PRUEBA DE HABILIDADES PRACTICAS CCNA

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CONTENIDO

INTRODUCCION

El siguiente documento presenta lo que ha denominado la evaluación de habilidades practicas la universidad y la plataforma CISCO, y nos presenta 2 ejercicios de aplicación a los cuales debemos hacerles configuraciones que hemos aprendido a lo largo del curso.

Dentro de los ejercicios encontramos ejercicios de inicialización de equipos y configuración para implementación de redes, estas destrezas han sido adquiridas por nosotros los estudiantes por medio de múltiples ejercicios, tanto prácticos como de conocimiento teórico.

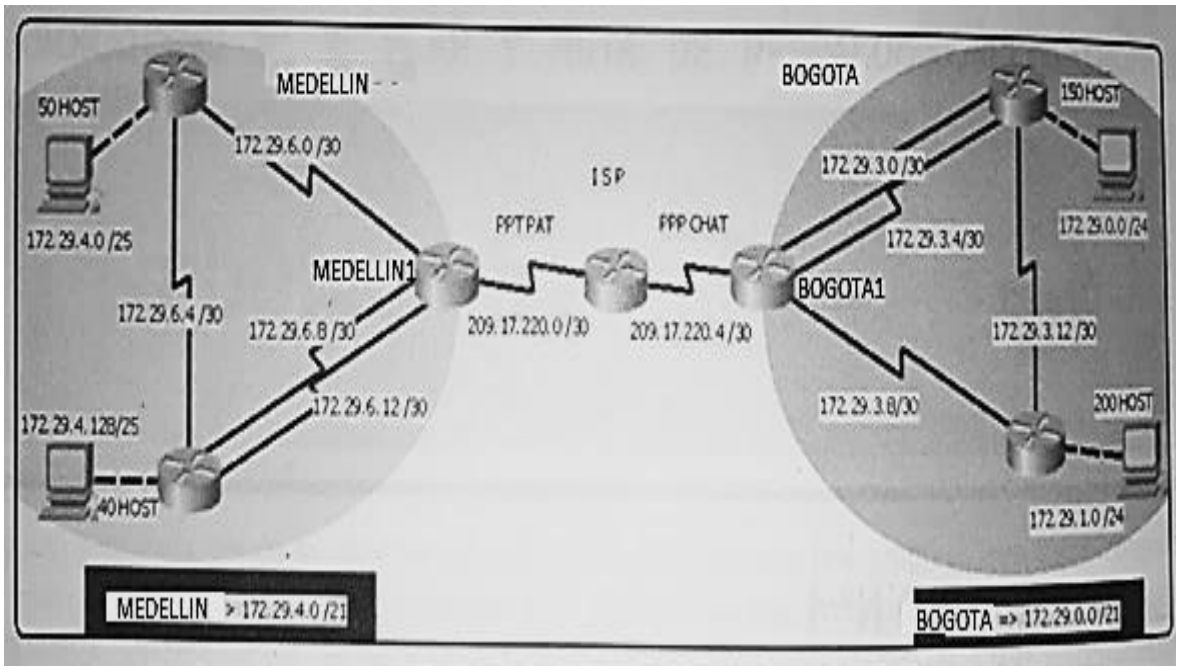
En los ejercicios desarrollados vamos a realizar elección de equipos, conexiones de diferentes tipos de cables, configuraciones básicas como direccionamiento, configuraciones DHCP, NAT, PAT, OSPF, implementación de ACL, aplicaciones de seguridad, también encontramos el uso de muchos mecanismos de diagnóstico y ayudas de configuración como PING, show ip route, show ip nat translations, do show ip route connected, tracer route, entre otros.

Prueba de habilidades practicas

Escenario 1

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

Topología de red



Este escenario plantea el uso de RIP como protocolo de enrutamiento, considerando que se tendran rutas por defecto redistribuidas; asimismo, habilitar el encapsulamiento PPP y su autenticación.

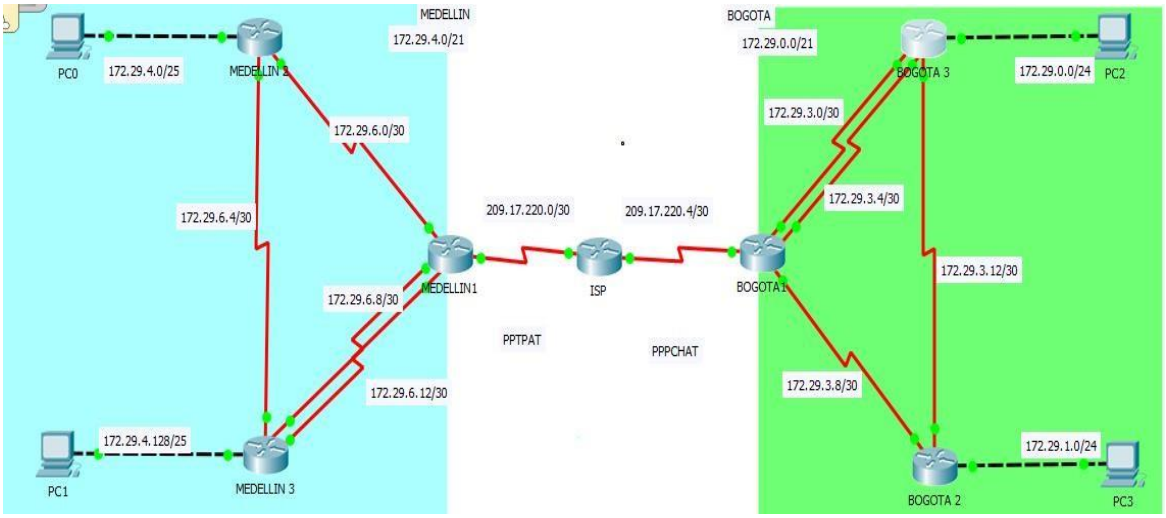
Los routers Bogota2 y medellin2 proporcionan el servicio DHCP a su propia red LAN y a los routers 3 de cada ciudad.
Debe configurar PPP en los enlaces hacia el ISP, con autenticación.
Debe habilitar NAT de sobrecarga en los routers Bogota1 y medellin1.

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 fisica de los equipos con base en la topología de red

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



Parte 1: Configuración del enrutamiento
a. Configurar el enrutamiento en la red usando el protocolo RIP versión 2, declare la red principal, desactive la sumarización automática.

Desarrollo:
Empezamos configurando en cada terminal el direccionamiento con todas las rutas necesarias; activando y desactivando lo solicitado, por lo cual vamos a dejar registro del codigo usado y pantallazos de comprobacion.

ISP
Conf t
Int s0/0/0
Ip address 209.17.220.1 255.255.255.252
Clock rate 4000000
No shutdown
Int s0/0/1
Ip address 209.17.220.5 255.255.255.252
Clock rate 4000000
No shutdown

MEDELLIN 1
Conf t
Int s0/0/0
Ip address 209.17.220.2 255.255.255.252
Clock rate 4000000
No shutdown

Int s0/0/1
Ip address 172.29.6.1 255.255.255.252
Clock rate 4000000
No shutdown
Int s0/1/0
Ip address 172.29.6.9 255.255.255.252
Clock rate 4000000
No shutdown

MEDELLIN 2
Int s0/0/0
Ip address 172.29.6.2 255.255.255.252
Clock rate 4000000
No shutdown
Int s0/0/1
Ip address 172.29.6.5 255.255.255.252
Clock rate 4000000
No shutdown
Int g0/0
ip address 172.29.4.1 255.255.255.128
no shutdown

MEDELLIN 3
Enable
Conf t
Int s0/0/0
Ip address 172.29.6.10 255.255.255.252
Clock rate 4000000
No shutdown
Int s0/0/1
Ip address 172.29.6.14 255.255.255.252
Clock rate 4000000
No shutdown
Int s0/1/0
Ip address 172.29.6.6 255.255.255.252
Clock rate 4000000
No shutdown
Int g0/0
Ip address 172.29.4.129 255.255.255.128
No shutdown

BOGOTA 1
enable
conf t
Int s0/0/0

Ip address 209.17.220.6 255.255.255.252
Clock rate 4000000
No shutdown
Int s0/0/1
Ip address 172.29.3.9 255.255.255.252
Clock rate 4000000
No shutdown
Int s0/1/0
Ip address 172.29.3.1 255.255.255.252
Clock rate 4000000
No shutdown
Int s0/1/1
Ip address 172.29.3.5 255.255.255.252
Clock rate 4000000
No shutdown

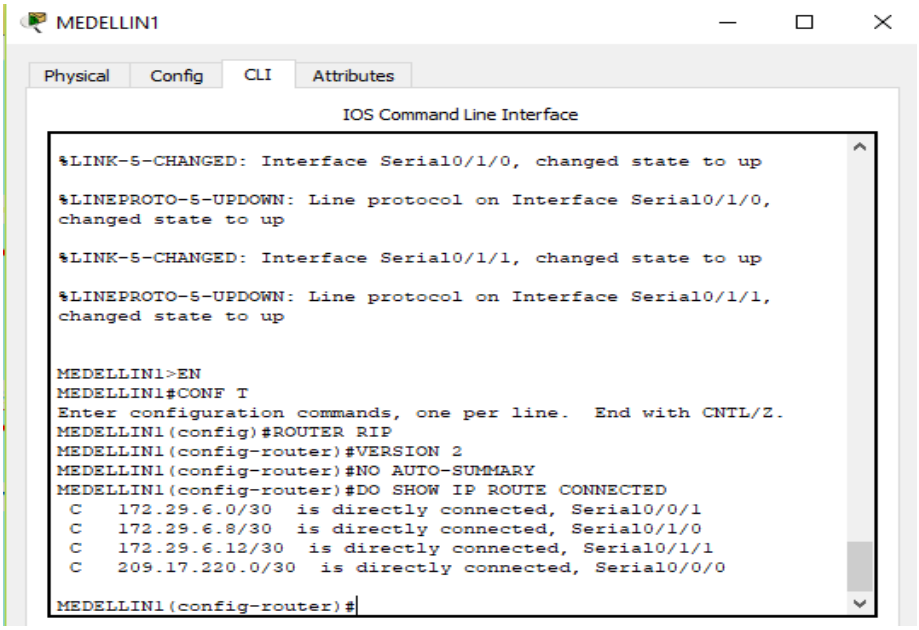
BOGOTA 2
Configure terminal
Int s0/0/0
Ip address 172.29.3.10 255.255.255.252
No shutdown
Int s0/0/1
Ip address 172.29.3.13 255.255.255.252
Clock rate 4000000
No shutdown
Int g0/0
Ip address 172.29.1.1 255.255.255.0
No shutdown

BOGOTA 3
En
Conf t
Int s0/0/0
Ip address 172.29.3.2 255.255.255.252
No shutdown
Int s0/0/1
Ip address 172.29.3.6 255.255.255.252
Clock rate 4000000
No shutdown
Int s0/1/0
Ip address 172.29.3.14 255.255.255.252
Clock rate 4000000
No shutdown
Int g0/0
Ip address 172.29.0.1 255.255.255.0

No shutdown

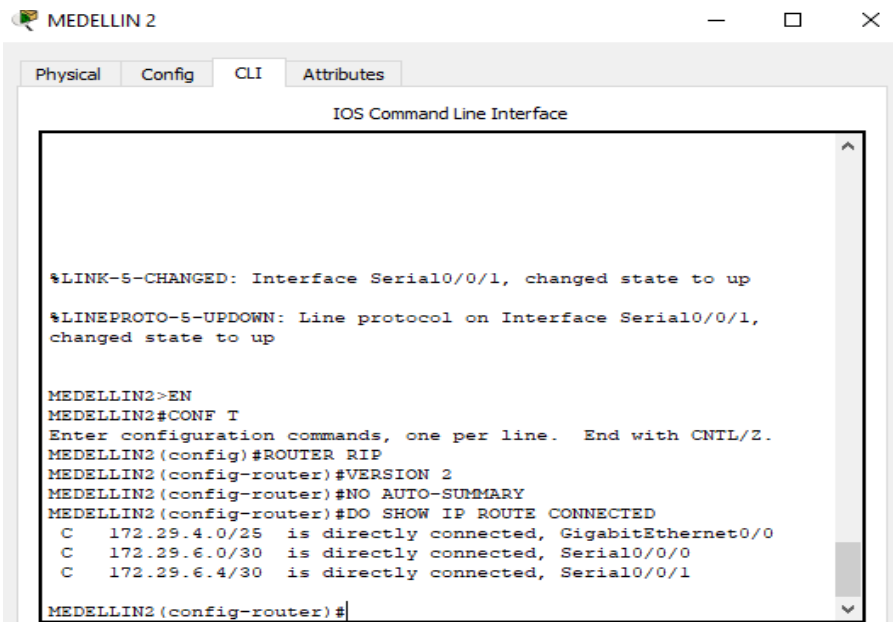
Ahora configuramos RIP en ambas zonas, debe ser en forma independiente y se solicita que sea la version 2.

