EVALUACIÓN – PRUEBA DE HABILIDADES PRÁCTICAS CCNA

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INFORME FINAL DIPLOMADO DE PROFUNDIZACIÓN CISCO
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Contenido

INTRODUCCIÓN

Con el desarrollo de la prueba de habilidades del diplomado de profundización Cisco Nosotros como estudiantes logramos implementar la temática y los diferentes conceptos que abarco el curso durante su estudio.

Para esta prueba de habilidades se va adesarrollar la topología correspondiente a dos escenarios, para esto se va a utilizar una herramienta llamada Packet Tracer , la cual abarca la conexión de redes y diferentes dispositivos que van a funcionar en cada escenario.

Dentro la implementación de los escenarios se van a desarrollar puntos como son la configuración de enrutamiento de cada uno de los elementos de la topología, verificación de protocols rip, la configuración y encapsulamientoy autenticación de ppp, diferentes configuraciones de NAT, DHCP, PAT, configuración de Vlan, configuración de interfaces, de direccionamiento ip, de router, switch y de los dispositivos pc.

Una vez desarrolladas las diferentes configuraciones vamos averificar su funcionamiento y se va a documentar por medio de captura de pantallas y código implementado para reportar la evidencia de su realización, además se va aincluir loas archivos pkta correspondientes a Packet Tracer, para caa escenario.

ABSTRACT

Taking into account, that today the development of telecommunications and the implementation of networks in different environments is of great importance, we must emphasize that the Cisco deepening course allowed us as students to develop and implement different topologies either in LAN networks and WAN that can be presented in daily life, since today the connection of networks and their different configurations is being implemented every day to reach different places.

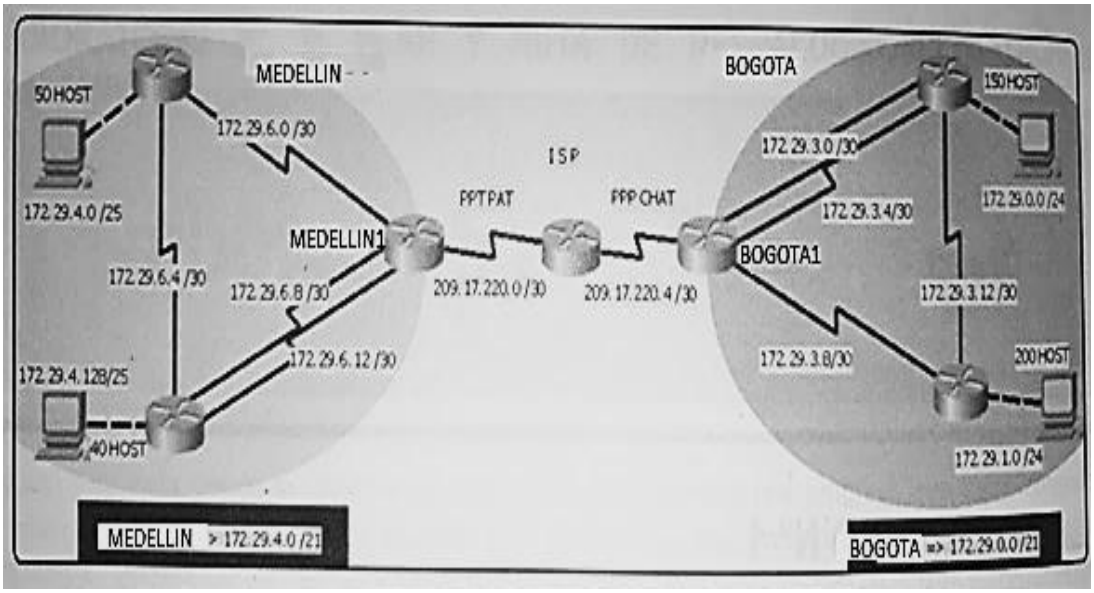
For the development of this course it was possible to show that all the knowledge acquired during this time helps us to implement it in our professional life.

DESARROLLO DE LOS DOS ESCENARIOS

1. 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.

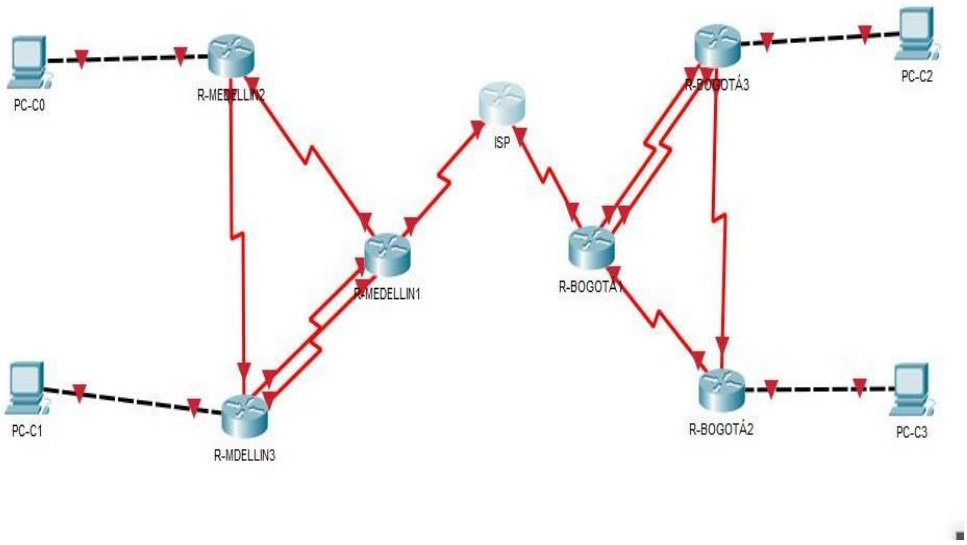
Desarrollo

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

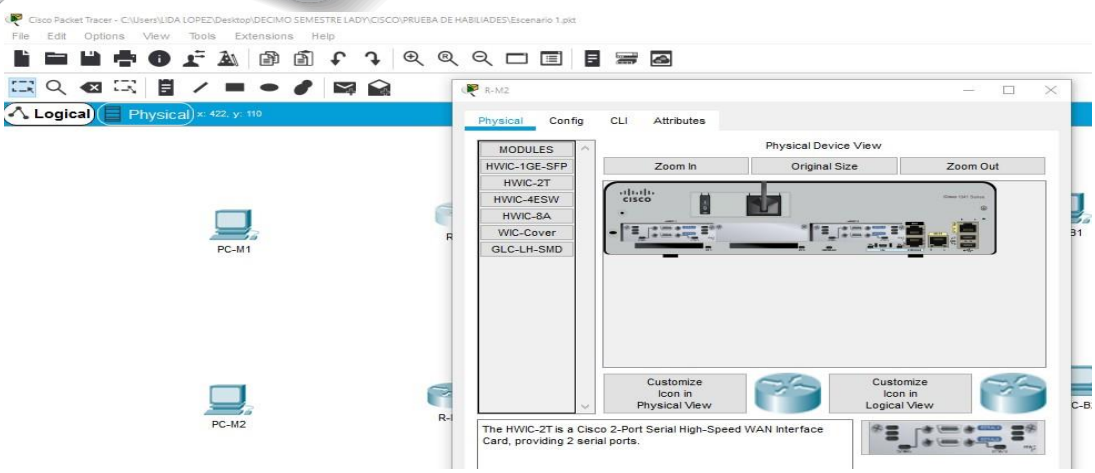
Par implementar la topologia de red, elegimos 7 router modelo 1841 ya que es el que mejor se adapta para configurar los puertos, porque cuenta con puertos de fastEthernet y puertos serial, además elegimos cuatro dispositivos de pc, para realizar la conexión.



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

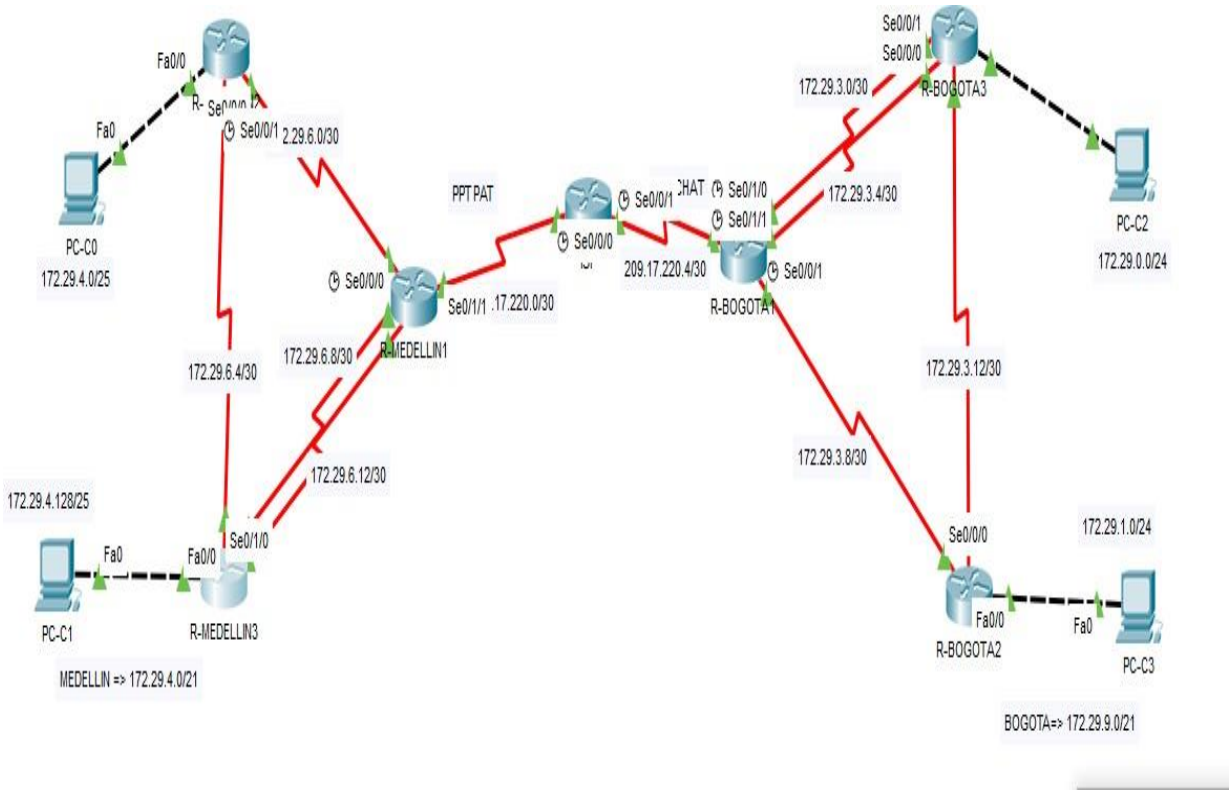
En los router aplicamos las faces serial para poder hacer la conexión:

Para cada router utilizamos el modelo de Router 1841, y a cada uno se le configuro los puertos de serie asi:



Configuración de la red según la topología sugerida:

Se configura cada router con su nombres y diferentes interfaz, luego se hace la respectiva conección, y se puede verificar que la topologia esta completa y funcionando como lo indica la guía.



CONFIGURACIÓN DE LOS ROUTER Y PC

Para el inicio de la parte 1, empezamos configurando cada terminal donde configuramos los router con su respectivo Hostname y asignamos la ip de cada dispositivo.

Router ISP

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname ISP

ISP(config)#int s0/0/0

ISP(config-if)#ip address 209.17.220.1 255.255.255.252

ISP(config-if)#no shutdown

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

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

ISP(config-if)#ip address 209.17.220.5 255.255.255.252

ISP(config-if)#clock rate 4000000

ISP(config-if)#no shutdown

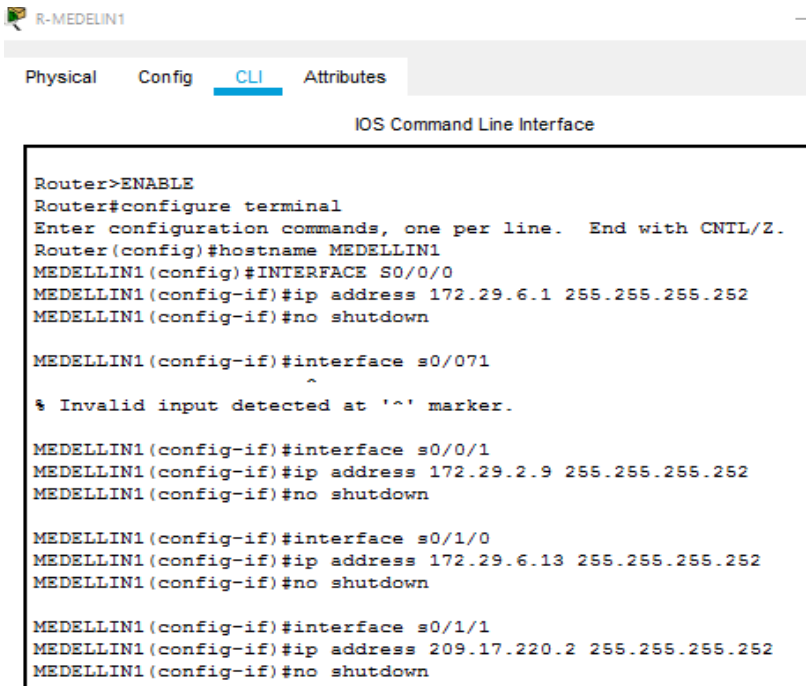
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down

ISP(config-if)#

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

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

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

Router Medellin1

Router>ENABLE
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN1
MEDELLIN1(config)#INTERFACE S0/0/0
MEDELLIN1(config-if)#ip address 172.29.6.1 255.255.255.252
MEDELLIN1(config-if)#no shutdown
MEDELLIN1(config-if)#interface s0/0/1
MEDELLIN1(config-if)#ip address 172.29.6.9 255.255.255.252
MEDELLIN1(config-if)#no shutdown
MEDELLIN1(config-if)#interface s0/1/0
MEDELLIN1(config-if)#ip address 172.29.6.13 255.255.255.252
MEDELLIN1(config-if)#no shutdown
MEDELLIN1(config-if)#interface s0/1/1
MEDELLIN1(config-if)#ip address 209.17.220.2 255.255.255.252
MEDELLIN1(config-if)#no shutdown
MEDELLIN1(config-if)#



Router MEDELLIN2

Router>ENABLE

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname MEDELLIN2

MEDELLIN2(config)#interface s0/0/0

MEDELLIN2(config-if)#ip address 172.29.6.2 255.255.255.252

MEDELLIN2(config-if)#no shutdown

MEDELLIN2(config-if)#

MEDELLIN2(config-if)#interface s0/0/1

MEDELLIN2(config-if)#ip address 172.29.6.5 255.255.255.252

MEDELLIN2(config-if)#no shutdown

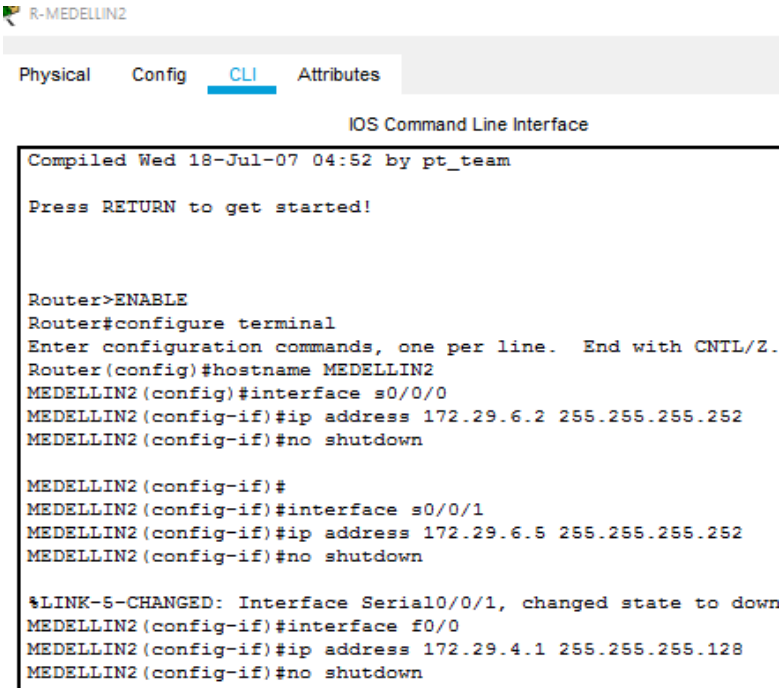
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down

