

EVALUACIÓN – PRUEBA DE HABILIDADES CCNA 2019

GRUPO 16

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INTRODUCCION

En este trabajo se verifica el desarrollo y análisis de los escenarios propuestos en la prueba de habilidades ccna 2019, los cuales son implementados paso a paso en cada pregunta que se pueden evidenciar los comandos utilizados para la configuración de todos los dispositivos que se encuentran en la topología de cada uno de los escenarios.

Para el desarrollo de esta prueba de habilidades escogí la herramienta Packet Tracer ya que fue la única que se utilizó en el curso. El desarrollo de este tipo de actividades nos reta a colocar en práctica todos los conceptos aprendidos durante el semestre.

RESUMEN

En este diplomado se me ha permitido afianzar el conocimiento sobre redes informáticas en CCNA del tiempo que empezamos profundizando nuestro conocimiento, es de vital importancia para cada uno de nosotros que estudiamos ingeniería. Las redes y sus herramientas son muy importantes en el mundo donde la tecnología avanza muy rápido.

En el problema uno se trabajara con protocolo de enrutamiento RIP y en el segundo problema se utilizara el protocolo de enrutamiento OSPF.

ABSTRACT

In this course, I have been able to consolidate the knowledge about computer networks in CCNA. From the time we started, deepening our knowledge, it is of vital importance for each of us who study engineering. Networks and their tools are very important in the world where technology advances very fast.

In the problem one will work with RIP routing protocol and in the second problem the OSPF routing protocol will be used.

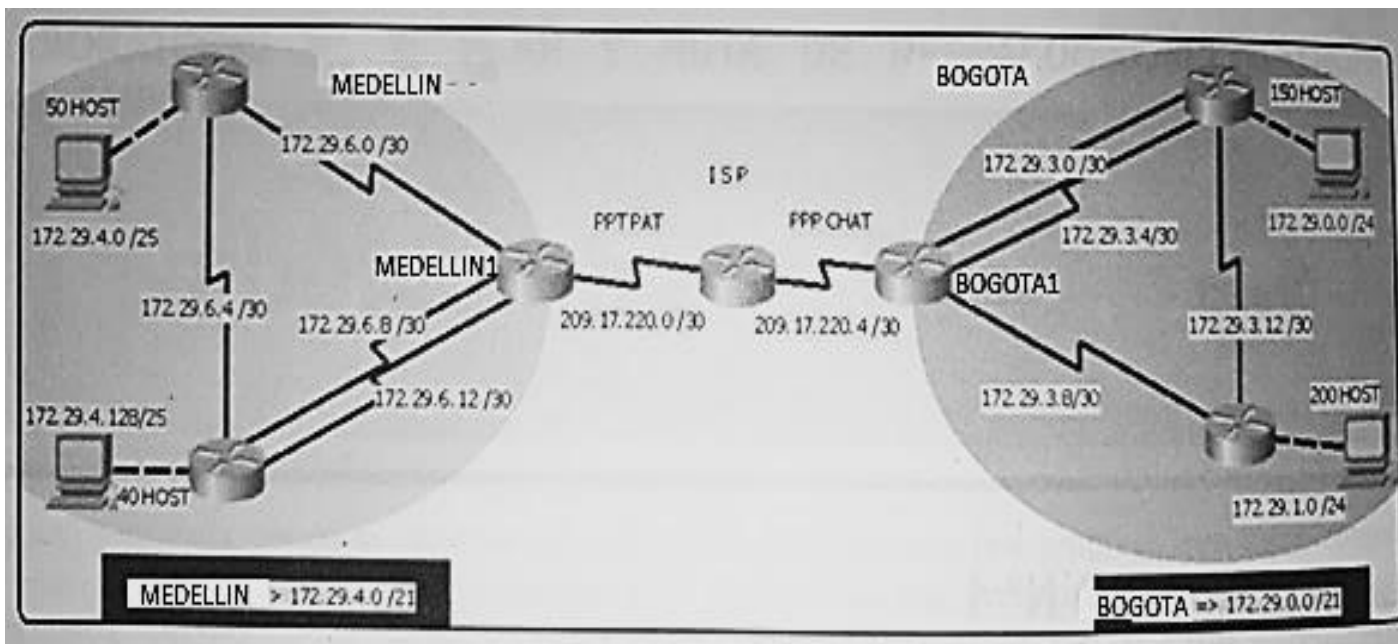
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Escenario 1

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 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

Como trabajo inicial se debe realizar lo siguiente.

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

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.

```
Medellin 1
router rip
version 2
no auto-summary
network 209.17.220.0
network 172.29.6.0
network 172.29.6.12
network 172.29.6.8

interface Serial0/0/0
ip address 172.29.6.13 255.255.255.252

interface Serial0/0/1
ip address 172.29.6.1 255.255.255.252
interface Serial0/1/0
ip address 209.17.220.2 255.255.255.252

interface Serial0/1/1
ip address 172.29.6.9 255.255.255.252
```

```
-----
Medellin 2
router rip
version 2
no auto-summary
network 172.29.4.0
network 172.29.6.0
network 172.29.6.4

interface GigabitEthernet0/0
ip address 172.29.4.1 255.255.255.128

interface Serial0/0/0
ip address 172.29.6.5 255.255.255.252
interface Serial0/0/1
```

```
ip address 172.29.6.2 255.255.255.252
```

```
-----  
Medellin 3
```

```
router rip
```

```
version 2
```

```
no auto-summary
```

```
network 172.29.6.8
```

```
network 172.29.6.12
```

```
network 172.29.6.4
```

```
network 172.29.4.128
```

```
interface GigabitEthernet0/0
```

```
ip address 172.29.4.129 255.255.255.128
```

```
ip helper-address 172.29.6.5
```

```
interface Serial0/0/0
```

```
ip address 172.29.4.14 255.255.255.252
```

```
interface Serial0/1/0
```

```
ip address 172.29.6.6 255.255.255.252
```

```
interface Serial0/1/1
```

```
ip address 172.29.4.10 255.255.255.252
```

```
-----  
Bogota 1
```

```
router rip
```

```
version 2
```

```
no auto-summary
```

```
network 209.17.220.4
```

```
network 172.29.3.0
```

```
network 172.29.3.4
```

```
network 172.29.3.8
```

```
interface Serial0/0/0
```

```
ip address 172.29.3.1 255.255.255.252
```

```
interface Serial0/0/1
```

```
ip address 172.29.3.9 255.255.255.252
```

```
ip helper-address 172.29.6.2
```

```
interface Serial0/1/0
```

```
ip address 172.29.3.5 255.255.255.252
```

```
interface Serial0/1/1
```

```
ip address 209.17.220.6 255.255.255.252
```

```
-----  
Bogota 3
```

```
router rip
version 2
no auto-summary
network 172.29.3.0
network 172.29.3.4
network 172.29.3.12
network 172.29.0.0
interface GigabitEthernet0/0
ip address 172.29.0.1 255.255.255.0

interface Serial0/0/0
ip address 172.29.3.2 255.255.255.252
interface Serial0/0/1
ip address 172.29.3.13 255.255.255.252

interface Serial0/1/0
ip address 172.29.3.6 255.255.255.252
-----
```

```
Bogota 2
router rip
version 2
no auto-summary
network 172.29.3.12
network 172.29.3.8
network 172.29.1.0

interface GigabitEthernet0/0
ip address 172.29.1.1 255.255.255.0
interface Serial0/0/0
ip address 172.29.3.14 255.255.255.252
interface Serial0/0/1
ip address 172.29.3.10 255.255.255.252
-----
```

```
ISP
interface Serial0/1/0
ip address 209.17.220.1 255.255.255.252

interface Serial0/1/1
ip address 209.17.220.5 255.255.255.252
```

b. Los routers Bogota1 y Medellín 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.

