp-config)#default-router 172.29.0.1
bogota3(dhcp-config)#dns-server 8.8.8.8

bogota2(config)#int g0/0
bogota2(config-if)#ip helper-add 172.29.3.13
bogota2(config-if)#exit
```

Verificación de los DHCP en los Pc



2. DESARROLLO DE LA ACTIVIIDAD 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.

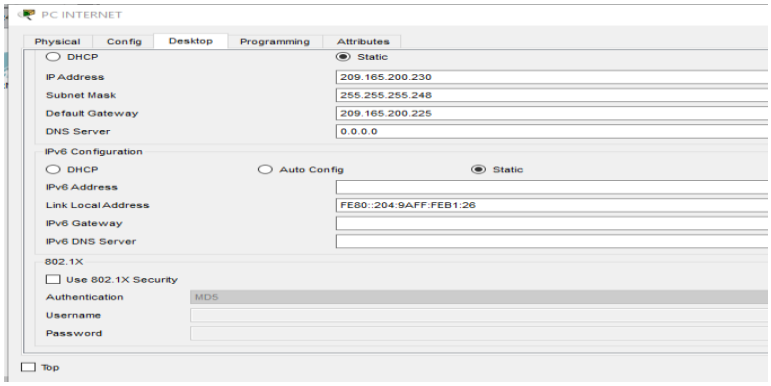


VLAN	Direccionamiento	Nombre
30	192.168.30.0/24	Administración
40	192.168.40.0/24	Mercadeo
200	192.168.200.0/24	Mantenimiento

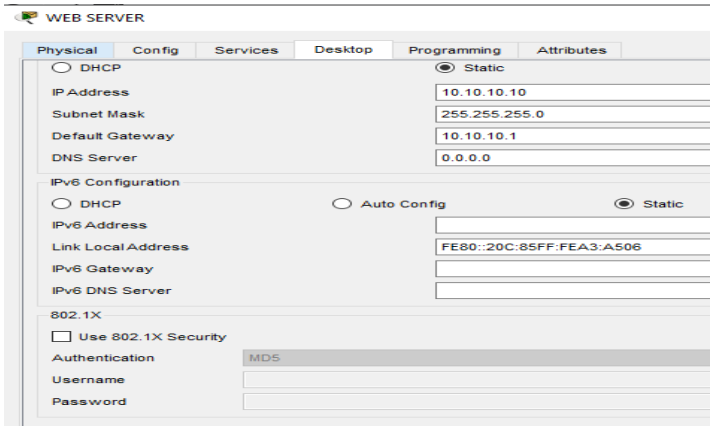
2.1 EVIDENCIAS DE LA SOLUCIÓN DEL ESCENARIO 2

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

PC Internet



WEB SERVER



CONFIGURACION ACCESO R1

```
Router(config)#hostname bogota
bogota(config)#enable secret class
bogota(config)#line consol 0
bogota(config-line)#password cisco
bogota(config-line)#login
bogota(config-line)#exit
bogota(config)#line vty 0 4
bogota(config-line)#password cisco
bogota(config-line)#login
bogota(config-line)#exit
```

bogota(config)#service password-encryption
bogota(config)#banner motd #SOLO PERSONAL AUTORIZADO#
bogota(config)#no ip domain-lookup

CONFIGURACIÓN PUERTOS R1
bogota(config)#int s0/0/0
bogota(config-if)#ip add 172.31.21.1 255.255.255.252
bogota(config-if)#clock rate 128000
bogota(config-if)#no shutdown
bogota(config-if)#exit

CONFIGURACIÓN ESTATICA POR DEFECTO R1
bogota(config)#ip route 0.0.0.0 0.0.0.0 s0/0/0
bogota(config)#

CONFIGURACION ACCESO R2
Router(config)#hostname Miami
miami(config)#enabl secret class

miami(config)#line console 0
miami(config-line)#password cisco
miami(config-line)#login
miami(config-line)#exit
miami(config)#line vty 0 4
miami(config-line)#password cisco
miami(config-line)#login
miami(config-line)#exit
miami(config)#service password-encryption
miami(config)#banner motd #SOLOPERSONAL AUTORIZADO#
miami(config)#no ip domain-lookup

CONFIGURACIÓN PUERTOS R2
miami(config)#int s0/0/0
miami(config-if)#exit
miami(config)#int s0/0/1
miami(config-if)#ip add 172.31.21.2 255.255.255.252
miami(config-if)#clock rate 128000
miami(config-if)#no shutdown
miami(config-if)#exit
miami(config)#int s0/0/0
miami(config-if)#ip add 172.31.23.2 255.255.255.252
miami(config-if)#no shutdown
miami(config-if)#no shutdown
miami(config-if)#exit