MEDELLIN2(config-if)#interface f0/0

MEDELLIN2(config-if)#ip address 172.29.4.1 255.255.255.128

MEDELLIN2(config-if)#no shutdown

MEDELLIN2(config-if)#



Router MEDELLIN3

Router>ENABLE

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname MEDDELIN3

MEDDELIN3(config)#INTERFACE S0/0/0

MEDDELIN3(config-if)#ip address 172.29.6.10 255.255.255.252

MEDDELIN3(config-if)#no shutdown

MEDDELIN3(config-if)#interface s0/0/1

MEDDELIN3(config-if)#ip address 172.29.6.14 255.255.255.252

MEDDELIN3(config-if)#no shutdown

MEDDELIN3(config-if)#interface s0/1/0

MEDDELIN3(config-if)#ip address 172.29.6.6 255.255.255.252

MEDDELIN3(config-if)#no shutdown

MEDDELIN3(config-if)#interface f0/0

MEDDELIN3(config-if)#ip address 172.29.4.129 255.255.255.128

MEDDELIN3(config-if)#no shutdown

MEDDELIN3(config-if)#copy running-config startup-config

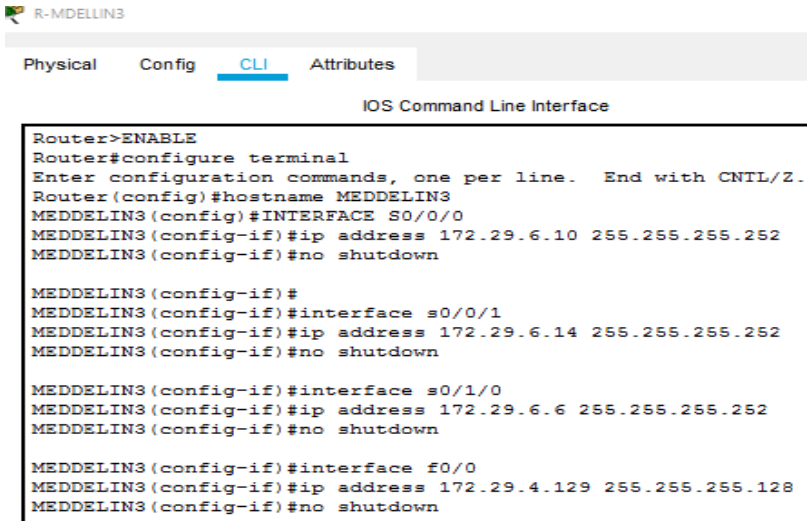
MEDDELIN3(config-if)#exit

MEDDELIN3(config)#exit

MEDDELIN3#copy running-config startup-config

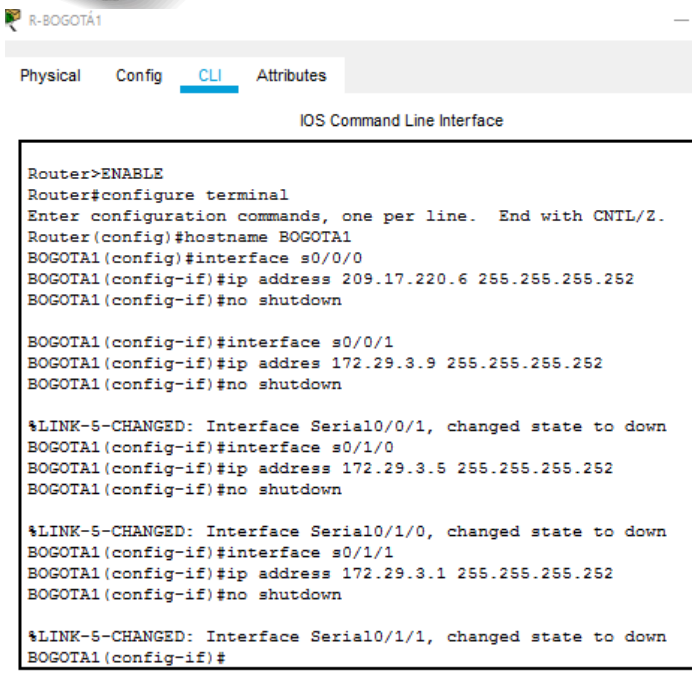
Destination filename [startup-config]?

Building configuration...



ROUTER BOGOTA1

```
Router>ENABLE
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA1
BOGOTA1(config)#interface s0/0/0
BOGOTA1(config-if)#ip address 209.17.220.6 255.255.255.252
BOGOTA1(config-if)#no shutdown
BOGOTA1(config-if)#interface s0/0/1
BOGOTA1(config-if)#ip addres 172.29.3.9 255.255.255.252
BOGOTA1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
BOGOTA1(config-if)#interface s0/1/0
BOGOTA1(config-if)#ip address 172.29.3.5 255.255.255.252
BOGOTA1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
BOGOTA1(config-if)#interface s0/1/1
BOGOTA1(config-if)#ip address 172.29.3.1 255.255.255.252
BOGOTA1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
BOGOTA1(config-if)#
```



ROUTER BOGOTA2

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname BOGOTA2

BOGOTA2(config)#interface s0/0/0

BOGOTA2(config-if)#ip address 172.29.3.10 255.255.255.252

BOGOTA2(config-if)#no shutdown

BOGOTA2(config-if)#interface s0/0/1

BOGOTA2(config-if)#ip address 172.29.3.13 255.255.255.252

BOGOTA2(config-if)#no shutdown

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

BOGOTA2(config-if)#interface f0/0

BOGOTA2(config-if)#ip address 172.29.1.1 255.255.255.0

BOGOTA2(config-if)#no shutdown

BOGOTA2(config-if)#exit

BOGOTA2(config)#exit

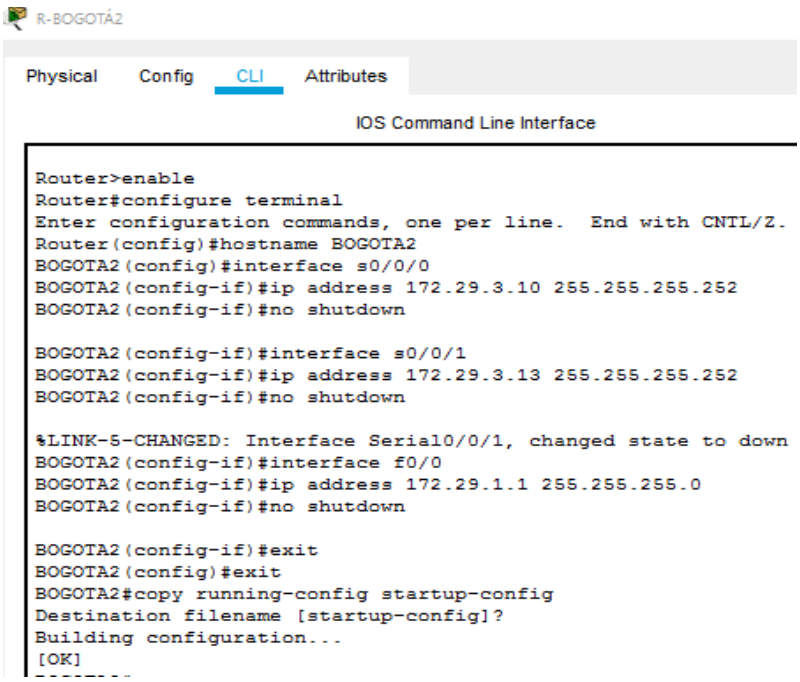
BOGOTA2#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

BOGOTA2#



ROUTER BOGOTA3

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname BOGOTA3

BOGOTA3(config)#interface s0/0/0

BOGOTA3(config-if)#ip address 172.29.3.2 255.255.255.252

BOGOTA3(config-if)#no shutdown

BOGOTA3(config-if)#interface s0/0/1

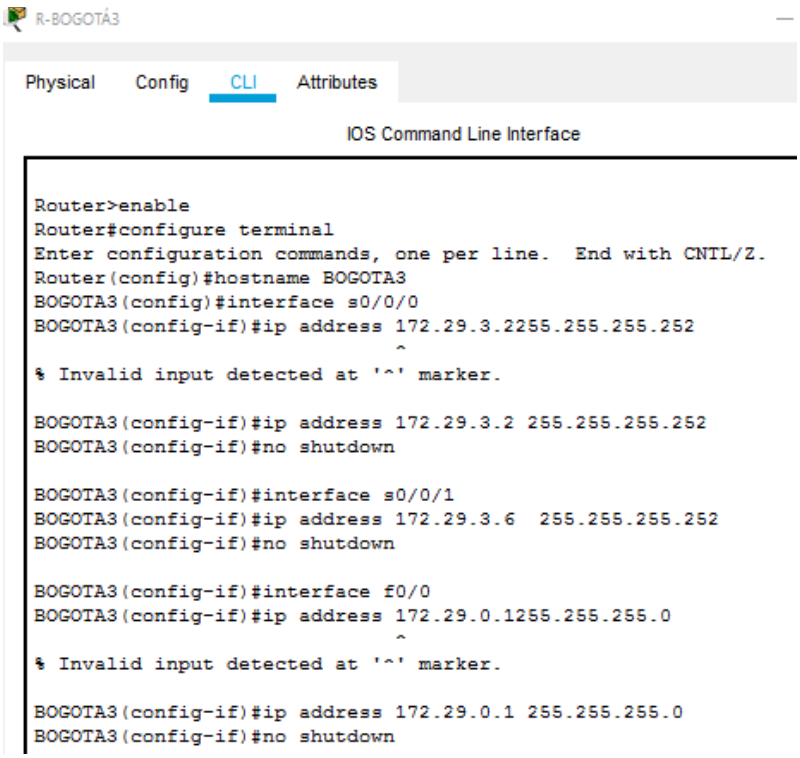
BOGOTA3(config-if)#ip address 172.29.3.6 255.255.255.252

BOGOTA3(config-if)#no shutdown

BOGOTA3(config-if)#interface f0/0

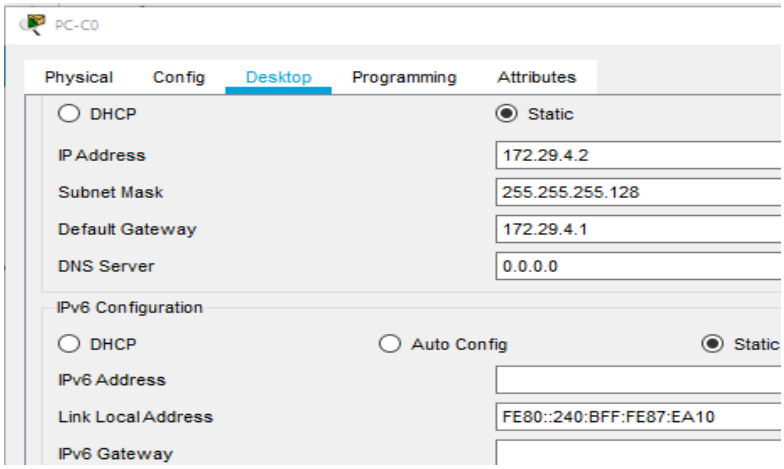
BOGOTA3(config-if)#ip address 172.29.0.1 255.255.255.0

BOGOTA3(config-if)#no shutdown



Configuración de los pc: asignamos la dirección IP, la máscara de red y la dirección del Gateway con respecto a las indicaciones dadas.