Medellin 1

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

```
router rip
version 2
network 172.29.0.0
network 209.17.220.0
default-information originate
no auto-summary
```

```
-----
Bogota 1
ip route 0.0.0.0 0.0.0.0 209.17.220.5
```

```
default-information originate
```

```
router rip
version 2
network 172.29.0.0
network 209.17.220.0
default-information originate
no auto-summary
```

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.

```
ip route 172.29.4.0 255.255.252.0 209.17.220.2
```

```
ip route 172.29.0.0 255.255.252.0 209.17.220.6
```

Parte 2: Tabla de Enrutamiento.

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

ISP

Physical Config CLI Attributes

IOS Command Line Interface

```
Codes: L - local, C - connected, S - static, R - RIP, M - mobile,
B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter
area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external
type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E -
EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia -
IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/22 is subnetted, 2 subnets
S    172.29.0.0/22 [1/0] via 209.17.220.6
S    172.29.4.0/22 [1/0] via 209.17.220.2
209.17.220.0/24 is variably subnetted, 4 subnets, 2 masks
C    209.17.220.0/30 is directly connected, Serial0/1/0
L    209.17.220.1/32 is directly connected, Serial0/1/0
C    209.17.220.4/30 is directly connected, Serial0/1/1
L    209.17.220.5/32 is directly connected, Serial0/1/1

Router#
```

Bogota 3

Physical Config CLI Attributes

IOS Command Line Interface

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

172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks
C    172.29.0.0/24 is directly connected, GigabitEthernet0/0
L    172.29.0.1/32 is directly connected, GigabitEthernet0/0
R    172.29.1.0/24 [120/1] via 172.29.3.14, 00:00:24,
Serial0/0/1
C    172.29.3.0/30 is directly connected, Serial0/0/0
L    172.29.3.2/32 is directly connected, Serial0/0/0
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, 00:00:00,
Serial0/1/0
                                     [120/1] via 172.29.3.14, 00:00:24,
Serial0/0/1
                                     [120/1] via 172.29.3.1, 00:00:00,
Serial0/0/0
C    172.29.3.12/30 is directly connected, Serial0/0/1
L    172.29.3.13/32 is directly connected, Serial0/0/1
209.17.220.0/30 is subnetted, 1 subnets
R    209.17.220.4/30 [120/1] via 172.29.3.5, 00:00:00,
Serial0/1/0
                                     [120/1] via 172.29.3.1, 00:00:00,
Serial0/0/0
R*  0.0.0.0/0 [120/1] via 172.29.3.5, 00:00:00, Serial0/1/0
                                     [120/1] via 172.29.3.1, 00:00:00, Serial0/0/0

Router#
```

```
Bogota 2
Physical Config CLI Attributes
IOS Command Line Interface
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, 9 subnets, 3 masks
R 172.29.0.0/24 [120/1] via 172.29.3.13, 00:00:02,
Serial0/0/0
C 172.29.1.0/24 is directly connected, GigabitEthernet0/0
L 172.29.1.1/32 is directly connected, GigabitEthernet0/0
R 172.29.3.0/30 [120/1] via 172.29.3.9, 00:00:19,
Serial0/0/1
[120/1] via 172.29.3.13, 00:00:02,
Serial0/0/0
R 172.29.3.4/30 [120/1] via 172.29.3.9, 00:00:19,
Serial0/0/1
[120/1] via 172.29.3.13, 00:00:02,
Serial0/0/0
C 172.29.3.8/30 is directly connected, Serial0/0/1
L 172.29.3.10/32 is directly connected, Serial0/0/1
C 172.29.3.12/30 is directly connected, Serial0/0/0
L 172.29.3.14/32 is directly connected, Serial0/0/0
209.17.220.0/30 is subnetted, 1 subnets
R 209.17.220.4/30 [120/1] via 172.29.3.9, 00:00:19,
Serial0/0/1
R* 0.0.0.0/0 [120/1] via 172.29.3.9, 00:00:19, Serial0/0/1
Router#
```

```
Bogota 1
Physical Config CLI Attributes
IOS Command Line Interface
P - periodic downloaded static route
Gateway of last resort is 209.17.220.5 to network 0.0.0.0
172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R 172.29.0.0/24 [120/1] via 172.29.3.6, 00:00:00,
Serial0/1/0
[120/1] via 172.29.3.2, 00:00:00,
Serial0/0/0
R 172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:06,
Serial0/0/1
C 172.29.3.0/30 is directly connected, Serial0/0/0
L 172.29.3.1/32 is directly connected, Serial0/0/0
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, Serial0/0/1
L 172.29.3.9/32 is directly connected, Serial0/0/1
R 172.29.3.12/30 [120/1] via 172.29.3.6, 00:00:00,
Serial0/1/0
[120/1] via 172.29.3.10, 00:00:06,
Serial0/0/1
[120/1] via 172.29.3.2, 00:00:00,
Serial0/0/0
209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C 209.17.220.4/30 is directly connected, Serial0/1/1
L 209.17.220.6/32 is directly connected, Serial0/1/1
S* 0.0.0.0/0 [1/0] via 209.17.220.5
```

```
Medellin 3
Physical Config CLI Attributes
IOS Command Line Interface
P - periodic downloaded static route
Gateway of last resort is 172.29.6.5 to network 0.0.0.0
    172.29.0.0/16 is variably subnetted, 12 subnets, 3 masks
R    172.29.4.0/25 [120/1] via 172.29.6.5, 00:00:01,
Serial0/1/0
C    172.29.4.8/30 is directly connected, Serial0/1/1
L    172.29.4.10/32 is directly connected, Serial0/1/1
C    172.29.4.12/30 is directly connected, Serial0/0/0
L    172.29.4.14/32 is directly connected, 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 172.29.6.5, 00:00:01,
Serial0/1/0
C    172.29.6.4/30 is directly connected, Serial0/1/0
L    172.29.6.6/32 is directly connected, Serial0/1/0
R    172.29.6.8/30 [120/2] via 172.29.6.5, 00:00:01,
Serial0/1/0
R    172.29.6.12/30 [120/2] via 172.29.6.5, 00:00:01,
Serial0/1/0
    209.17.220.0/30 is subnetted, 1 subnets
R    209.17.220.0/30 [120/2] via 172.29.6.5, 00:00:01,
Serial0/1/0
R*  0.0.0.0/0 [120/2] via 172.29.6.5, 00:00:01, Serial0/1/0
Router#
```