MEDELLIN 1
En
Conf t
Router rip
Version 2
No auto-summary
Do show ip route connected



Network 172.29.6.0
Network 172.29.6.8
Network 172.29.6.12
Passive-interface s0/0/0

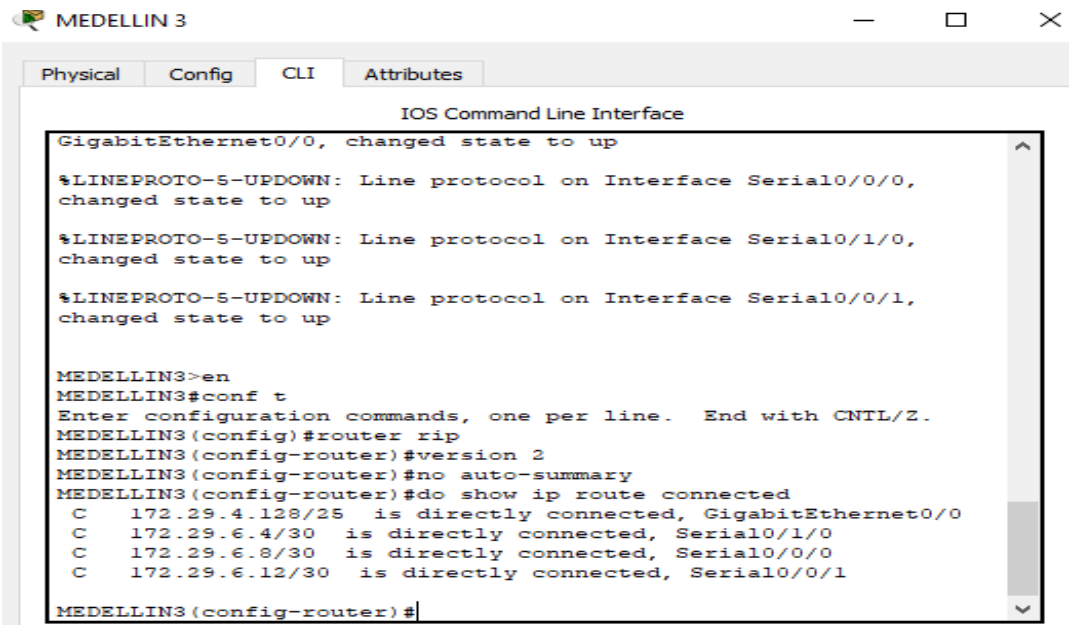
MEDELLIN 2
En
Conf t
Router rip
Version 2
No auto-summary
Do show ip route connected



Network 172.29.4.0
Network 172.29.6.0
Network 172.29.6.4
Passive-interface g0/0

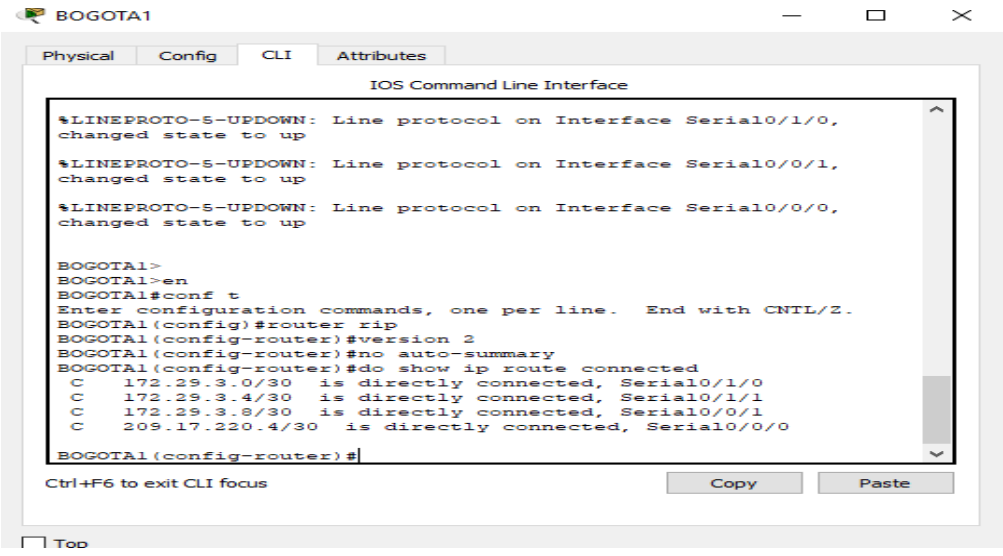
MEDELLIN 3

En
Conf t
Router rip
Version 2
No auto-summary
Do show ip route connected
Network 172.29.4.12
Network 172.29.6.8
Network 172.29.6.4
Network 172.29.4.128
Passive-interface g0/0



BOGOTA 1

En
Conf t
Router rip
Version 2
No auto-summary
Do show ip route connected

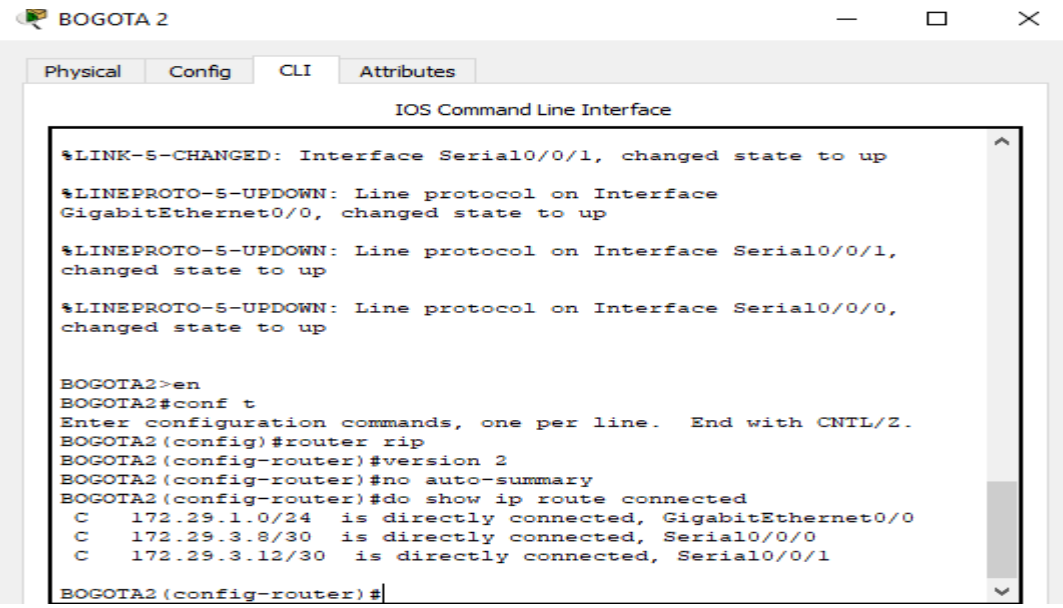


Network 172.29.3.0

Network 172.29.3.4
Network 172.29.3.8
Passive-interface s0/0/0

BOGOTA 2

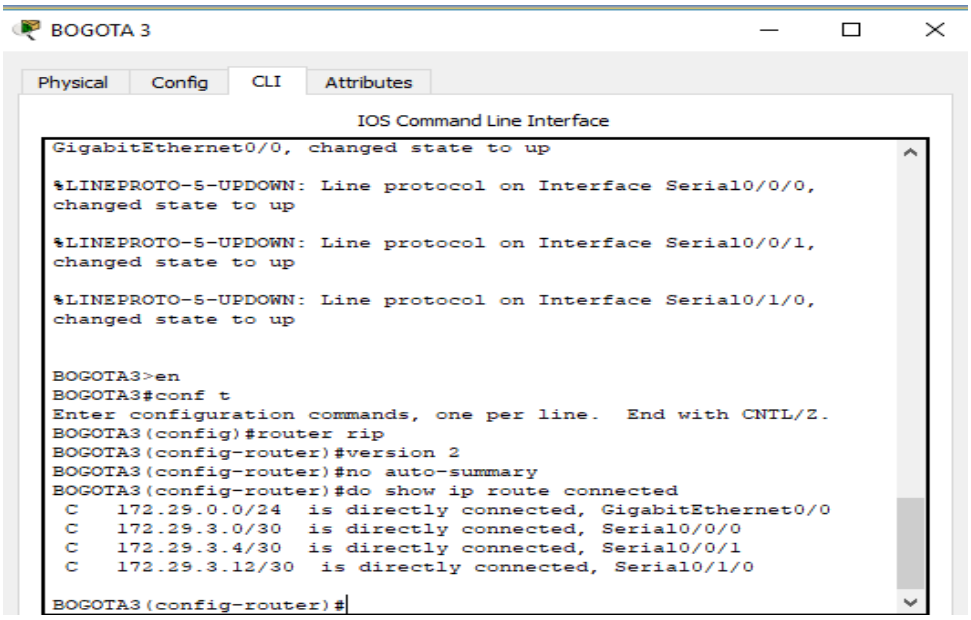
En
Conf t
Router rip
Version 2
No auto-summary
Do show ip route connected



Network 172.29.3.8
Network 172.29.3.12
Passive-interface g0/0

BOGOTA 3

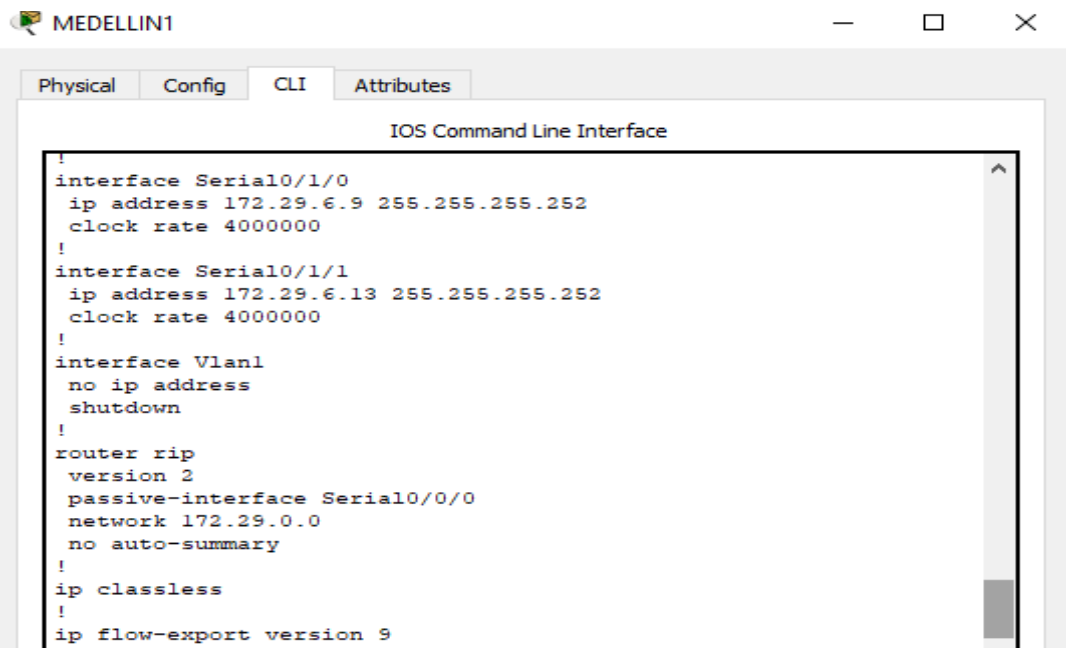
En
Conf t
Router rip
Version 2
No auto-summary
Do show ip route connected



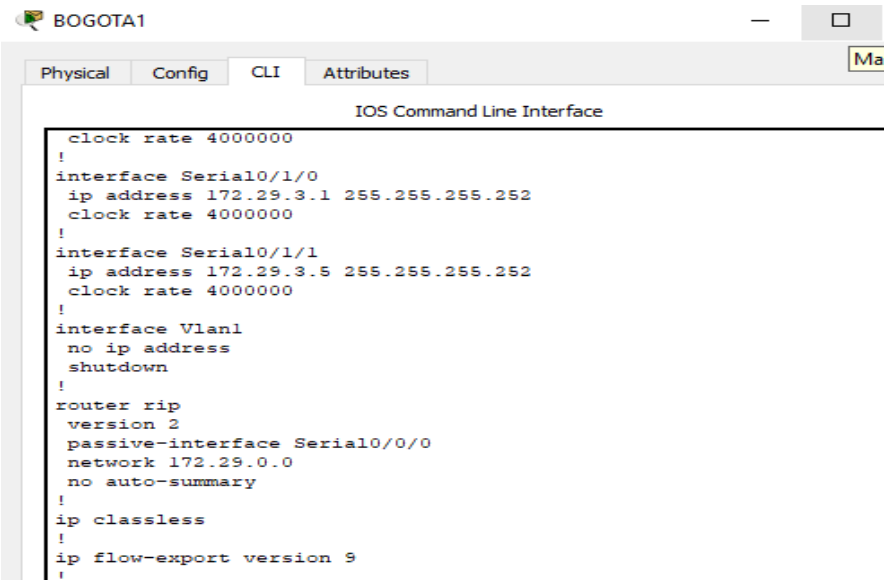
Network 172.29.3.0
Network 172.29.0.0
Network 172.29.3.4
Network 172.29.3.12
Passive-interface g0/0

Ahora hacemos verificacion de las redes conesctedas que usamos por medio del codigo *show ip route* en los router MEDELLIN 1 Y BOGOTA 1; tambien podemos encontrar la red principal por medio del codigo *show running-config.*

```
MEDELLIN1#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 not set

     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, 00:00:11, Serial0/0/1
R       172.29.4.128/25 [120/1] via 172.29.6.14, 00:00:10, Serial0/1/1
                        [120/1] via 172.29.6.10, 00:00:10, Serial0/1/0
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, 00:00:11, Serial0/0/1
                      [120/1] via 172.29.6.14, 00:00:10, Serial0/1/1
                      [120/1] via 172.29.6.10, 00:00:10, Serial0/1/0
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
C       209.17.220.0/30 is directly connected, Serial0/0/0
L       209.17.220.2/32 is directly connected, Serial0/0/0
```




```
BOGOTA1>en
BOGOTA1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R       172.29.0.0/24 [120/1] via 172.29.3.2, 00:00:21, Serial0/1/0
                      [120/1] via 172.29.3.6, 00:00:21, Serial0/1/1
R       172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:22, 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, 00:00:22, Serial0/0/1
                       [120/1] via 172.29.3.2, 00:00:21, Serial0/1/0
                       [120/1] via 172.29.3.6, 00:00:21, Serial0/1/1
     209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C       209.17.220.4/30 is directly connected, Serial0/0/0
L       209.17.220.6/32 is directly connected, Serial0/0/0
```



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.

Añadimos las configuraciones solicitadas.

