DIPLOMADO DE PROFUNDIZACION CISCO – 203092_34

PRUEBAS DE HABILIDADES PRACTICAS CCNA

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TABLA DE CONTENIDO

INTRODUCCIÓN

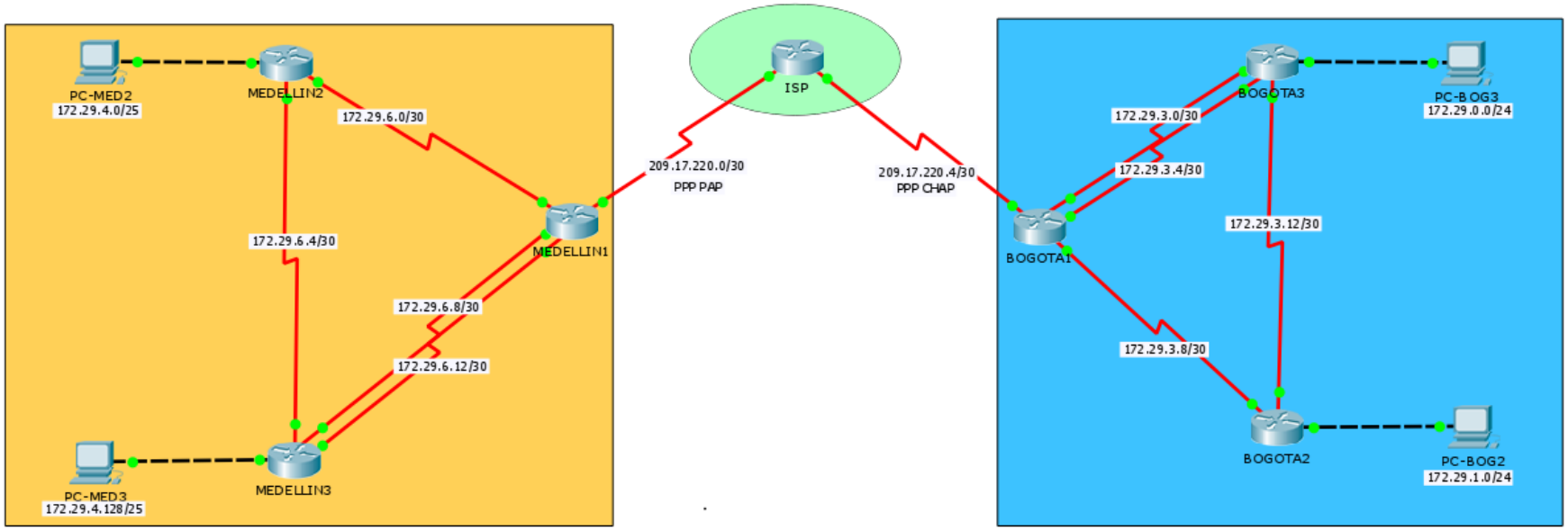
Es necesario colocar a prueba nuestras habilidades para saber el grado de experiencia que hemos adquirido durante el curso y las temáticas vistas, esto nos permite tener la experiencia suficiente para resolver problemas relacionados con Switching y Routering con dispositivos CISCO.

Esta Prueba de habilidades practicas nos evaluara y medirá el grado de conocimiento y competencias que hemos logrado adquirir en temas realacionados a configuración de equipos CISCO (switchs y Routers) y análisis de problemas en redes generando solución a todos los inconvenientes de conectividad de datos.

Este trabajo contiene 2 escenarios en los cuales debemos crear en Packet Tracer la red planteada en la guia, colocar puesta en marcha y dejar funcional todo el sistema, esto tiene como objetivo afianzar conocimientos teóricos e implementar la experiencia adquirida a lo largo del curso en resolución de problemas.

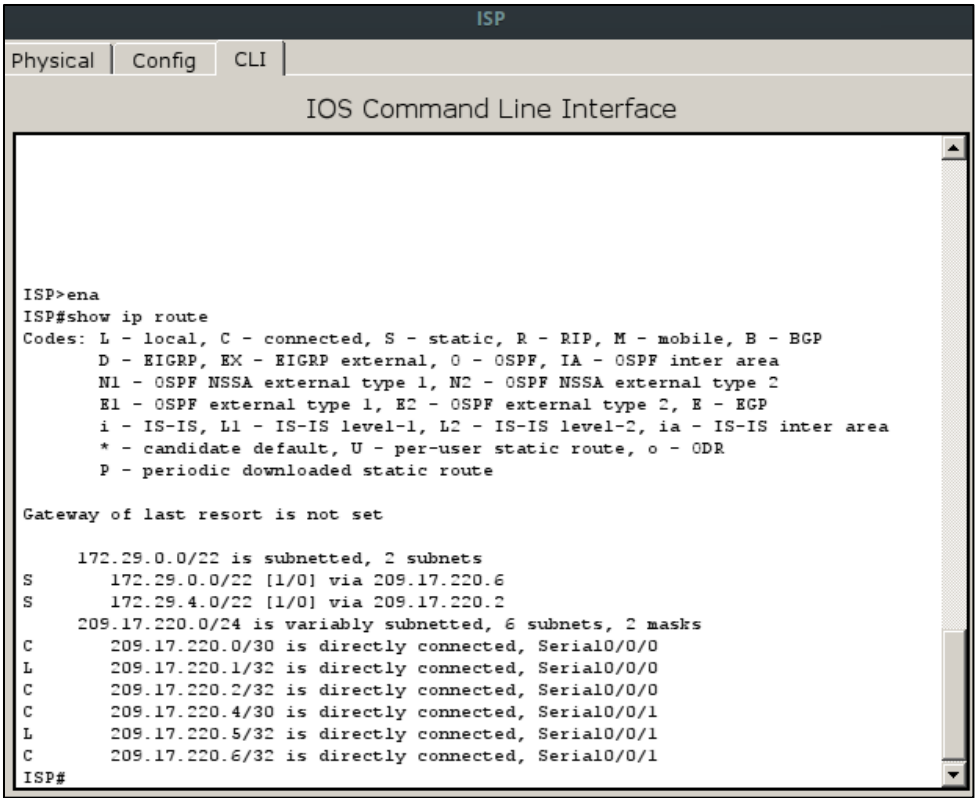
ESCENARIO 1

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.



CONFIGURACIÓN ISP

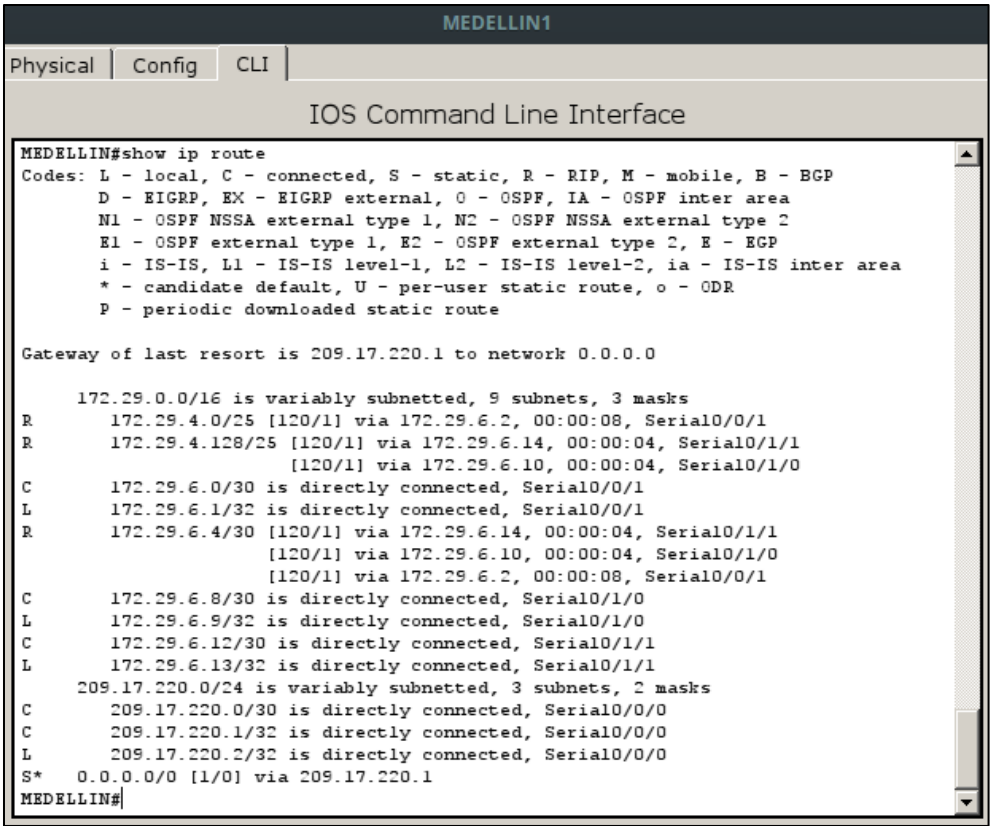
```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.5 255.255.255.252
Router(config-if)#exit
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.1 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Router(config-if)#int s0/0/1
Router(config-if)#ip address 209.17.220.5 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
```



CONFIGURACION MEDELLIN1

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.2 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