```
Medellin 2
Physical Config CLI Attributes
IOS Command Line Interface
Gateway of last resort is 172.29.6.1 to network 0.0.0.0
    172.29.0.0/16 is variably subnetted, 11 subnets, 3 masks
C    172.29.4.0/25 is directly connected, GigabitEthernet0/0
L    172.29.4.1/32 is directly connected, GigabitEthernet0/0
R    172.29.4.8/30 [120/1] via 172.29.6.6, 00:00:22,
Serial0/0/0
R    172.29.4.12/30 [120/1] via 172.29.6.6, 00:00:22,
Serial0/0/0
R    172.29.4.128/25 [120/1] via 172.29.6.6, 00:00:22,
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    172.29.6.5/32 is directly connected, Serial0/0/0
R    172.29.6.8/30 [120/1] via 172.29.6.1, 00:00:10,
Serial0/0/1
R    172.29.6.12/30 [120/1] via 172.29.6.1, 00:00:10,
Serial0/0/1
    209.17.220.0/30 is subnetted, 1 subnets
R    209.17.220.0/30 [120/1] via 172.29.6.1, 00:00:10,
Serial0/0/1
R*  0.0.0.0/0 [120/1] via 172.29.6.1, 00:00:10, Serial0/0/1
Router#
```

```
Medellin 1
Physical Config CLI Attributes
IOS Command Line Interface
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, 11 subnets, 3 masks
R 172.29.4.0/25 [120/1] via 172.29.6.2, 00:00:13, Serial0/0/1
R 172.29.4.8/30 [120/2] via 172.29.6.2, 00:00:13, Serial0/0/1
R 172.29.4.12/30 [120/2] via 172.29.6.2, 00:00:13,
Serial0/0/1
R 172.29.4.128/25 [120/2] via 172.29.6.2, 00:00:13,
Serial0/0/1
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, 00:00:13, Serial0/0/1
C 172.29.6.8/30 is directly connected, Serial0/1/1
L 172.29.6.9/32 is directly connected, Serial0/1/1
C 172.29.6.12/30 is directly connected, Serial0/0/0
L 172.29.6.13/32 is directly connected, Serial0/0/0
L 209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C 209.17.220.0/30 is directly connected, Serial0/1/0
L 209.17.220.2/32 is directly connected, Serial0/1/0
S* 0.0.0.0/0 [1/0] via 209.17.220.1

Router#
```

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

Se presenta en los Router de Bogota

```
Bogota 3
Physical Config CLI Attributes
IOS Command Line Interface
* - 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, 10 subnets, 3 masks
C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
L 172.29.0.1/32 is directly connected, GigabitEthernet0/0
R 172.29.1.0/24 [120/1] via 172.29.3.14, 00:00:24, Serial0/0/1
C 172.29.3.0/30 is directly connected, Serial0/0/0
L 172.29.3.2/32 is directly connected, Serial0/0/0
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, 00:00:00, Serial0/1/0
[120/1] via 172.29.3.14, 00:00:24, Serial0/0/1
[120/1] via 172.29.3.1, 00:00:00, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/0/1
L 172.29.3.13/32 is directly connected, Serial0/0/1
209.17.220.0/30 is subnetted, 1 subnets
R 209.17.220.4/30 [120/1] via 172.29.3.5, 00:00:00, Serial0/1/0
[120/1] via 172.29.3.1, 00:00:00, Serial0/0/0
R* 0.0.0.0/0 [120/1] via 172.29.3.5, 00:00:00, Serial0/1/0
[120/1] via 172.29.3.1, 00:00:00, Serial0/0/0

Router#
```

```
Bogota 1
Physical Config CLI Attributes
IOS Command Line Interface
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, 9 subnets, 3 masks
R 172.29.0.0/24 [120/1] via 172.29.3.6, 00:00:00, Serial0/1/0
[120/1] via 172.29.3.2, 00:00:00, Serial0/0/0
R 172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:06, Serial0/0/1
C 172.29.3.0/30 is directly connected, Serial0/0/0
L 172.29.3.1/32 is directly connected, Serial0/0/0
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, Serial0/0/1
L 172.29.3.9/32 is directly connected, Serial0/0/1
R 172.29.3.12/30 [120/1] via 172.29.3.6, 00:00:00, Serial0/1/0
[120/1] via 172.29.3.10, 00:00:06, Serial0/0/1
[120/1] via 172.29.3.2, 00:00:00, Serial0/0/0
209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C 209.17.220.4/30 is directly connected, Serial0/1/1
L 209.17.220.6/32 is directly connected, Serial0/1/1
S* 0.0.0.0/0 [1/0] via 209.17.220.5

Router#
```

```

Bogota 2
Physical Config CLI Attributes
IOS Command Line Interface
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, 9 subnets, 3 masks
R   172.29.0.0/24 [120/1] via 172.29.3.13, 00:00:02, Serial0/0/0
C   172.29.1.0/24 is directly connected, GigabitEthernet0/0
L   172.29.1.1/32 is directly connected, GigabitEthernet0/0
R   172.29.3.0/30 [120/1] via 172.29.3.9, 00:00:19, Serial0/0/1
   [120/1] via 172.29.3.13, 00:00:02, Serial0/0/0
R   172.29.3.4/30 [120/1] via 172.29.3.9, 00:00:19, Serial0/0/1
   [120/1] via 172.29.3.13, 00:00:02, Serial0/0/0
C   172.29.3.8/30 is directly connected, Serial0/0/1
L   172.29.3.10/32 is directly connected, Serial0/0/1
C   172.29.3.12/30 is directly connected, Serial0/0/0
L   172.29.3.14/32 is directly connected, Serial0/0/0
209.17.220.0/30 is subnetted, 1 subnets
R   209.17.220.4/30 [120/1] via 172.29.3.9, 00:00:19, Serial0/0/1
R*  0.0.0.0/0 [120/1] via 172.29.3.9, 00:00:19, Serial0/0/1

Router#

```

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.