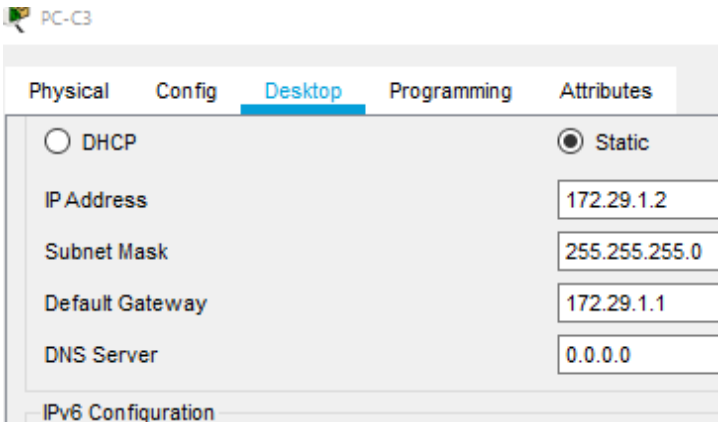
Pc-c0



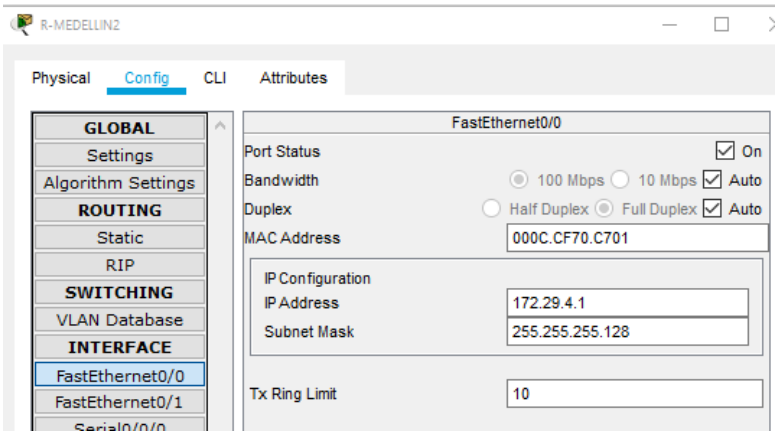
Pc-c1

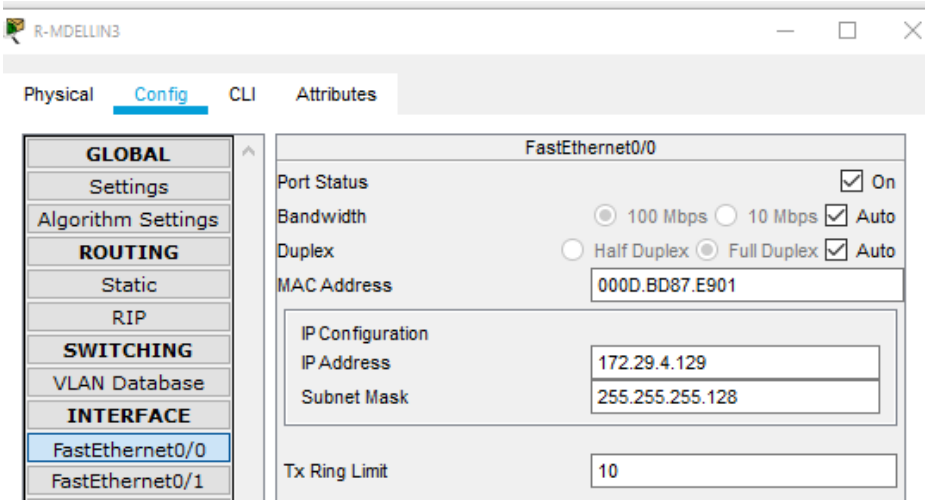
Pc-c2

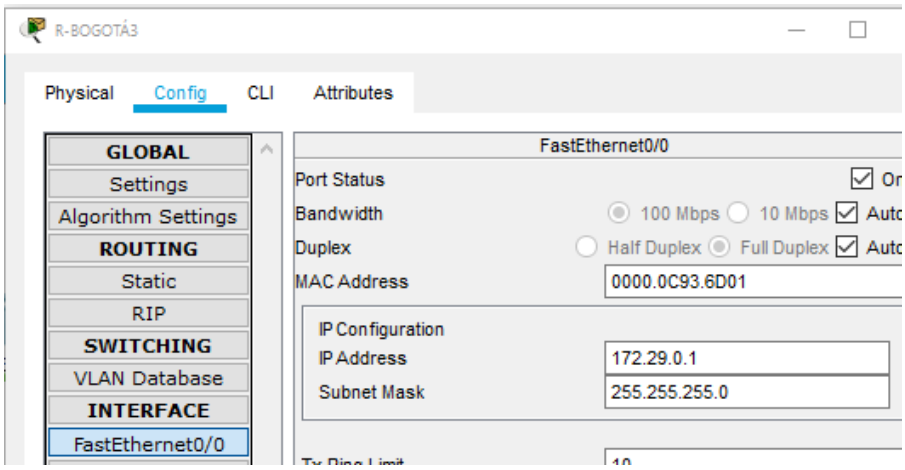
Pc-c3

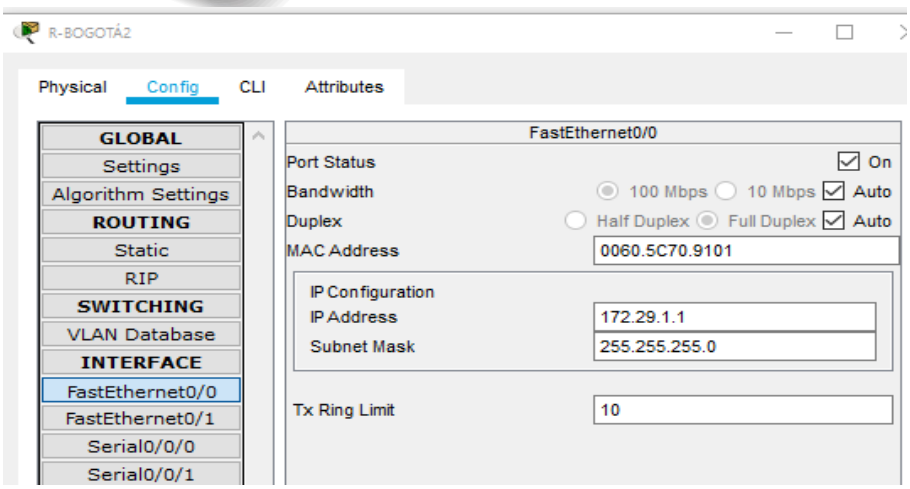


Para poder continuar con la configuración se debe habilitar los puertos de cada sucursal:









Parte 1: Configuración del enrutamiento

Configurar el enrutamiento en la red usando el protocolo RIP versión 2, declare la red principal, desactive la sumarización automática.

Una vez realizada la configuración de cada interfaz con sus direcciones ip a cada dispositivo, vamos a configurar el RIP en cada sucursal.

La configuración de enrutamiento usando el protocolo RIP se realiza e cada zona utilizando la verión 2 y nos pide dasactivar la sumarización automática.

MEDELLIN1

MEDELLIN1(config-if)#router rip

MEDELLIN1(config-router)#version 2

MEDELLIN1(config-router)#no auto-summary

MEDELLIN1(config-router)#do show ip route connected

C 172.29.2.8/30 is directly connected, Serial0/0/1

C 172.29.6.0/30 is directly connected, Serial0/0/0

C 172.29.6.12/30 is directly connected, Serial0/1/0

C 209.17.220.0/30 is directly connected, Serial0/1/1

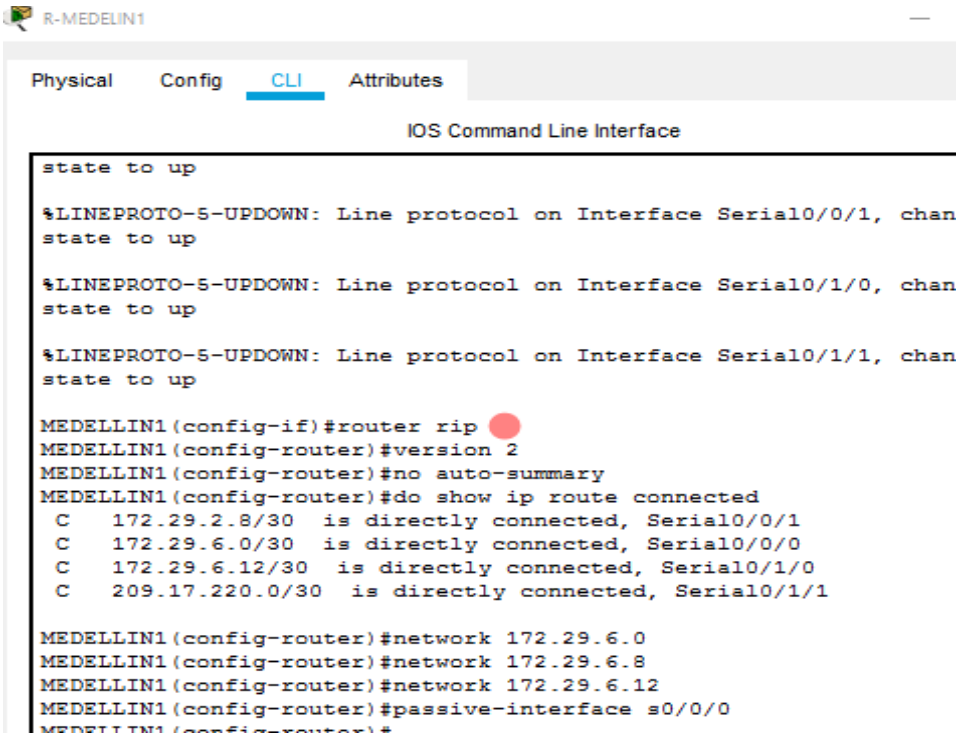
MEDELLIN1(config-router)#network 172.29.6.0

MEDELLIN1(config-router)#network 172.29.6.8

MEDELLIN1(config-router)#network 172.29.6.12

MEDELLIN1(config-router)#passive-interface s0/0/0

MEDELLIN1(config-router)#



MEDELLIN2

MEDELLIN2(config-if)#exit

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, FastEthernet0/0

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)#

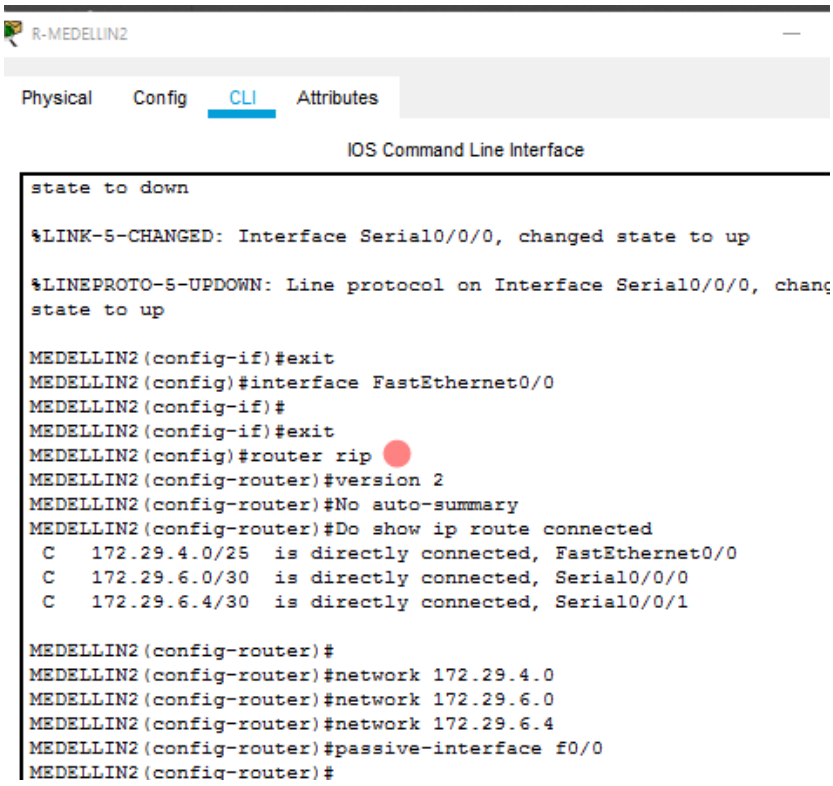
MEDELLIN2(config-router)#network 172.29.4.0

MEDELLIN2(config-router)#network 172.29.6.0

MEDELLIN2(config-router)#network 172.29.6.4

MEDELLIN2(config-router)#passive-interface f0/0

MEDELLIN2(config-router)#



MEDELLIN3

MEDDELIN3(config)#router rip

MEDDELIN3(config-router)#version 2

MEDDELIN3(config-router)#No auto-summary

MEDDELIN3(config-router)#Do show ip route connected

C 172.29.4.128/25 is directly connected, FastEthernet0/0

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

MEDDELIN3(config-router)#Network 172.29.4.128

MEDDELIN3(config-router)#Network 172.29.6.4

MEDDELIN3(config-router)#Network 172.29.6.8

MEDDELIN3(config-router)#Network 172.29.6.12

MEDDELIN3(config-router)#exit

MEDDELIN3(config)#exit

MEDDELIN3#

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

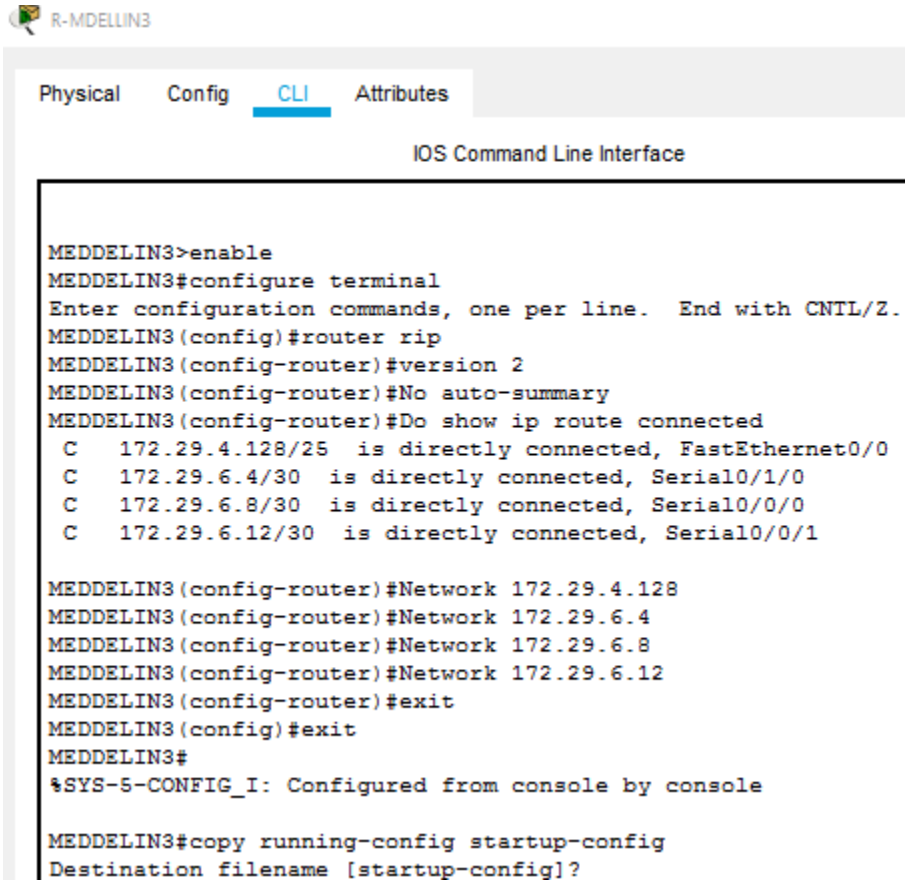
MEDDELIN3#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

MEDDELIN3#



BOGOTA1

BOGOTA1(config)#router rip

BOGOTA1(config-router)#version 2

BOGOTA1(config-router)#No auto-summaryDo show ip route connected Network 172.29.3.0

BOGOTA1(config-router)#no auto-summary

BOGOTA1(config-router)#do show ip route connected

C 172.29.3.0/30 is directly connected, Serial0/1/1

C 172.29.3.4/30 is directly connected, Serial0/1/0

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)#Network 172.29.3.0

BOGOTA1(config-router)#Network 172.29.3.4

BOGOTA1(config-router)#Network 172.29.3.8

BOGOTA1(config-router)#Network 209.17.220.4

BOGOTA1(config-router)#

BOGOTA1(config-router)#exit

BOGOTA1(config)#exit

BOGOTA1#

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

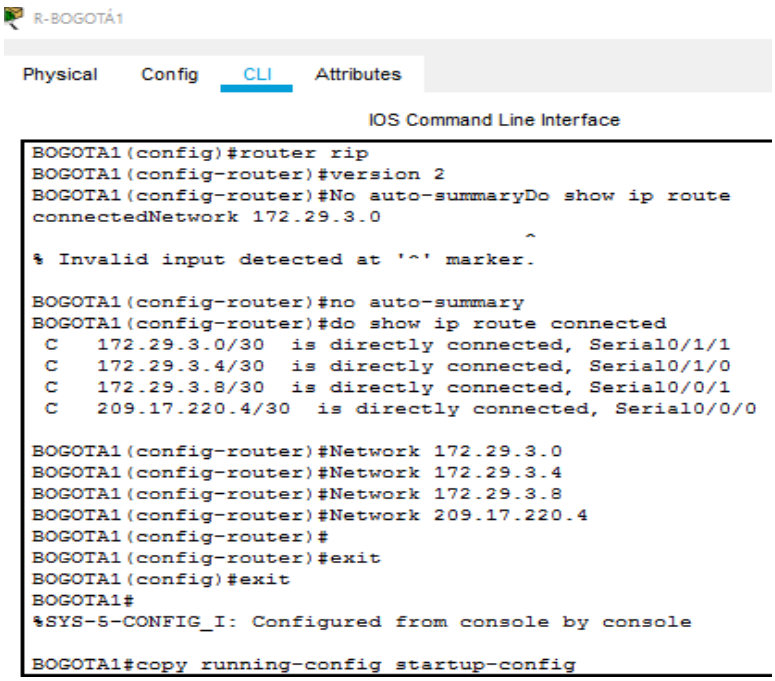
BOGOTA1#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