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

Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.1 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#int s0/1/1
Router(config-if)#ip address 172.29.6.9 255.255.255.252
```

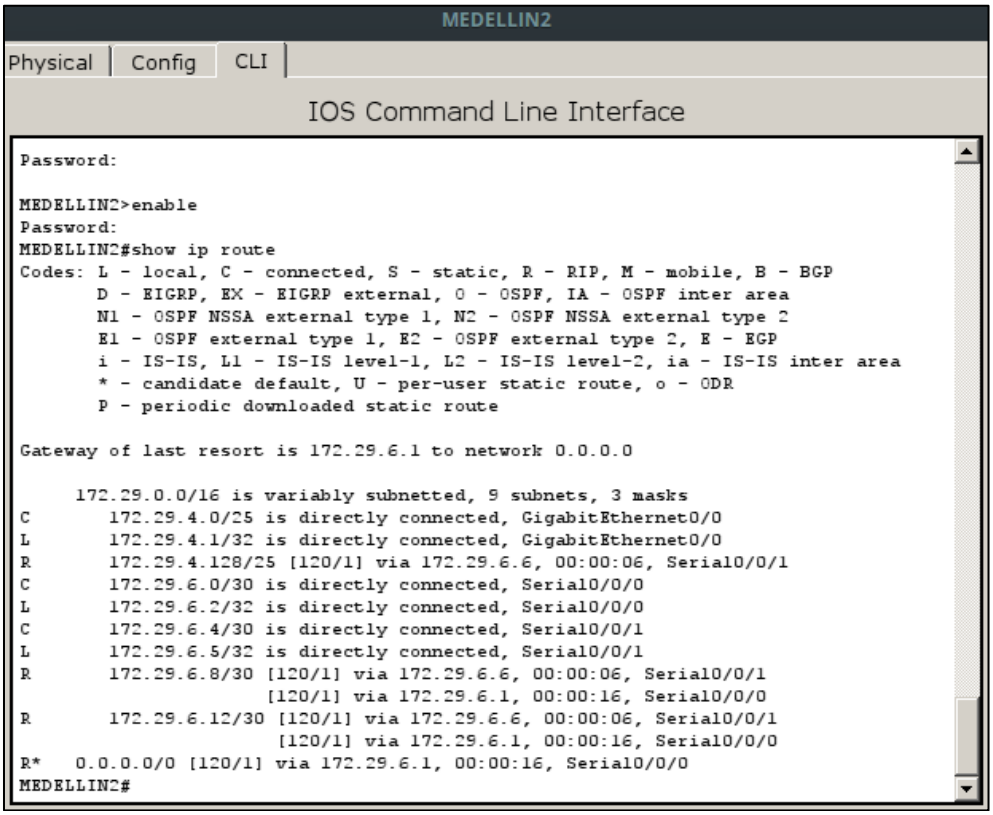
```
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to administratively
down
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.6.13 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to administratively
down
Router(config-if)#
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.6.9 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#
Router(config-if)#int s0/1/1
Router(config-if)#ip address 172.29.6.13 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown
```



CONFIGURACION MEDELLIN 2

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.6.2 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

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

Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.2 255.255.255.252
% 172.29.6.0 overlaps with Serial0/0/0
Router(config-if)#ip address 172.29.6.5 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown
```

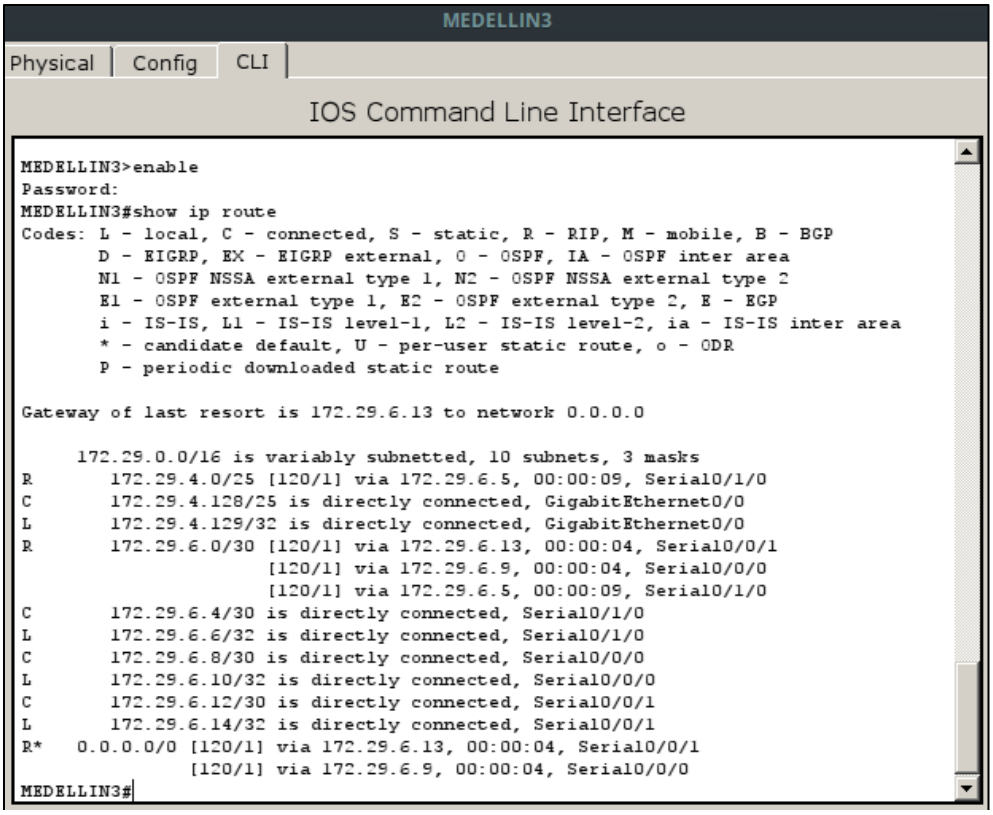
```
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.4.1 255.255.255.128
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
```



CONFIGURACION MEDELLIN 3

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.6.10 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

Router(config-if)#int s0/0/1
```

```
Router(config-if)#ip address 172.29.6.14 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

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

Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.6.6 255.255.255.252
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

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

Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.4.129 255.255.255.128
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
```



CONFIGURACION BOGOTA1

```
Router>enable
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.6 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

Router(config-if)#int s0/0/1
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state
to up

Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.9 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.3.1 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#int s0/1/1
Router(config-if)#ip address 172.29.3.5 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#
```

BOGOTA1

Physical | Config | CLI

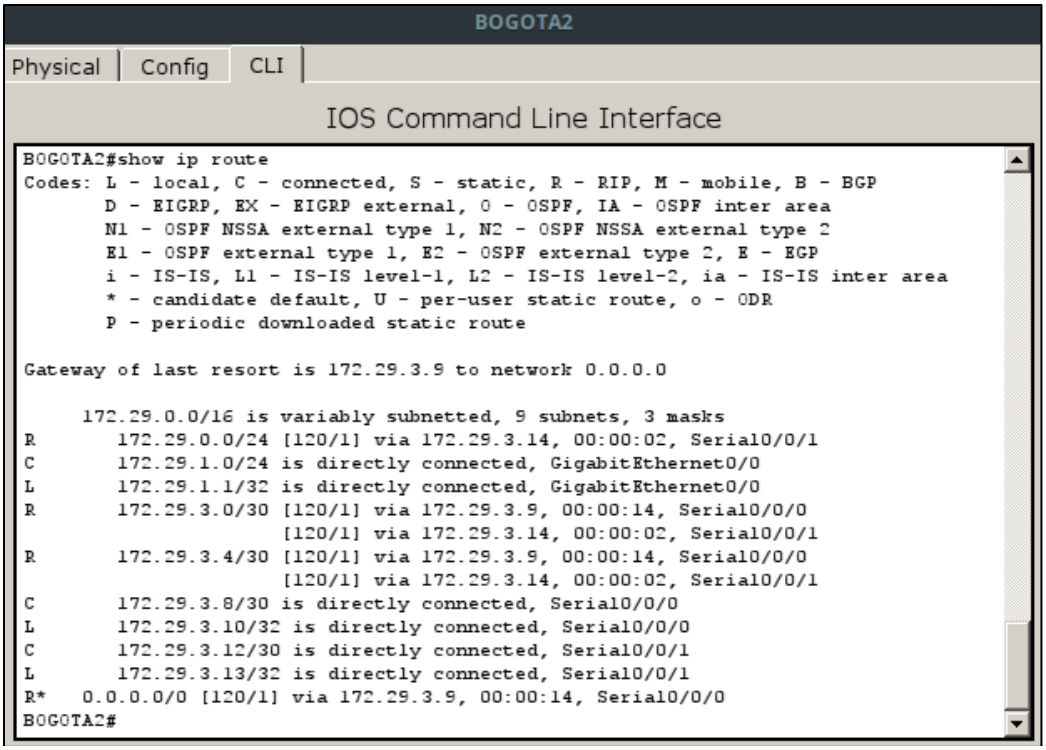
IOS Command Line Interface

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

Gateway of last resort is 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, 00:00:04, Serial0/1/1
                      [120/1] via 172.29.3.2, 00:00:04, Serial0/1/0
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, Serial0/1/0
L       172.29.3.1/32 is directly connected, Serial0/1/0
C       172.29.3.4/30 is directly connected, Serial0/1/1
L       172.29.3.5/32 is directly connected, Serial0/1/1
C       172.29.3.8/30 is directly connected, Serial0/0/1
L       172.29.3.9/32 is directly connected, Serial0/0/1
R       172.29.3.12/30 [120/1] via 172.29.3.10, 00:00:06, Serial0/0/1
                       [120/1] via 172.29.3.6, 00:00:04, Serial0/1/1
                       [120/1] via 172.29.3.2, 00:00:04, Serial0/1/0
     209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
C       209.17.220.4/30 is directly connected, Serial0/0/0
C       209.17.220.5/32 is directly connected, Serial0/0/0
L       209.17.220.6/32 is directly connected, Serial0/0/0
S*   0.0.0.0/0 [1/0] via 209.17.220.5
BOGOTA#
```