MEDELLIN 1
En
Conf t
Ip route 0.0.0.0 0.0.0.0 209.17.220.1
Router rip
Default-information originate
Show ip-route
(buscamos dentro de las direcciones la que nos da salida a red la identifica un *)

```
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, 00:00:10, Serial0/0/1
R       172.29.4.128/25 [120/1] via 172.29.6.10, 00:00:15, Serial0/1/0
                        [120/1] via 172.29.6.14, 00:00:15, 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, 00:00:15, Serial0/1/0
                      [120/1] via 172.29.6.14, 00:00:15, Serial0/1/1
                      [120/1] via 172.29.6.2, 00:00:10, 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, 3 subnets, 2 masks
C       209.17.220.0/30 is directly connected, Serial0/0/0
C       209.17.220.1/32 is directly connected, Serial0/0/0
L       209.17.220.2/32 is directly connected, Serial0/0/0
S*   0.0.0.0/0 [1/0] via 209.17.220.1

MEDELLIN1#
```

BOGOTA 1
En
Conf t
Ip route 0.0.0.0 0.0.0.0 209.17.220.5
Router rip
Default-information originate
Show ip-route
(buscamos dentro de las direcciones la que nos da salida a red la identifica un *)

```
Gateway of last resort is 172.29.3.1 to network 0.0.0.0

     172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks
C       172.29.0.0/24 is directly connected, GigabitEthernet0/0
L       172.29.0.1/32 is directly connected, GigabitEthernet0/0
R       172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:24,
Serial0/1/0
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, Serial0/0/1
L       172.29.3.6/32 is directly connected, Serial0/0/1
R       172.29.3.8/30 [120/1] via 172.29.3.13, 00:00:24,
Serial0/1/0
                      [120/1] via 172.29.3.1, 00:00:22,
Serial0/0/0
                      [120/1] via 172.29.3.5, 00:00:22,
Serial0/0/1
C       172.29.3.12/30 is directly connected, Serial0/1/0
L       172.29.3.14/32 is directly connected, Serial0/1/0
R*    0.0.0.0/0 [120/1] via 172.29.3.1, 00:00:22, Serial0/0/0
                [120/1] via 172.29.3.5, 00:00:22, Serial0/0/1
```

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.

Sumarizamos en excel y procedemos a configurar las rutas en ISP

MEDELLIN			128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1
172.29.4.0	172	29	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
172.29.4.128	172	29	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
172.29.6.0	172	29	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
172.29.6.12	172	29	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0
172.29.6.8	172	29	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0
172.29.6.4	172	29	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0
172.29.4.0/22	172	29	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0

BOGOTA			128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1
172.29.1.0	172	29	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
172.29.3.0	172	29	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
172.29.0.0	172	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
172.29.3.8	172	29	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
172.29.3.4	172	29	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0
172.29.3.12	172	29	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0
172.29.4.0/22	172	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

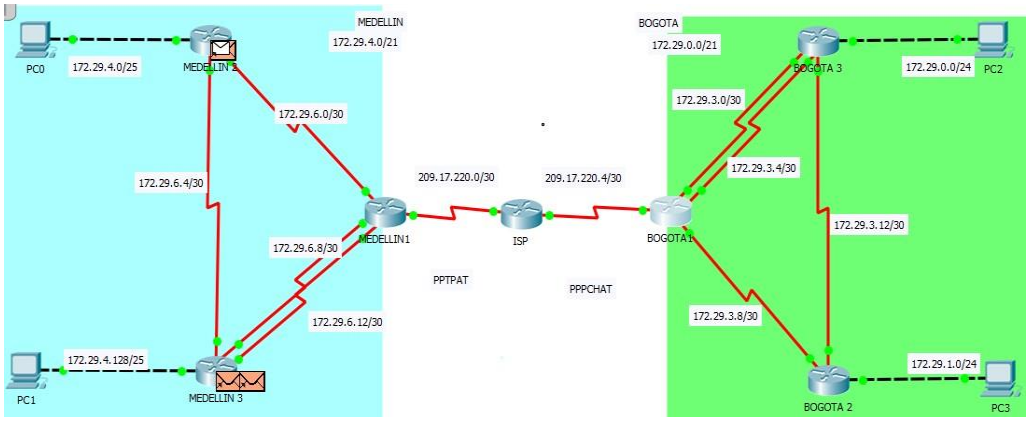
ISP

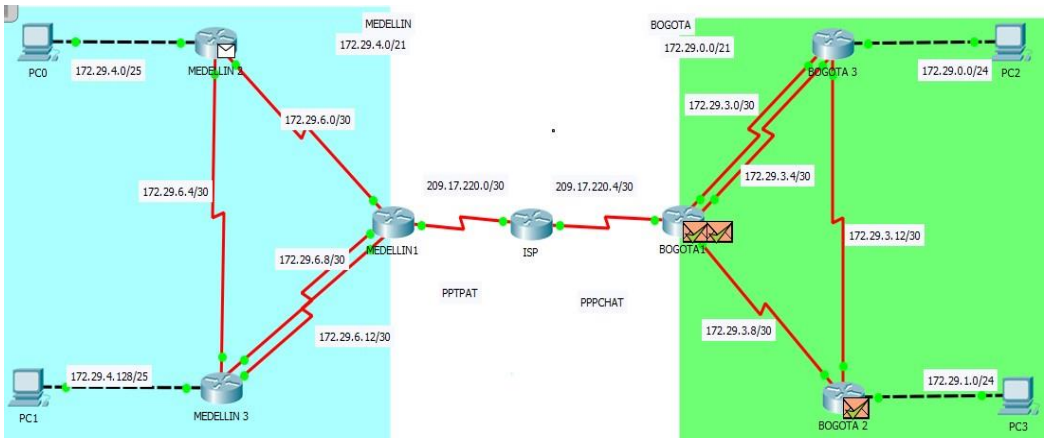
en
Conf t
Ip route 172.29.4.0 255.255.255.0 209.17.220.2
Ip route 172.29.0.0 255.255.255.0 209.17.220.6

Parte 2: Tabla de Enrutamiento.

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

Hacemos verificacion por medio de envio de paquetes para verificar redes y rutas.





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

El balanceo de cargas lo podemos notar en las conexiones dobles donde se balancea el envio de informacion y lo podemos ver en las rutas delos router con mas de una conexión. Tomamos como ejemplo MEDELLIN 1 donde en la ruta 172.29.6.4/30 encontramos e rutas de transito de informacion.

MEDELLIN 1
enable
show ip route

```
MEDELLIN1#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 not set

     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, 00:00:01, Serial0/0/1
R       172.29.4.128/25 [120/1] via 172.29.6.10, 00:00:02, Serial0/1/0
                        [120/1] via 172.29.6.14, 00:00:02, Serial0/1/1
C       172.29.6.0/30 is directly connected, Serial0/0/1
L       172.29.6.1/32 is directly connected, Serial0/0/1
R       172.29.6.4/30 [120/1] via 172.29.6.2, 00:00:01, Serial0/0/1
                      [120/1] via 172.29.6.10, 00:00:02, Serial0/1/0
                      [120/1] via 172.29.6.14, 00:00:02, Serial0/1/1
```

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

BOGOTA 1 Y MEDELLIN1 son redes similares, en numero de conexiones, se conectan a igual numero de routers y se conectan con ISP.

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

MEDELLIN 2 – BOGOTA 2
Enable
Show ip route

```
     172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R       172.29.0.0/24 [120/1] via 172.29.3.14, 00:00:16, Serial0/0/1
C       172.29.1.0/24 is directly connected, GigabitEthernet0/0
L       172.29.1.1/32 is directly connected, GigabitEthernet0/0
R       172.29.3.0/30 [120/1] via 172.29.3.9, 00:00:23, Serial0/0/0
                      [120/1] via 172.29.3.14, 00:00:16, Serial0/0/1
R       172.29.3.4/30 [120/1] via 172.29.3.9, 00:00:23, Serial0/0/0
                      [120/1] via 172.29.3.14, 00:00:16, Serial0/0/1
C       172.29.3.8/30 is directly connected, Serial0/0/0
L       172.29.3.10/32 is directly connected, Serial0/0/0
C       172.29.3.12/30 is directly connected, Serial0/0/1
L       172.29.3.13/32 is directly connected, Serial0/0/1

BOGOTA2#
```

```
     172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
C       172.29.4.0/25 is directly connected, GigabitEthernet0/0
L       172.29.4.1/32 is directly connected, GigabitEthernet0/0
R       172.29.4.128/25 [120/1] via 172.29.6.6, 00:00:07, Serial0/0/1
C       172.29.6.0/30 is directly connected, Serial0/0/0
L       172.29.6.2/32 is directly connected, Serial0/0/0
C       172.29.6.4/30 is directly connected, Serial0/0/1
L       172.29.6.5/32 is directly connected, Serial0/0/1
R       172.29.6.8/30 [120/1] via 172.29.6.1, 00:00:27, Serial0/0/0
                      [120/1] via 172.29.6.6, 00:00:07, Serial0/0/1
R       172.29.6.12/30 [120/1] via 172.29.6.1, 00:00:27, Serial0/0/0
                       [120/1] via 172.29.6.6, 00:00:07, Serial0/0/1

MEDELLIN2#
```

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

El balanceo de cargas tambien se representa con los conexiones redundantes, esto lo podemos observar en MEDELLIN 3 Y BOGOTA 3, por medio del codigo *show ip route.*

MEDELLIN 3 – BOGOTA 3
Enable
Show ip route

Medellin 3

```
MEDELLIN3#SHOW IP ROUTE
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks
R       172.29.4.0/25 [120/1] via 172.29.6.5, 00:00:10, Serial0/1/0
C       172.29.4.128/25 is directly connected, GigabitEthernet0/0
L       172.29.4.129/32 is directly connected, GigabitEthernet0/0
R       172.29.6.0/30 [120/1] via 172.29.6.5, 00:00:10, Serial0/1/0
                      [120/1] via 172.29.6.9, 00:00:01, Serial0/0/0
                      [120/1] via 172.29.6.13, 00:00:01, Serial0/0/1
```

Bogota 3

```
     172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks
C       172.29.0.0/24 is directly connected, GigabitEthernet0/0
L       172.29.0.1/32 is directly connected, GigabitEthernet0/0
R       172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:06, Serial0/1/0
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, Serial0/0/1
L       172.29.3.6/32 is directly connected, Serial0/0/1
R       172.29.3.8/30 [120/1] via 172.29.3.1, 00:00:14, Serial0/0/0
                      [120/1] via 172.29.3.5, 00:00:14, Serial0/0/1
                      [120/1] via 172.29.3.13, 00:00:06, Serial0/1/0
C       172.29.3.12/30 is directly connected, Serial0/1/0
```

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

Cuando configuramos RIP en ambas zonas, pudimos visualizar las interfaces pasivas de los router, aquí mostramos cada una de ellas.

Passive-interface s0/0/0 MEDELLIN1

Passive-interface g0/0 MEDELLIN2

Passive-interface g0/0 MEDELLIN3

Passive-interface s0/0/0 BOGOTA1

Passive-interface g0/0 BOGOTA2

Passive-interface g0/0 BOGOTA3

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

En la parte 1 cuando configuramos los routers y RIP se configuraron estas interfaces y todo lo demás se deshabilito porque no era necesario.

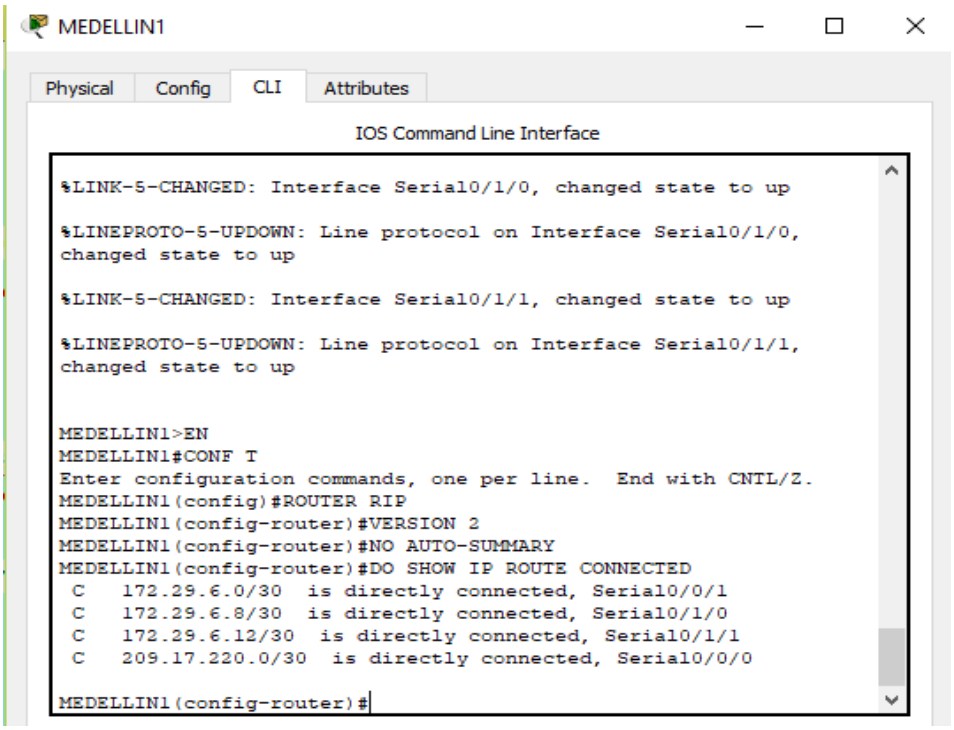
Parte 4: Verificación del protocolo RIP.