BOGOTA1#



Bogota2

BOGOTA2(config-if)#exit

BOGOTA2(config)#router rip

BOGOTA2(config-router)#version 2

BOGOTA2(config-router)#No auto-summary

BOGOTA2(config-router)#do show ip route connected

C 172.29.1.0/24 is directly connected, FastEthernet0/0

C 172.29.3.8/30 is directly connected, Serial0/0/0

C 172.29.3.12/30 is directly connected, Serial0/0/1

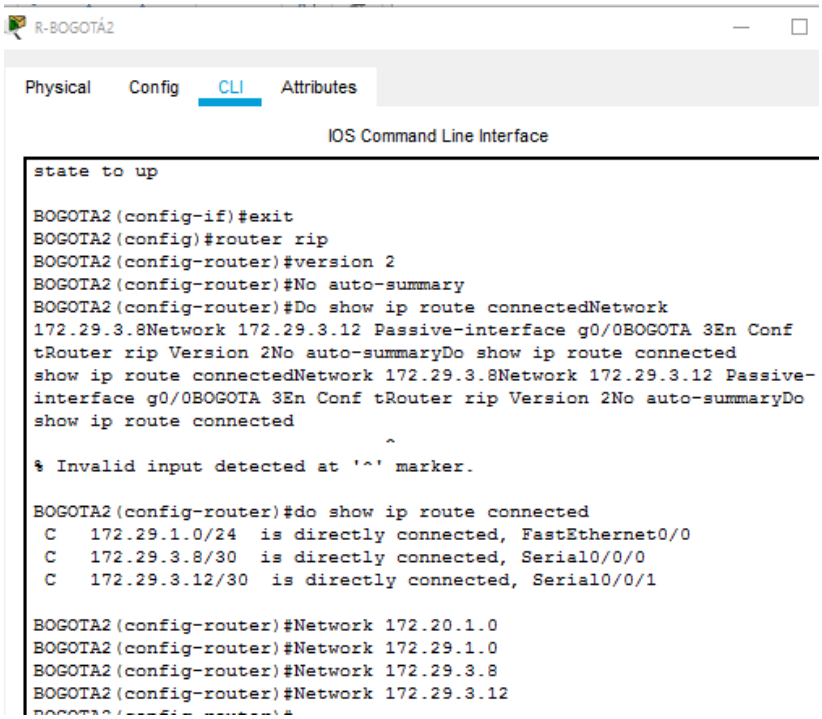
BOGOTA2(config-router)#Network 172.20.1.0

BOGOTA2(config-router)#Network 172.29.1.0

BOGOTA2(config-router)#Network 172.29.3.8

BOGOTA2(config-router)#Network 172.29.3.12

BOGOTA2(config-router)#



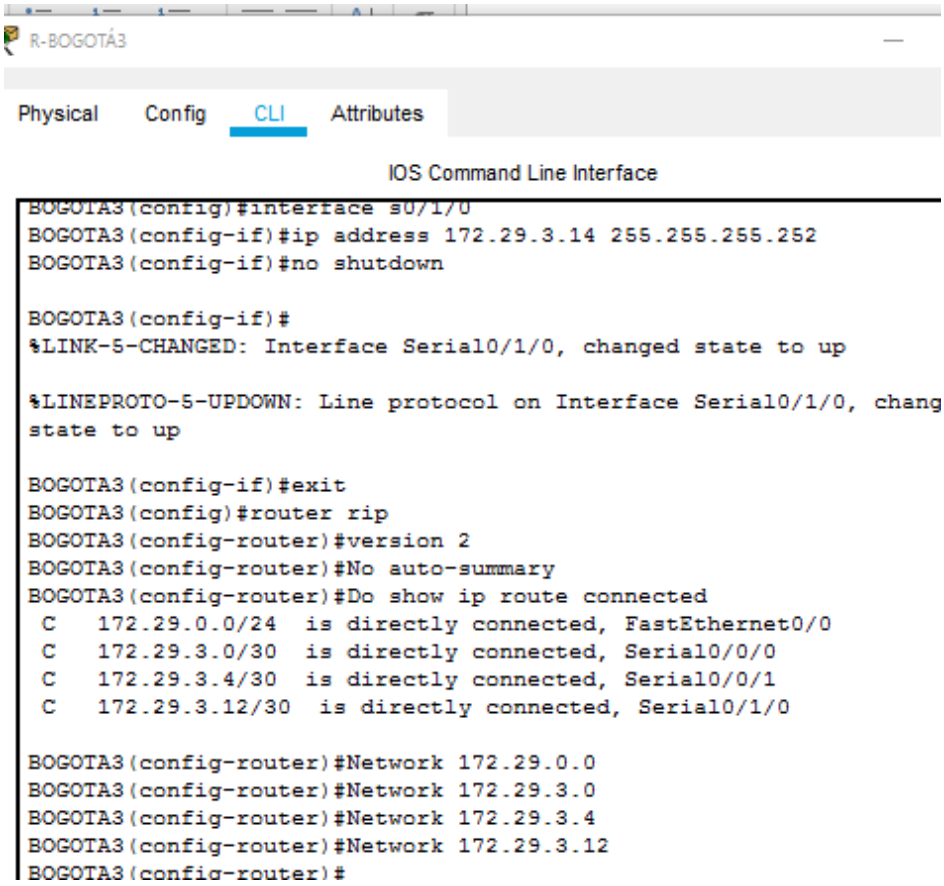
BOGOTA3

BOGOTA3(config-if)#exit

BOGOTA3(config)#router rip

BOGOTA3(config-router)#version 2
BOGOTA3(config-router)#No auto-summary
BOGOTA3(config-router)#Do show ip route connected
C 172.29.0.0/24 is directly connected, FastEthernet0/0
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

BOGOTA3(config-router)#Network 172.29.0.0
BOGOTA3(config-router)#Network 172.29.3.0
BOGOTA3(config-router)#Network 172.29.3.4
BOGOTA3(config-router)#Network 172.29.3.12
BOGOTA3(config-router)#



ISP

ISP>ENABLE

ISP#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

ISP(config)#router rip

ISP(config-router)#version 2

ISP(config-router)#No auto-summary

ISP(config-router)#Do show ip route connected

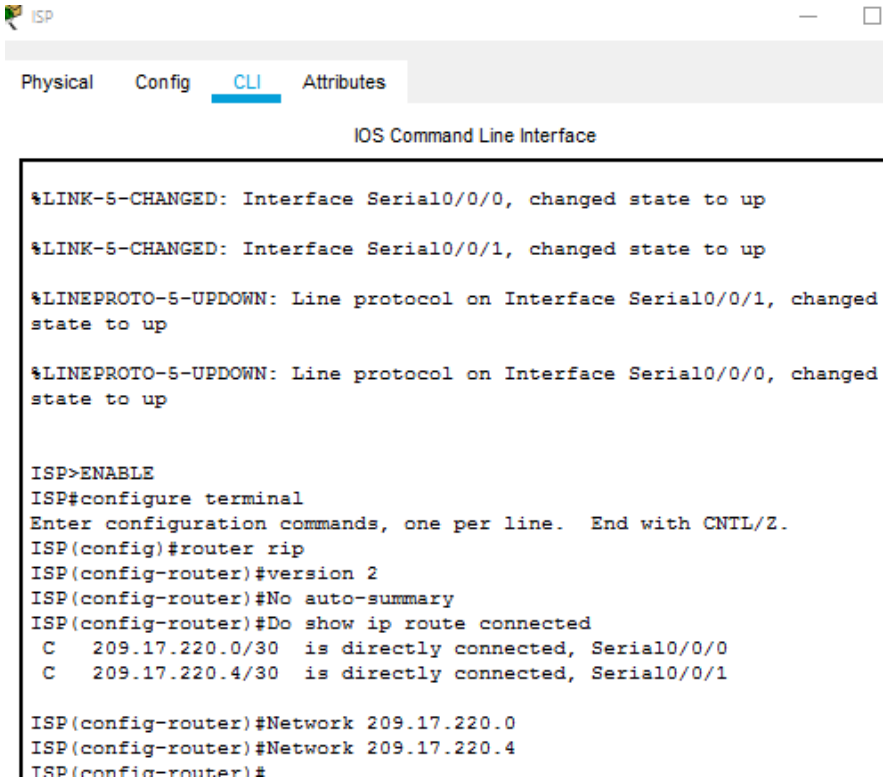
C 209.17.220.0/30 is directly connected, Serial0/0/0

C 209.17.220.4/30 is directly connected, Serial0/0/1

ISP(config-router)#Network 209.17.220.0

ISP(config-router)#Network 209.17.220.4

ISP(config-router)#



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.

Para el intercambio de información de enrutamiento ente router se debe de utilizar el mismo protocolo RIP.

Al redistribuir en RIP el protocolo, este utiliza una métrica por defecto, con lo que es necesario especificar una métrica para que el router vecino incorpore la información de enrutamiento en su tabla.

Para la configuración de BOGOTA1 Y MEDELLIN1 se configura la ruta por defecto hacia el ISP.

MEDELLIN1

MEDELLIN1>ENABLE

MEDELLIN1#configure terminal

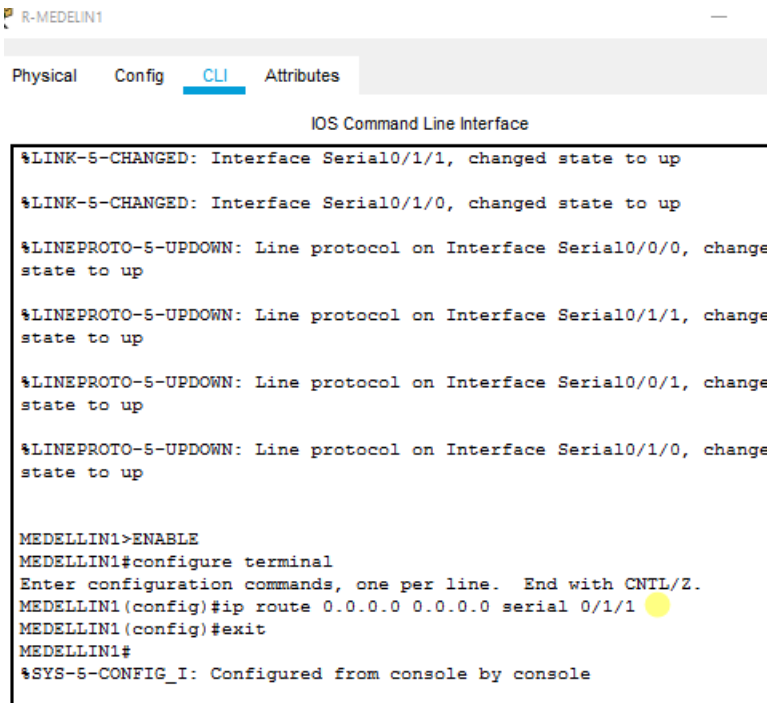
Enter configuration commands, one per line. End with CNTL/Z.

MEDELLIN1(config)#ip route 0.0.0.0 0.0.0.0 serial 0/1/1

MEDELLIN1(config)#exit

MEDELLIN1#

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



BOGOTA1

BOGOTA1>enable

BOGOTA1#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

BOGOTA1(config)#ip route 0.0.0.0 0.0.0.0 s0/0/0

BOGOTA1(config)#exit

BOGOTA1#

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

```
BOGOTA1>enable
BOGOTA1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
BOGOTA1(config)#ip route 0.0.0.0 0.0.0.0 s0/0/0
BOGOTA1(config)#exit
BOGOTA1#
%SYS-5-CONFIG_I: Configured from console by console
```

Una vez configurado BOGOTA1 y MEDELLIN1 con rutas estaticas a ISP, **procedemos a realizar la redistribución:**

MEDELIN1

MEDELLIN1#enable

MEDELLIN1#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

MEDELLIN1(config)#route rip

MEDELLIN1(config-router)#version 2

MEDELLIN1(config-router)#redistribute rip metric 1

MEDELLIN1(config-router)#exit

MEDELLIN1(config)#

```
MEDELLIN1#enable
MEDELLIN1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
MEDELLIN1(config)#route rip
MEDELLIN1(config-router)#version 2
MEDELLIN1(config-router)#redistribute rip metric 1
MEDELLIN1(config-router)#exit
MEDELLIN1(config)#
```

BOGOTA1

BOGOTA1#ENABLE

BOGOTA1#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

BOGOTA1(config)#route rip

BOGOTA1(config-router)#version 2

BOGOTA1(config-router)#redistribute rip metric 1

BOGOTA1(config-router)#exit

BOGOTA1(config)#exit

BOGOTA1#

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

BOGOTA1#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

BOGOTA1#

```
BOGOTA1#ENABLE
BOGOTA1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
BOGOTA1(config)#route rip
BOGOTA1(config-router)#version 2
BOGOTA1(config-router)#redistribute rip metric 1
BOGOTA1(config-router)#exit
BOGOTA1(config)#exit
BOGOTA1#
%SYS-5-CONFIG_I: Configured from console by console

BOGOTA1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
BOGOTA1#
```

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 y configuramos una ruta estática de ISP a BOGOTA1 y MEDELLIN1:

ISP

ISP>enable

ISP#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#ip route 172.29.4.0 255.255.252.0 s0/0/0
ISP(config)#ip route 172.29.0.0 255.255.252.0 s0/0/1
ISP(config)#exit
ISP#
%SYS-5-CONFIG_I: Configured from console by console
ISP#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

Nota: verificamos ping de BOGOTA 3 A BOGOTA 1

BOGOTA3#ping 172.29.3.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.29.3.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms

BOGOTA3#

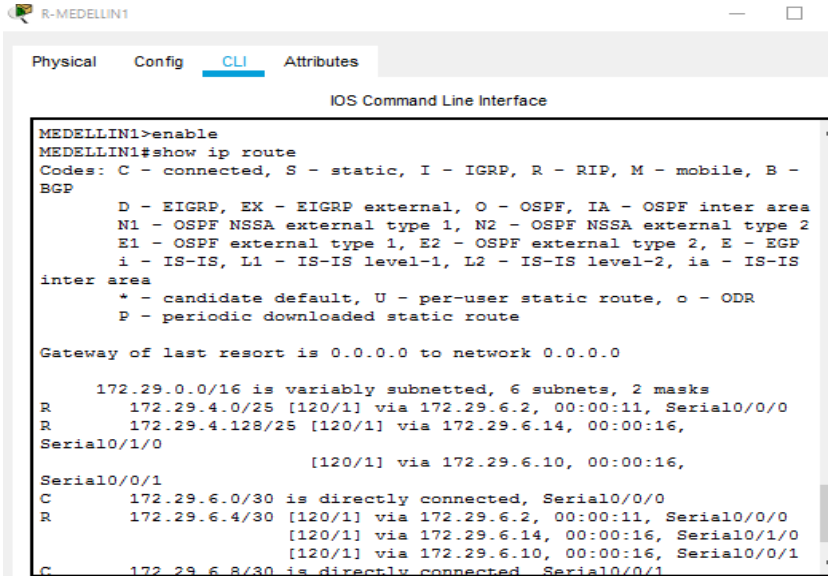
```
BOGOTA3#ping 172.29.3.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.29.3.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms

BOGOTA3#
```

Parte 2: Tabla de Enrutamiento.