CONFIGURACION BOGOTA 2

```
Router>enable
```

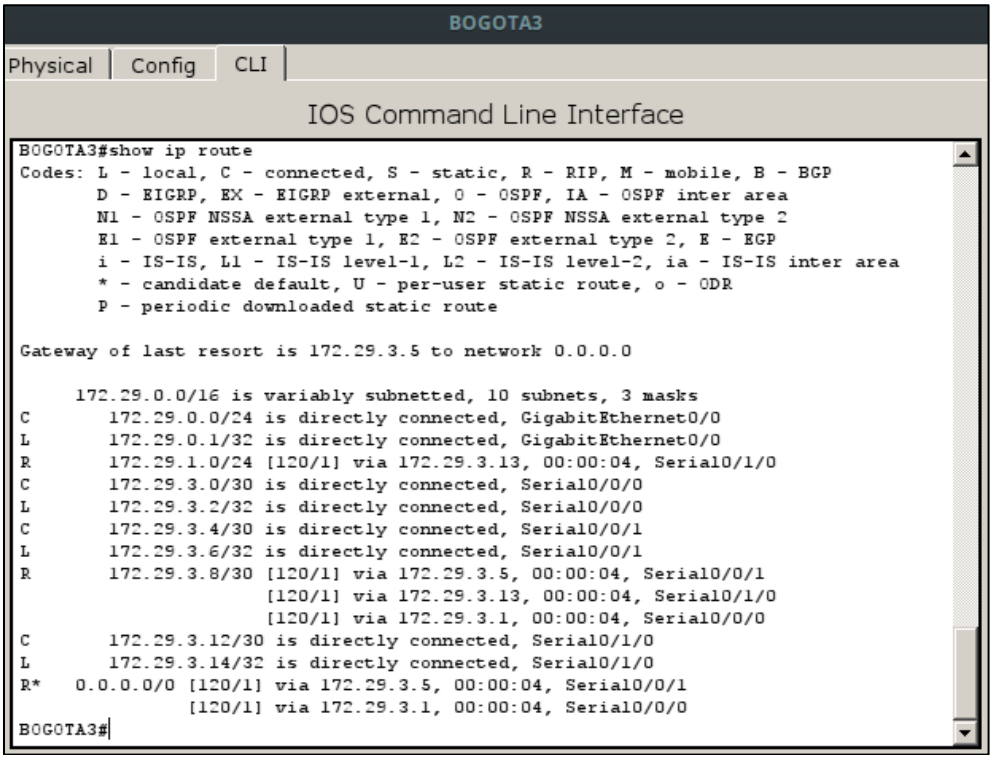
```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.3.10 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

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

Router(config-if)#int s0/0/1
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.13 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown
Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.1.1 255.255.255.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed
state to up
```



CONFIGURACION BOGOTA 3

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.3.2 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

Router(config-if)#int s0/0/0
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state
to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.6 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

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

```
Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.0.1 255.255.255.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed
state to up
Router(config)#int s0/1/0
Router(config-if)#ip address 172.29.3.14 255.255.255.252
Router(config-if)#no shutdown
```



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 fisica de los equipos con base en la topología de red**

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

```
MEDELLIN#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#no ip domain-lookup
MEDELLIN(config)#service password-encryption
MEDELLIN(config)#enable secret class
MEDELLIN(config)#banner motd #Acceso Restringido#
MEDELLIN(config)#line con 0
MEDELLIN(config-line)#password cisco
MEDELLIN(config-line)#login
MEDELLIN(config-line)#line vty 0 4
MEDELLIN(config-line)#password cisco
MEDELLIN(config-line)#login
MEDELLIN(config-line)#

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#service password-encryption
Router(config)#enable secret class
Router(config)#banner motd #Acceso Restringido#
Router(config)#line con 0
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#line vty 0 4
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#hostname MEDELLIN2
MEDELLIN2(config)#

Router>enable
Router#configure terminal
```

```
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#service password-encryption
Router(config)#enable secret class
Router(config)#banner motd #Acceso Restringido#
Router(config)#line con 0
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#line vty 0 4
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#hostname MEDELLIN3
MEDELLIN3(config)#

BOGOTA(config)#no ip domain-lookup
BOGOTA(config)#service password-encryption
BOGOTA(config)#enable secret class
BOGOTA(config)#banner motd #Acceso Restringido#
BOGOTA(config)#line con 0
BOGOTA(config-line)#password cisco
BOGOTA(config-line)#login
BOGOTA(config-line)#line vty 0 4
BOGOTA(config-line)#password cisco
BOGOTA(config-line)#login
BOGOTA(config-line)#

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#service password-encryption
Router(config)#enable secret class
Router(config)#banner motd #Acceso Restringido#
Router(config)#line con 0
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#line vty 0 4
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#hostname BOGOTA2
BOGOTA2(config)#

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
```

```
Router(config)#service password-encryption
Router(config)#enable secret class
Router(config)#banner motd #Acceso Restringido#
Router(config)#line con 0
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#line vty 0 4
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#hostname BOGOTA3
BOGOTA3(config)#
```

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.

RIP MEDELLIN1

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show 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
Router(config-router)#network 172.29.6.0
Router(config-router)#network 172.29.6.8
Router(config-router)#network 172.29.6.12
Router(config-router)#passive-interface s0/0/0
```

RIP MEDELLIN2

```
Router>enable
Router#configure terminañ
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
C 172.29.4.0/25 is directly connected, GigabitEthernet0/0
C 172.29.6.0/30 is directly connected, Serial0/0/0
C 172.29.6.4/30 is directly connected, Serial0/0/1
Router(config-router)#network 172.29.4.0
Router(config-router)#network 172.29.6.0
Router(config-router)#network 172.29.6.4
Router(config-router)#passive-interface g0/0
Router(config-router)#
```

RIP MEDELLIN3

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
C 172.29.4.128/25 is directly connected, GigabitEthernet0/0
C 172.29.6.4/30 is directly connected, Serial0/1/0
C 172.29.6.8/30 is directly connected, Serial0/0/0
C 172.29.6.12/30 is directly connected, Serial0/0/1
Router(config-router)#network 172.29.4.128
Router(config-router)#network 172.29.6.4
Router(config-router)#network 172.29.6.8
Router(config-router)#network 172.29.6.12
Router(config-router)#passive-interface g0/0
Router(config-router)#
```

RIP BOGOTA 1

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
C 172.29.3.0/30 is directly connected, Serial0/1/0
C 172.29.3.4/30 is directly connected, Serial0/1/1
C 172.29.3.8/30 is directly connected, Serial0/0/1
C 209.17.220.4/30 is directly connected, Serial0/0/0
Router(config-router)#network 172.29.3.0
Router(config-router)#network 172.29.3.4
Router(config-router)#network 172.29.3.8
Router(config-router)#passive-interface s0/0/0
Router(config-router)#
```

RIP BOGOTA 2

```
Router(config-router)#exit
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show 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
Router(config-router)#network 172.29.1.0
Router(config-router)#network 172.29.3.8
Router(config-router)#network 172.29.3.12
Router(config-router)#passive-interface g0/0
Router(config-router)#
```

RIP BOGOTA 3

```
Router(config-if)#exit
```

```
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
C 172.29.3.0/30 is directly connected, Serial0/0/0
C 172.29.3.4/30 is directly connected, Serial0/0/1
C 172.29.3.12/30 is directly connected, Serial0/1/0
Router(config-router)#network 172.29.0.0
Router(config-router)#network 172.29.3.0
Router(config-router)#network 172.29.3.4
Router(config-router)#network 172.29.3.12
Router(config-router)#passive-interface g0/0
Router(config-router)#
```

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

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.1
Router(config)#router rip
Router(config-router)#default-information originate
Router(config-router)#
```

BOGOTA 1

```
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.5
Router(config)#router rip
Router(config-router)#default-information originate
Router(config-router)#
```

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.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 172.29.4.0 255.255.252.0 209.17.220.2
Router(config)#ip route 172.29.0.0 255.255.252.0 209.17.220.6
Router(config)#
```

Parte 2: Tabla de Enrutamiento.

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

MEDELLIN 1

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

Gateway of last resort is 209.17.220.1 to network 0.0.0.0

172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R 172.29.4.0/25 [120/1] via 172.29.6.2, 00:00:16, Serial0/0/1
R 172.29.4.128/25 [120/1] via 172.29.6.10, 00:00:00, Serial0/1/0
[120/1] via 172.29.6.14, 00:00:00, 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 172.29.6.10, 00:00:00, Serial0/1/0
[120/1] via 172.29.6.14, 00:00:00, Serial0/1/1
[120/1] via 172.29.6.2, 00:00:16, Serial0/0/1
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, 2 subnets, 2 masks
```

BOGOTA 1

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

Gateway of last resort is 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, 00:00:02, Serial0/1/1
[120/1] via 172.29.3.2, 00:00:02, Serial0/1/0
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, Serial0/1/0
L 172.29.3.1/32 is directly connected, Serial0/1/0
C 172.29.3.4/30 is directly connected, Serial0/1/1
L 172.29.3.5/32 is directly connected, Serial0/1/1
C 172.29.3.8/30 is directly connected, Serial0/0/1
L 172.29.3.9/32 is directly connected, Serial0/0/1
R 172.29.3.12/30 [120/1] via 172.29.3.10, 00:00:06, Serial0/0/1
[120/1] via 172.29.3.6, 00:00:02, Serial0/1/1
[120/1] via 172.29.3.2, 00:00:02, Serial0/1/0
209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C 209.17.220.4/30 is directly connected, Serial0/0/0
```

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

MEDELLIN3