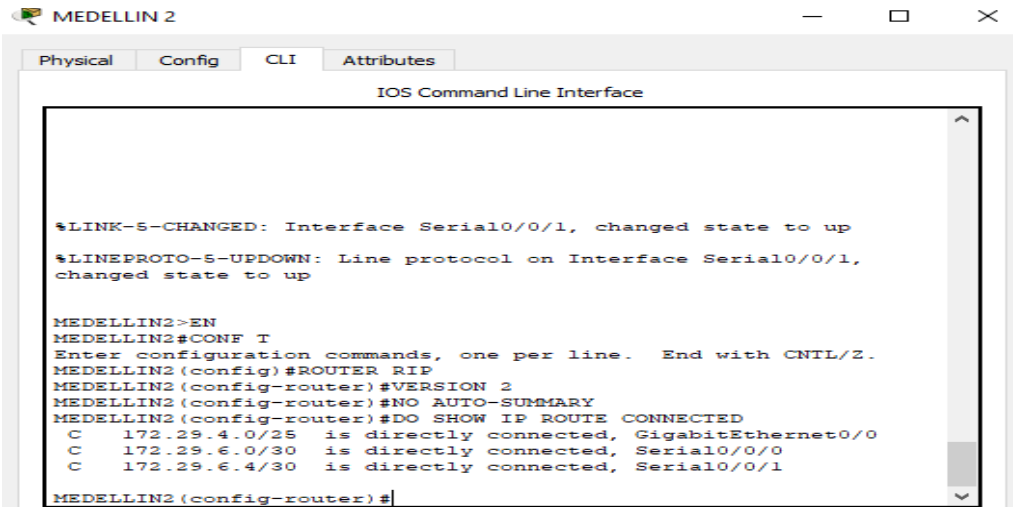
a. Verificar y documentar las opciones de enrutamiento configuradas en los routers, como el **passive interface** para la conexión hacia el ISP, la versión de RIP y las interfaces que participan de la publicación entre otros datos.

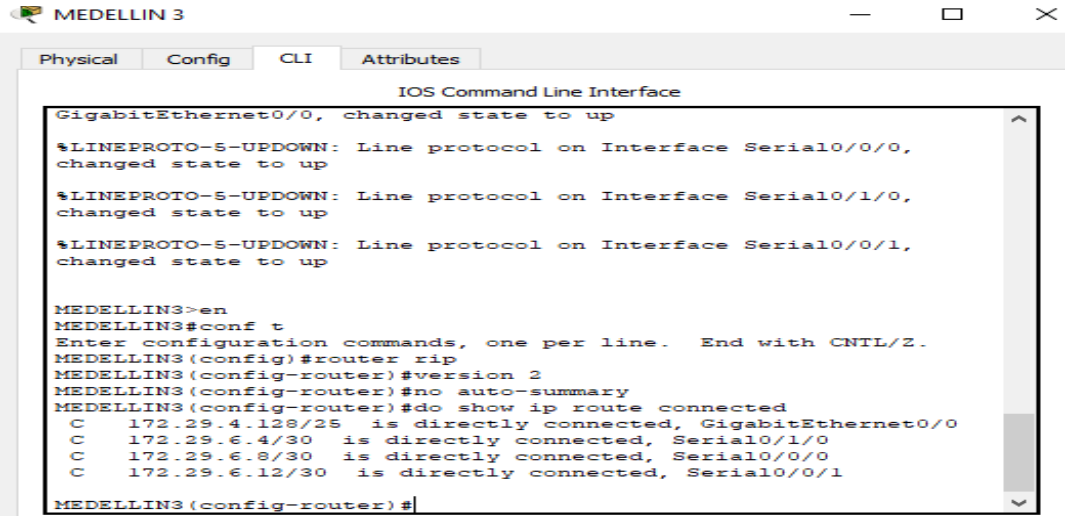
passive interface: Una interface pasiva lo que hace es que no envía ningún tipo de paquete, ni hellos ni cualquier otro tipos de paquetes. Es decir que por esa interfaces no podremos tener neighbors o vecinos pero si anunciara las redes de dichas interfaces.

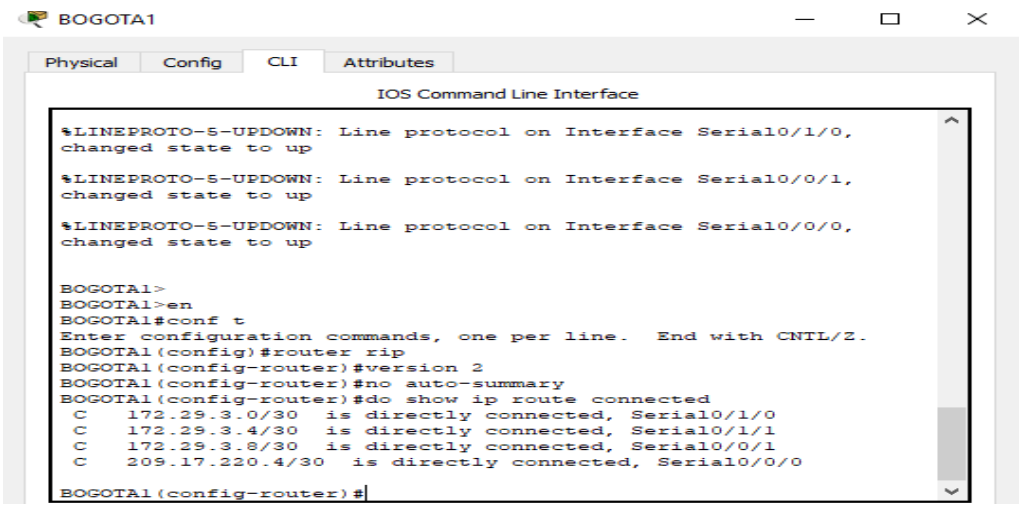
Rip version 2: Soporta subredes, CIDR y VLSM. Soporta autenticación utilizando uno de los siguientes mecanismos: no autentificación, autentificación mediante contraseña, autentificación mediante contraseña codificada

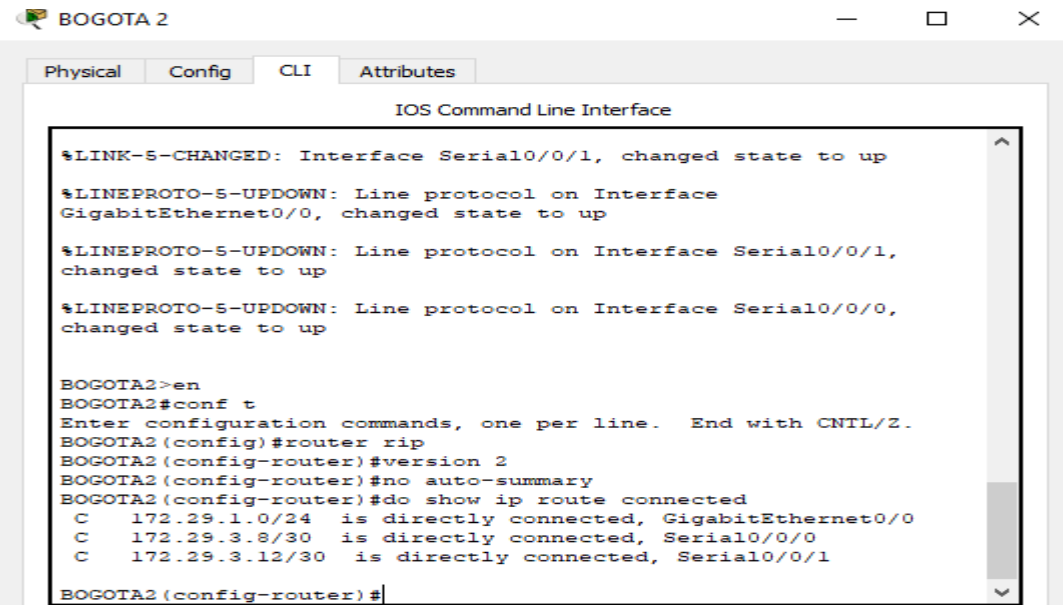
b. Verificar y documentar la base de datos de RIP de cada router, donde se informa de manera detallada de todas las rutas hacia cada red.

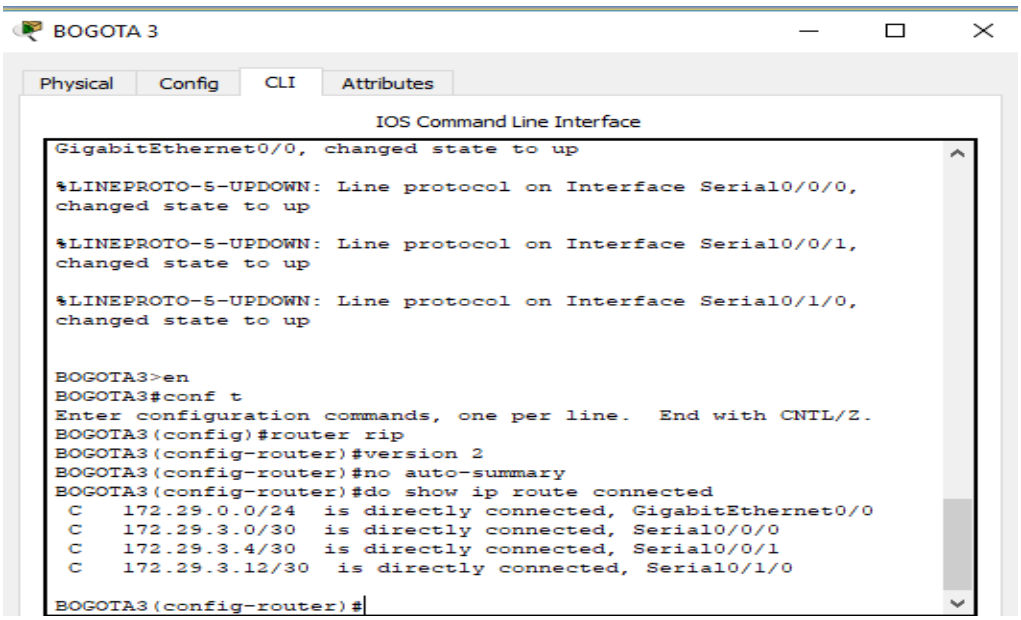



MEDELLIN 2
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
MEDELLIN2>EN
MEDELLIN2#CONF T
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN2(config)#ROUTER RIP
MEDELLIN2(config-router)#VERSION 2
MEDELLIN2(config-router)#NO AUTO-SUMMARY
MEDELLIN2(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
MEDELLIN2(config-router)#


MEDELLIN 3
Physical
Config
CLI
Attributes
IOS Command Line Interface
GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
MEDELLIN3>en
MEDELLIN3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN3(config)#router rip
MEDELLIN3(config-router)#version 2
MEDELLIN3(config-router)#no auto-summary
MEDELLIN3(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
MEDELLIN3(config-router)#


BOGOTA1
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
BOGOTA1>
BOGOTA1>en
BOGOTA1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA1(config)#router rip
BOGOTA1(config-router)#version 2
BOGOTA1(config-router)#no auto-summary
BOGOTA1(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
BOGOTA1(config-router)#





En las tablas podemos apreciar las rutas que están conectadas con su dirección ip y el puerto de conexión.

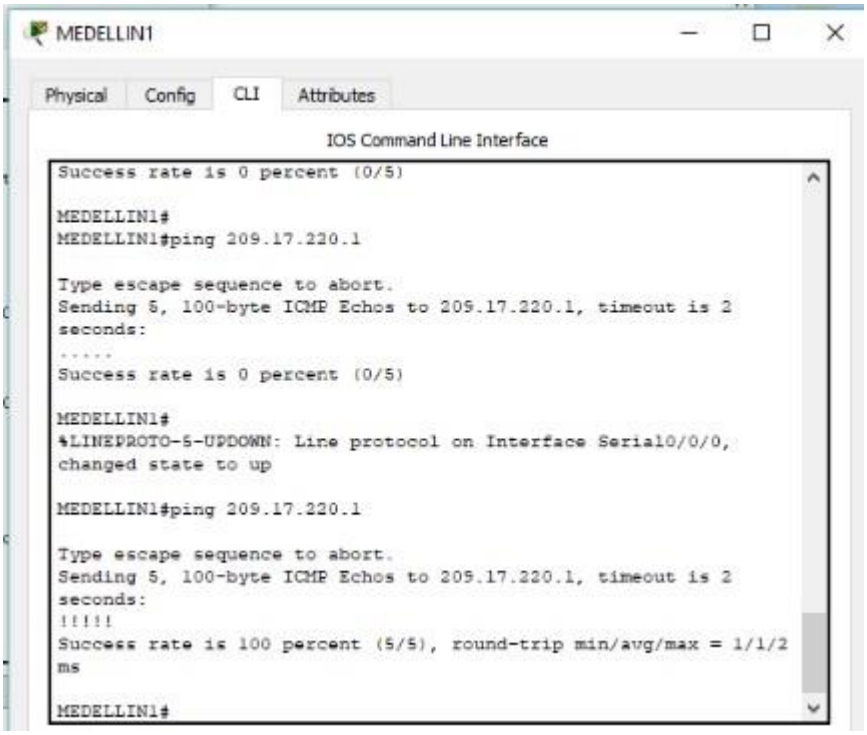
Parte 5: Configurar encapsulamiento y autenticación PPP.

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

ISP
Enable
Configure terminal
Hostname ISP
Username MEDELLIN1 password cisco
Int s0/0/0
Encapsulation ppp
Ppp authentication pap
Ppp pap sent-username ISP password cisco
End

MEDELLIN1
Enable
Configure terminal
Hostname MEDELLIN1
Username ISP password cisco
Int s0/0/0
Encapsulation ppp
Ppp authentication pap
Ppp pap sent-username ISP password cisco
End

Comprobamos por medio de un ping de MEDELLIN1 a ISP

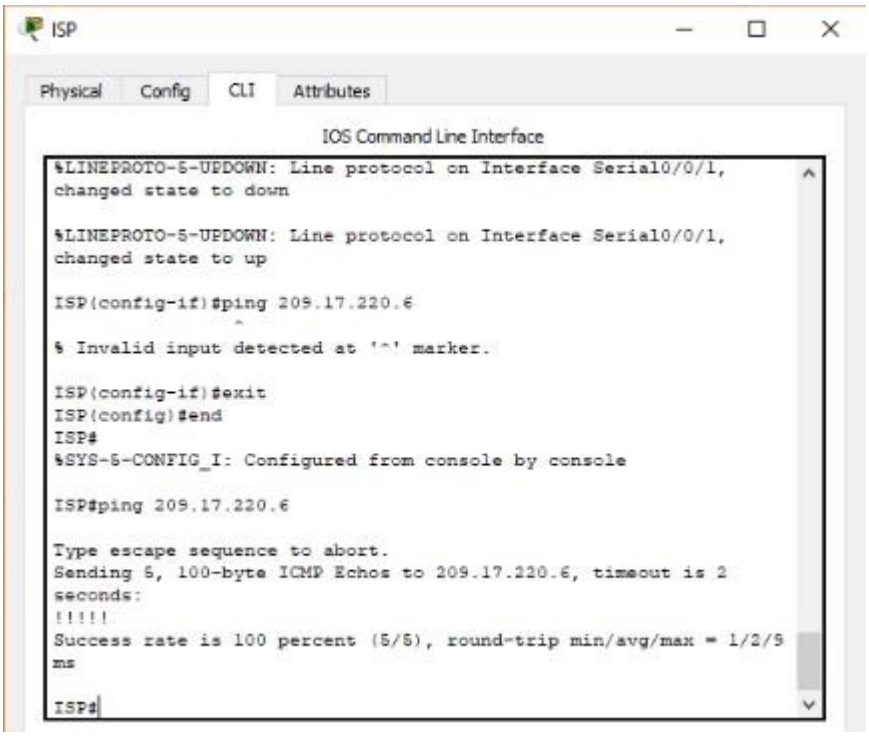


b. El enlace Bogotá1 con ISP se debe configurar con autenticación CHAT.