```
miami(config)#int f0/0
miami(config-if)#ip add 209.165.200.225 255.255.255.248
miami(config-if)#no shutdown
miami(config-if)#exit
miami(config)#int f0/1
miami(config-if)#ip add 10.10.10.11 255.255.255.0
miami(config-if)#no shutdown
miami(config-if)#exit
```

CONFIGURACIÓN ESTATICA POR DEFECTO R2

```
miami(config)#ip route 0.0.0.0 0.0.0.0 f0/0
miami(config)#
```

CONFIGURACION ACCESO R3

```
Router(config)#hostname buenosa
buenosa(config)#hostname buenosaires
buenosaires(config)#enable secret class
buenosaires(config)#line console 0
buenosaires(config-line)#password cisco
buenosaires(config-line)#login
buenosaires(config-line)#exit
buenosaires(config)#line vty 0 4
buenosaires(config-line)#password cisco
buenosaires(config-line)#login
buenosaires(config-line)#exit
buenosaires(config)#service password-encryption
buenosaires(config)#banner motd #SOLO PERSONAL AUTORIZADO#
buenosaires(config)#no ip domain-lookup
```

CONFIGURACIÓN PUERTOS R3

```
buenosaires(config)#int s0/0/1
buenosaires(config-if)#ip add 172.31.23.1 255.255.255.0
buenosaires(config-if)#clock rate 128000
buenosaires(config-if)#no shutdown
buenosaires(config-if)#exit
```

CONFIGURACIÓN PUERTOS LOOPBACK WEBSERVER

```
buenosaires(config)#int lo4
buenosaires(config-if)#ip add 192.168.4.1 255.255.255.0
buenosaires(config-if)#no shutdown
buenosaires(config-if)#exit
buenosaires(config)#int lo5
buenosaires(config-if)#ip add 192.168.5.1 255.255.255.0
buenosaires(config-if)#no shutdown
buenosaires(config-if)#exit
```

buenosaires(config)#int lo6
buenosaires(config-if)#ip add 192.168.6.1 255.255.255.0
buenosaires(config-if)#no shutdown
buenosaires(config-if)#exit
buenosaires(config)#

CONFIGURACIÓN ESTATICA POR DEFECTO R3
buenosaires(config)#ip route 0.0.0.0 0.0.0.0 s0/0/1
buenosaires(config)#exit

CONFIGURACION ACCESO S1
Switch#CONF T
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#enable secret class
S1(config)#line console 0
S1(config-line)#password cisco
S1(config-line)#login
S1(config-line)#exit
S1(config)#line vty 0 4
S1(config-line)#password cisco
S1(config-line)#login
S1(config-line)#exit
S1(config)#service password-encryption
S1(config)#banner motd #SOLO PERSONAL AUTORIZADO#
S1(config)#exit

CONFIGURACION ACCESO S3
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S3
S3(config)#enable secret class
S3(config)#line console 0
S3(config-line)#password cisco
S3(config-line)#login
S3(config-line)#exit
S3(config)#line vty 0 4
S3(config-line)#password cisco
S3(config-line)#login
S3(config-line)#exit
S3(config)#service password-encryption
S3(config)#banner motd #SOLO PERSONAL AUTORIZADO#

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

OSPFv2 área 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

- 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

Determinamos los wildcard para las redes y la sumatoria de los lookup (solo una dirección)

```
Address:    192.168.30.0
Netmask:    255.255.255.0 = 24
Wildcard:   0.0.0.255
```

```
Address:    172.31.21.0
Netmask:    255.255.255.252 = 30
Wildcard:   0.0.0.3
```

```
Address:    172.31.23.0
Netmask:    255.255.255.252 = 30
Wildcard:   0.0.0.3
```

Interface lookup

```
Address:    192.168.4.0
Netmask:    255.255.255.0 = 24
Wildcard:   0.0.0.255
```

CONFIGURACION OSPF R1