```
R 172.29.6.0/30 [120/1] via 172.29.6.9, 00:00:07, Serial0/0/0
[120/1] via 172.29.6.13, 00:00:07, Serial0/0/1
[120/1] via 172.29.6.5, 00:00:20, Serial0/1/0
```

```
R* 0.0.0.0/0 [120/1] via 172.29.6.13, 00:00:07, Serial0/0/1
[120/1] via 172.29.6.9, 00:00:07, Serial0/0/0
```

BOGOTA 3

```
R 172.29.3.8/30 [120/1] via 172.29.3.5, 00:00:22, Serial0/0/1
[120/1] via 172.29.3.1, 00:00:22, Serial0/0/0
[120/1] via 172.29.3.13, 00:00:28, Serial0/1/0

R* 0.0.0.0/0 [120/1] via 172.29.3.5, 00:00:22, Serial0/0/1
[120/1] via 172.29.3.1, 00:00:22, Serial0/0/0
```

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

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 172.29.4.0 255.255.252.0 209.17.220.2
Router(config)#ip route 172.29.0.0 255.255.252.0 209.17.220.6
```

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

Parte 4: Verificación del protocolo RIP.

a. 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.

MEDELLIN 1

```
Router(config-router)#network 172.29.6.0
Router(config-router)#network 172.29.6.8
Router(config-router)#network 172.29.6.12
Router(config-router)#passive-interface s0/0/0
```

MEDELLIN 2

```
Router(config-router)#network 172.29.4.0
Router(config-router)#network 172.29.6.0
Router(config-router)#network 172.29.6.4
Router(config-router)#passive-interface g0/0
Router(config-router)#
```

MEDELLIN 3

```
Router(config-router)#network 172.29.4.128
Router(config-router)#network 172.29.6.4
Router(config-router)#network 172.29.6.8
Router(config-router)#network 172.29.6.12
Router(config-router)#passive-interface g0/0
```

BOGOTA 1

```
Router(config-router)#network 172.29.3.0
Router(config-router)#network 172.29.3.4
Router(config-router)#network 172.29.3.8
Router(config-router)#passive-interface s0/0/0
```

BOGOTA 2

```
Router(config-router)#network 172.29.1.0
Router(config-router)#network 172.29.3.8
Router(config-router)#network 172.29.3.12
Router(config-router)#passive-interface g0/0
```

BOGOTA 3

```
Router(config-router)#network 172.29.0.0
Router(config-router)#network 172.29.3.0
Router(config-router)#network 172.29.3.4
Router(config-router)#network 172.29.3.12
Router(config-router)#passive-interface g0/0
```

Parte 5: Configurar encapsulamiento y autenticación PPP.

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

MEDDELLIN 1

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN
MEDELLIN(config)#username ISP password cisco
MEDELLIN(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state
to down

MEDELLIN(config)#int s0/0/0
MEDELLIN(config-if)#encapsulation ppp
MEDELLIN(config-if)#ppp authentication pap
MEDELLIN(config-if)#ppp pap sent-username MEDELLIN password cisco
MEDELLIN(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state
to up
```

ISP

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname ISP
ISP(config)#username MEDELLIN password cisco
ISP(config)#int s0/0/0
ISP(config-if)#encapsulation ppp
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state
to down

ISP(config-if)#ppp authentication pap
ISP(config-if)#ppp pap ?
sent-username Set outbound PAP username
ISP(config-if)#ppp pap sent-username ISP password cisco
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state
to u
```

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

```
ISP(config-if)#exit
ISP(config)#username BOGOTA password cisco
ISP(config)#int s0/0/1
ISP(config-if)#encapsulation ppp

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

ISP(config-if)#ppp authentication chap

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

ISP(config-if)#exit
ISP(config)#exit
ISP#
%SYS-5-CONFIG_I: Configured from console by console
```

Parte 6: Configuración de PAT.

a. 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.

MEDELLIN 1

```
MEDELLIN>enable
MEDELLIN#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#ip nat inside source list 1 interface s0/0/0 overload
MEDELLIN(config)#access-list 1 permit 172.29.4.0 0.0.3.255
MEDELLIN(config)#int s0/0/0
MEDELLIN(config-if)#ip nat outside
MEDELLIN(config-if)#int s0/0/1
MEDELLIN(config-if)#ip nat inside
MEDELLIN(config-if)#int s0/1/1
MEDELLIN(config-if)#ip nat inside
MEDELLIN(config-if)#
```

BOGOTA 1

```
BOGOTA# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#ip nat inside source list 1 interface s0/0/0 overload
BOGOTA(config)#access-list 1 permit 172.29.0.0 0.0.3.255
BOGOTA(config)#int s0/0/0
BOGOTA(config-if)#ip nat outside
BOGOTA(config-if)#int s0/0/1
BOGOTA(config-if)#ip nat inside
BOGOTA(config-if)#int s0/1/0
BOGOTA(config-if)#ip nat inside
BOGOTA(config-if)#int s0/1/1
BOGOTA(config-if)#ip nat inside
BOGOTA(config-if)#
```

b. 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.

```
BOGOTA#show ip nat translations
Pro Inside global Inside local Outside local Outside global
icmp 209.17.220.6:21 172.29.0.6:21 209.17.220.5:21 209.17.220.5:21
icmp 209.17.220.6:22 172.29.0.6:22 209.17.220.5:22 209.17.220.5:22
icmp 209.17.220.6:23 172.29.0.6:23 209.17.220.5:23 209.17.220.5:23
icmp 209.17.220.6:24 172.29.0.6:24 209.17.220.5:24 209.17.220.5:24
```

Parte 7: Configuración del servicio DHCP.

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

MEDELLIN2

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp excluded-address 172.29.4.1 172.29.4.5
Router(config)#ip dhcp excluded-address 172.29.4.129 172.29.4.133
Router(config)#ip dhcp pool MEDELLIN2
Router(dhcp-config)#network 172.29.4.0 255.255.255.128
Router(dhcp-config)#default-router 172.29.4.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#exit
Router(config)#ip dhcp pool MEDELLIN3
Router(dhcp-config)#network 172.29.4.128 255.255.255.128
Router(dhcp-config)#default-router 172.29.4.129
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#exit
```

MEDELLIN3

```
Router>enable
Router#configure terminal
```

```
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int g0/0
Router(config-if)#ip helper-address 172.29.6.5
```

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

BOGOTA 2

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp excluded-address 172.29.1.1 172.29.1.5
Router(config)#ip dhcp excluded-address 172.29.0.1 172.29.0.5
Router(config)#ip dhcp pool BOGOTA2
Router(dhcp-config)#network 172.29.1.0 255.255.255.0
Router(dhcp-config)#default-router 172.29.1.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ip dhcp pool BOGOTA3
Router(dhcp-config)#network 172.29.0.0 255.255.255.0
Router(dhcp-config)#default-router 172.29.0.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#
```

BOGOTA 3

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int g0/0
Router(config-if)#ip helper-address 172.29.3.13
Router(config-if)#
```

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

CONFIGURACIÓN ISP

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.5 255.255.255.252
Router(config-if)#exit
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.1 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down

Router(config-if)#int s0/0/1
Router(config-if)#ip address 209.17.220.5 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
```

CONFIGURACION MEDELLIN1

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.2 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

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

Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.1 255.255.255.252
Router(config-if)#clock rate 4000000
```

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

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down

Router(config-if)#int s0/1/1
Router(config-if)#ip address 172.29.6.9 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to administratively
down
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.6.13 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to administratively
down

Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.6.9 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#
Router(config-if)#int s0/1/1
Router(config-if)#ip address 172.29.6.13 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
```

MEDELLIN 2

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.6.2 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

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

Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.2 255.255.255.252
% 172.29.6.0 overlaps with Serial0/0/0
Router(config-if)#ip address 172.29.6.5 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#
Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.4.1 255.255.255.128
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
```

MEDELLIN 3

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.6.10 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.14 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
```

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

Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.6.6 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

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

Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.4.129 255.255.255.128
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
```

CONFIGURACION BOGOTA1

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.6 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

Router(config-if)#int s0/0/1

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

Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.9 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#
Router(config-if)#int s0/1/0
```

```
Router(config-if)#ip address 172.29.3.1 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#int s0/1/1
Router(config-if)#ip address 172.29.3.5 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#
```