BOGOTA1
Enable
Configure terminal
Hostname BOGOTA 1
Username ISP password cisco
Int s0/0/0
Encapsulation ppp
Ppp authentication chap
End

ISP
Enable
Configure terminal
Hostname ISP
Username BOGOTA1 password cisco
Int s0/0/0
Encapsulation ppp
Ppp authentication chap
End

Comprobamos con un ping de ISP a BOGOTA1



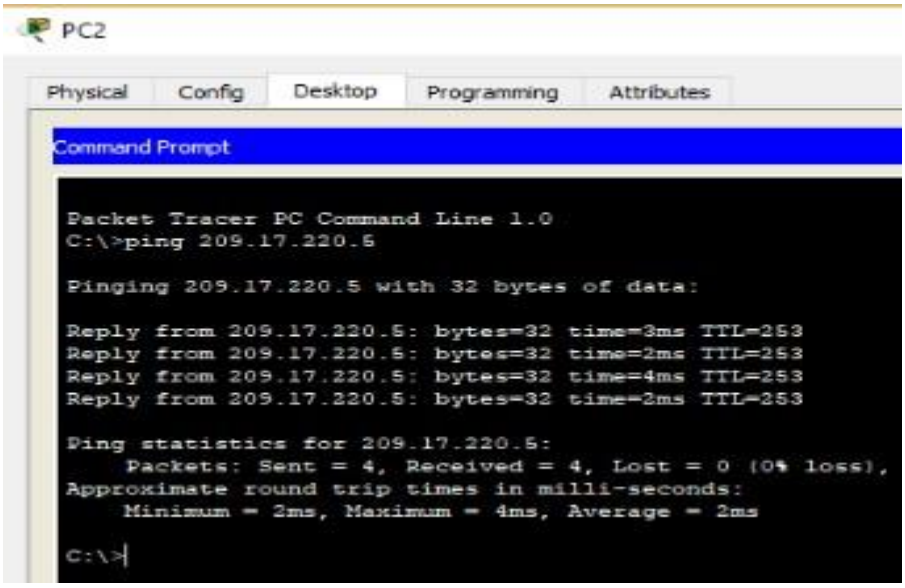
Parte 6: Configuración de PAT.

a. En la topología, si se activa NAT en cada equipo de salida (Bogotá1 y Medellín1), los routers internos de una ciudad no podrán llegar hasta los routers internos en el otro extremo, sólo existirá comunicación hasta los routers Bogotá1, ISP y Medellín1.
b. Después de verificar lo indicado en el paso anterior proceda a configurar el NAT en el router Medellín1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/0 del router Medellín1, cómo diferente puerto.
c. Proceda a configurar el NAT en el router Bogotá1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/0 del router Bogotá1, cómo diferente puerto.

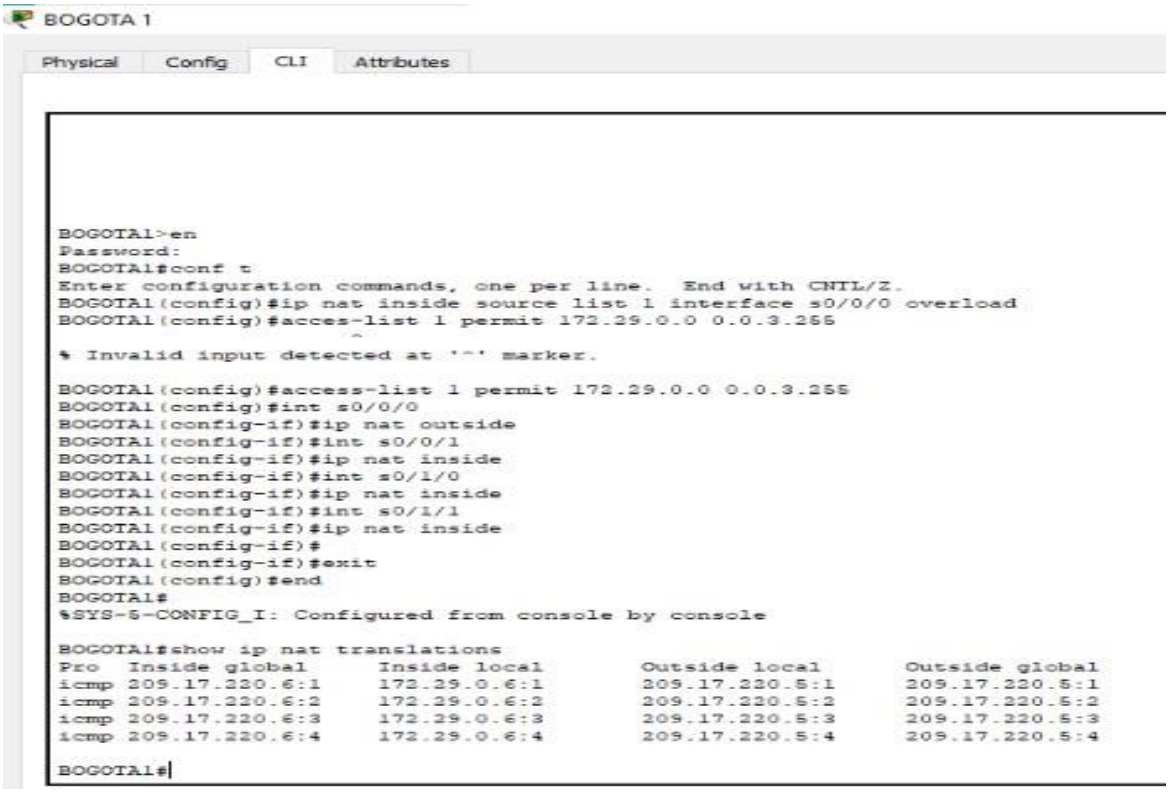
MEDELLIN1
En
Conf t
Ip nat inside source list 1 interface s0/0/0 overload
Access-list 1 permit 172.29.4.0 0.0.3.255
Int s0/0/0
Ip nat outside
Int s0/0/1
Ip nat inside
Int s0/1/0
Ip nat inside
Int s0/1/1
Ip nat inside

BOGOTA1
En
Conf t
Ip nat inside source list 1 interface s0/0/0 overload
Access-list 1 permit 172.29.0.0 0.0.3.255
Int s0/0/0
Ip nat outside
Int s0/0/1
Ip nat inside
Int s0/1/0
Ip nat inside
Int s0/1/1
Ip nat inside

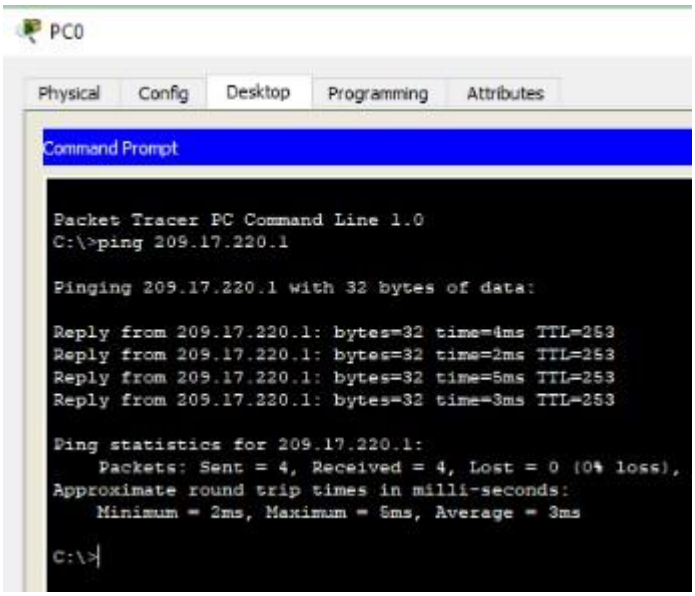
Comprobamos por medio de ping desde la computadora PC2 a ISP cuya dirección IP por esa red es: 209.17.220.5



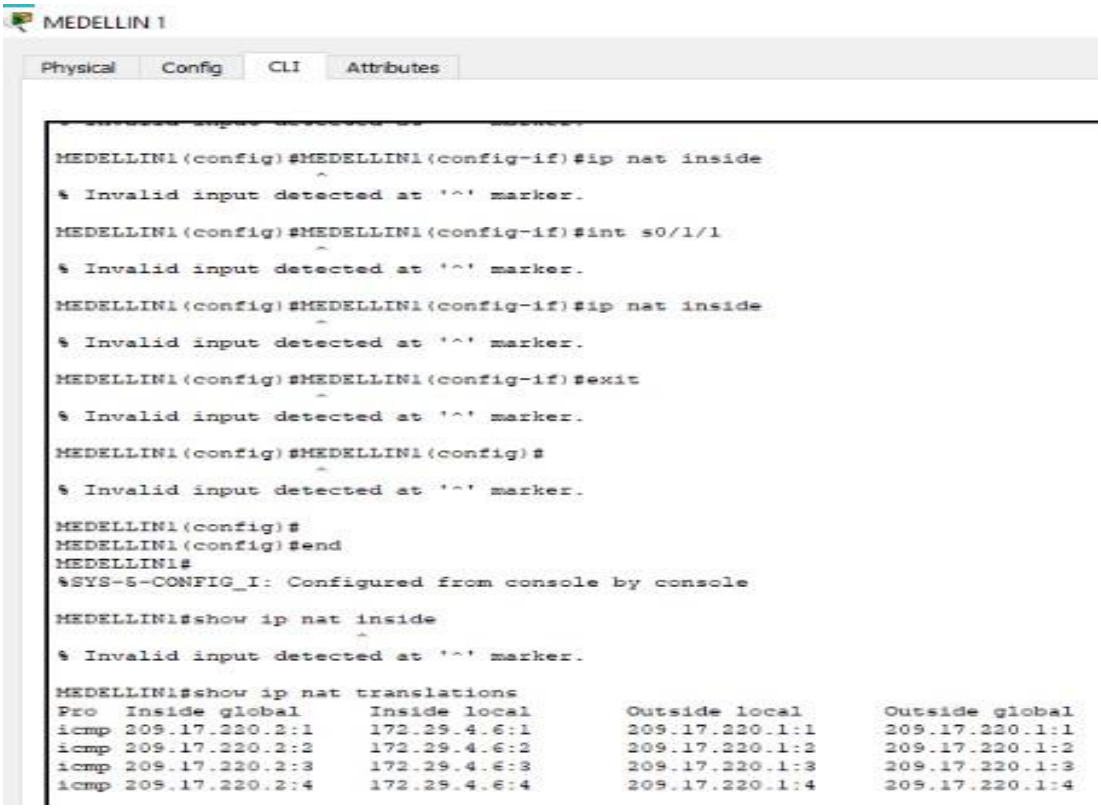
Ahora usamos *show ip nat translations* en BOGOTA1 para comprobar las traducciones de las interfaces



Ahora comprobamos también por el lado de MEDELLIN1 con ping a ISP



Ahora usamos *show ip nat translations* en MEDELLIN1 para comprobar las traducciones de las interfaces



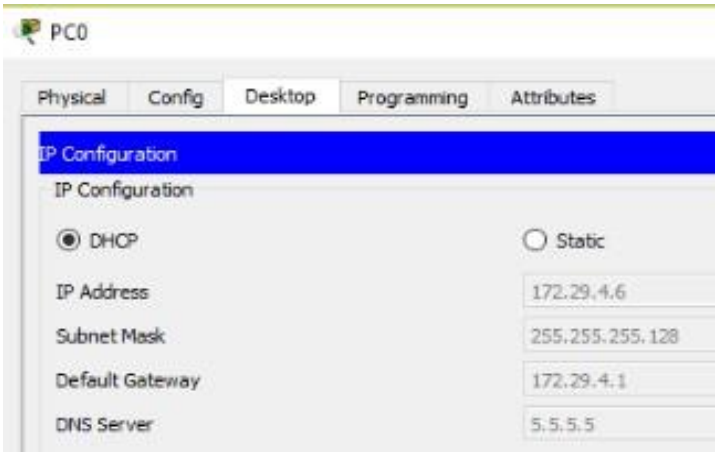
Podemos observar las traducciones de los puertos y cada vez que se hace una conexión el puerto cambia y van al destino que ISP.
Si llegaramos a intentar conexión de punto a punto a punto no lo lograríamos porque NAT bloque la traducción de afuera hacia adentro.

Parte 7: Configuración del servicio DHCP.
a. Configurar la red Medellín2 y Medellín3 donde el router Medellín 2 debe ser el servidor DHCP para ambas redes Lan.
b. El router Medellín3 deberá habilitar el paso de los mensajes broadcast hacia la IP del router Medellín2.

Desarrollamos lo requerido en ambos puntos para optimizar.