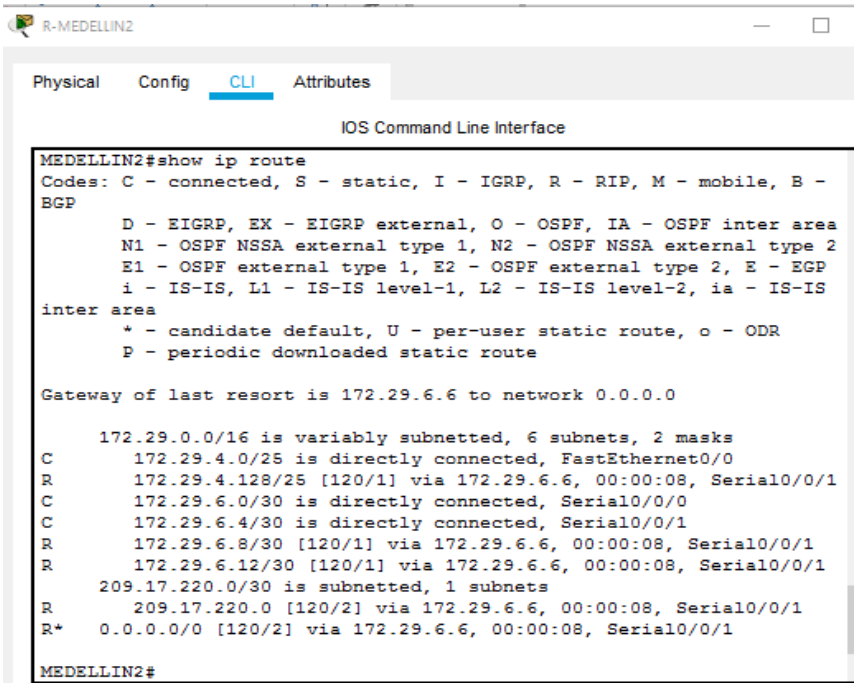
Verificar la tabla de enrutamiento en cada uno de los routers para comprobar las redes y sus rutas.

Vamos a verificar la tabla de enrutamiento de cada route por medio del comando show ip route:

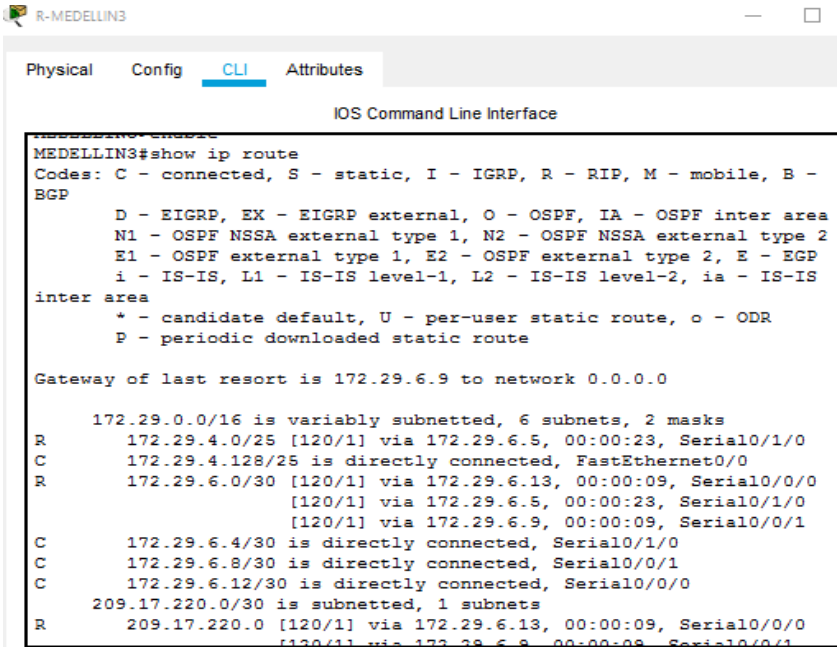
MEDELLIN1



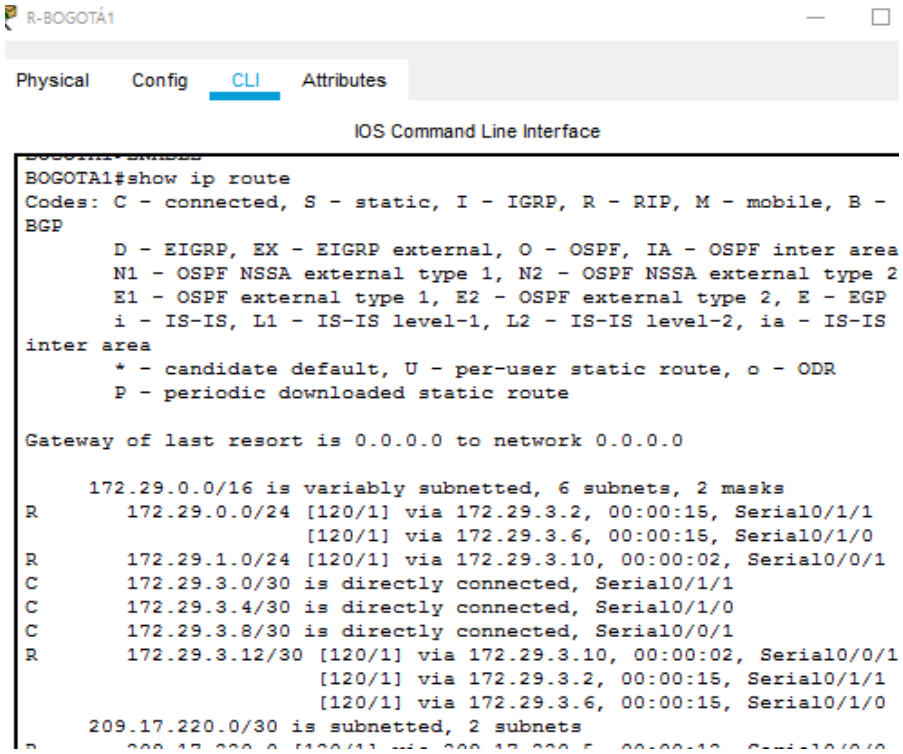
MEDELLIN2



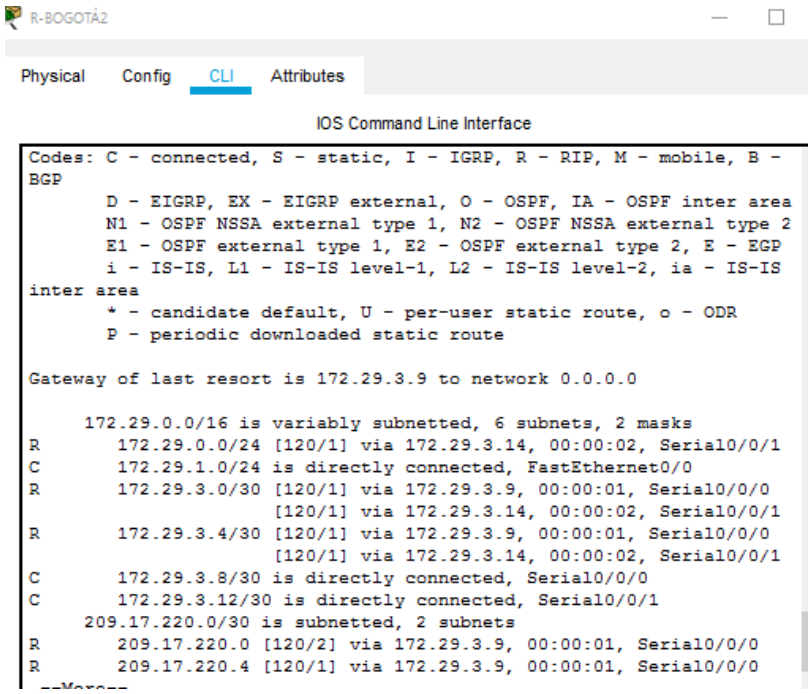
MEDELLIN3



BOGOTA1



BOGOTA2

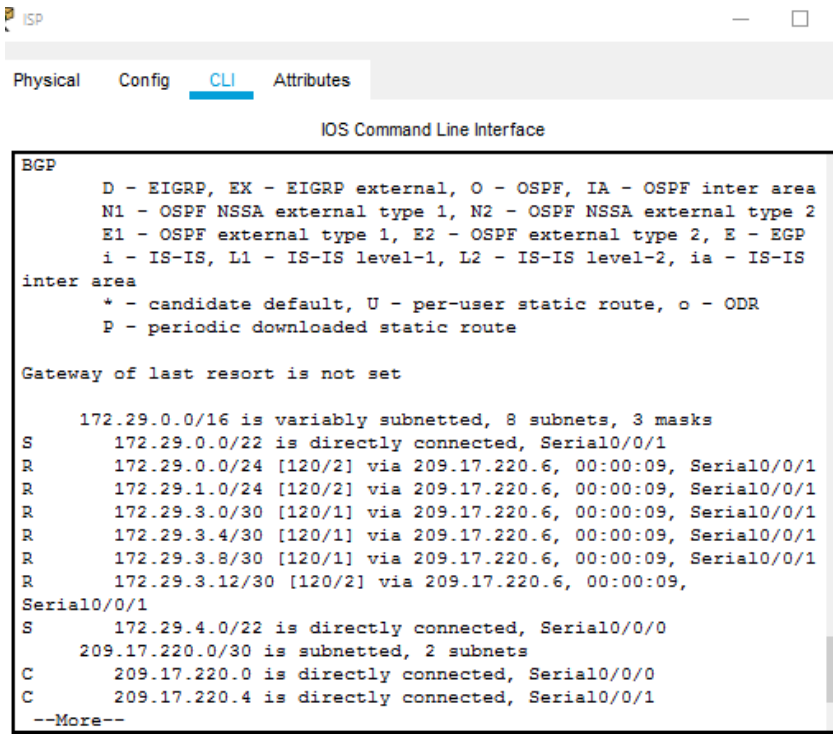



```
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B -
BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, 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 172.29.3.9 to network 0.0.0.0

     172.29.0.0/16 is variably subnetted, 6 subnets, 2 masks
R       172.29.0.0/24 [120/1] via 172.29.3.14, 00:00:02, Serial0/0/1
C       172.29.1.0/24 is directly connected, FastEthernet0/0
R       172.29.3.0/30 [120/1] via 172.29.3.9, 00:00:01, Serial0/0/0
                      [120/1] via 172.29.3.14, 00:00:02, Serial0/0/1
R       172.29.3.4/30 [120/1] via 172.29.3.9, 00:00:01, Serial0/0/0
                      [120/1] via 172.29.3.14, 00:00:02, Serial0/0/1
C       172.29.3.8/30 is directly connected, Serial0/0/0
C       172.29.3.12/30 is directly connected, Serial0/0/1
     209.17.220.0/30 is subnetted, 2 subnets
R       209.17.220.0 [120/2] via 172.29.3.9, 00:00:01, Serial0/0/0
R       209.17.220.4 [120/1] via 172.29.3.9, 00:00:01, Serial0/0/0
 --More--
```

BOGOTA3

```
BOGOTA3>enable
BOGOTA3#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 172.29.3.5 to network 0.0.0.0

     172.29.0.0/16 is variably subnetted, 6 subnets, 2 masks
C       172.29.0.0/24 is directly connected, FastEthernet0/0
R       172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:21, Serial0/1/0
C       172.29.3.0/30 is directly connected, Serial0/0/0
C       172.29.3.4/30 is directly connected, Serial0/0/1
R       172.29.3.8/30 [120/1] via 172.29.3.1, 00:00:06, Serial0/0/0
                      [120/1] via 172.29.3.5, 00:00:06, Serial0/0/1
                      [120/1] via 172.29.3.13, 00:00:21, Serial0/1/0
C       172.29.3.12/30 is directly connected, Serial0/1/0
     209.17.220.0/30 is subnetted, 2 subnets
```

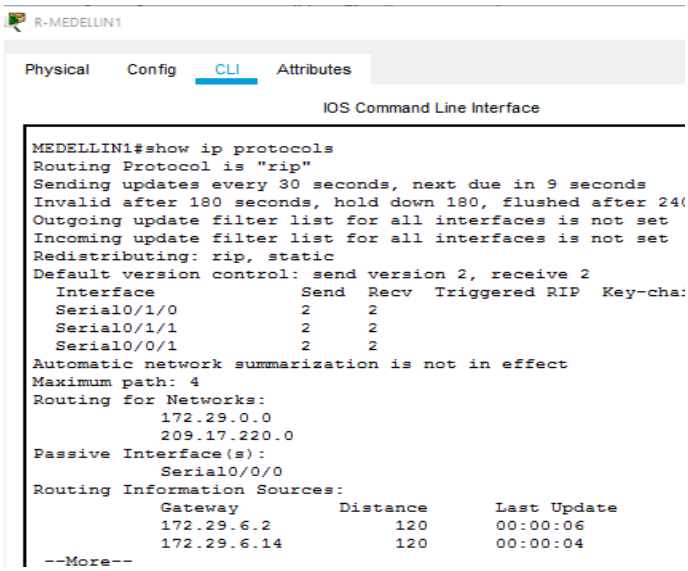
ISP



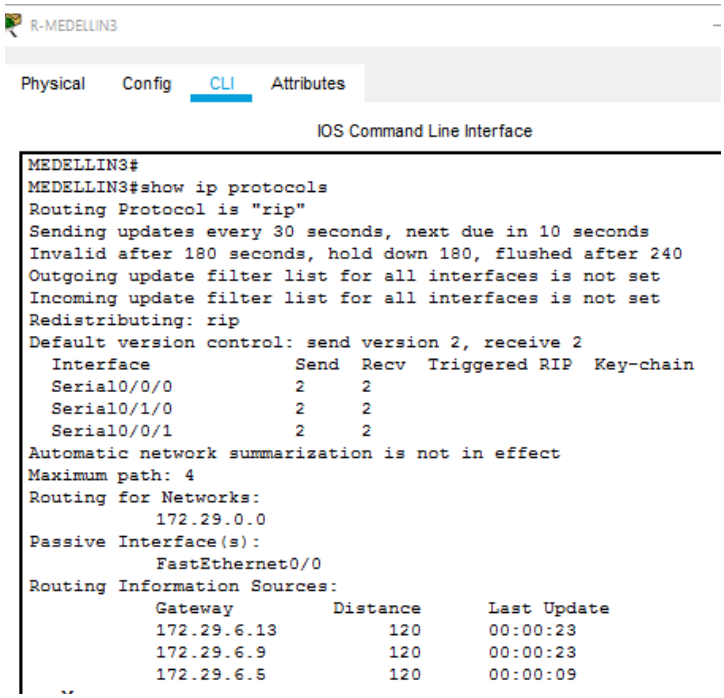
Verificar el balanceo de carga que presentan los routers.

Para verificar el balanceo de carga nos dirigimos a los router donde hay conexiones dobles , para este caso en MEDELLIN1, MEDDELIN3, BOGOTA1, BOGOTA3.