CONFIGURACION BOGOTA 2

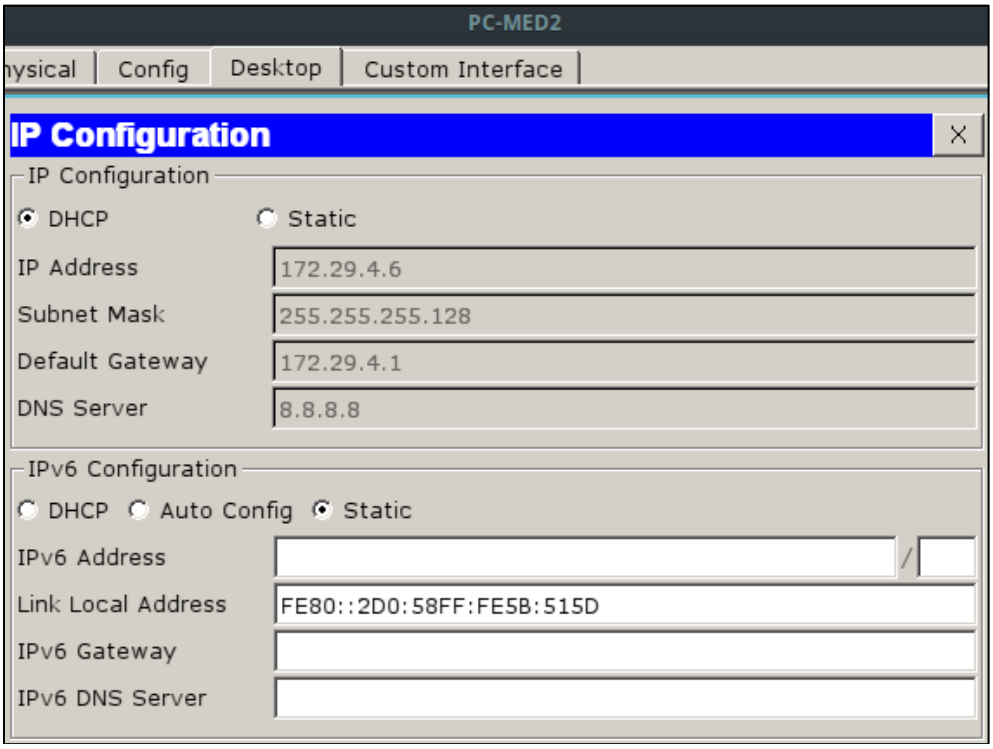
```
Router>
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.3.10 255.255.255.252
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

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

Router(config-if)#int s0/0/1
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.13 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown
Router(config-if)#int g0/0
Router(config-if)#clock rate 4000000

Router(config-if)#ip address 172.29.1.1 255.255.255.0
Router(config-if)#no shutdown
```

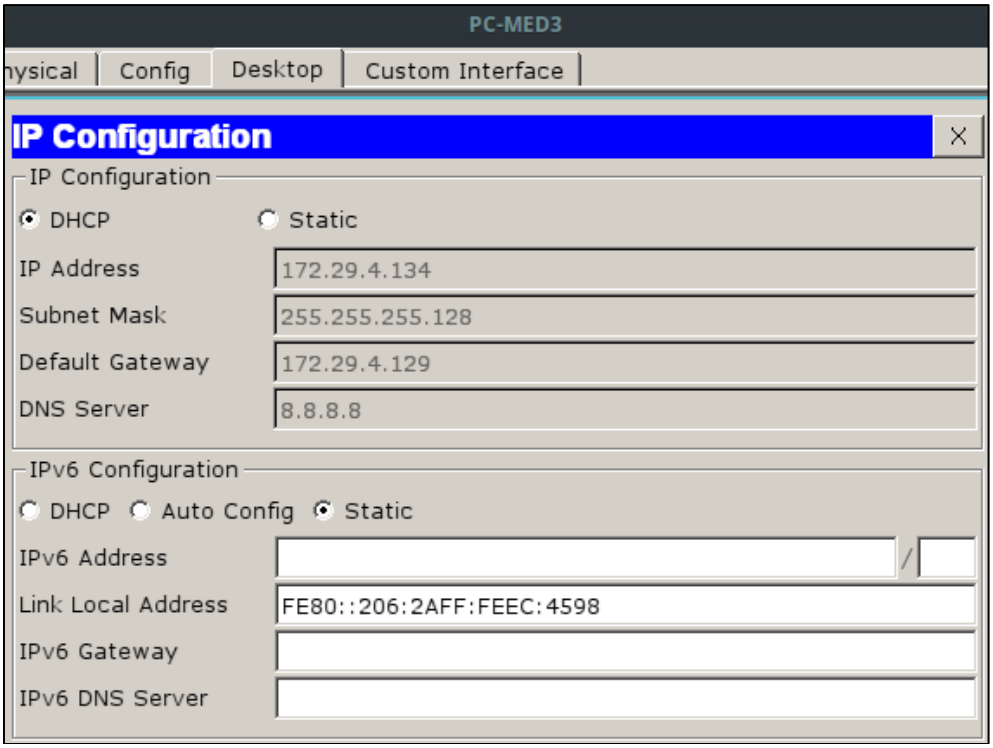
```
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed
state to up
```

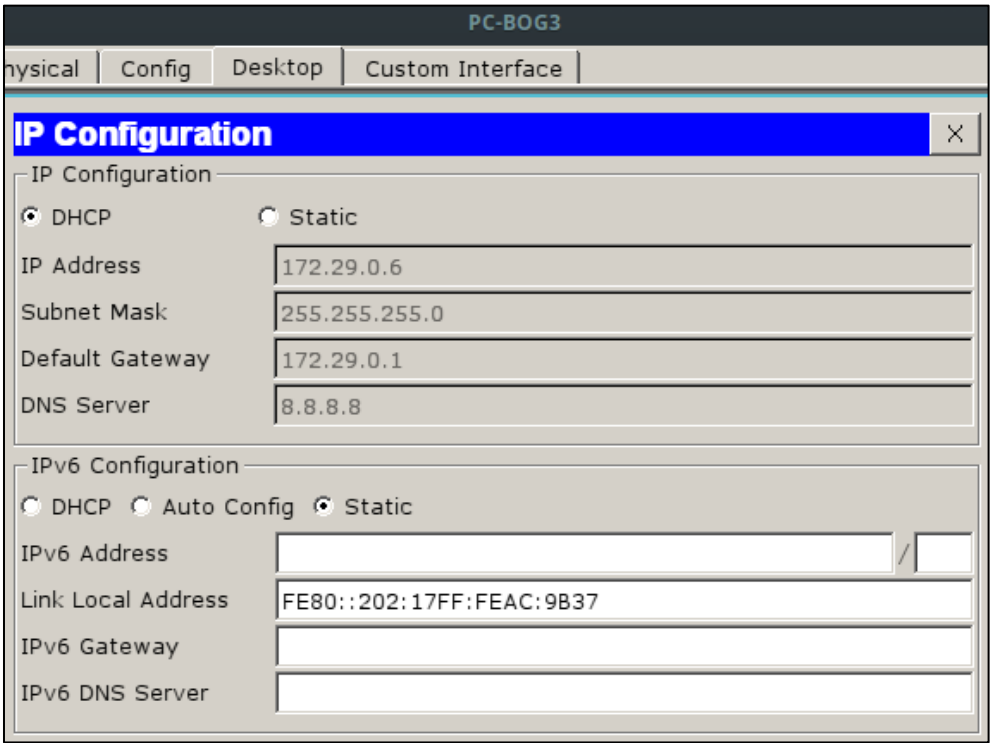
BOGOTA 3

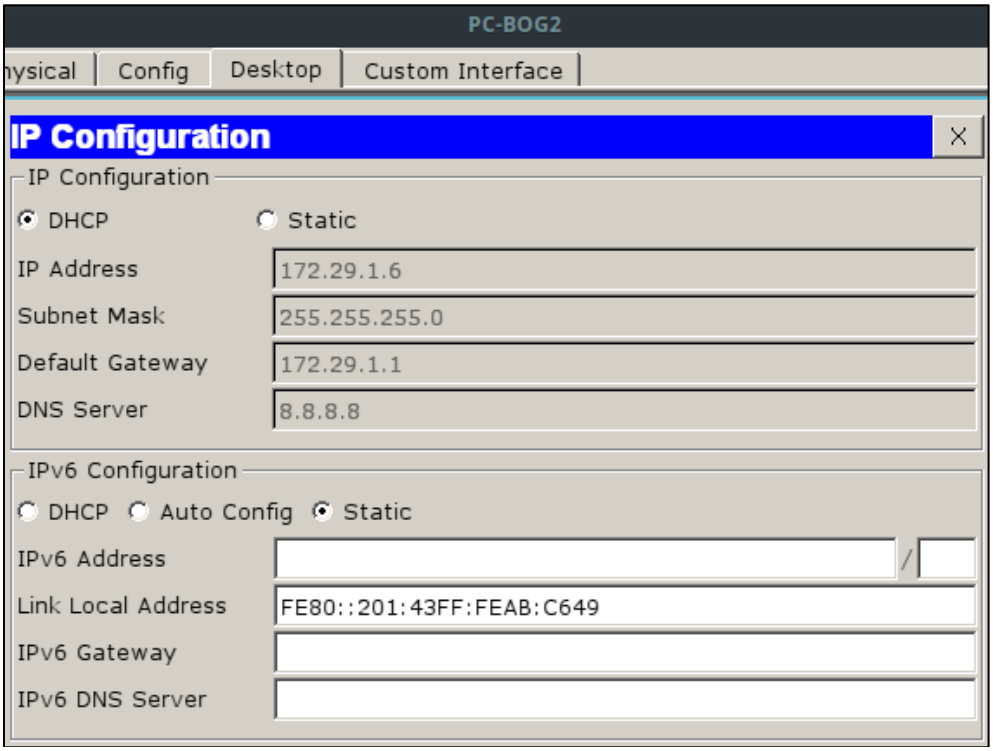
```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.3.2 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

Router(config-if)#int s0/0/0
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state
to up

Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.6 255.255.255.252
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

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

Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.0.1 255.255.255.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed
state to up
```