MEDELLIN2
Conf t
Ip dhcp excluded-address 172.29.4.1 172.29.4.5
Ip dhcp excluded-address 172.29.4.129 172.29.4.133
Ip dhcp pool MEDELLIN2
Network 172.29.4.0 255.255.255.128
Default-router 172.29.4.1
Dns-server 5.5.5.5
Exit
Ip dhcp pool MEDELLIN3
Network 172.29.4.128 255.255.255.128
Default-router 172.29.4.129
Dns-server 5.5.5.5
Exit

Comprobamos configuración DHCP en PC0



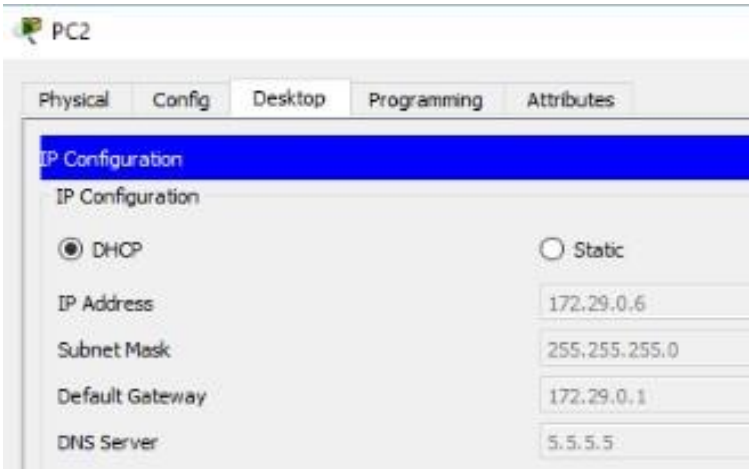
Habilitamos MEDELLIN3 como paso de mensajes broadcast

MEDELLIN3
En
conf t
int g0/0
ip helper-address 172.29.6.5
exit

c. Configurar la red Bogotá2 y Bogotá3 donde el router Bogota2 debe ser el servidor DHCP para ambas redes Lan.
d. Configure el router Bogotá1 para que habilite el paso de los mensajes Broadcast hacia la IP del router Bogotá2.

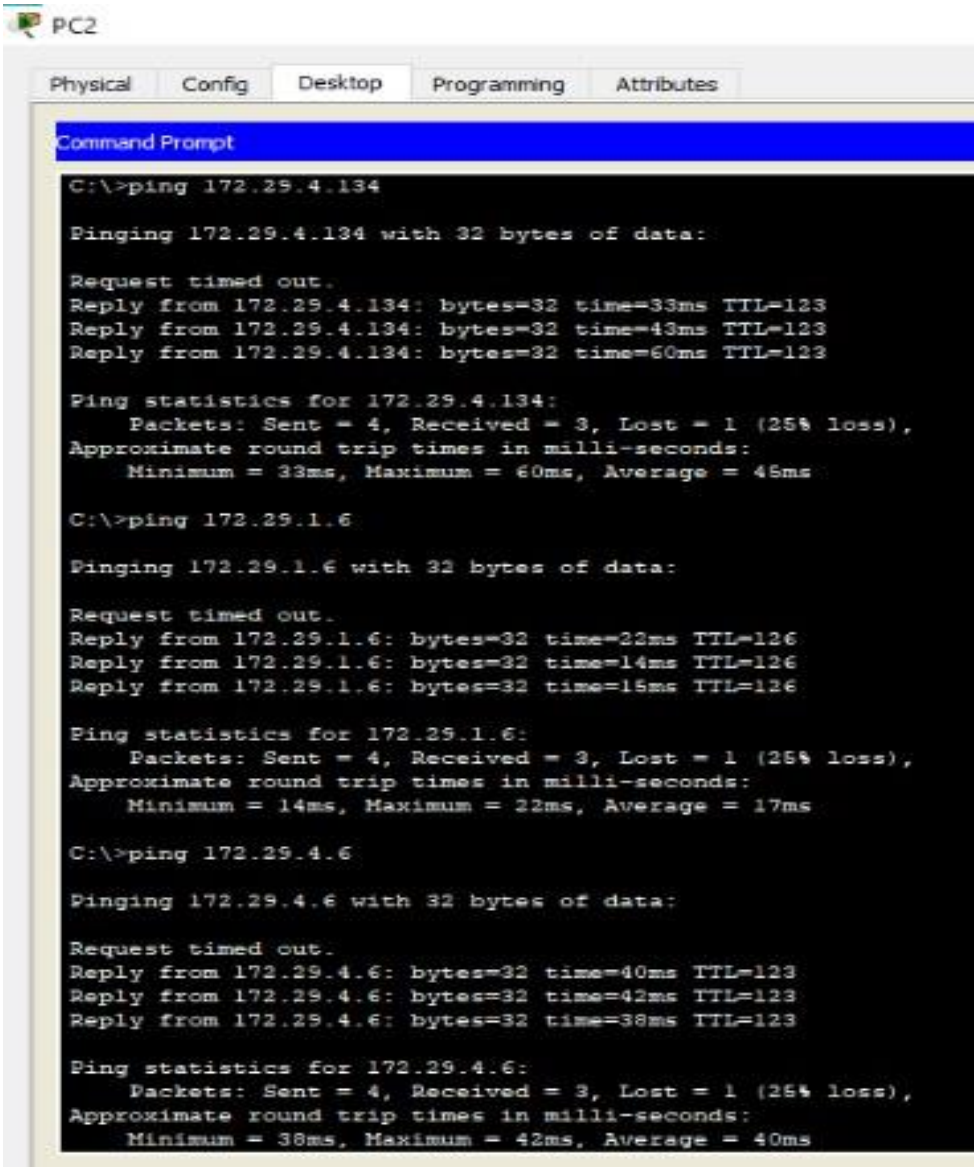
BOGOTA2
Conf t
Ip dhcp excluded-address 172.29.1..1 172.29.1.5
Ip dhcp excluded-address 172.29.0.1 172.29.0.5
Ip dhcp pool BOGOTA2
Network 172.29.1.0 255.255.255.0
Default-router 172.29.0.1
Dns-server 5.5.5.5
Exit
Ip dhcp pool BOGOTA3
Network 172.29.4.128 255.255.255.128
Default-router 172.29.0.1
Dns-server 5.5.5.5
Exit

Comprobamos configuración DHCP en PC2



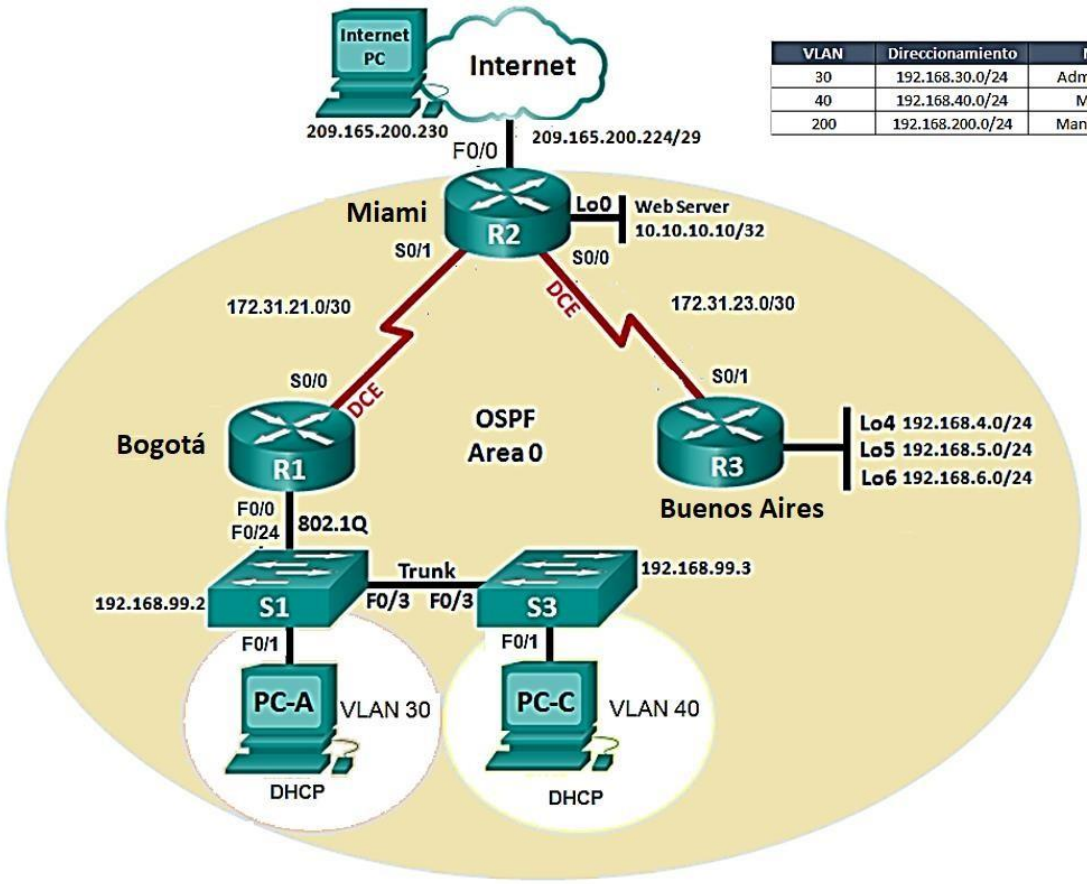
BOGOTA3
En
conf t
int g0/0
ip helper-address 172.29.3.13
exit

Comprobamos por medio de ping desde PC2 al resto de las computadoras para comprobar conexión entre la misma red y a su vez entre las dos redes, de punta a punta.



Escenario 2

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

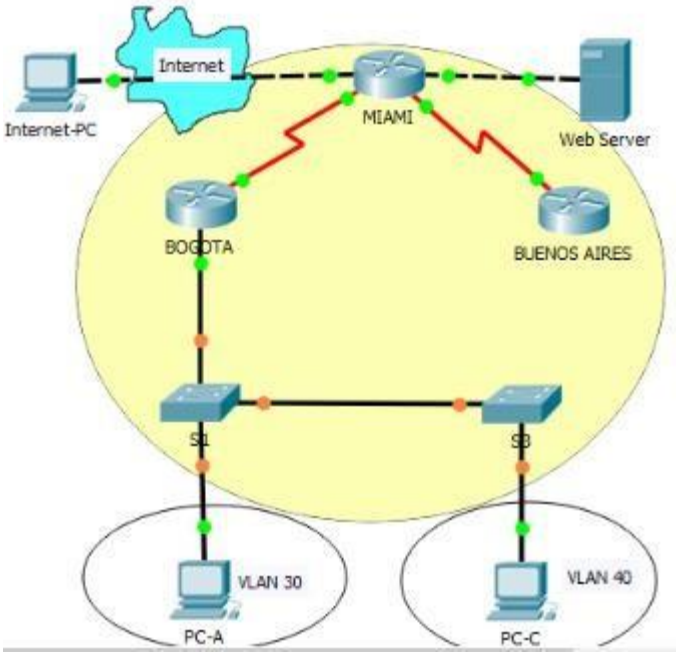


VLAN	Direccionamiento	Nombre
30	192.168.30.0/24	Administración
40	192.168.40.0/24	Mercadeo
200	192.168.200.0/24	Mantenimiento

Elementos utilizados

- **3 Routers 1841**
- **2 switches 2960**
- **3 computadores**
- **1 servidor genérico**
- **Cableado**

Topología solicitada



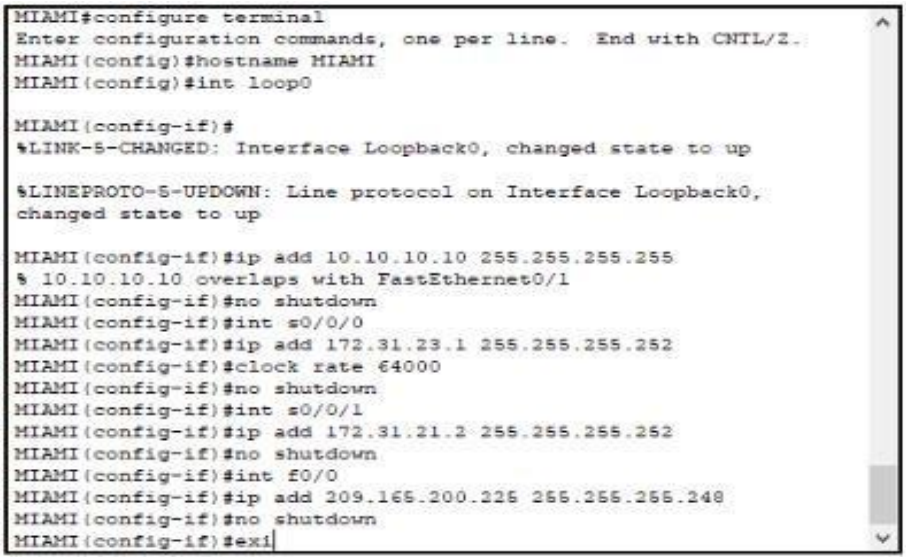
1. Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario

BOGOTA
Configure terminal
Hostname BOGOTA
Int s0/0/0
Ip add 172.31.21.1 255.255.255.252
Clock rate 64000
No shutdown
Exit

```
BOGOTA#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
BOGOTA(config)#config t
%Invalid hex value
BOGOTA(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 shutdown
BOGOTA(config-if)#ex
BOGOTA(config)#
```

MIAMI

Configure terminal
Hostname MIAMI
Int loop0
Ip add 10.10.10.10 255.255.255.255
No shutdown
Int s0/0/0
Ip add 172.31.23.1 255.255.255.252
Clock rate 64000
No shutdown
Int s0/0/1
Ip add 172.31.21.2 255.255.255.252
No shutdown
Int f0/0
Ip add 209.165.200.225 255.255.255.248
No shutdown
Exit



BUENOSAIRES

Configure terminal
Hostname BUENOS AIRES
Int loop4
Ip add 192.168.4.1 255.255.255.0
No shutdown