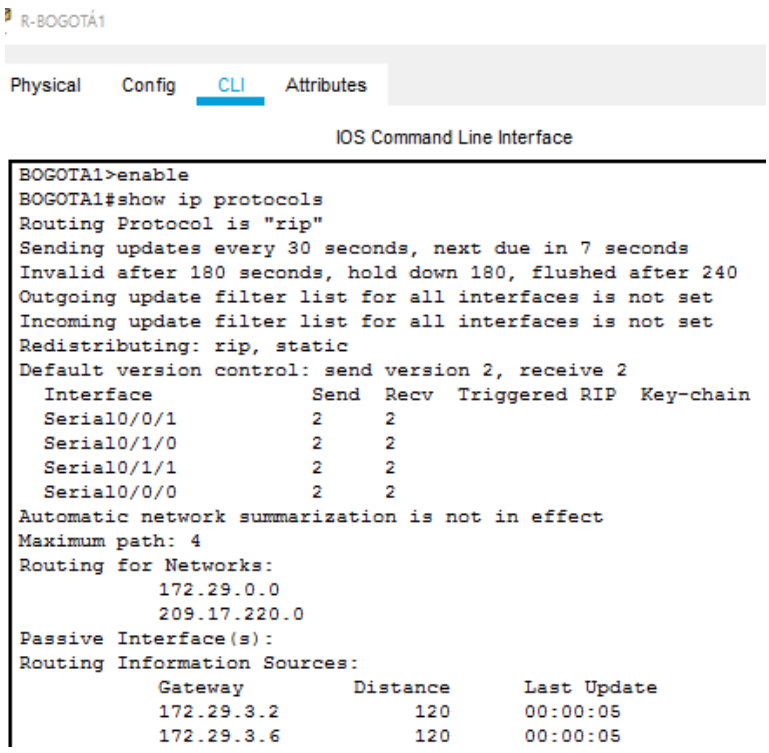
Utilizamos el comando show ip protocols



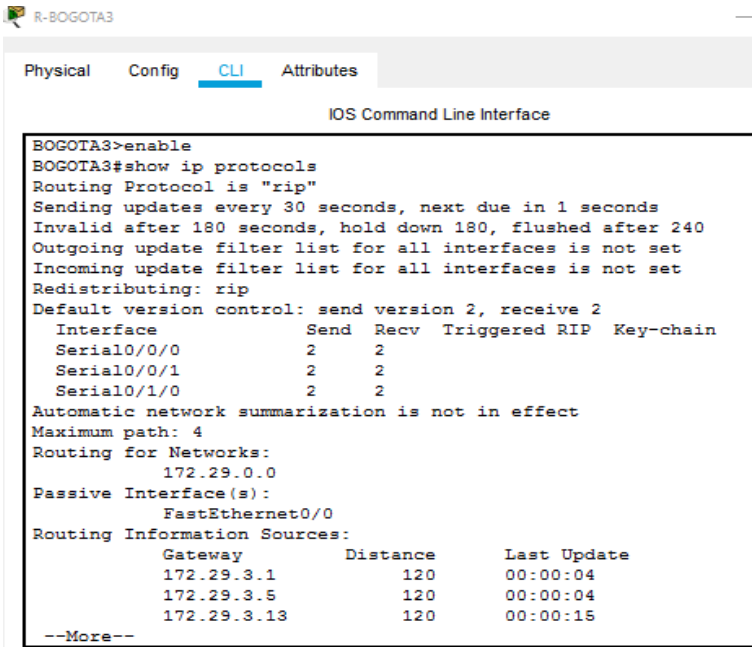
MEDELLIN3



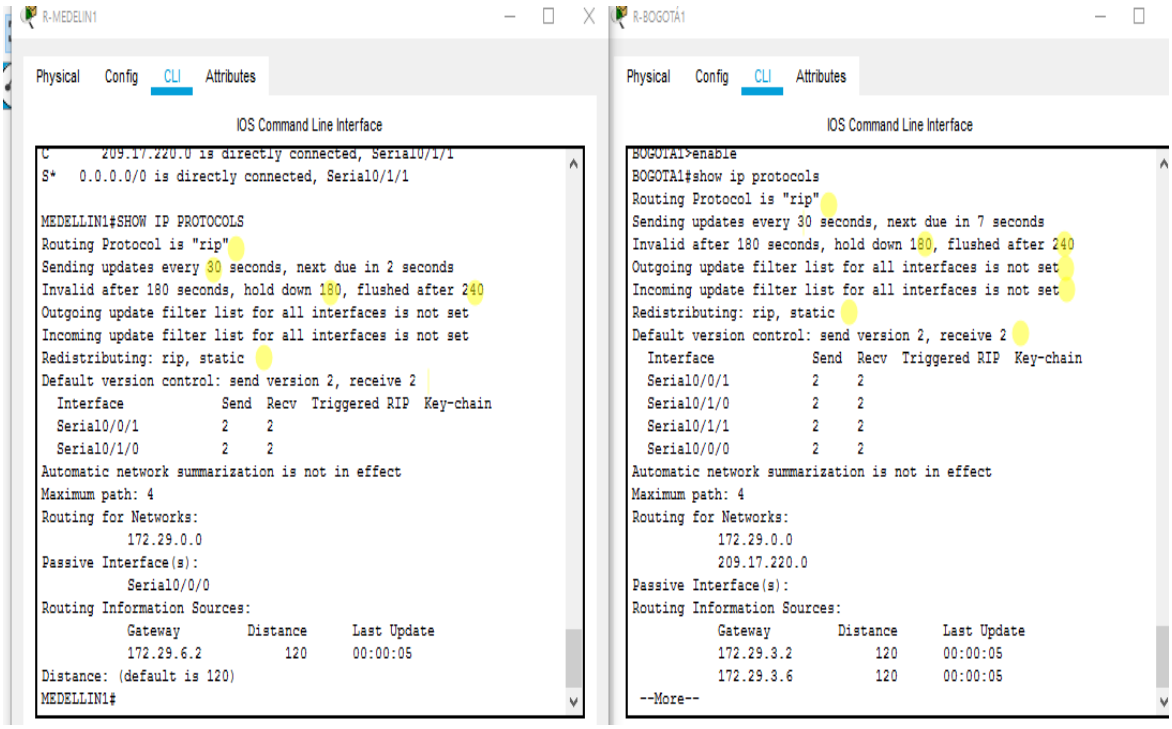
BOGOTA1



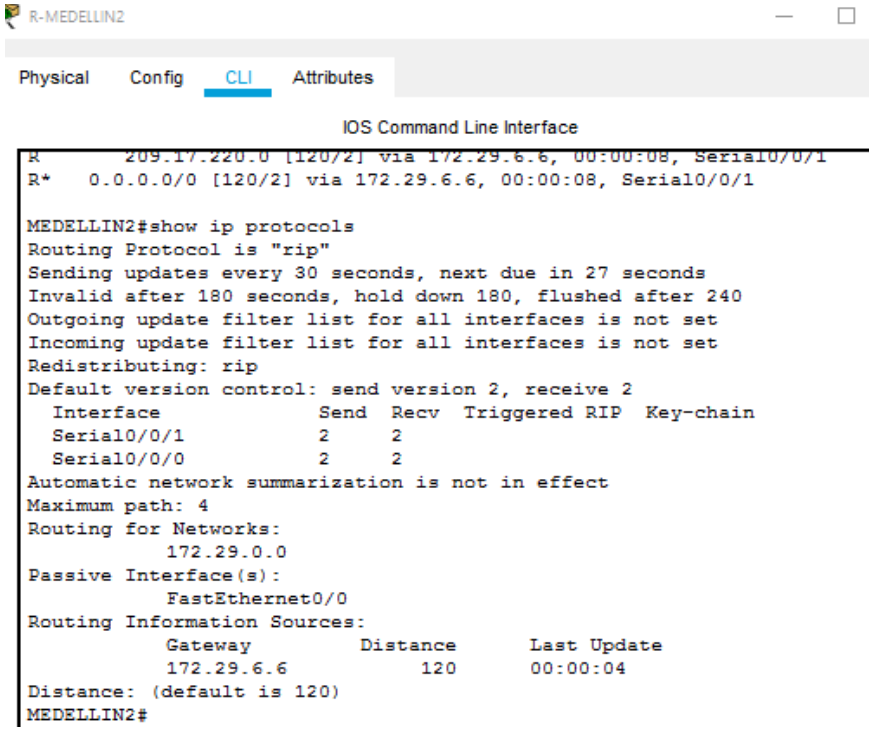
BOGOTA3



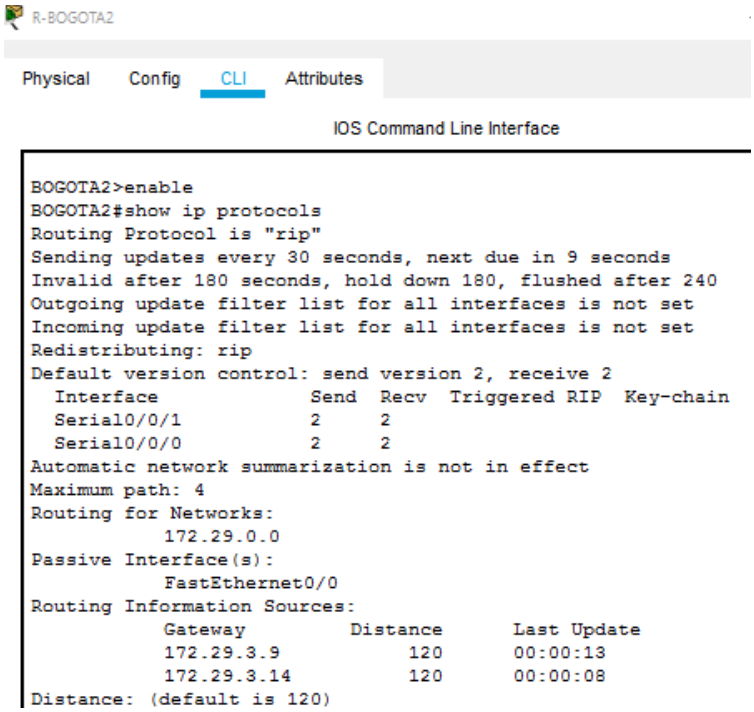
Obsérvese en los routers Bogotá1 y Medellín1 cierta similitud por su ubicación, por tener dos enlaces de conexión hacia otro router y por la ruta por defecto que manejan.



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

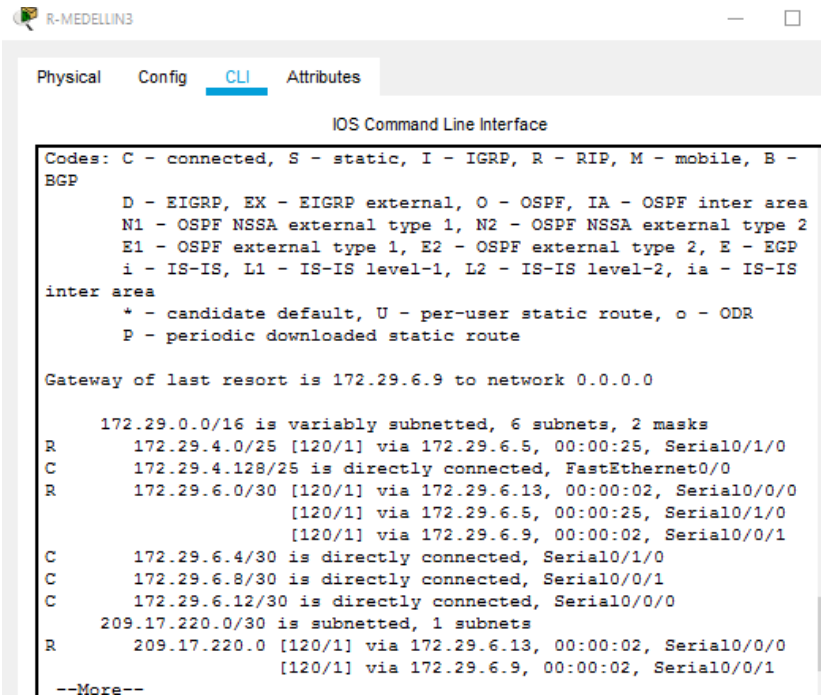


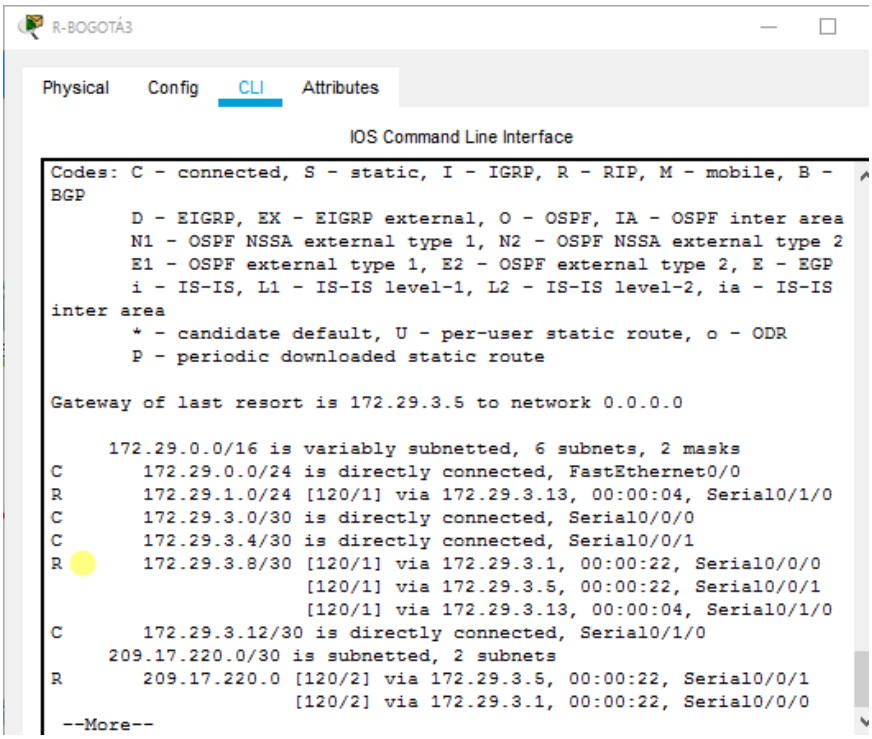
BOGOTA2



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

Cuando los router presentan más de una camino se puede considerar que son rutas rebundantes:





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

ISP>enable

ISP#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 209.17.220.2 to network 0.0.0.0

172.29.0.0/16 is variably subnetted, 8 subnets, 3 masks

S 172.29.0.0/22 is directly connected, Serial0/0/1

[1/0] via 209.17.220.6

S 172.29.4.0/22 is directly connected, Serial0/0/0

[1/0] via 209.17.220.2

R 172.29.4.0/25 [120/2] via 209.17.220.2, 00:00:13, Serial0/0/0

R 172.29.4.128/25 [120/2] via 209.17.220.2, 00:00:13, Serial0/0/0

R 172.29.6.0/30 [120/1] via 209.17.220.2, 00:00:13, Serial0/0/0

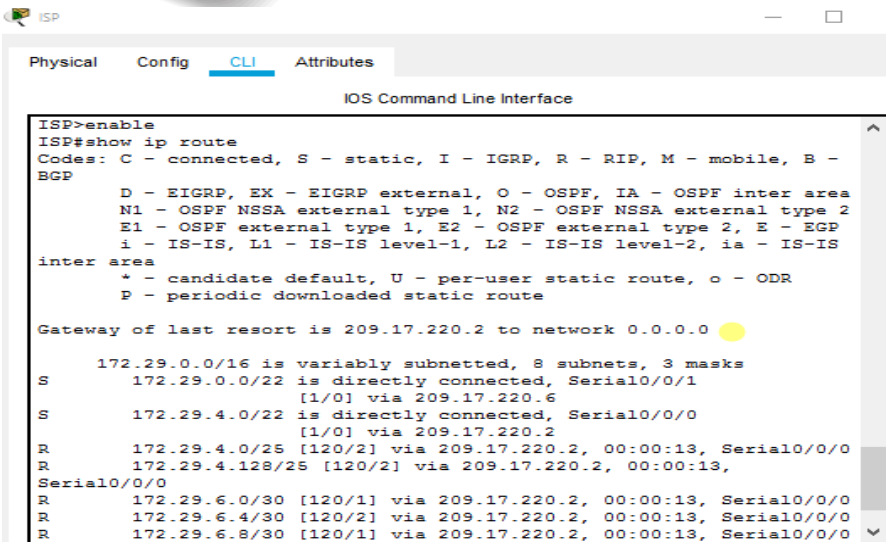
R 172.29.6.4/30 [120/2] via 209.17.220.2, 00:00:13, Serial0/0/0

R 172.29.6.8/30 [120/1] via 209.17.220.2, 00:00:13, Serial0/0/0

R 172.29.6.12/30 [120/1] via 209.17.220.2, 00:00:13, Serial0/0/0

209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks

--More--



Parte 3: Deshabilitar la propagación del protocolo RIP.