```
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)#network 192.168.99.0 0.0.0.255 area 0
bogota(config-router)#passive-int default
bogota(config-router)#no passive-int s0/0/0
bogota(config-router)#auto-cost reference-bandwidth 1000
% OSPF: Reference bandwidth is changed.
Please ensure reference bandwidth is consistent across all routers.
bogota(config-router)#exit
```

CONFIGURACION ANCHO DE BANDA Y COSTO R1

```
bogota(config)#int s0/0/0
bogota(config-if)#bandwidth 256
bogota(config-if)#ip ospf cost 9500
```

CONFIGURACION OSPF R2

```
iami(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)#network 172.31.21.0 0.0.0.3 area 0
02:47:32: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/1 f
miami(config-router)#network 172.31.23.0 0.0.0.3 area 0
miami(config-router)#network 10.10.10.0 0.0.0.255 area 0
miami(config-router)#passive-int f0/1
miami(config-router)#auto-cost reference-bandwidth 1000
```

CONFIGURACION ANCHO DE BANDA Y COSTO R2

```
iami(config-if)#ip ospf cost 9500
miami(config-if)#exit
miami(config)#int s0/0/0
miami(config-if)#bandwidth 256
miami(config-if)#ip ospf cost 9500
miami(config-if)#exit
miami(config)#
```

CONFIGURACION OSPF R3
buenosaires(config)#router ospf 1
buenosaires(config-router)#router-id 8.8.8.8
buenosaires(config-router)#network 172.31.23.0 0.0.0.3 area 0
buenosaires(config-router)#network 192.168.4.0 0.0.0.255 area 0
buenosaires(config-router)#passive-int lo4
buenosaires(config-router)#passive-int lo5
buenosaires(config-router)#passive-int lo6
buenosaires(config-router)#auto-cost reference-bandwidth 1000

CONFIGURACION ANCHO DE BANDA Y COSTO R3
buenosaires(config)#int s0/0/1
buenosaires(config-if)#bandwidth 256
buenosaires(config-if)#ip ospf cost 9500
buenosaires(config-if)#exit

Verificar información de OSPF

- Visualizar tablas de enrutamiento y routers conectados por OSPFv2

```
bogota#sh ip ospf neig

Neighbor ID     Pri   State           Dead Time   Address
Interface
5.5.5.5           0   FULL/  -        00:00:35    172.31.21.2
Serial0/0/0
```

```
miami#sh ip ospf neig

Neighbor ID     Pri   State           Dead Time   Address
Interface
1.1.1.1           0   FULL/  -        00:00:32    172.31.21.1
Serial0/0/1
miami#
```

```
buenosaires#sh ip ospf neig

Neighbor ID     Pri   State           Dead Time   Address
Interface
5.5.5.5           0   FULL/  -        00:00:36    172.31.23.2
Serial0/0/1
buenosaires#sh ip protocols
```

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

```
bogota#sh ip ospf int

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)
bogota#
```

```
miami#sh ip ospf int

FastEthernet0/1 is up, line protocol is up
  Internet address is 10.10.10.11/24, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 5.5.5.5, Interface address 10.10.10.11
  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 172.31.23.2/30, 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
    Hello due in 00:00:02
  Index 2/2, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  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
```

```
buenosaires#sh ip ospf  int

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
Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.23.1/24, 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 00:00:07
  Index 2/2, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Suppress hello for 0 neighbor(s)
```

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

```
bogota#sh 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
    192.168.99.0 0.0.0.255 area 0
  Passive Interface(s):
    Vlan1
    FastEthernet0/0
    FastEthernet0/1
    Serial0/0/1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1              110      00:17:38
    5.5.5.5              110      00:17:38
  Distance: (default is 110)
```

```
miami#sh 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):
    FastEthernet0/1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1              110      00:18:14
    5.5.5.5              110      00:18:14
  Distance: (default is 110)
```

```
buenosaires#sh 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 0.0.0.255 area 0
  Passive Interface(s):
    Loopback4
    Loopback5
    Loopback6
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1              110      00:26:01
    5.5.5.5              110      00:02:40
    8.8.8.8              110      00:02:33
  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.