```

Medellin 1
Physical Config CLI Attributes
IOS Command Line Interface
* - 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, 11 subnets, 3 masks
R   172.29.4.0/25 [120/1] via 172.29.6.2, 00:00:13, Serial0/0/1
R   172.29.4.8/30 [120/2] via 172.29.6.2, 00:00:13, Serial0/0/1
R   172.29.4.12/30 [120/2] via 172.29.6.2, 00:00:13, Serial0/0/1
R   172.29.4.128/25 [120/2] via 172.29.6.2, 00:00:13, Serial0/0/1
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, 00:00:13, Serial0/0/1
C   172.29.6.8/30 is directly connected, Serial0/1/1
L   172.29.6.9/32 is directly connected, Serial0/1/1
C   172.29.6.12/30 is directly connected, Serial0/0/0
L   172.29.6.13/32 is directly connected, Serial0/0/0
209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C   209.17.220.0/30 is directly connected, Serial0/1/0
L   209.17.220.2/32 is directly connected, Serial0/1/0
S*  0.0.0.0/0 [1/0] via 209.17.220.1

Router#
Router#

Ctrl+F6 to exit CLI focus
Copy Paste

Top

```

```

Bogota 1
Physical Config CLI Attributes
IOS Command Line Interface
* - 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, 9 subnets, 3 masks
R   172.29.0.0/24 [120/1] via 172.29.3.6, 00:00:00, Serial0/1/0
   [120/1] via 172.29.3.2, 00:00:00, Serial0/0/0
R   172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:06, Serial0/0/1
C   172.29.3.0/30 is directly connected, Serial0/0/0
L   172.29.3.1/32 is directly connected, Serial0/0/0
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, Serial0/0/1
L   172.29.3.9/32 is directly connected, Serial0/0/1
R   172.29.3.12/30 [120/1] via 172.29.3.6, 00:00:00, Serial0/1/0
   [120/1] via 172.29.3.10, 00:00:06, Serial0/0/1
   [120/1] via 172.29.3.2, 00:00:00, Serial0/0/0
C   209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C   209.17.220.4/30 is directly connected, Serial0/1/1
L   209.17.220.6/32 is directly connected, Serial0/1/1
S*  0.0.0.0/0 [1/0] via 209.17.220.5

Router#
Router#

Ctrl+F6 to exit CLI focus
Copy Paste

Top

```

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


```

ISP
Physical Config CLI Attributes
IOS Command Line Interface
Codes: L - local, C - connected, S - static, R - RIP, M - mobile,
B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter
area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external
type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E -
EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia -
IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

      172.29.0.0/22 is subnetted, 2 subnets
S       172.29.0.0/22 [1/0] via 209.17.220.6
S       172.29.4.0/22 [1/0] via 209.17.220.2
      209.17.220.0/24 is variably subnetted, 4 subnets, 2 masks
C       209.17.220.0/30 is directly connected, Serial0/1/0
L       209.17.220.1/32 is directly connected, Serial0/1/0
C       209.17.220.4/30 is directly connected, Serial0/1/1
L       209.17.220.5/32 is directly connected, Serial0/1/1

```

Parte 3: Deshabilitar la propagación del protocolo RIP.

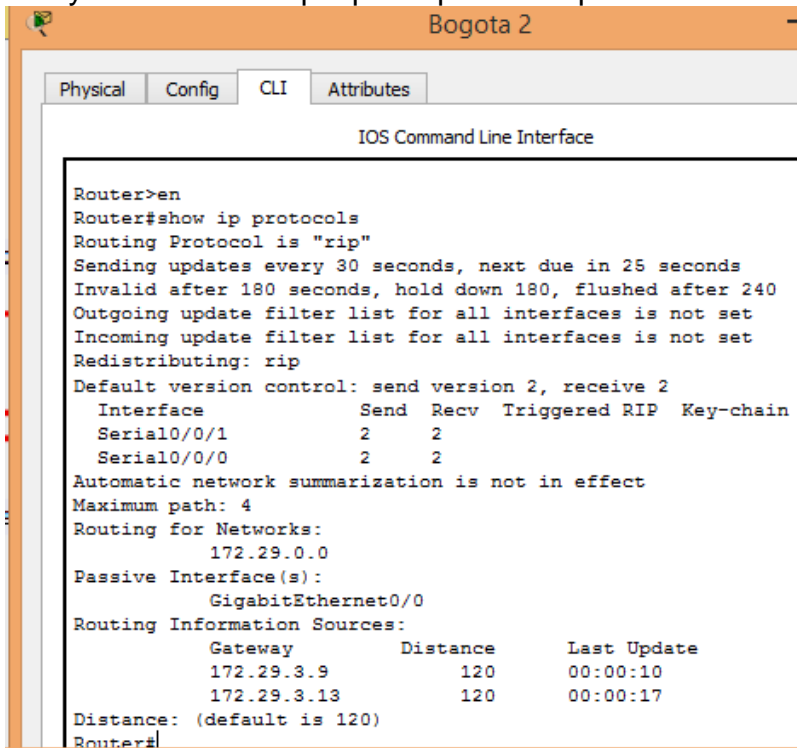
a. Para no propagar las publicaciones por interfaces que no lo requieran se debe deshabilitar la propagación del protocolo RIP, en la siguiente tabla se indican las interfaces de cada router que no necesitan desactivación.

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

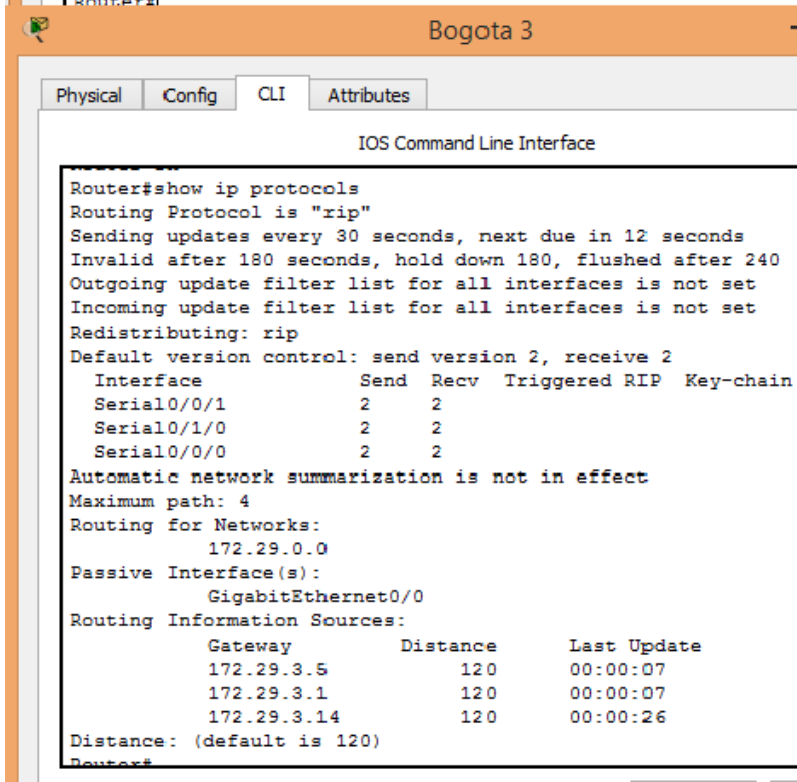
Se verifican las interfaces que no se usan y están desactivadas

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.