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

Vamos a deshabilitar la propagación del protocolo RIP

En el router BOGOTA1 la IP 209.17.225.5 a través de la interfaz S0/0/0 del router de BOGOTA1, por lo tanto, se debe desactivar:

BOGOTA1

BOGOTA1>enable

BOGOTA1#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

BOGOTA1(config)#router rip

BOGOTA1(config-router)#version 2

BOGOTA1(config-router)#passive-interface serial0/0/0

BOGOTA1(config-router)#exit

BOGOTA1(config)#exit

BOGOTA1#

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

BOGOTA1#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

BOGOTA1#

```
BOGOTA1>enable
BOGOTA1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
BOGOTA1(config)#router rip
BOGOTA1(config-router)#version 2
BOGOTA1(config-router)#passive-interface serial0/0/0
BOGOTA1(config-router)#exit
BOGOTA1(config)#exit
BOGOTA1#
%SYS-5-CONFIG_I: Configured from console by console

BOGOTA1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
BOGOTA1#
```

Router MEDELIN1 IP 172.29.6.2 através de la interfaz S0/0/0 del router de MEDELLIN1, por lo tanto SE desactiva:

MEDELLIN1>enable

MEDELLIN1#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

MEDELLIN1(config)#route rip

MEDELLIN1(config-router)#version 2

MEDELLIN1(config-router)#passive-interface serial0/0/0

MEDELLIN1(config-router)#exit

MEDELLIN1(config)#exit

MEDELLIN1#

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

MEDELLIN1#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

MEDELLIN1#

```
MEDELLIN1>enable
MEDELLIN1#configure terminal
Enter configuration commands, one per line.  End with CNTL
MEDELLIN1(config)#route rip
MEDELLIN1(config-router)#version 2
MEDELLIN1(config-router)#passive-interface serial0/0/0
MEDELLIN1(config-router)#exit
MEDELLIN1(config)#exit
MEDELLIN1#
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
MEDELLIN1#
```

Router BOGOTA2 desactivamos f0/0

BOGOTA2>enable

BOGOTA2#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

BOGOTA2(config)#route rip

BOGOTA2(config-router)#version 2

BOGOTA2(config-router)#passive-interface f0/0

BOGOTA2(config-router)#exit

BOGOTA2(config)#exit

BOGOTA2#

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

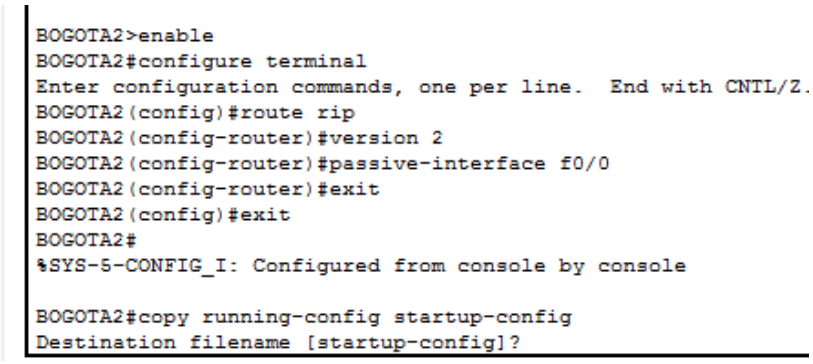
BOGOTA2#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

BOGOTA2#



Router BOGOTA3 desactivamos f0/0

BOGOTA3>enable

BOGOTA3#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

BOGOTA3(config)#route rip

BOGOTA3(config-router)#version 2

BOGOTA3(config-router)#passive-interface f0/0

BOGOTA3(config-router)#exit

BOGOTA3(config)#exit

BOGOTA3#

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

BOGOTA3#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

BOGOTA3#

```
BOGOTA3>enable
BOGOTA3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
BOGOTA3(config)#route rip
BOGOTA3(config-router)#version 2
BOGOTA3(config-router)#passive-interface f0/0
BOGOTA3(config-router)#exit
BOGOTA3(config)#copy running-config startup-config
                ^
% Invalid input detected at '^' marker.

BOGOTA3(config)#exit
BOGOTA3#
%SYS-5-CONFIG_I: Configured from console by console

BOGOTA3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

Router MEDELIN2 desactivamos f0/0

MEDELLIN2>ENABLE

MEDELLIN2#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

MEDELLIN2(config)#route rip

MEDELLIN2(config-router)#version 2

MEDELLIN2(config-router)#passive-interface f0/0

MEDELLIN2(config-router)#exit

MEDELLIN2(config)#exit

MEDELLIN2#

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

MEDELLIN2#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

MEDELLIN2#

```
MEDELLIN2>ENABLE
MEDELLIN2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z
MEDELLIN2(config)#route rip
MEDELLIN2(config-router)#version 2
MEDELLIN2(config-router)#passive-interface f0/0
MEDELLIN2(config-router)#exit
MEDELLIN2(config)#exit
MEDELLIN2#
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
MEDELLIN2#
```

Router MEDELIN3 desactivamos f0/0

MEDDELIN3>enable

MEDDELIN3#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

MEDDELIN3(config)#route rip

MEDDELIN3(config-router)#version 2

MEDDELIN3(config-router)#passive-interface f0/0

MEDDELIN3(config-router)#exit

MEDDELIN3(config)#exit

MEDDELIN3#

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

MEDDELIN3#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

MEDDELIN3#

```
MEDDELIN3>enable
MEDDELIN3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
MEDDELIN3(config)#route rip
MEDDELIN3(config-router)#version 2
MEDDELIN3(config-router)#passive-interface f0/0
MEDDELIN3(config-router)#exit
MEDDELIN3(config)#exit
MEDDELIN3#
%SYS-5-CONFIG_I: Configured from console by console

MEDDELIN3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
MEDDELIN3#
```

Router ISP Desactivamos la S0/0/0 y S0/0/1:

ISP>enable

ISP#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

ISP(config)#route rip

ISP(config-router)#version 2

ISP(config-router)#passive-interface serial0/0/0

ISP(config-router)#passive-interface serial0/0/1

ISP(config-router)#exit

ISP(config)#exit

ISP#

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

ISP#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

ISP#

```
ISP>enable
ISP#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z
ISP(config)#route rip
ISP(config-router)#version 2
ISP(config-router)#passive-interface serial0/0/0
ISP(config-router)#passive-interface serial0/0/1
ISP(config-router)#exit
ISP(config)#exit
ISP#
%SYS-5-CONFIG_I: Configured from console by console

ISP#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
ISP#
```

Parte 4: Verificación del protocolo RIP.

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.

Para poder visualizar el enrutamiento de passive interface vamos a ejecutar el comando show ip protocols.

MEDELLIN1

MEDELLIN1>enable

MEDELLIN1#show ip protocols

Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 12 seconds

Invalid after 180 seconds, hold down 180, flushed after 240

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Redistributing: rip, static

Default version control: send version 2, receive 2

Interface Send Recv Triggered RIP Key-chain

Serial0/0/1 2 2

Serial0/1/0 2 2

Automatic network summarization is not in effect

Maximum path: 4

Routing for Networks:

172.29.0.0
Passive Interface(s):
Serial0/0/0
Routing Information Sources:
Gateway Distance Last Update
172.29.6.2 120 00:00:28
Distance: (default is 120)
MEDELLIN2
MEDELLIN2#SHOW IP PROTOCOLS
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 6 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/0/1 2 2
Serial0/0/0 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
172.29.0.0
Passive Interface(s):
FastEthernet0/0
Routing Information Sources:
Gateway Distance Last Update
172.29.6.6 120 00:00:14
Distance: (default is 120)

MEDELLIN3

MEDDELIN3#SHOW IP PROTOCOLS

Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 6 seconds

Invalid after 180 seconds, hold down 180, flushed after 240

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Redistributing: rip

Default version control: send version 2, receive 2

Interface Send Recv Triggered RIP Key-chain

Serial0/0/0 2 2

Serial0/0/1 2 2

Serial0/1/0 2 2

Automatic network summarization is not in effect

Maximum path: 4

Routing for Networks:

172.29.0.0

Passive Interface(s):

FastEthernet0/0

Routing Information Sources:

Gateway Distance Last Update

172.29.6.5 120 00:00:00

Distance: (default is 120)

BOGOTA1

BOGOTA1>ENABLE

BOGOTA1#show ip protocols

Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 27 seconds

Invalid after 180 seconds, hold down 180, flushed after 240

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Redistributing: rip, static

Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/0/1 2 2
Serial0/1/0 2 2
Serial0/1/1 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
172.29.0.0
209.17.220.0
Passive Interface(s):
Serial0/0/0
Routing Information Sources:
Gateway Distance Last Update
172.29.3.2 120 00:00:04
172.29.3.6 120 00:00:04

BOGOTA2

BOGOTA2#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 3 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/0/0 2 2
Serial0/0/1 2 2
Automatic network summarization is not in effect
Maximum path: 4

Routing for Networks:
172.20.0.0
172.29.0.0
Passive Interface(s):
FastEthernet0/0
Routing Information Sources:
Gateway Distance Last Update
172.29.3.9 120 00:00:22
172.29.3.14 120 00:00:24
Distance: (default is 120)

BOGOTA3

BOGOTA3>ENABLE
BOGOTA3#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 26 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/0/0 2 2
Serial0/0/1 2 2
Serial0/1/0 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
172.29.0.0
Passive Interface(s):
FastEthernet0/0
Routing Information Sources:

Gateway Distance Last Update
172.29.3.5 120 00:00:27
172.29.3.1 120 00:00:27
172.29.3.13 120 00:00:26

ISP

ISP#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 15 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
209.17.220.0
Passive Interface(s):
Serial0/0/0
Serial0/0/1
Routing Information Sources:
Gateway Distance Last Update
Distance: (default is 120)
ISP#

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

Para verificar la base de datos RIP vamos a implementar el comando route RIP y se puede verificar en cada route.

MEDELLIN1

MEDELLIN1#enable

MEDELLIN1#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

MEDELLIN1(config)#route rip

MEDELLIN1(config-router)#version 2

MEDELLIN1(config-router)#no auto-summary

MEDELLIN1(config-router)#do show ip route connected

C 172.29.2.8/30 is directly connected, Serial0/0/1

C 172.29.6.0/30 is directly connected, Serial0/0/0

C 172.29.6.12/30 is directly connected, Serial0/1/0

C 209.17.220.0/30 is directly connected, Serial0/1/1

MEDELLIN2

MEDELLIN2>ENABLE

MEDELLIN2#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

MEDELLIN2(config)#route 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, FastEthernet0/0

C 172.29.6.0/30 is directly connected, Serial0/0/0

C 172.29.6.4/30 is directly connected, Serial0/0/1

MEDELIIN3

MEDDELIN3>enable

MEDDELIN3#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

MEDDELIN3(config)#route rip

MEDDELIN3(config-router)#version 2

MEDDELIN3(config-router)#no auto-summary

MEDDELIN3(config-router)#do show ip route connected

C 172.29.4.128/25 is directly connected, FastEthernet0/0

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

BOGOTA1

BOGOTA1>enable

BOGOTA1#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

BOGOTA1(config)#route 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, Serial0/1/1

C 172.29.3.4/30 is directly connected, Serial0/1/0

C 172.29.3.8/30 is directly connected, Serial0/0/1

C 209.17.220.4/30 is directly connected, Serial0/0/0

BOGOTA2

BOGOTA2(config)#route rip

BOGOTA2(config-router)#version 2

BOGOTA2(config-router)#no auto-summary

BOGOTA2(config-router)#do show ip route connected

C 172.29.1.0/24 is directly connected, FastEthernet0/0

C 172.29.3.8/30 is directly connected, Serial0/0/0

C 172.29.3.12/30 is directly connected, Serial0/0/1

BOGOTA3

BOGOTA3>enable

BOGOTA3#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

BOGOTA3(config)#route rip

BOGOTA3(config-router)#version 2

BOGOTA3(config-router)#no auto-summary

BOGOTA3(config-router)#do show ip route connected

C 172.29.0.0/24 is directly connected, FastEthernet0/0

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

Parte 5: Configurar encapsulamiento y autenticación PPP.

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

Se realiza el encapsulamiento de MEDELLIN1 A ISP

MEDELLIN1

MEDELLIN1(config-router)#exit

MEDELLIN1(config)#interface serial 0/1/1

MEDELLIN1(config-if)#ip address 209.17.220.2 255.255.255.252

MEDELLIN1(config-if)#encapsulation ppp

MEDELLIN1(config-if)#

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

MEDELLIN1(config-if)#no shutdown

MEDELLIN1(config-if)#exit

MEDELLIN1(config)#exit

MEDELLIN1#

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

MEDELLIN1#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK

Realizamos la autenticación con PAP en MEDELLIN1 a ISP

MEDELLIN1

MEDELLIN1#CONFIGURE TERMINAL

Enter configuration commands, one per line. End with CNTL/Z.

MEDELLIN1(config)#username MEDELLIN1 password cisco

MEDELLIN1(config)#interface serial 0/1/1

MEDELLIN1(config-if)#ppp authentication pap

MEDELLIN1(config-if)#exit

MEDELLIN1(config)#exit

MEDELLIN1#

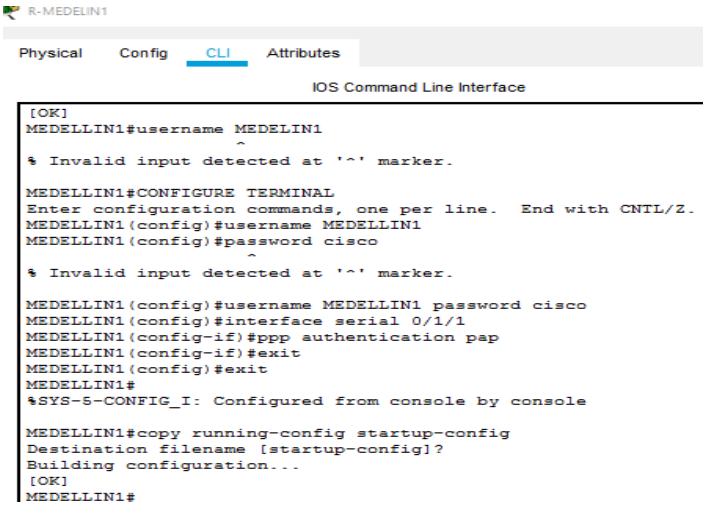
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN1#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]



MEDELLIN1#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

MEDELLIN1(config)#username ISP password cisco

MEDELLIN1(config)#interface s0/0/0

MEDELLIN1(config-if)#encapsulation ppp

MEDELLIN1(config-if)#

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

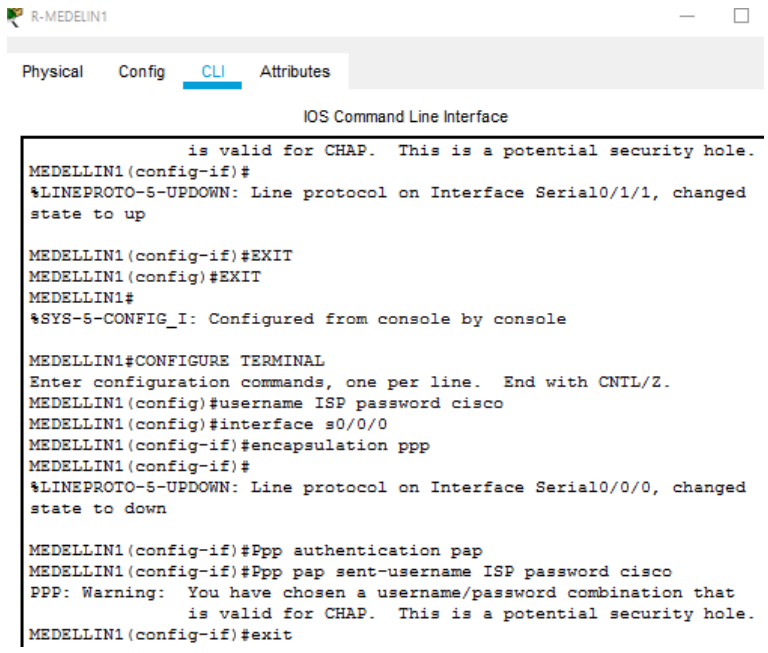
MEDELLIN1(config-if)#Ppp authentication pap

MEDELLIN1(config-if)#Ppp pap sent-username ISP password cisco

PPP: Warning: You have chosen a username/password combination that

is valid for CHAP. This is a potential security hole.

MEDELLIN1(config-if)#



ISP

ISP>enable

ISP#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

ISP(config)#username MEDELLIN1 password cisco

ISP(config)#int s0/0/0

ISP(config-if)#encapsulation ppp

ISP(config-if)#Ppp authentication pap

ISP(config-if)#Ppp pap sent-username ISP password cisco

ISP(config-if)#exit

ISP(config)#