CONFIGURACION EQUIPOS PC



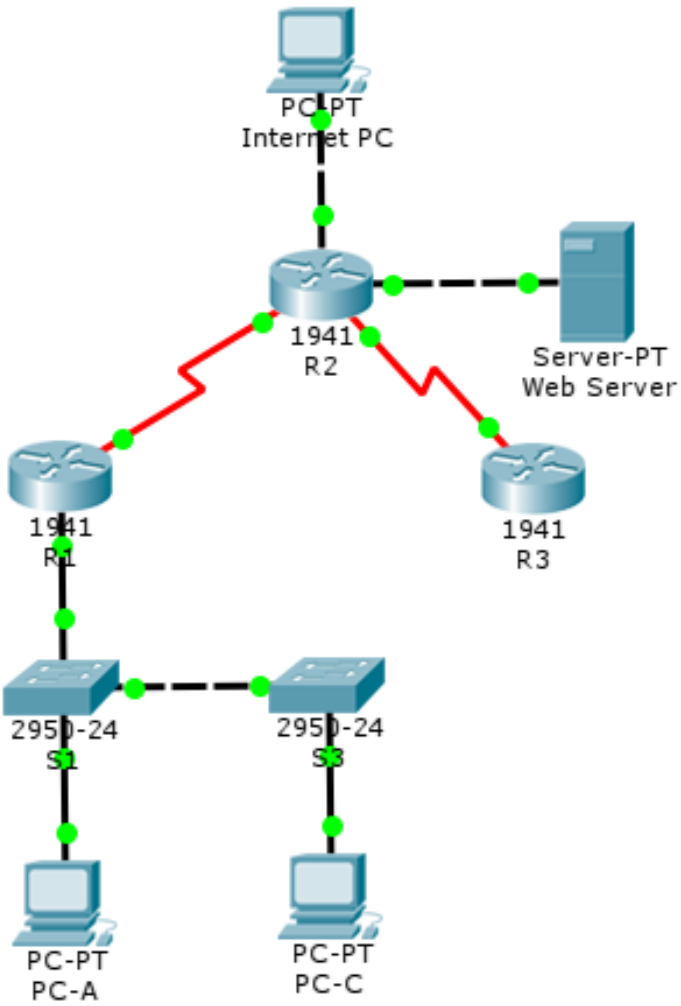



PC-BOG3
nysical
Config
Desktop
Custom Interface
IP Configuration
IP Configuration
DHCP
Static
IP Address
172.29.0.6
Subnet Mask
255.255.255.0
Default Gateway
172.29.0.1
DNS Server
8.8.8.8
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::202:17FF:FEAC:9B37
IPv6 Gateway
IPv6 DNS Server


PC-BOG2
nysical
Config
Desktop
Custom Interface
IP Configuration
IP Configuration
DHCP
Static
IP Address
172.29.1.6
Subnet Mask
255.255.255.0
Default Gateway
172.29.1.1
DNS Server
8.8.8.8
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::201:43FF:FEAB:C649
IPv6 Gateway
IPv6 DNS Server

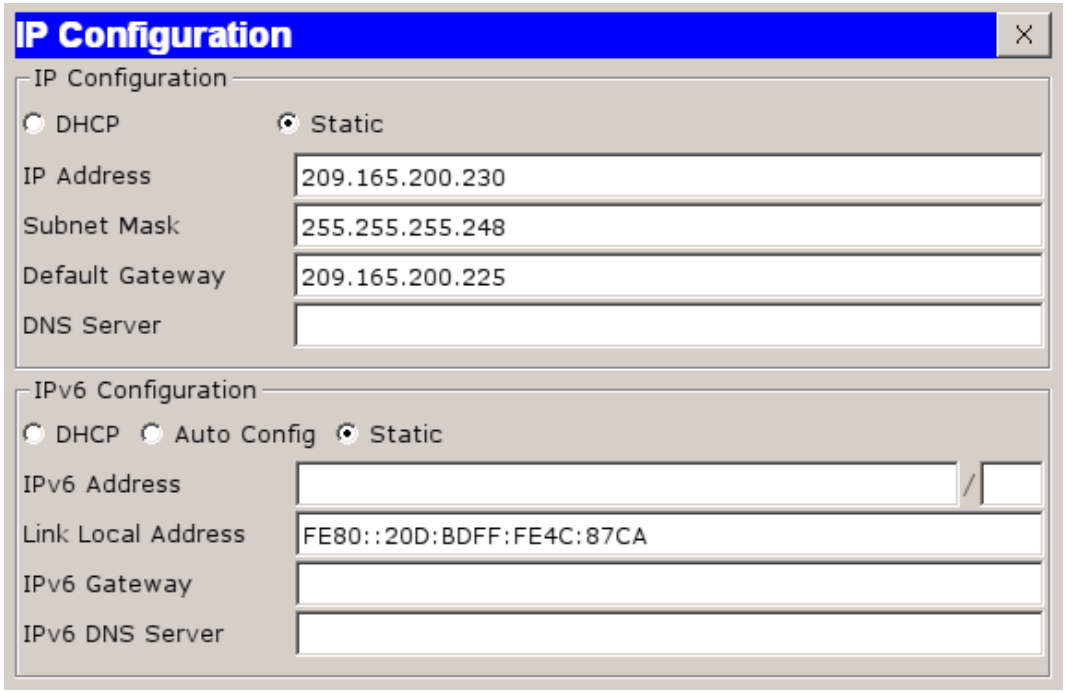
ESCENARIO 2

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



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

CONFIGURACION INTERNET PC

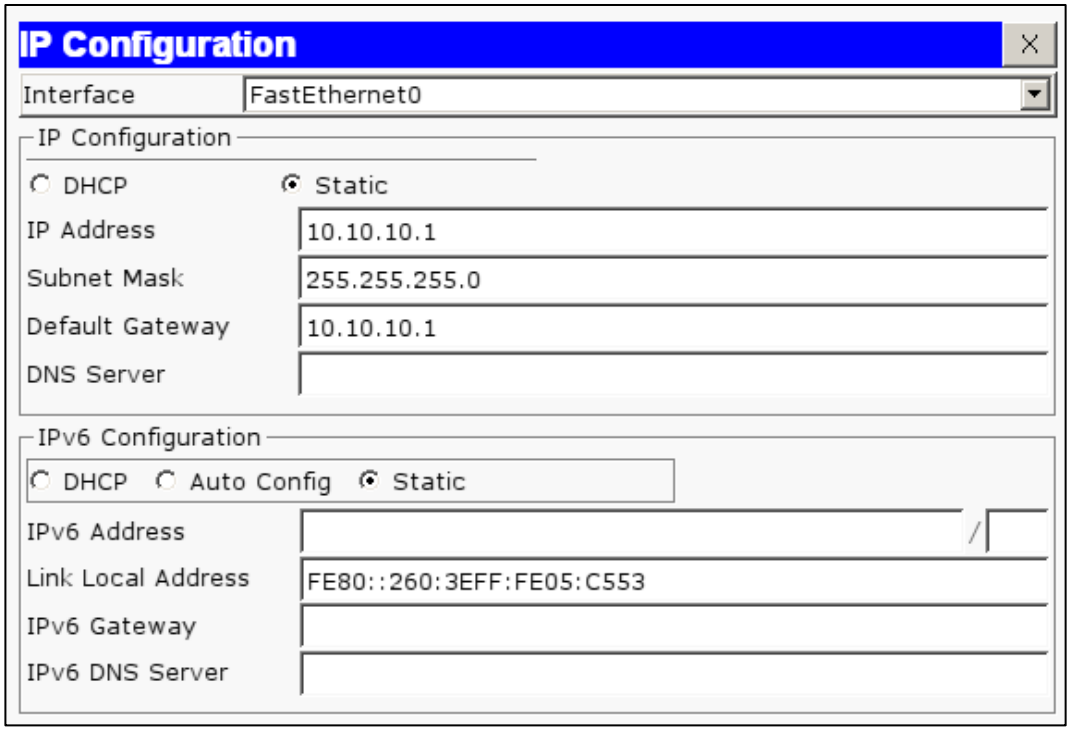


CONFIGURACION R2

```
R2>enable
R2#configure terminal
R2(config)#no ip domain-lookup
R2(config)#enable secret class
R2(config)#line console 0
R2(config-line)#password cisco
R2(config-line)#login
R2(config-line)#line vty 0 4
R2(config-line)#password cisco
R2(config-line)#login
R2(config-line)#exit
```

```
R2(config)#service password-encryption
R2(config)#banner motd *Prohibido el Acceso a personal no Autorizado*

R2(config)#interface s0/0/0
R2(config-if)#description Conexion con R3
R2(config-if)#ip address 172.31.23.1 255.255.255.252
R2(config-if)#clock rate 128000
R2(config-if)#no shutdown


R2(config-if)#interface s0/0/1
R2(config-if)#description Conexion con R1
R2(config-if)#ip address 172.31.21.2 255.255.255.252
R2(config-if)#no shutdown


R2(config-if)#interface g0/1
R2(config-if)#description Conexion PC Internet
R2(config-if)#ip address 209.165.200.225 255.255.255.248
R2(config-if)#no shutdown


R2(config-if)#interface g0/0
R2(config-if)#description Conexion con Web Server
R2(config-if)#ip address 10.10.10.1 255.255.255.0
R2(config-if)#no shutdown

R2(config-if)#exit
R2(config)#ip route 0.0.0.0 0.0.0.0 g0/1
```