```
Router>en
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 25 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
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  172.29.0.0
Passive Interface(s):
  GigabitEthernet0/0
Routing Information Sources:
  Gateway            Distance    Last Update
  172.29.3.9         120        00:00:10
  172.29.3.13        120        00:00:17
Distance: (default is 120)
Router#
```



```
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 12 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
Serial0/0/0          2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  172.29.0.0
Passive Interface(s):
  GigabitEthernet0/0
Routing Information Sources:
  Gateway            Distance    Last Update
  172.29.3.5         120        00:00:07
  172.29.3.1         120        00:00:07
  172.29.3.14        120        00:00:26
Distance: (default is 120)
Router#
```

Medellin 3

Physical Config CLI Attributes

IOS Command Line Interface

```
Router>en
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 6 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
  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):
  GigabitEthernet0/0
Routing Information Sources:
  Gateway            Distance    Last Update
  172.29.6.5         120        00:00:00
Distance: (default is 120)
Router#
```

Medellin 2

Physical Config CLI Attributes

IOS Command Line Interface

```
Router>en
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 3 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface          Send Recv Triggered RIP Key-chain
  Serial0/0/0         2    2
  Serial0/0/1         2    2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  172.29.0.0
Passive Interface(s):
  GigabitEthernet0/0
Routing Information Sources:
  Gateway            Distance    Last Update
  172.29.6.1         120        00:00:08
  172.29.6.6         120        00:00:20
Distance: (default is 120)
Router#
```

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.

The image shows two screenshots of a network simulator interface, each displaying the CLI of a different router. The top screenshot is for 'Bogota 1' and the bottom is for 'Bogota 3'. Both show the output of the 'show ip protocols' command, detailing the RIP configuration and the routing table.

Bogota 1

```
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 7 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
  Serial0/0/0         2    2
  Serial0/1/1         2    2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  172.29.0.0
  209.17.220.0
Passive Interface(s):
Routing Information Sources:
  Gateway         Distance    Last Update
  172.29.3.6      120         00:00:26
  172.29.3.2      120         00:00:26
  172.29.3.10     120         00:00:14
Distance: (default is 120)
Router#
```

Bogota 3

```
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 12 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
  Serial0/0/0         2    2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  172.29.0.0
Passive Interface(s):
  GigabitEthernet0/0
Routing Information Sources:
  Gateway         Distance    Last Update
  172.29.3.5      120         00:00:07
  172.29.3.1      120         00:00:07
  172.29.3.14     120         00:00:26
Distance: (default is 120)
Router#
```

```
Bogota 2
Physical Config CLI Attributes
IOS Command Line Interface
Router>en
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 25 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
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  172.29.0.0
Passive Interface(s):
  GigabitEthernet0/0
Routing Information Sources:
  Gateway            Distance    Last Update
  172.29.3.9         120        00:00:10
  172.29.3.13        120        00:00:17
Distance: (default is 120)
Router#
```

```
Medellin 3
Physical Config CLI Attributes
IOS Command Line Interface
Router>en
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 6 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
  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):
  GigabitEthernet0/0
Routing Information Sources:
  Gateway            Distance    Last Update
  172.29.6.5         120        00:00:00
Distance: (default is 120)
Router#
```

Medellin 2

Physical Config CLI Attributes

IOS Command Line Interface

```
Router>en
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 3 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface          Send Recv Triggered RIP Key-chain
  Serial0/0/0        2     2
  Serial0/0/1        2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  172.29.0.0
Passive Interface(s):
  GigabitEthernet0/0
Routing Information Sources:
  Gateway            Distance      Last Update
  172.29.6.1         120           00:00:08
  172.29.6.6         120           00:00:20
Distance: (default is 120)
Router#
```

Medellin 1

Physical Config CLI Attributes

IOS Command Line Interface

```
Router>en
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 10 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface          Send Recv Triggered RIP Key-chain
  Serial0/1/1        2     2
  Serial0/0/0        2     2
  Serial0/0/1        2     2
  Serial0/1/0        2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  172.29.0.0
  209.17.220.0
Passive Interface(s):
Routing Information Sources:
  Gateway            Distance      Last Update
  172.29.6.2         120           00:00:04
Distance: (default is 120)
Router#
```

Parte 5: Configurar encapsulamiento y autenticación PPP.

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

```
Medellin 1
En
Conf t
s0/1/0
ip nat inside
```

```
IPS
En
Conf t
s0/1/0
ip nat inside
```

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

```
Bogota 1

En
Conf t
int s0/1/1

encapsulation ppp

ppp authentication chap
```

```
ISP

En
Conf t
int s0/1/1

encapsulation ppp

ppp authentication chap
```

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, como 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, como diferente puerto.

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.

```
ip dhcp pool LANMEDELLIN2
network 172.29.4.0 255.255.255.128
default-router 172.29.4.1
dns-server 8.8.8.8
ip dhcp pool LANMEDELLIN3
network 172.29.4.128 255.255.255.128
default-router 172.29.4.129
dns-server 8.8.8.8
```

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

```
interface GigabitEthernet0/0
ip address 172.29.4.129 255.255.255.128
ip helper-address 172.29.6.5
```

- c. Configurar la red Bogotá2 y Bogotá3 donde el router Medellín2 debe ser el servidor DHCP para ambas redes Lan.

```
ip dhcp pool BOGOTA1
network 172.29.0.0 255.255.255.0
default-router 172.29.0.1
dns-server 8.8.8.8
ip dhcp pool BOGOTA2
network 172.29.1.0 255.255.255.0
```

```
default-router 172.29.1.1
dns-server 8.8.8.8
```

d. Configure el router Bogotá1 para que habilite el paso de los mensajes Broadcast hacia la IP del router Bogotá2.

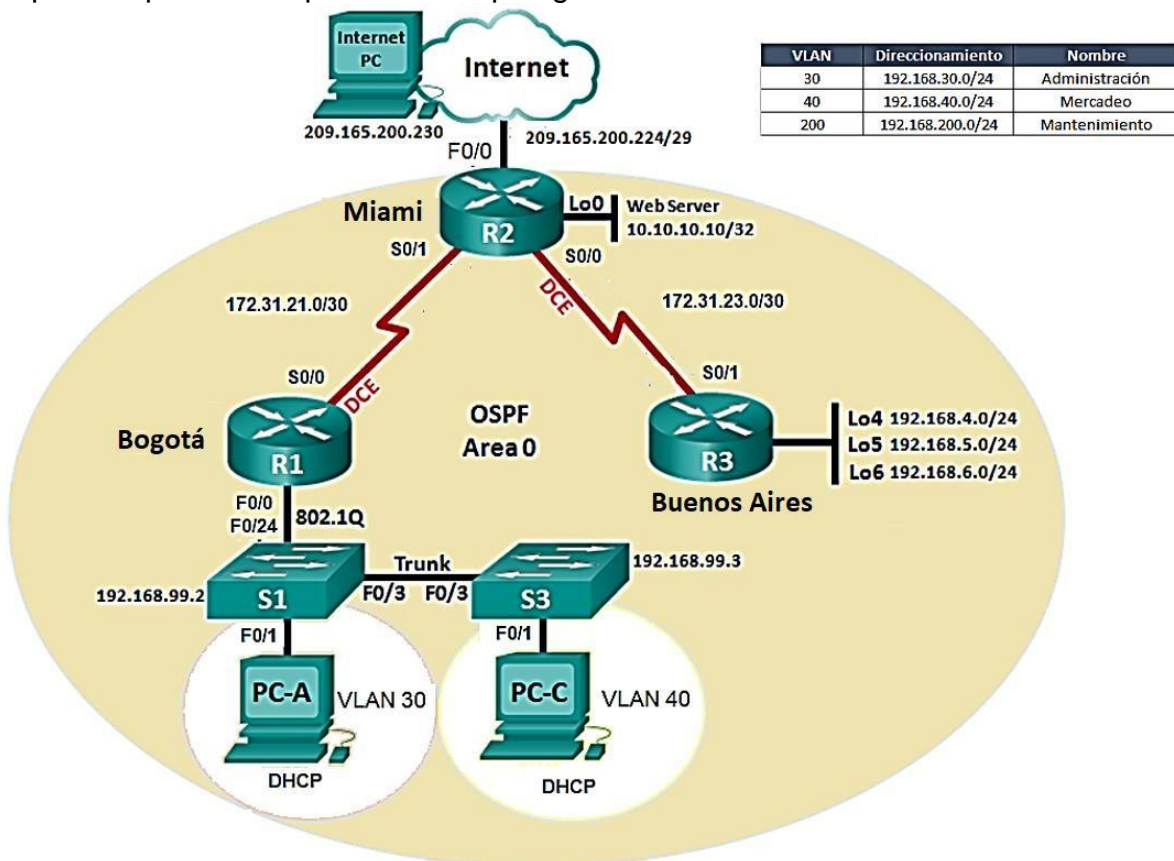
```
interface Serial0/0/1
```