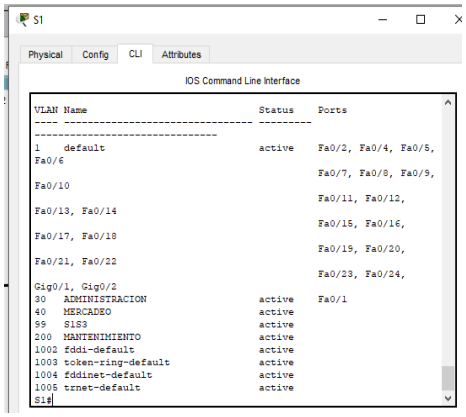
CONFIGURACION S1

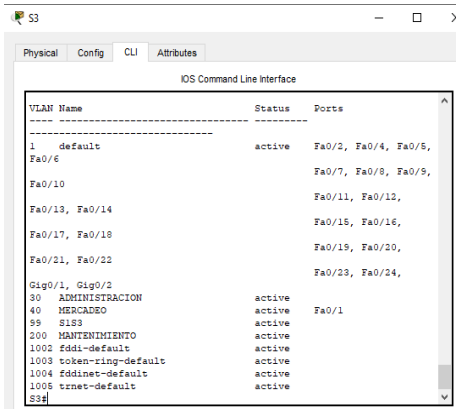
```
S1(config)#vlan 30
S1(config-vlan)#name ADMINISTRACION
S1(config-vlan)#EXIT
S1(config)#vlan 40
S1(config-vlan)#name MERCADEO
S1(config-vlan)#EXIT
S1(config)#vlan 200
S1(config-vlan)#name MANTENIMIENTO
S1(config-vlan)#EXIT
S1(config)#vlan 99
S1(config-vlan)#name S1S3
S1(config-vlan)#EXIT
S1(config)#vlan 99
S1(config)#int vlan 99
S1(config-if)#ip add 192.168.99.2 255.255.255.0
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#ip default-gateway 192.168.30.1
S1(config)#int f0/3
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#exit
S1(config)#int f0/24
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#exit
S1(config)#int range f0/1-2, f0/4-23, g0/1
```

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, f0/4-23, g0/1
S1(config-if-range)#shutdown

CONFIGURACION S3

S3(config)#vlan 30
S3(config-vlan)#name ADMINISTRACION
S3(config-vlan)#EXIT
S3(config)#vlan 40
S3(config-vlan)#name MERCADEO
S3(config-vlan)#EXIT
S3(config)#vlan 200
S3(config-vlan)#name MANTENIMIENTO
S3(config-vlan)#EXIT
S3(config)#vlan 99
S3(config-vlan)#name S1S3
S3(config-vlan)#EXIT
S3(config)#int vlan 99
S3(config-if)#ip add 192.168.99.3 255.255.255.0
S3(config-if)#no shutdown
S3(config-if)#exit
S3(config)#ip default-gateway 192.168.40.1
S3(config)#int f0/3
S3(config-if)#switchport mode trunk
S3(config-if)#switchport trunk native vlan 1
S3(config-if)#exit
S3(config)#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)#exit
S3(config)#int range f0/2, f0/4-24, g0/1-2
S3(config-if-range)#shutdown





CONFIGURACION 802.1Q EN R1

bogota#
bogota#conf t
Enter configuration commands, one per line. End with CNTL/Z.
bogota(config)#int f0/0.30
bogota(config-subif)#encapsulation dot1q 30
bogota(config-subif)#ip add 192.168.30.1 255.255.255.0
bogota(config-subif)#exit
bogota(config)#int f0/0.40
bogota(config-subif)#encapsulation dot1q 40
bogota(config-subif)#ip add 192.168.40.1 255.255.255.0
bogota(config-subif)#exit
bogota(config)#int f0/0.200
bogota(config-subif)#encapsulation dot1q 200
bogota(config-subif)#ip add 192.168.200.1 255.255.255.0
bogota(config-subif)#exit
bogota(config)#int f0/0.99
bogota(config-subif)#encapsulation dot1q 99
bogota(config-subif)#ip add 192.168.99.1 255.255.255.0
bogota(config-subif)#exit
bogota(config)#
bogota(config)#interface FastEthernet0/0
bogota(config-if)#no shutdown
bogota(config-if)#