CONFIGURACION WEB SERVER



CONFIGURACION R1

```
R1>enable
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#no ip domain lookup
R1(config)#enable secret class
R1(config)#line console 0
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#line vty 0 4
R1(config-line)#password class
R1(config-line)#login
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#banner motd *Prohibido el Acceso a personal no Autorizado*

R1(config)#interface s0/0/0
R1(config-if)#description Conexion con R2
R1(config-if)#ip address 172.31.21.1 255.255.255.252
R1(config-if)#clock rate 128000
```

```
R1(config-if)#no shutdown
R1(config)#ip route 0.0.0.0 0.0.0.0 s0/0/0

R1(config)#interface g0/0.30
R1(config-subif)#description ADMINISTRACION LAN
R1(config-subif)#encapsulation dot1Q 30
R1(config-subif)#ip address 192.168.30.1 255.255.255.0

R1(config)#interface g0/0.40
R1(config-subif)#description MERCADEO LAN
R1(config-subif)#encapsulation dot1Q 40
R1(config-subif)#ip address 192.168.40.1 255.255.255.0

R1(config)#interface g0/0.200
R1(config-subif)#description MANTENIMIENTO LAN
R1(config-subif)#encapsulation dot1Q 200
R1(config-subif)#ip address 192.168.200.1 255.255.255.0

R1(config)#interface g0/0
R1(config-if)#no shutdown
```

CONFIGURACION R3

```
R3>enable
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#no ip domain-lookup
R3(config)#enable secret class
R3(config)#line console 0
R3(config-line)#password cisco
R3(config-line)#login
R3(config-line)#line vty 0 4
R3(config-line)#password cisco
R3(config-line)#login
R3(config-line)#exit
R3(config)#service password-encryption
R3(config)#banner motd *Prohibido el Acceso a personal no Autorizado*
```

```
R3(config)#interface s0/0/1
R3(config-if)#description Conexion con R2
R3(config-if)#ip address 172.31.23.2 255.255.255.252
R3(config-if)#no shutdown

R3(config-if)#interface loopback 4
R3(config-if)#ip address 192.168.4.1 255.255.255.0
R3(config-if)#no shutdown

R3(config-if)#interface loopback 5
R3(config-if)#ip address 192.168.5.1 255.255.255.0
R3(config-if)#no shutdown

R3(config-if)#interface loopback 6
R3(config-if)#ip address 192.168.6.1 255.255.255.0
R3(config-if)#no shutdown

R3(config-if)#exit
R3(config)#ip route 0.0.0.0 0.0.0.0 s0/0/1
```

CONFIGURACION S1

```
S1>enable
S1#configure terminal
S1(config)#no ip domain-lookup
S1(config)#enable secret class
S1(config)#line console 0
S1(config-line)#password cisco
S1(config-line)#login
S1(config-line)#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 *Prohibido el Acceso a personal no autorizado*
```

CONFIGURACION S3

```
S3>enable
S3#configure terminal
S3(config)#no ip domain-lookup
S3(config)#enable secret class
S3(config)#line console 0
S3(config-line)#password cisco
S3(config-line)#login
S3(config-line)#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 *Prohibido el Acceso a personal no autorizado*
```

- 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

R1

```
R1(config)#router ospf 1
R1(config-router)#router-id 1.1.1.1
```

```
R1(config-router)#network 172.31.21.0 0.0.0.3 area 0
R1(config-router)#Network 192.168.30.0 0.0.0.255 area 0
R1(config-router)#Network 192.168.40.0 0.0.0.255 area 0
R1(config-router)#Network 192.168.200.0 0.0.0.255 area 0
R1(config-router)#passive-interface g0/0.30
R1(config-router)#passive-interface g0/0.40
R1(config-router)#passive-interface g0/0.200
R1(config-router)#exit
R1(config)#interface s0/0/0
R1(config-if)#bandwidth 128
R1(config-if)#ip ospf cost 7500
```

R2

```
R2>enable
R2#configure terminal
R2(config)#router ospf 1
R2(config-router)#router-id 2.2.2.2
R2(config-router)#Network 172.31.21.0 0.0.0.3 area 0
R2(config-router)#Network 172.31.21.0 0.0.0.3 area 0
R2(config-router)#Network 172.31.23.0 0.0.0.3 area 0
R2(config-router)#Network 10.10.10.0 0.0.0.255 area 0
R2(config-router)#passive-interface g0/0

R2(config)#interface s0/0/0
R2(config-if)#bandwidth 128
R2(config-if)#ip ospf cost 7500

R2(config)#interface s0/0/1
R2(config-if)#bandwidth 128
```

R3

```
R3>enable
R3#configure terminal
R3(config)#router ospf 1
R3(config-router)#router-id 3.3.3.3
R3(config-router)#Network 172.31.23.0 0.0.0.3 area 0
R3(config-router)#Network 192.168.4.0 0.0.3.255 area 0
```

```
R3(config-router)#Passive-interface lo4
R3(config-router)#Passive-interface lo5
R3(config-router)#Passive-interface lo6

R3(config)#interface s0/0/1
R3(config-if)#bandwidth 128
```

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

S1

```
S1>enable
S1#configure terminal
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#show vlan

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                 Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                 Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                 Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                 Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                 Fa0/21, Fa0/22, Fa0/23, Fa0/24
30   ADMINISTRACION                    active
40   MERCADEO                          active
200  MANTENIMIENTO                     active
1002 fddi-default                      act/unsup
1003 token-ring-default                act/unsup
1004 fddinet-default                   act/unsup
1005 trnet-default                     act/unsup

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
30   enet  100030     1500  -      -      -        -    -        0      0
40   enet  100040     1500  -      -      -        -    -        0      0
200  enet  100200     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

Remote SPAN VLANs
------------------------------------------------------------------------------


Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
```

```
S1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#interface vlan 200
S1(config-if)#ip address 192.168.200.2 255.255.255.0
S1(config-if)#ip default-gateway 192.168.200.1
S1(config-if)#no shutdown

S1(config)#interface f0/3
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1

S1(config)#interface f0/24
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1

S1(config)#interface range f0/2, f0/4-23
```

```
S1(config-if-range)#switchport mode access

S1(config)#interface f0/1
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 30
```

S3

```
S3>enable
Password:
S3#configure terminal
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

S3(config)#interface vlan 200
S3(config-if)#ip address 192.168.200.3 255.255.255.0
S3(config-if)#ip default-gateway 192.168.200.1
S3(config-if)#no shutdown

S3(config-if)#interface f0/3
S3(config-if)#switchport mode trunk
S3(config-if)#switchport trunk native vlan 1

S3(config-if)#interface range f0/2, f0/4-24
S3(config-if-range)#switchport mode access

S3(config)#interface f0/1
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 40
```

- En el Switch 3 deshabilitar DNS lookup

```
S3>enable
S3#configure terminal
```