```
ip address 172.29.3.9 255.255.255.252
```

```
ip helper-address 172.29.6.2
```

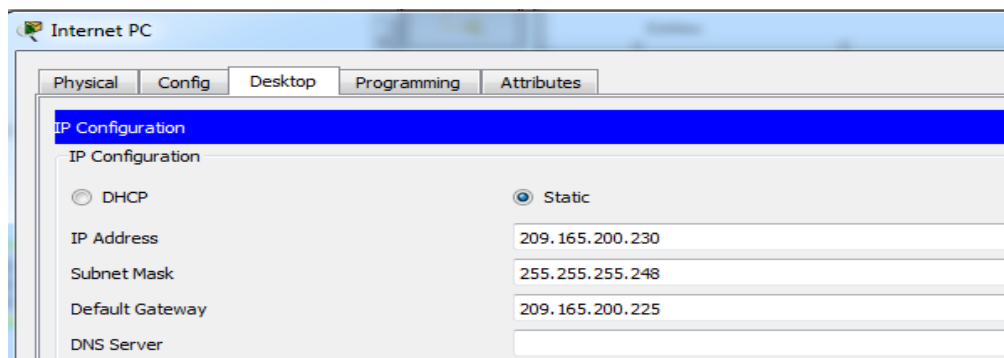
Escenario 2

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.



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

Dispositivo	Interfaz	Dirección IP	Máscara de subred	Gateway predeterminado
R1 (BOGOTA)	S0/0/0 (DCE)	172.31.21.1	255.255.255.252	N/A
	G0/0	192.168.13.1	255.255.255.252	N/A
R2 (MIAMI)	G0/0	209.165.200.225	255.255.255.248	N/A
	G0/1	10.10.10.1	255.255.255.0	N/A
	S0/0/0 (DCE)	172.31.23.1	255.255.255.252	N/A
	S0/0/1	172.31.21.2	255.255.255.252	N/A
R3 (B/AIRES)	S0/0/1	172.31.23.2	255.255.255.252	N/A
	Lo4	192.168.4.1	255.255.255.0	N/A
	Lo5	192.168.5.1	255.255.255.0	N/A
	Lo6	192.168.6.1	255.255.255.0	N/A
Internet PC	NIC	209.165.200.230	255.255.255.248	209.165.200.225
Web Server	Fa0	10.10.10.10	255.255.255.0	10.10.10.1
PC-A	F0/1	DHCP	DHCP	DHCP
PC-C	F0/1	DHCP	DHCP	DHCP



R1 bogota

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname bogota
bogota(config)#int s0/0/0
bogota(config-if)#ip add 172.31.21.1 255.255.255.252
bogota(config-if)#clock rate 64000
bogota(config-if)#no s
bogota(config-if)#no shu
bogota(config-if)#no shutdown
```

R2 miami

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname miami
miami(config)#int g0/1
miami(config-if)#ip add 10.10.10.10 255.255.255.0
miami(config-if)#no shut
miami(config-if)#int s0/0/0
miami(config-if)#ip add 172.31.23.1 255.255.255.252
miami(config-if)#clock rate 64000
miami(config-if)#no shutdown
miami(config-if)#int s0/0/1
miami(config-if)#ip add 172.31.21.2 255.255.255.252
miami(config-if)#no shutdown
miami(config-if)#ip add 209.165.200.225 255.255.255.248
miami(config-if)#no shutdown
```

R3 buenos aires

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname buenosaires
buenosaires(config)#int loop4
buenosaires(config-if)#ip add 192.168.4.1 255.255.255.0
buenosaires(config-if)#no shu
buenosaires(config-if)#no shutdown
buenosaires(config-if)#int loop5
buenosaires(config-if)#
buenosaires(config-if)#ip add 192.168.5.1 255.255.255.0
```

```

buenosaires(config-if)#no shutdown
buenosaires(config-if)#int loop6
buenosaires(config-if)#ip add 192.168.6.1 255.255.255.0
buenosaires(config-if)#no shutdown
buenosaires(config-if)#int s0/0/1
buenosaires(config-if)#ip add 172.31.23.2 255.255.255.252
buenosaires(config-if)#no shutdown

```

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

CONFIGURACIÓN OSPF V2

R1 bogota

```

bogota>en
bogota#conf t
Enter configuration commands, one per line. End with CNTL/Z.
bogota(config)#router ospf 1
bogota(config-router)#router-id 1.1.1.1
bogota(config-router)#network 192.168.99.0 0.0.0.255 area 0
bogota(config-router)#network 172.31.21.0 0.0.0.3 area 0
bogota(config-router)#passive-interface gi0/0
bogota(config-router)#int s0/0/0
bogota(config-if)#bandwidth 128
bogota(config-if)#ip ospf cost 7500
bogota(config-if)#int s0/0/1
bogota(config-if)#bandwidth 128
bogota(config-if)#

```

R2 miami

```
miami>en
miami#conf t
Enter configuration commands, one per line. End with CNTL/Z.
miami(config)#router ospf 1
miami(config-router)#router-id 2.2.2.2
miami(config-router)#network 209.165.200.224 0.0.0.7 area 0
miami(config-router)#network 172.31.21.0 0.0.0.3 area 0
miami(config-router)#network 10.10.10.10 0.0.0.3 area 0
miami(config-router)#passive-interface gi0/0
miami(config-router)#int s0/0/0
miami(config-if)#bandwidth 128
miami(config-if)#ip ospf cost 7500
miami(config-if)#int s0/0/1
miami(config-if)#bandwidth 128
miami(config-if)#
```