4. En el Switch 3 deshabilitar DNS lookup

```
S3>en
Password:
S3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S3(config)#no ip domain-lookup
```

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

CONFIGURACION EN S1
S1(config)#int vlan 30
S1(config-if)#ip add 192.168.30.2 255.255.255.0
S1(config-if)#no shutdown
S1(config-if)#int vlan 40
S1(config-if)#ip add 192.168.40.2 255.255.255.0
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#int vlan 200
S1(config-if)#
S1(config-if)#ip add 192.168.200.2 255.255.255.0
S1(config-if)#no shutdown
CONFIGURACION EN S2

S3(config)#int vlan 30
S3(config-if)#ip add 192.168.30.2 255.255.255.0
S3(config-if)#no shutdown
S3(config-if)#exit
S3(config)#int vlan 40
S3(config-if)#ip add 192.168.40.2 255.255.255.0
S3(config-if)#no shutdown
S3(config-if)#exit
S3(config)#int vlan 200
S3(config-if)#ip add 192.168.200.2 255.255.255.0
S3(config-if)#no shutdown
S3(config-if)#exit

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

```
S1#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES manual up                    up
FastEthernet0/2        unassigned      YES manual administratively down down
FastEthernet0/3        unassigned      YES manual up                    up
FastEthernet0/4        unassigned      YES manual administratively down down
FastEthernet0/5        unassigned      YES manual administratively down down
FastEthernet0/6        unassigned      YES manual administratively down down
FastEthernet0/7        unassigned      YES manual administratively down down
FastEthernet0/8        unassigned      YES manual administratively down down
FastEthernet0/9        unassigned      YES manual administratively down down
FastEthernet0/10       unassigned      YES manual administratively down down
FastEthernet0/11       unassigned      YES manual administratively down down
FastEthernet0/12       unassigned      YES manual administratively down down
FastEthernet0/13       unassigned      YES manual administratively down down
FastEthernet0/14       unassigned      YES manual administratively down down
FastEthernet0/15       unassigned      YES manual administratively down down
FastEthernet0/16       unassigned      YES manual administratively down down
FastEthernet0/17       unassigned      YES manual administratively down down
FastEthernet0/18       unassigned      YES manual administratively down down
FastEthernet0/19       unassigned      YES manual administratively down down
FastEthernet0/20       unassigned      YES manual administratively down down
FastEthernet0/21       unassigned      YES manual administratively down down
FastEthernet0/22       unassigned      YES manual administratively down down
FastEthernet0/23       unassigned      YES manual administratively down down
FastEthernet0/24       unassigned      YES manual up                    up
GigabitEthernet0/1     unassigned      YES manual administratively down down
GigabitEthernet0/2     unassigned      YES manual down                  down
Vlan1                  unassigned      YES manual administratively down down
Vlan30                 192.168.30.2    YES manual up                    up
Vlan40                 192.168.40.2    YES manual up                    up
Vlan99                 192.168.99.2    YES manual up                    up
Vlan200                192.168.200.2   YES manual up                    up
```

```
S3#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES manual up                    up
FastEthernet0/2        unassigned      YES manual administratively down down
FastEthernet0/3        unassigned      YES manual up                    up
FastEthernet0/4        unassigned      YES manual administratively down down
FastEthernet0/5        unassigned      YES manual administratively down down
FastEthernet0/6        unassigned      YES manual administratively down down
FastEthernet0/7        unassigned      YES manual administratively down down
FastEthernet0/8        unassigned      YES manual administratively down down
FastEthernet0/9        unassigned      YES manual administratively down down
FastEthernet0/10       unassigned      YES manual administratively down down
FastEthernet0/11       unassigned      YES manual administratively down down
FastEthernet0/12       unassigned      YES manual administratively down down
FastEthernet0/13       unassigned      YES manual administratively down down
FastEthernet0/14       unassigned      YES manual administratively down down
FastEthernet0/15       unassigned      YES manual administratively down down
FastEthernet0/16       unassigned      YES manual administratively down down
FastEthernet0/17       unassigned      YES manual administratively down down
FastEthernet0/18       unassigned      YES manual administratively down down
FastEthernet0/19       unassigned      YES manual administratively down down
FastEthernet0/20       unassigned      YES manual administratively down down
FastEthernet0/21       unassigned      YES manual administratively down down
FastEthernet0/22       unassigned      YES manual administratively down down
FastEthernet0/23       unassigned      YES manual administratively down down
FastEthernet0/24       unassigned      YES manual administratively down down
GigabitEthernet0/1     unassigned      YES manual administratively down down
GigabitEthernet0/2     unassigned      YES manual administratively down down
Vlan1                  unassigned      YES manual administratively down down
Vlan30                 192.168.30.2    YES manual up                    up
Vlan40                 192.168.40.2    YES manual up                    up
Vlan99                 192.168.99.3    YES manual up                    up
Vlan200                192.168.200.2   YES manual up                    up
```