Exit
Int loop5
Ip add 192.168.5.1 255.255.255.0
No shutdown
Exit
Int loop6
Ip add 192.168.6.1 255.255.255.0
No shutdown
Exit
Int s0/0/1
Ip add 172.31.23.2 255.255.255.252
No shutdown
Exit

```
BUENOSAIRES#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
BUENOSAIRES(config)#hostname BUENOSAIRES
BUENOSAIRES(config)#int loop4
BUENOSAIRES(config-if)#ip add 192.168.4.1 255.255.255.0
BUENOSAIRES(config-if)#no shutdown
BUENOSAIRES(config-if)#ex
BUENOSAIRES(config)#int loop5
BUENOSAIRES(config-if)#ip add 192.168.5.1 255.255.255.0
BUENOSAIRES(config-if)#no shutdown
BUENOSAIRES(config-if)#ex
BUENOSAIRES(config)#int loop6
BUENOSAIRES(config-if)#ip add 192.168.6.1 255.255.255.0
BUENOSAIRES(config-if)#no shutdown
BUENOSAIRES(config-if)#ex
BUENOSAIRES(config)#int s0/0/1
BUENOSAIRES(config-if)#ip add 172.31.23.2 255.255.255.252
BUENOSAIRES(config-if)#no shutdown
BUENOSAIRES(config-if)#exit
```

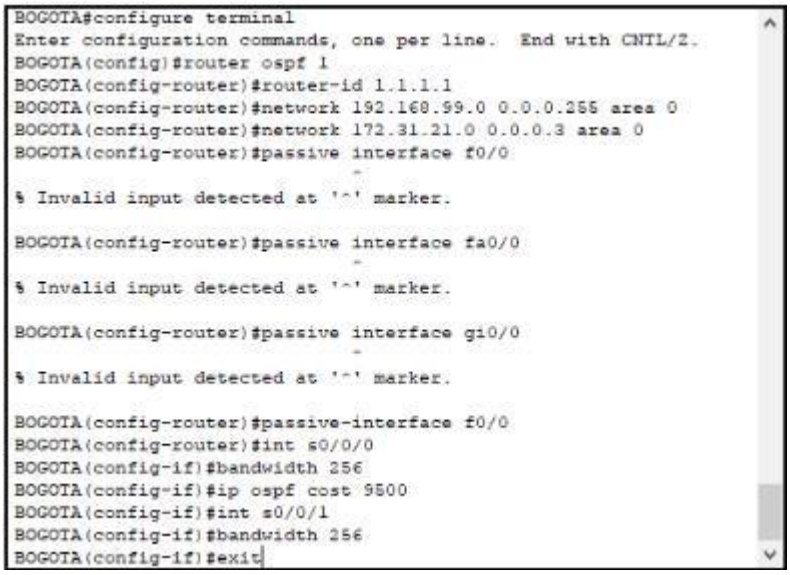
2. Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:

OSPFv2 area 0

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

BOGOTA
Configure terminal
Router ospf 1

Router-id 1.1.1.1
Network 192.168.99.0 0.0.0.255 area 0
Network 172.31.21.0 0.0.0.3 area 0
Passive-interface f0/0
Int s0/0/0
Bandwidth 256
Ip ospf cost 9500
Int s0/0/1 bandwidth 256
Exit



MIAMI
Configure terminal
Router ospf 1
Router-id 5.5.5.5
Network 209.165.200.224 0.0.0.7 area 0
Network 172.31.21.0 0.0.0.3 area 0
Network 10.10.10.10 0.0.0.3 area 0
Passive-interface f0/0
Int s0/0/0
Bandwidth 256
Ip ospf cost 9500
Int s0/0/1
Bandwidth 256
Exit

```
MIAMI#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
MIAMI(config)#router ospf 1
MIAMI(config-router)#router-id 5.5.5.5
MIAMI(config-router)#network 209.165.200.224 0.0.0.7
% Incomplete command.
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 f0/0
MIAMI(config-router)#int s0/0/0
MIAMI(config-if)#bandwidth 256
MIAMI(config-if)#ip ospf cost 9500
MIAMI(config-if)#int s0/0/1
MIAMI(config-if)#bandwidth 256
MIAMI(config-if)#exit
```

BUENOSAIRES

Configure terminal
Router ospf 1
Router-id 8.8.8.8
Network 172.31.23.0 0.0.0.3 area 0
Network 192.168.4.0 0.0.0.255 area 0
Network 192.168.5.0 0.0.0.255 area 0
Network 192.168.6.0 0.0.0.255 area 0
Int s0/0/0
Bandwidth 256
Ip ospf cost 9500
Int s0/0/1
Bandwidth 256
Exit

```
BUENOSAIRES#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
BUENOSAIRES(config)#router ospf 1
BUENOSAIRES(config-router)#router-id 8.8.8.8
BUENOSAIRES(config-router)#network 172.31.23.0 0.0.0.3 area 0
BUENOSAIRES(config-router)#network 192.168.4.0 0.0.0.255 area 0
BUENOSAIRES(config-router)#network 192.168.5.0 0.0.0.255 area0
                                                           ^
% Invalid input detected at '^' marker.

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)#banwidth 256
                      ^
% Invalid input detected at '^' marker.

BUENOSAIRES(config-if)#bandwidth 256
BUENOSAIRES(config-if)#ip ospf cost 9500
BUENOSAIRES(config-if)#int s0/0/1
BUENOSAIRES(config-if)#bandwidth 256
BUENOSAIRES(config-if)#exit
BUENOSAIRES(config)#
```

Verificar información de OSPF

- Visualizar tablas de enrutamiento y routers conectados por OSPFv2
- Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface
- Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.

Usamos el comando *show ip route*

BOGOTA

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

Gateway of last resort is 0.0.0.0 to network 0.0.0.0

     10.0.0.0/24 is subnetted, 1 subnets
O       10.10.10.0 [110/9501] via 172.31.21.2, 00:27:04, Serial0/0/0
     172.31.0.0/30 is subnetted, 2 subnets
C       172.31.21.0 is directly connected, Serial0/0/0
O       172.31.23.0 [110/19000] via 172.31.21.2, 00:17:18, Serial0/0/0
     192.168.4.0/32 is subnetted, 1 subnets
O       192.168.4.1 [110/19001] via 172.31.21.2, 00:12:30, Serial0/0/0
     192.168.5.0/32 is subnetted, 1 subnets
O       192.168.5.1 [110/19001] via 172.31.21.2, 00:12:30, Serial0/0/0
     192.168.6.0/32 is subnetted, 1 subnets
O       192.168.6.1 [110/19001] via 172.31.21.2, 00:12:30, Serial0/0/0
C    192.168.30.0/24 is directly connected, FastEthernet0/0.30
C    192.168.40.0/24 is directly connected, FastEthernet0/0.40
C    192.168.200.0/24 is directly connected, FastEthernet0/0.200
     209.165.200.0/29 is subnetted, 1 subnets
O       209.165.200.224 [110/9501] via 172.31.21.2, 00:19:40, Serial0/0/0
S*   0.0.0.0/0 is directly connected, Serial0/0/0
```

Usamos el commando *do sh ip ospf interface*

```
BOGOTA#do sh ip ospf interface
          ^
% Invalid input detected at '^' marker.

BOGOTA#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
BOGOTA(config)#do sh ip ospf interface

FastEthernet0/0.30 is up, line protocol is up
  Internet address is 192.168.30.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 192.168.30.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    No Hellos (Passive interface)
  Index 1/1, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
FastEthernet0/0.40 is up, line protocol is up
  Internet address is 192.168.40.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 192.168.40.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
```

MIAMI

Usamos el comando *show ip route*

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

Gateway of last resort is 0.0.0.0 to network 0.0.0.0

     10.0.0.0/24 is subnetted, 1 subnets
C       10.10.10.0 is directly connected, FastEthernet0/1
     172.31.0.0/30 is subnetted, 2 subnets
C       172.31.21.0 is directly connected, Serial0/0/1
C       172.31.23.0 is directly connected, Serial0/0/0
     192.168.4.0/32 is subnetted, 1 subnets
O       192.168.4.1 [110/9501] via 172.31.23.2, 00:14:27, Serial0/0/0
     192.168.5.0/32 is subnetted, 1 subnets
O       192.168.5.1 [110/9501] via 172.31.23.2, 00:14:27, Serial0/0/0
     192.168.6.0/32 is subnetted, 1 subnets
O       192.168.6.1 [110/9501] via 172.31.23.2, 00:14:27, Serial0/0/0
O    192.168.30.0/24 [110/391] via 172.31.21.1, 00:10:46, Serial0/0/1
O    192.168.40.0/24 [110/391] via 172.31.21.1, 00:10:46, Serial0/0/1
O    192.168.200.0/24 [110/391] via 172.31.21.1, 00:10:46, Serial0/0/1
     209.165.200.0/29 is subnetted, 1 subnets
C       209.165.200.224 is directly connected, FastEthernet0/0
S*   0.0.0.0/0 is directly connected, FastEthernet0/0
```

Usamos el commando *do sh ip ospf interface*

```
MIAMI(config)#do sh ip ospf interface

FastEthernet0/1 is up, line protocol is up
  Internet address is 10.10.10.1/24, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 5.5.5.5, Interface address 10.10.10.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    No Hellos (Passive interface)
  Index 1/1, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.23.1/30, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 9600
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:03
  Index 2/2, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1 , Adjacent neighbor count is 1
    Adjacent with neighbor 8.8.8.8
  Suppress hello for 0 neighbor(s)
Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.21.2/30, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 390
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
```

BUENOSAIRES

Usamos el comando *show ip route*

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

Gateway of last resort is 0.0.0.0 to network 0.0.0.0

     10.0.0.0/24 is subnetted, 1 subnets
O       10.10.10.0 [110/391] via 172.31.23.1, 00:10:06, Serial0/0/1
     172.31.0.0/30 is subnetted, 2 subnets
O       172.31.21.0 [110/780] via 172.31.23.1, 00:10:06, Serial0/0/1
C       172.31.23.0 is directly connected, Serial0/0/1
C    192.168.4.0/24 is directly connected, Loopback4
C    192.168.5.0/24 is directly connected, Loopback5
C    192.168.6.0/24 is directly connected, Loopback6
O    192.168.30.0/24 [110/781] via 172.31.23.1, 00:10:06, Serial0/0/1
O    192.168.40.0/24 [110/781] via 172.31.23.1, 00:10:06, Serial0/0/1
O    192.168.200.0/24 [110/781] via 172.31.23.1, 00:10:06, Serial0/0/1
     209.165.200.0/29 is subnetted, 1 subnets
O       209.165.200.224 [110/391] via 172.31.23.1, 00:10:06, Serial0/0/1
S*   0.0.0.0/0 is directly connected, Serial0/0/1
```

Usamos el commando *do sh ip ospf interface*

```
BUENOSAIRES(config)#do sh ip ospf interface

Loopback4 is up, line protocol is up
  Internet address is 192.168.4.1/24, Area 0
  Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
  Loopback interface is treated as a stub Host
Loopback5 is up, line protocol is up
  Internet address is 192.168.5.1/24, Area 0
  Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
  Loopback interface is treated as a stub Host
Loopback6 is up, line protocol is up
  Internet address is 192.168.6.1/24, Area 0
  Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
  Loopback interface is treated as a stub Host
Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.23.2/30, Area 0
  Process ID 1, Router ID 8.8.8.8, Network Type POINT-TO-POINT, Cost: 390
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:00
  Index 4/4, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1 , Adjacent neighbor count is 1
    Adjacent with neighbor 5.5.5.5
  Suppress hello for 0 neighbor(s)
```

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

S1

Configure terminal
Vlan 30
Name ADMINISTRACION
Exit
Vlan 40
Name MERCADO
Exit
Vlan 200
Name MANTENIMIENTO
Exit
Int f0/3
Switchport mode trunk
Switchport trunk native vlan
Int f0/24
Switchport mode trunk
Switchport trunk native vlan 1
No shutdown
Exit
Line console 0
Pass cisco
Line vty 0 4
Enable secret cisco
Int range f0/1
Switchport mode access
Switchport access vlan 30
Exit

BOGOTA
Int f0/0.30
Description accounting LAN
Encapsulation dot1q 30
Ip address 192.168.30.1 255.255.255.0
Int f0/0.40
Description accounting LAN
Encapsulation dot1q 40
Ip address 192.168.40.1 255.255.255.0
Int f0/0.200
Description accounting LAN
Encapsulation dot1q 200
Ip address 192.168.200.1 255.255.255.0
Int f0/0
No shutdown

```
Password:
S1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
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)#int f0/3
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#int f0/24
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan1
                                          ^
% Invalid input detected at '^' marker.

S1(config-if)#switchport trunk native vlan 1
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#line console
% Incomplete command.
S1(config)#line console 0
S1(config-line)#line console
               ^
% Invalid input detected at '^' marker.

S1(config-line)#console
               ^
% Invalid input detected at '^' marker.

S1(config-line)#pass cisco
S1(config-line)#line vty 0 4
S1(config-line)#enable secret cisco
S1(config)#
```

4. En el Switch 3 deshabilitar DNS lookup

   S3

   No dns lookup
   No ip domain-lookup
   exit

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

   S1

   Configure terminal
   Int vlan 1
   Ip address 192.168.99.2 255.255.255.0
   No shutdown
   Exit

S3

Configure terminal
Int vlan 1
Ip address 192.168.99.3 255.255.255.0
No shutdown
Exit

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

S1

Configure terminal

Int f0/1

Switchport mode access

Switch access vlan 30

Int range f0/2, f0/4-23, g0/1-2

Shutdown

exit

7. Implement DHCP and NAT for IPv4

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

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

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

BOGOTA

Configure terminal

Ip dhcp excluded-address 192.168.30.1 192.168.30.30

Ip dhcp excluded-address 192.168.40.1 192.168.40.30

Ip dhcp pool ADMINISTRACION

Dns-server 10.10.10.11

Ip domain-name ccna-unad.com

Default-router 192.168.30.1

Network 192.168.30.0 255.255.255.0

Exit

Ip dhcp MERCADEO

Dns-server 10.10.10.11

Ip domain-name ccna-unad.com

Ip dhcp pool MERCADEO

Default-router 192.168.40.0 255.255.255.0

Exit

```
BOGOTA>en
Password:
BOGOTA#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
BOGOTA(config)#ip dhcp exc
% Incomplete command.
BOGOTA(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
BOGOTA(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
BOGOTA(config)#ip dhcp pool ADMINISTRACION
BOGOTA(dhcp-config)#dns-server 10.10.10.11
BOGOTA(dhcp-config)#domain-name ccna-unad.com
                   ^
% Invalid input detected at '^' marker.