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

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

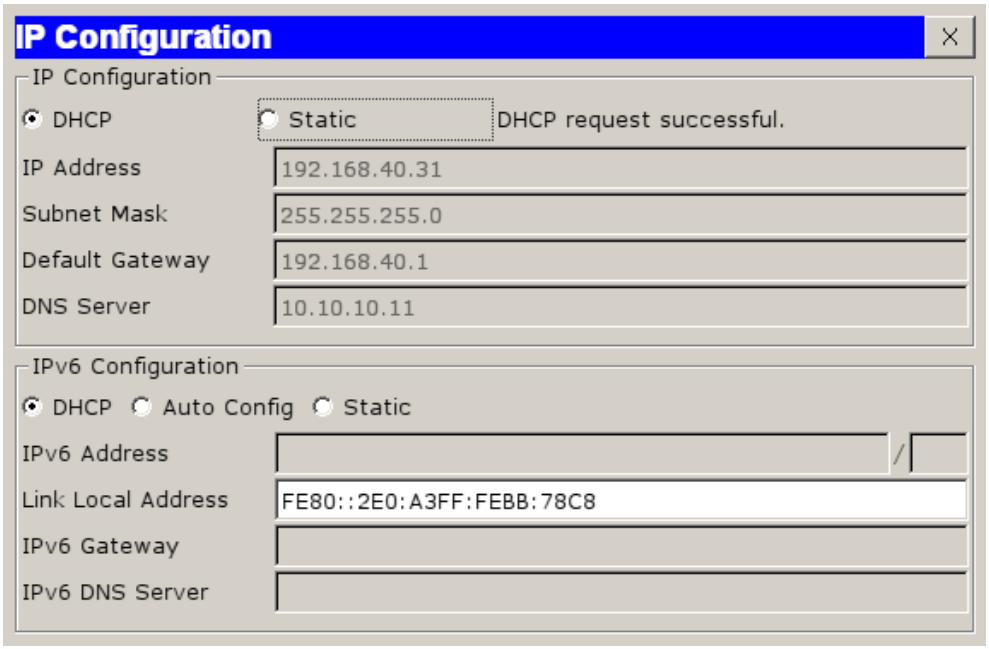
S1

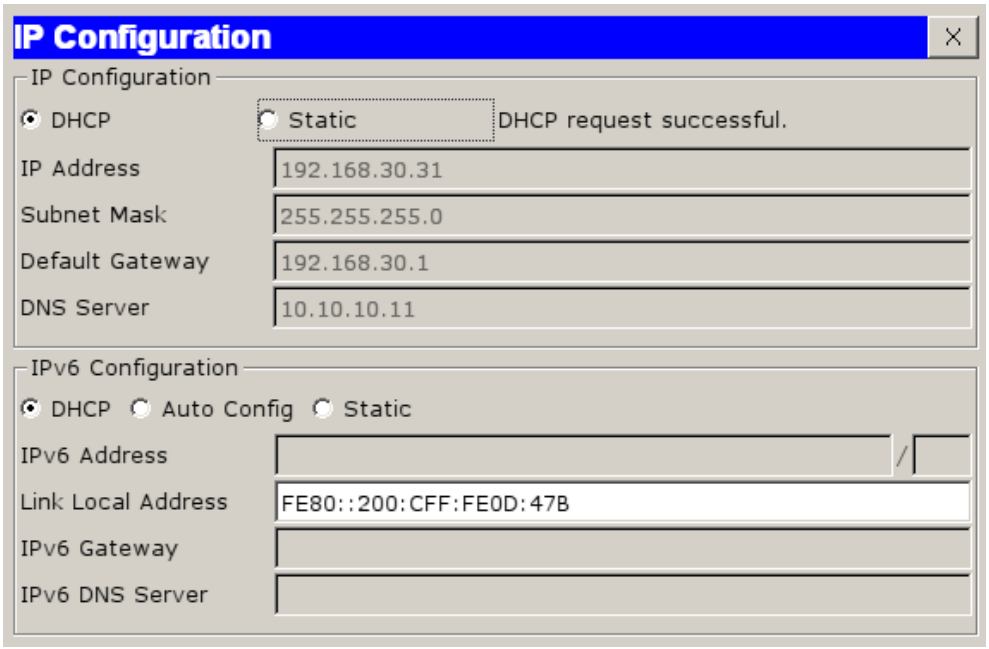
```
S1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#interface range f0/2, f0/4-23
S1(config-if-range)#shutdown
```

S3

```
S3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#interface range f0/2, f0/4-24
S3(config-if-range)#shutdown
```

- 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.

```
R1>enable
R1#configure terminal
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30

R1(config)#ip dhcp pool ADMINISTRACION
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#network 192.168.30.0 255.255.255.0

R1(config)#ip dhcp pool MERCADEO
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#network 192.168.40.0 255.255.255.0
```

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

```
R2>enable
R2#configure terminal
R2(config)#user webuser privilege 15 secret cisco12345
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.229
R2(config)#interface g0/1
R2(config-if)#ip nat outside

R2(config)#interface g0/0
```

```
R2(config-if)#ip nat inside
R2(config-if)#access-list 1 permit 192.168.30.0 0.0.0.255
R2(config-if)#access-list 1 permit 192.168.40.0 0.0.0.255
R2(config-if)#access-list 1 permit 192.168.4.0 0.0.3.255

R2(config)#Ip nat pool INTERNET 209.165.200.225 209.165.200.228 netmask
255.255.255.248
R2(config)#ip nat inside source list 1 pool INTERNET

R2(config)#ip Access-list standard ADMIN-MANTENIMIENTO
R2(config-std-nacl)#permit host 172.31.21.1

R2(config)#line vty 0 4
R2(config-line)#access-class ADMIN-MANTENIMIENTO in
R2(config)#access-list 101 permit tcp any host 209.165.229.230 eq www
R2(config)#access-list 101 permit icmp any any echo-reply

R2(config)#interface g0/1
R2(config-if)#ip access-group 101 in
R2(config-if)#exit

R2(config)#interface g0/0
R2(config-if)#ip access-group 101 out
R2(config-if)#exit

R2(config)#interface s0/0/0
R2(config-if)#ip access-group 101 out
R2(config-if)#exit

R2(config)#interface s0/0/1
R2(config-if)#ip access-group 101 out
```

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

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	PC-A	PC-C	ICMP		0.000	N	0
	Successful	PC-C	PC-A	ICMP		0.000	N	1
	Successful	PC-A	R1	ICMP		0.000	N	2
	Successful	R1	PC-A	ICMP		0.000	N	3
	Successful	PC-C	R1	ICMP		0.000	N	4
	Successful	R1	PC-C	ICMP		0.000	N	5
	Successful	PC-A	Internet PC	ICMP		0.000	N	6
	Successful	PC-C	Internet PC	ICMP		0.000	N	7
	Successful	PC-A	Web Server	ICMP		0.000	N	8
	Successful	PC-C	Web Server	ICMP		0.000	N	9
	Successful	R2	PC-A	ICMP		0.000	N	10
	Successful	PC-A	R2	ICMP		0.000	N	11
	Successful	R2	PC-C	ICMP		0.000	N	12
	Successful	PC-C	R2	ICMP		0.000	N	13

```
Packet Tracer PC Command Line 1.0
PC>ipconfig

FastEthernet0 Connection:(default port)

   Link-local IPv6 Address.....: FE80::2E0:A3FF:FEBB:78C8
   IP Address.....: 192.168.40.31
   Subnet Mask.....: 255.255.255.0
   Default Gateway.....: 192.168.40.1

PC>ping 192.168.30.31

Pinging 192.168.30.31 with 32 bytes of data:

Reply from 192.168.30.31: bytes=32 time=26ms TTL=127
Reply from 192.168.30.31: bytes=32 time=0ms TTL=127
Reply from 192.168.30.31: bytes=32 time=0ms TTL=127
Reply from 192.168.30.31: bytes=32 time=0ms TTL=127

Ping statistics for 192.168.30.31:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 26ms, Average = 6ms
```

```
PC>ipconfig

FastEthernet0 Connection:(default port)

   Link-local IPv6 Address.....: FE80::2E0:A3FF:FEBB:78C8
   IP Address.....: 192.168.40.31
   Subnet Mask.....: 255.255.255.0
   Default Gateway.....: 192.168.40.1

PC>ping 172.31.21.2

Pinging 172.31.21.2 with 32 bytes of data:

Reply from 172.31.21.2: bytes=32 time=2ms TTL=254
Reply from 172.31.21.2: bytes=32 time=1ms TTL=254
Reply from 172.31.21.2: bytes=32 time=10ms TTL=254
Reply from 172.31.21.2: bytes=32 time=2ms TTL=254

Ping statistics for 172.31.21.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 10ms, Average = 3ms
```

```
Packet Tracer PC Command Line 1.0
PC>ipconfig

FastEthernet0 Connection:(default port)

   Link-local IPv6 Address.....: FE80::200:CFF:FE0D:47B
   IP Address.....: 192.168.30.31
   Subnet Mask.....: 255.255.255.0
   Default Gateway.....: 192.168.30.1

PC>ping 192.168.40.31

Pinging 192.168.40.31 with 32 bytes of data:

Reply from 192.168.40.31: bytes=32 time=11ms TTL=127
Reply from 192.168.40.31: bytes=32 time=12ms TTL=127
Reply from 192.168.40.31: bytes=32 time=8ms TTL=127
Reply from 192.168.40.31: bytes=32 time=10ms TTL=127

Ping statistics for 192.168.40.31:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 8ms, Maximum = 12ms, Average = 10ms
```

```
PC>ipconfig

FastEthernet0 Connection:(default port)

   Link-local IPv6 Address.....: FE80::200:CFF:FE0D:47B
   IP Address......................: 192.168.30.31
   Subnet Mask.....................: 255.255.255.0
   Default Gateway.................: 192.168.30.1

PC>ping 172.31.21.2

Pinging 172.31.21.2 with 32 bytes of data:

Reply from 172.31.21.2: bytes=32 time=2ms TTL=254
Reply from 172.31.21.2: bytes=32 time=1ms TTL=254
Reply from 172.31.21.2: bytes=32 time=1ms TTL=254
Reply from 172.31.21.2: bytes=32 time=2ms TTL=254

Ping statistics for 172.31.21.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

TRACEROUTE

```
PC>tracert 172.31.21.2

Tracing route to 172.31.21.2 over a maximum of 30 hops:

  1    1 ms      0 ms      13 ms     192.168.40.1
  2    11 ms     13 ms     0 ms      172.31.21.2

Trace complete.

PC>tracert 192.168.30.31

Tracing route to 192.168.30.31 over a maximum of 30 hops:

  1    1 ms      0 ms      0 ms      192.168.40.1
  2    0 ms      13 ms     0 ms      192.168.30.31

Trace complete.
```

```
PC>tracert 172.31.21.2

Tracing route to 172.31.21.2 over a maximum of 30 hops:

  1    0 ms      0 ms      0 ms      192.168.30.1
  2    0 ms      0 ms      1 ms      172.31.21.2

Trace complete.

PC>tracert 192.168.40.31

Tracing route to 192.168.40.31 over a maximum of 30 hops:

  1    1 ms      0 ms      0 ms      192.168.30.1
  2    0 ms      0 ms      0 ms      192.168.40.31

Trace complete.
```

CONCLUSIONES

Al finalizar este trabajo se observan todas las destrezas y conocimientos adquiridos con las habilidades desarrolladas a lo largo de este Diplomado, las herramientas del curso y apoyo con los compañeros de grupo fueron pilares fundamentales para finalizar con éxito el curso, podemos observar como nuestras habilidades son mejores de cuando iniciamos el primer trabajo colaborativo y la seguridad y confianza es lo suficiente para poder crear y administrar una red con elementos de CISCO dando los parámetros de seguridad, generar direccionamiento IPv4 e IPv6 de manera automática por DHCP o de forma fija, validar accesos de routers a otros, permitir accesos a determinadas redes, etc., también podemos estar seguros de que podemos usar el programa de simulación de Packet Tracer y tener los conocimientos suficientes para poder analizar el paso de los paquetes enviados y que transitan en la red para probar conectividad o perdidas que ayuden en nuestra labor de optimizar la red para una mejor funcionalidad.

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