7. Implement 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.

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.

CONFIGURACION EN R1 7,8 Y 9
bogota(config)#ip dhcp excluded-add 192.168.30.1 192.168.30.30
bogota(config)#ip dhcp excluded-add 192.168.40.1 192.168.40.30
bogota(config)#ip dhcp pool ADMINISTRACION
bogota(dhcp-config)#dns-server 10.10.10.11
bogota(dhcp-config)#domain-name ccna-unad.com
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 dhcp pool MERCADEO
bogota(dhcp-config)#dns-server 10.10.10.11
bogota(dhcp-config)#domain-name ccna-unad.com
bogota(dhcp-config)#default-router 192.168.40.1
bogota(dhcp-config)#network 192.168.40.0 255.255.255.0
bogota(dhcp-config)#exit
bogota(config)#

10. Configurar NAT en R2 para permitir que los hosts puedan salir a internet
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 0.0.0.255
miami(config)#ipnatpoolinternet209.165.200.225209.165.200.228netmask255.255.255.248
miami(config)#ip nat inside source list 1 pool internet
miami(config)#ip nat inside source static 10.10.10.10 209.165.200.229
miami(config)#int f0/0
miami(config-if)#ip nat outside

miami(config-if)#int f0/1
miami(config-if)#ip nat inside

```
miami#sh ip nat statistics
Total translations: 2 (1 static, 1 dynamic, 1 extended)
Outside Interfaces: FastEthernet0/0
Inside Interfaces: FastEthernet0/1
Hits: 19  Misses: 6
Expired translations: 3
Dynamic mappings:
-- Inside Source
access-list 1 pool internet refCount 0
 pool internet: netmask 255.255.255.248
       start 209.165.200.225 end 209.165.200.228
       type generic, total addresses 4 , allocated 0 (0%), misses 0
```

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.

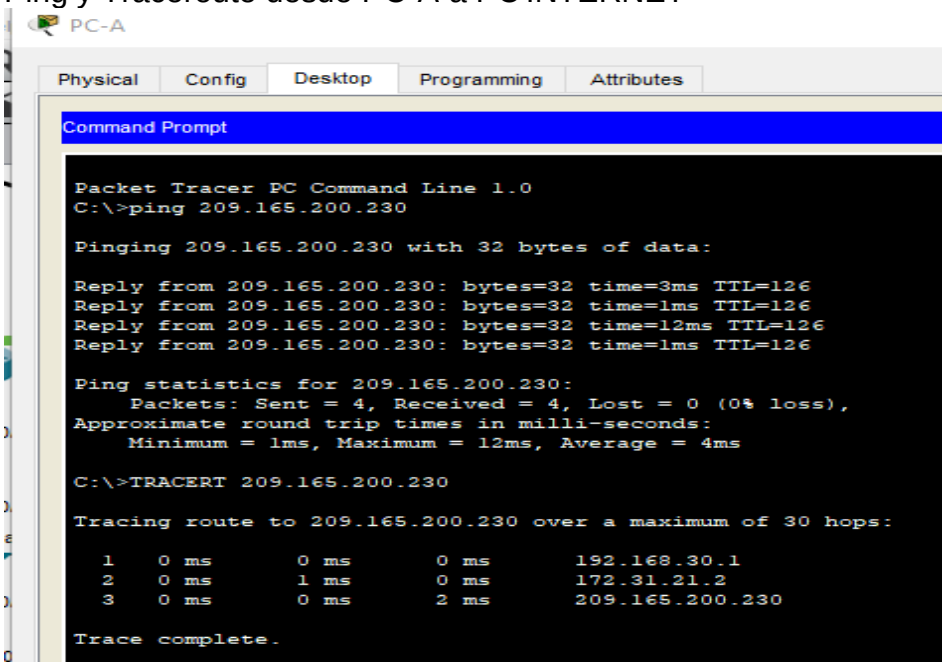
miami(config)#ip access-list standard admin
miami(config-std-nacl)#permit host 172.31.21.1
miami(config-std-nacl)#exit
miami(config)#line vty 0 4
miami(config-line)#access-class admin in
miami(config-line)#exit
miami(config)#

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.