BOGOTA(dhcp-config)#ip domain-name ccna-unad.com
BOGOTA(config)#default-router 192.168.30.0
              ^
% Invalid input detected at '^' marker.

BOGOTA(config)#ip dhcp pool ADMINISTRACION
BOGOTA(dhcp-config)#default-router 192.168.30.1
BOGOTA(dhcp-config)#network 192.168.30.0 255.255.255.0
BOGOTA(dhcp-config)#exit
BOGOTA(config)#ip dchp pool MERCADEO
                 ^
% Invalid input detected at '^' marker.

BOGOTA(config)#ip dhcp pool MERCADEO
BOGOTA(dhcp-config)#dns-server 10.10.10.11
BOGOTA(dhcp-config)#ip domain-name ccna-unad.com
BOGOTA(config)#ip dhcp pool MERCADEO
BOGOTA(dhcp-config)#default-router 192.168.40.1
BOGOTA(dhcp-config)#network 192.168.40.0 255.255.255.0
BOGOTA(dhcp-config)#exit
BOGOTA(config)#
```

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

MIAMI

Configure terminal
User webuser privilege 15 secret cisco12345
Ip http server
Ip http authentication local
Ip nat inside source static 10.10.10.10 209.165.200.229
Int f0/0
Ip nat outsideint f0/1
Ip nat inside
Exit
Configure terminal
Access-list 1 permit 192.168.30.0 0.0.0.255
Access-list 1 permit 192.168.40.0 0.0.0.255
Access-list 1 permit 192.168.4.0 0.0.3.255
Ip nat pool INTERNET 209.165.200.225 209.165.200.229 netmask 255.255.255.248
exit

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

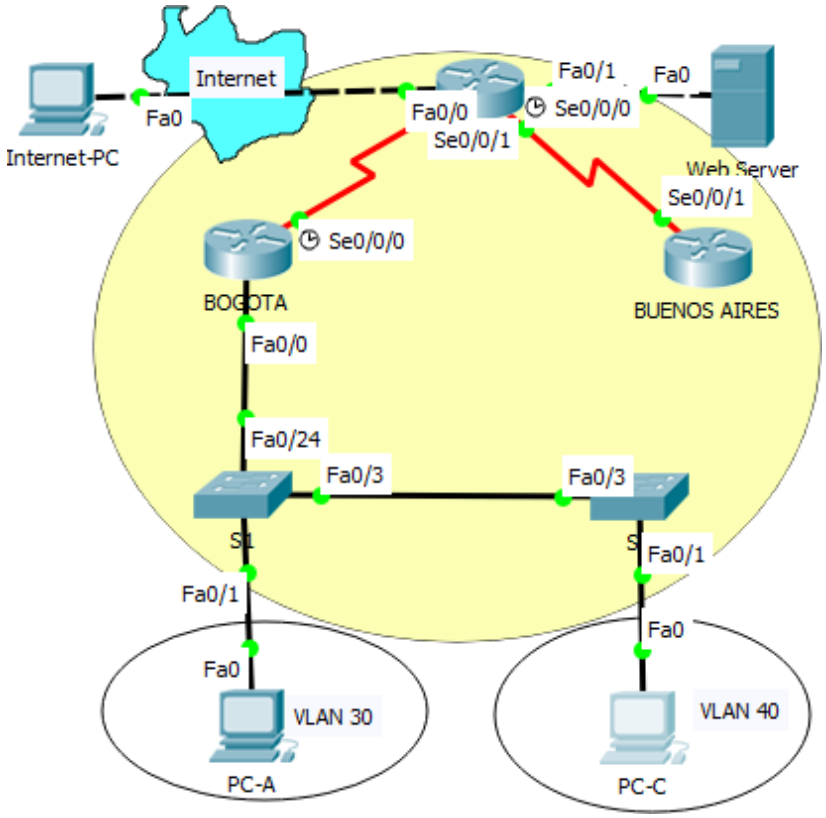
Configure terminal
Ip access-list standard ADMIN
Permit host 172.31.21.1
Exit
Line vty 0 4
Access-class ADMIN in
exit

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

Configure terminal
Access-list 100 permit tcp any host 209.165.200.229 eq www
Access-list 100 permit icmp any any echo-reply
Exit

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



PC-A

Physical | Config | Desktop | Programming | Attributes

Command Prompt

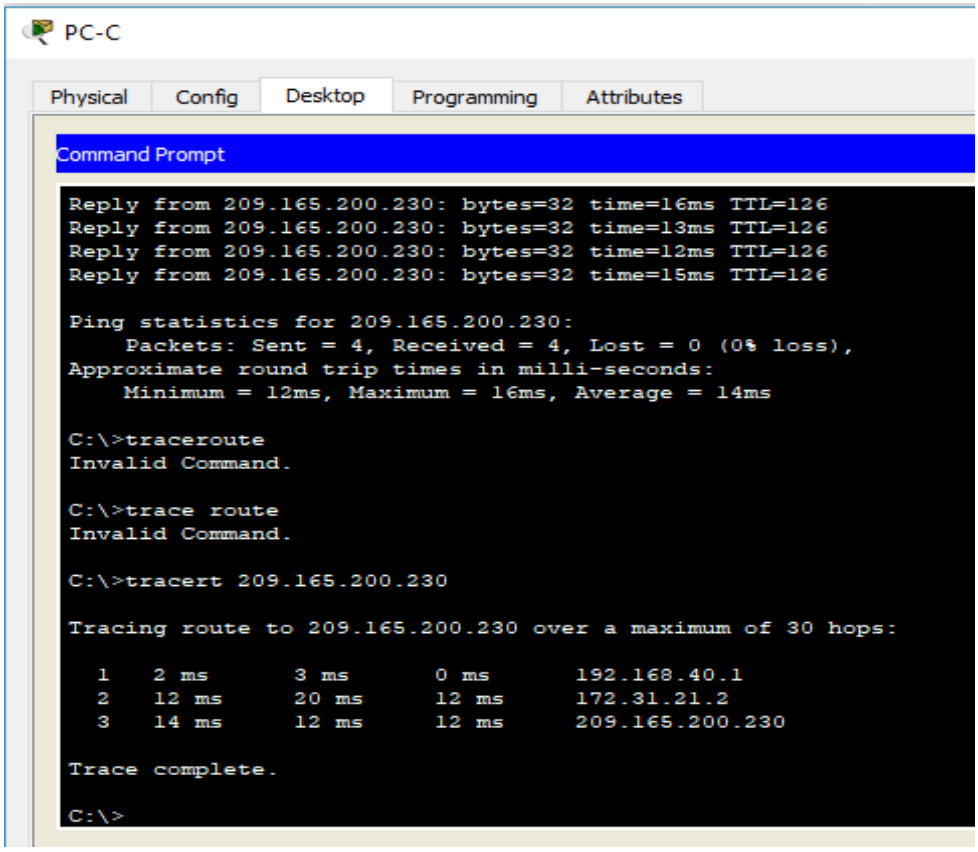
```
Packet Tracer PC Command Line 1.0
C:\>ping 209.165.200.230

Pinging 209.165.200.230 with 32 bytes of data:

Request timed out.
Reply from 209.165.200.230: bytes=32 time=13ms TTL=126
Reply from 209.165.200.230: bytes=32 time=18ms TTL=126
Reply from 209.165.200.230: bytes=32 time=30ms TTL=126

Ping statistics for 209.165.200.230:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 13ms, Maximum = 30ms, Average = 20ms

C:\>
```

PC-C

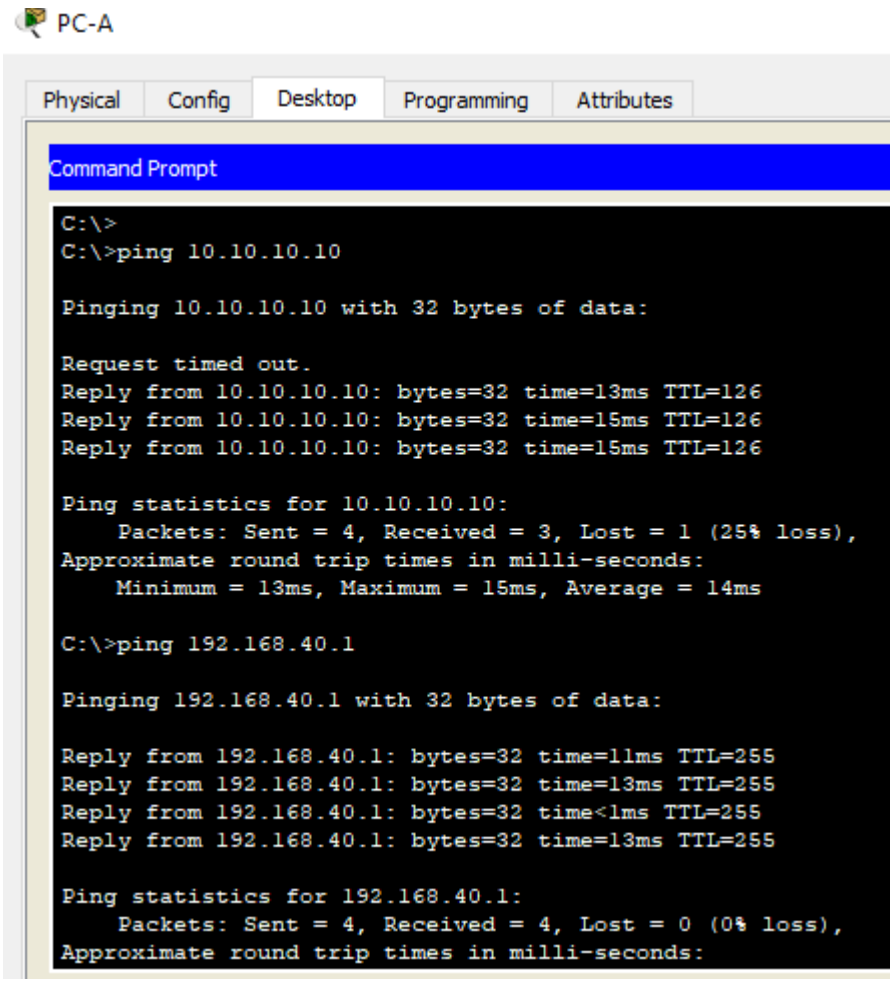
Physical | Config | Desktop | Programming | Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ping 209.165.200.230

Pinging 209.165.200.230 with 32 bytes of data:

Reply from 209.165.200.230: bytes=32 time=16ms TTL=126
Reply from 209.165.200.230: bytes=32 time=13ms TTL=126
Reply from 209.165.200.230: bytes=32 time=12ms TTL=126
Reply from 209.165.200.230: bytes=32 time=15ms TTL=126

Ping statistics for 209.165.200.230:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 12ms, Maximum = 16ms, Average = 14ms

C:\>
```


PC-C
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Reply from 209.165.200.230: bytes=32 time=16ms TTL=126
Reply from 209.165.200.230: bytes=32 time=13ms TTL=126
Reply from 209.165.200.230: bytes=32 time=12ms TTL=126
Reply from 209.165.200.230: bytes=32 time=15ms TTL=126
Ping statistics for 209.165.200.230:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 12ms, Maximum = 16ms, Average = 14ms
C:\>traceroute
Invalid Command.
C:\>trace route
Invalid Command.
C:\>tracert 209.165.200.230
Tracing route to 209.165.200.230 over a maximum of 30 hops:
1 2 ms 3 ms 0 ms 192.168.40.1
2 12 ms 20 ms 12 ms 172.31.21.2
3 14 ms 12 ms 12 ms 209.165.200.230
Trace complete.
C:\>


Physical
Config
Desktop
Programming
Attributes
Web Browser
URL
http://www.cna-unad.com
Go
Stop
Cisco Packet Tracer
Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
Quick Links:
A small page
Copyrights
Image page
Image


PC-A
Physical
Config
Desktop
Programming
Attributes
Command Prompt
C:\>
C:\>ping 10.10.10.10
Pinging 10.10.10.10 with 32 bytes of data:
Request timed out.
Reply from 10.10.10.10: bytes=32 time=13ms TTL=126
Reply from 10.10.10.10: bytes=32 time=15ms TTL=126
Reply from 10.10.10.10: bytes=32 time=15ms TTL=126
Ping statistics for 10.10.10.10:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 13ms, Maximum = 15ms, Average = 14ms
C:\>ping 192.168.40.1
Pinging 192.168.40.1 with 32 bytes of data:
Reply from 192.168.40.1: bytes=32 time=11ms TTL=255
Reply from 192.168.40.1: bytes=32 time=13ms TTL=255
Reply from 192.168.40.1: bytes=32 time<1ms TTL=255
Reply from 192.168.40.1: bytes=32 time=13ms TTL=255
Ping statistics for 192.168.40.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:

CONCLUSIONES

Este curso de profundización ha mostrado que es posible diseñar y poner en funcionamiento una red de comunicación integrando varios equipos cisco y elementos de interconexión.

En el desarrollo de la práctica pudimos observar que en la implementación de una red todos los aspectos son importantes empezando por el nombre del equipo y así mismo todos los pasos siguientes en la configuración.

Se ha podido reforzar el concepto de la utilidad de las herramientas cisco y su plataforma de aprendizaje interactivo. La colaboración entre estudiantes y tutores ha contribuido mucho en la satisfacción y bienestar de todos los estudiantes.

Con la orientación de los tutores los grupos colaborativos de estudiantes motivados por el nuevo conocimiento, trabajando de forma colaborativa y ordenada hemos logrado llevar a cabo este diplomado con gran éxito.

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