R3 buenos aires

```
buenosaires>en
buenosaires#conf t
buenosaires(config)#router ospf 1
buenosaires(config-router)#router-id 3.3.3.3
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)#network 192.168.5.0 0.0.0.255 area 0
buenosaires(config-router)#network 192.168.6.0 0.0.0.255 area 0
buenosaires(config-router)#int s0/0/0
buenosaires(config-if)#bandwidth 128
buenosaires(config-if)#ip ospf cost 7500
buenosaires(config-if)#int s0/0/1
buenosaires(config-if)#bandwidth 128
buenosaires(config-if)#router ospf 1
```

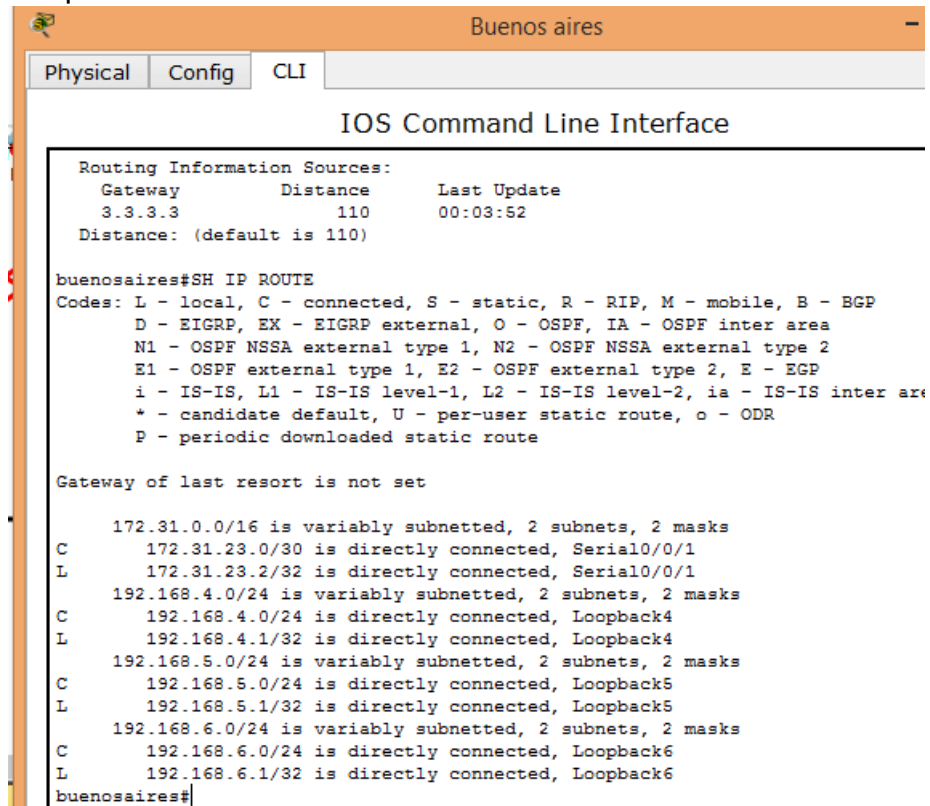
Configuracion web Server

IP Configuration	
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IP Address	10.10.10.10
Subnet Mask	255.255.255.0
Default Gateway	10.10.10.1

Verificar información de OSPF

- Visualizar tablas de enrutamiento y routers conectados por OSPFv2

miami#sh ip route



The screenshot shows a Cisco IOS CLI window titled "Buenos aires". The window has three tabs: "Physical", "Config", and "CLI". The main content area displays the output of the command "SH IP ROUTE".

```
Routing Information Sources:
Gateway          Distance      Last Update
3.3.3.3          110           00:03:52
Distance: (default is 110)

buenosaires#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 not set

    172.31.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       172.31.23.0/30 is directly connected, Serial0/0/1
L       172.31.23.2/32 is directly connected, Serial0/0/1
    192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.4.0/24 is directly connected, Loopback4
L       192.168.4.1/32 is directly connected, Loopback4
    192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.5.0/24 is directly connected, Loopback5
L       192.168.5.1/32 is directly connected, Loopback5
    192.168.6.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.6.0/24 is directly connected, Loopback6
L       192.168.6.1/32 is directly connected, Loopback6
buenosaires#
```

```
Bogota
Physical Config CLI
IOS Command Line Interface
Routing Information Sources:
  Gateway      Distance    Last Update
  1.1.1.1      110        00:03:15
Distance: (default is 110)

bogota#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 not set

172.16.0.0/16 is variably subnetted, 8 subnets, 2 masks
C    172.16.30.0/24 is directly connected, GigabitEthernet0/0.30
L    172.16.30.1/32 is directly connected, GigabitEthernet0/0.30
C    172.16.40.0/24 is directly connected, GigabitEthernet0/0.40
L    172.16.40.1/32 is directly connected, GigabitEthernet0/0.40
C    172.16.150.0/24 is directly connected, GigabitEthernet0/0.150
L    172.16.150.1/32 is directly connected, GigabitEthernet0/0.150
C    172.16.200.0/24 is directly connected, GigabitEthernet0/0.200
L    172.16.200.1/32 is directly connected, GigabitEthernet0/0.200
172.31.0.0/16 is variably subnetted, 2 subnets, 2 masks
C    172.31.21.0/30 is directly connected, Serial0/0/0
L    172.31.21.1/32 is directly connected, Serial0/0/0
bogota#
```

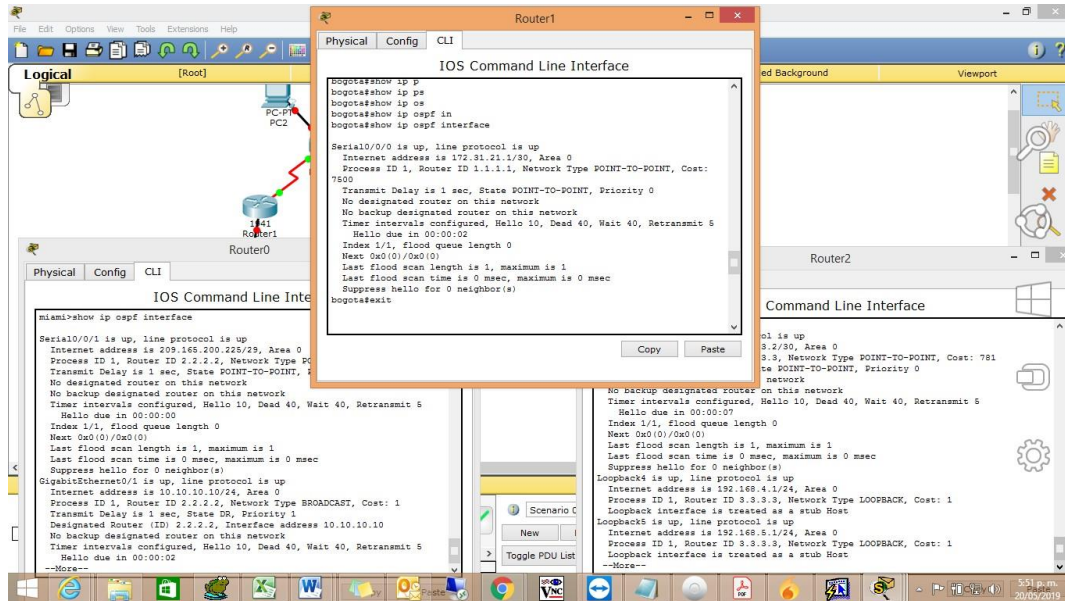
```
Miami
Physical Config CLI
IOS Command Line Interface
10.10.10.8 0.0.0.3 area 0
Passive Interface(s):
  GigabitEthernet0/0
Routing Information Sources:
  Gateway      Distance    Last Update
  2.2.2.2      110        00:02:14
Distance: (default is 110)

miami#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 not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    10.10.10.0/24 is directly connected, GigabitEthernet0/1
L    10.10.10.10/32 is directly connected, GigabitEthernet0/1
172.31.0.0/16 is variably subnetted, 2 subnets, 2 masks
C    172.31.23.0/30 is directly connected, Serial0/0/0
L    172.31.23.1/32 is directly connected, Serial0/0/0
209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C    209.165.200.224/29 is directly connected, Serial0/0/1
L    209.165.200.225/32 is directly connected, Serial0/0/1
miami#
```