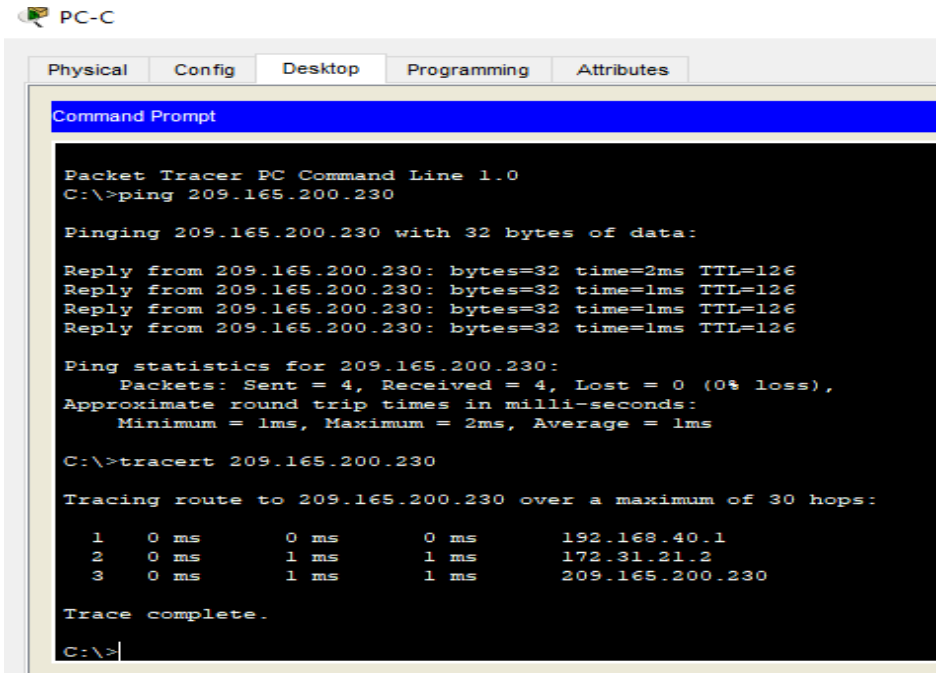
miami(config)#access-list 100 permit tcp any host 209.165.200.229 eq www
miami(config)#access-list 100 permit icmp any any echo-reply
miami(config)#int f0/0
miami(config-if)#ip access-group 100 in
miami(config-if)#exit
miami(config)#

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

Ping y Traceroute desde PC-A a PC INTERNET



Ping y Traceroute desde PC-C a PC INTERNET



Ping y Traceroute desde R1 a R3

```
SOLO PERSONAL AUTORIZADO

User Access Verification

Password:

bogota>en
Password:
bogota#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 = 2/7/15
ms

bogota#traceroute 172.31.23.1
Type escape sequence to abort.
Tracing the route to 172.31.23.1

  1   172.31.21.2     1 msec    0 msec    1 msec
  2   172.31.23.1     6 msec    3 msec    1 msec
bogota#
```

CONCLUSIONES

- Durante el proceso de profundización de Cisco se trabaja sobre una curva de conocimiento básico hasta llegar a configuraciones en topologías aplicables en el ámbito laboral actual, logrando en el desarrollo de los escenarios planteados la aplicación de configuraciones como la de direccionamiento, seguridad, OSPF, NAT, entre otros.

- De los dispositivos conocidos en este proceso se considera que el servidor DHCP importante debido a que mejora la administración de una red, ya que una gran parte de la configuración la realizaría el servidor.

- Se resalta de manera positiva la herramienta Packet Tracer durante el desarrollo del diplomado, el cual permite simular cualquier tipo de red con diferentes dispositivos según el diseño, errores en la misma y las posibles soluciones que se puede aplicar y sus respectivas comprobaciones.

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