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



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

show ip protocols

```

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:
    192.168.99.0 0.0.0.255 area 0
    172.31.21.0 0.0.0.3 area 0
  Passive Interface(s):
    GigabitEthernet0/0
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110           00:27:06
  Distance: (default is 110)

miami>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 2.2.2.2
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    209.165.200.224 0.0.0.7 area 0
    172.31.21.0 0.0.0.3 area 0
    10.10.10.8 0.0.0.3 area 0
  Passive Interface(s):
    GigabitEthernet0/0
  Routing Information Sources:
    Gateway         Distance      Last Update
    2.2.2.2          110           00:25:56
  Distance: (default is 110)

```

```

buenosaires>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 3.3.3.3
  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
    192.168.5.0 0.0.0.255 area 0
    192.168.6.0 0.0.0.255 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    3.3.3.3          110           00:24:08
  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.

Crear vlans S1

```

S1>en
S1#conf t
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

```

Creación vlans S3

```

S3>en
S3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
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

```

Puertos de acceso

```

S1>en
S1#conf t
S1(config)#int fa0/1
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 30

```

```

S3>en
S3#conf t
S3(config)#int fa0/1
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 40

```

Configuracion en R1 bogota

```
bogota>en
bogota#conf t
Enter configuration commands, one per line. End with CNTL/Z.
bogota(config)#interface g0/0.30
bogota(config-subif)#description administracion
bogota(config-subif)#encapsulation dot1q 30
bogota(config-subif)#ip add 172.16.30.1 255.255.255.0
bogota(config-subif)#interface g0/0.40
bogota(config-subif)#description dot1q 40
bogota(config-subif)#encapsulation dot1q 40
bogota(config-subif)#ip add 172.16.40.1 255.255.255.0
bogota(config-subif)#interface g0/0.200
bogota(config-subif)#description dot1q 200
bogota(config-subif)#encapsulation dot1q 200
bogota(config-subif)#ip add 172.16.200.1 255.255.255.0
bogota(config-subif)#no shutdown
```

4. En el Switch 3 deshabilitar DNS lookup

S3(config-vlan)#no ip domain-lookup

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

Configuración S1

```
S1(config)#int vlan 99
S1(config-if)#ip add 192.168.99.2 255.255.255.0
S1(config-if)#no sh
```

Configuración S3

```
S3(config)#int vlan 99
S3(config-if)#ip add 192.168.99.3 255.255.255.0
S3(config-if)#no sh
```

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

Configuración S1

```
S1(config)#int range fa0/2-23
S1(config-if-range)#sh
```

Configuración S3

```
S3(config)#int range fa0/2-24
S3(config-if-range)#sh
```

- Implement DHCP and NAT for IPv4
- Configurar R1 como servidor DHCP para las VLANs 30 y 40.
- 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.

Direcciones excluidas DHCP

```
bogota>en
bogota#conf t
bogota(config)#ip dhcp exc
bogota(config)#ip dhcp excluded-address 192.168.30.2 192.168.30.32
bogota(config)#ip dhcp excluded-address 192.168.40.2 192.168.40.32
```

DHCP POOL

```
bogota(dhcp-config)#ip dhcp pool administracion
bogota(dhcp-config)#dns-server 10.10.10.11
bogota(dhcp-config)#default-router 172.31.30.1
bogota(config)#ip dhcp pool mercadeo
bogota(dhcp-config)#dns-server 10.10.10.11
bogota(dhcp-config)#default-router 172.31.40.1
```

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

```
miami(config)#ip access-list extended administracion
miami(config-ext-nacl)#remark permit local lan to use nat
miami(config-ext-nacl)#permit ip 192.168.30.0 0.0.0.255 any
miami(config-ext-nacl)#permit ip 192.168.40.0 0.0.0.255 any
miami(config-ext-nacl)#ex
miami(config)#ip nat pool miami-local 209.165.200.255 209.168.200.228 netmask
255.255.255.248
miami(config)#ip nat inside source list administracion pool miami-pool
miami(config)#int lo0
miami(config-if)#ip nat inside
miami(config-if)#int s0/0/1
miami(config-if)#ip nat outside
miami(config-if)#
```

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)#access-list 1 per
miami(config)#access-list 1 permit 192.168.99.0 0.0.0.255
miami(config)#access-list 2 deny 192.168.30.0 0.0.0.255
```

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 ip 192.168.4.0 0.0.0.255 any
miami(config)#access-list 100 deny ip 192.168.5.0 0.0.0.255 any
miami(config)#
```

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

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>ping 192.168.4.1

Pinging 192.168.4.1 with 32 bytes of data:

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

Ping statistics for 192.168.4.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>tracert 192.168.4.1

Tracing route to 192.168.4.1 over a maximum of 30 hops:

  0  *         *         *         Request timed out.
  1  *         *         *         Request timed out.
  2  *         *         *         Request timed out.
  3  *         *         *         Request timed out.
  4  *         *         |

```

```
bogota>en
bogota#traceroute 209.165.200.255
Type escape sequence to abort.
Tracing the route to 209.165.200.255
```

```
  0  *         *         *
  1  *         *         *
  2  *         *         *
  3  *         *         *
  4  *         *         *
  5  *

```

CONCLUSIONES

Se colocó en práctica los diferentes protocolos de routing disponibles para cada una de las necesidades de la red

Mediante la configuración de las listas de acceso, permite o deniega el acceso de hosts a algunos recursos ofrecidos en red.

Se logró una satisfactoria conexión, configuración y simulación de los dispositivos de las redes en los correspondientes casos de estudio.

Se entendió los pasos básicos para la configuración de un dispositivo de red, en estos se debe hacer un aseguramiento del equipo con el fin de garantizar un mínimo de seguridad sobre el acceso a la red.

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