```
ISP>enable
ISP#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
ISP(config)#username MEDELLIN1 password cisco
ISP(config)#int s0/0/0
ISP(config-if)#encapsulation ppp
ISP(config-if)#Ppp authentication pap
ISP(config-if)#Ppp pap sent-username ISP password cisco
ISP(config-if)#exit
ISP(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0,
state to up
```

Comprobamos la conexión por medio de un ping de MEDELLIN1 a ISP

```
MEDELLIN1#ping 209.17.220.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.17.220.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/6 ms

MEDELLIN1#
```

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

BOGOTA1

BOGOTA1>enable

BOGOTA1#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

BOGOTA1(config)#username BOGOTA1 password 1234

BOGOTA1(config)#interface serial 0/0/0
BOGOTA1(config-if)#ppp authentication chap
Must set encapsulation to PPP before using PPP subcommands
BOGOTA1(config-if)#exit
BOGOTA1(config)#exit
BOGOTA1#
%SYS-5-CONFIG_I: Configured from console by console

BOGOTA1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

```
BOGOTA1>enable
BOGOTA1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
BOGOTA1(config)#username BOGOTA1 password 1234
BOGOTA1(config)#interface serial 0/0/0
BOGOTA1(config-if)#ppp authentication chap
Must set encapsulation to PPP before using PPP subcommands
BOGOTA1(config-if)#exit
BOGOTA1(config)#exit
BOGOTA1#
%SYS-5-CONFIG_I: Configured from console by console

BOGOTA1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
BOGOTA1#
```

Para verificar la configuración realizamos un ping de ISP a BOGOTA1

ISP#ping 209.17.220.6

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.17.220.6, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/8 ms
ISP#

```
ISP#ping 209.17.220.6

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.17.220.6, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/8 ms

ISP#
```

Parte 6: Configuración de PAT.

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.

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.

MEDELLIN1#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

MEDELLIN1(config)#ip nat inside source list 1 interface s0/0/0 overload

MEDELLIN1(config)#access-list 1 permit 172.29.4.0 0.0.3.255

MEDELLIN1(config)#interface serial 0/0/0

MEDELLIN1(config-if)#ip nat outside

MEDELLIN1(config-if)#interface serial 0/0/1

MEDELLIN1(config-if)#ip nat outside

MEDELLIN1(config-if)#interface serial 0/1/0

MEDELLIN1(config-if)#ip nat outside

MEDELLIN1(config-if)#interface serial 0/1/1

MEDELLIN1(config-if)#ip nat outside

MEDELLIN1(config-if)#exit

MEDELLIN1(config)#exit

MEDELLIN1#

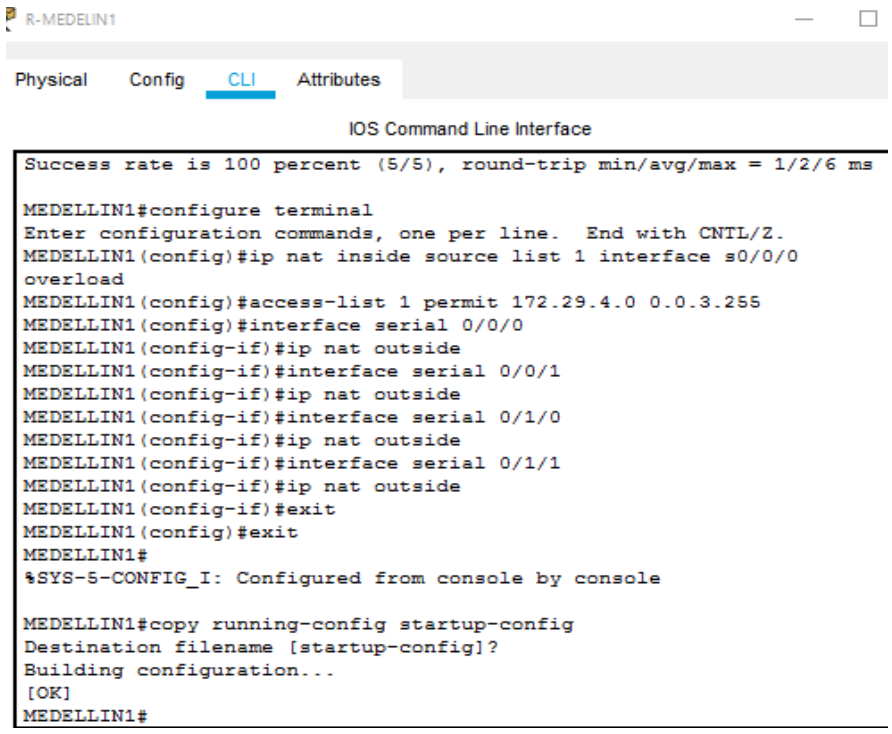
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN1#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]



Proceda a configurar el NAT en el router Bogotá1

Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/0 del router Bogotá1, cómo diferente puerto.

BOGOTA1

BOGOTA1#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

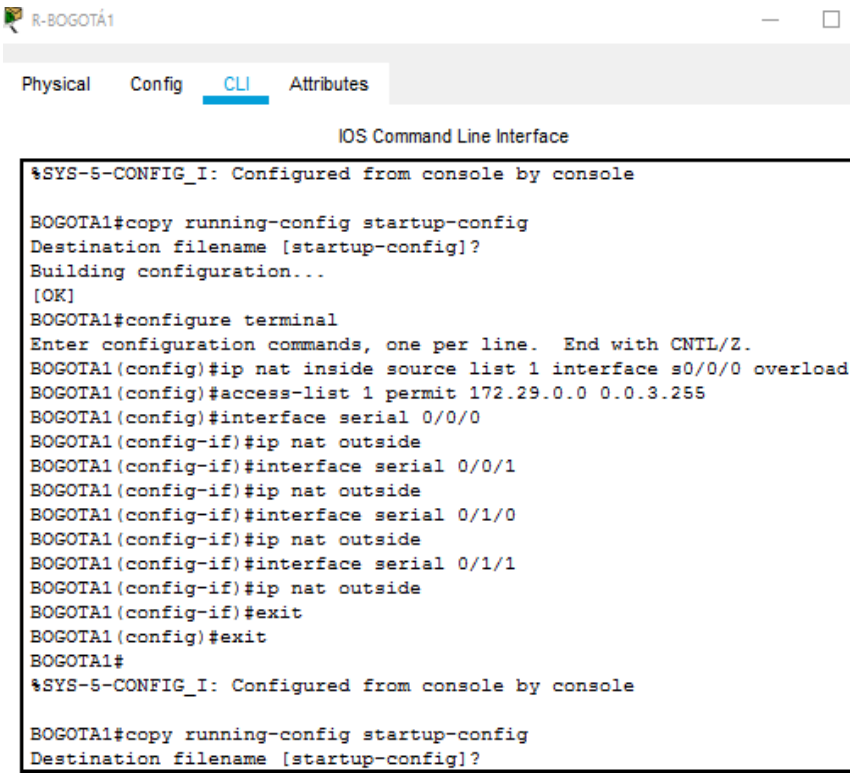
BOGOTA1(config)#ip nat inside source list 1 interface s0/0/0 overload

BOGOTA1(config)#access-list 1 permit 172.29.0.0 0.0.3.255

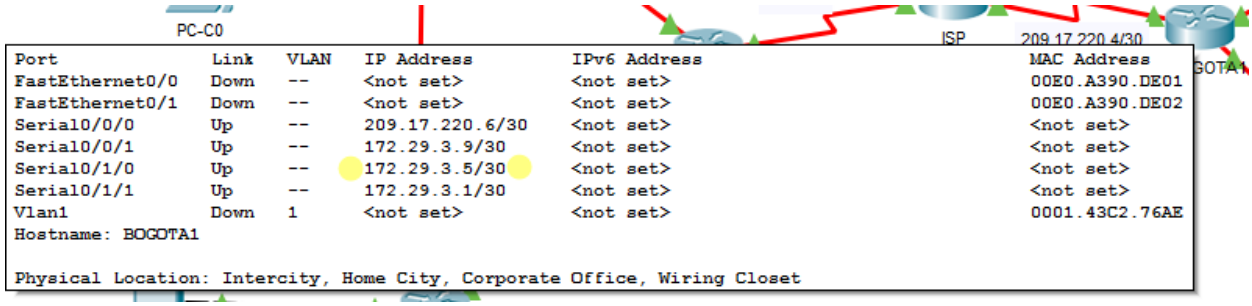
BOGOTA1(config)#interface serial 0/0/0

BOGOTA1(config-if)#ip nat outside

BOGOTA1(config-if)#interface serial 0/0/1
BOGOTA1(config-if)#ip nat outside
BOGOTA1(config-if)#interface serial 0/1/0
BOGOTA1(config-if)#ip nat outside
BOGOTA1(config-if)#interface serial 0/1/1
BOGOTA1(config-if)#ip nat outside
BOGOTA1(config-if)#exit
BOGOTA1(config)#exit
BOGOTA1#
%SYS-5-CONFIG_I: Configured from console by console
BOGOTA1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
BOGOTA1#



Como se puede verificar el puerto serial para BOGOTA1 es el de 172.29.3.5



Verificamos la configuración realizando un ping desde pc-c2 a ISP

Packet Tracer PC Command Line 1.0

C:\>PING 209.17.220.5

Pinging 209.17.220.5 with 32 bytes of data:

Reply from 209.17.220.5: bytes=32 time=15ms TTL=253

Reply from 209.17.220.5: bytes=32 time=6ms TTL=253

Reply from 209.17.220.5: bytes=32 time=2ms TTL=253

Reply from 209.17.220.5: bytes=32 time=2ms TTL=253

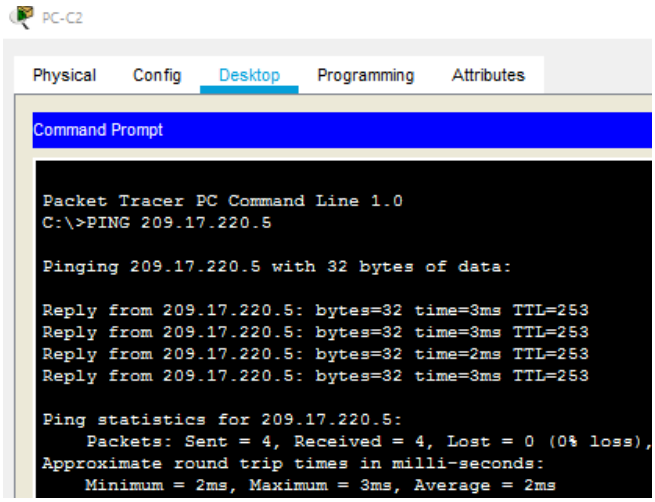
Ping statistics for 209.17.220.5:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

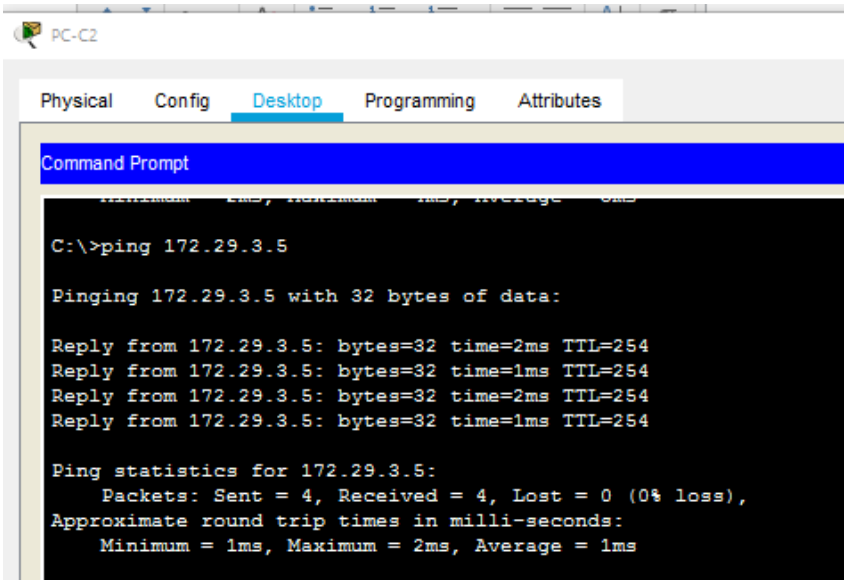
Approximate round trip times in milli-seconds:

Minimum = 2ms, Maximum = 15ms, Average = 6ms

C:\>



Verificamos la conexión realizando un ping en pc-c2 a puerto serial s0/1/0



Implementamos el comando show ip translations para comprobar la traducción de las interfaces.

BOGOTA1#show ip nat translations

Pro Inside global Inside local Outside local Outside global

udp 209.17.220.6:1024 172.29.3.5:520 224.0.0.9:520 224.0.0.9:520

udp 209.17.220.6:1025 172.29.3.1:520 224.0.0.9:520 224.0.0.9:520

udp 209.17.220.6:520 172.29.3.9:520 224.0.0.9:520 224.0.0.9:520

BOGOTA1#

```
BOGOTA1#show ip nat translations
Pro  Inside global     Inside local       Outside local      Outside
global
udp 209.17.220.6:1024  172.29.3.5:520     224.0.0.9:520
224.0.0.9:520
udp 209.17.220.6:1025  172.29.3.1:520     224.0.0.9:520
224.0.0.9:520
udp 209.17.220.6:520   172.29.3.9:520     224.0.0.9:520
224.0.0.9:520

BOGOTA1#
```

Parte 7: Configuración del servicio DHCP.

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

Configuramos el DHCP en el router MEDELLIN2

MEDELLIN2(config)#

MEDELLIN2(config)#ip dhcp excluded-address 172.29.4.1 172.29.4.5

MEDELLIN2(config)#ip dhcp excluded-address 172.29.4.129 172.29.4.132

MEDELLIN2(config)#ip dhcp pool MEDELLIN2

MEDELLIN2(dhcp-config)#Network 172.29.4.1 255.255.255.128

MEDELLIN2(dhcp-config)#default-router 172.29.4.1

MEDELLIN2(dhcp-config)#dns-server 8.8.8.8

MEDELLIN2(dhcp-config)#exit

MEDELLIN2(config)#Ip dhcp pool MEDELLIN3

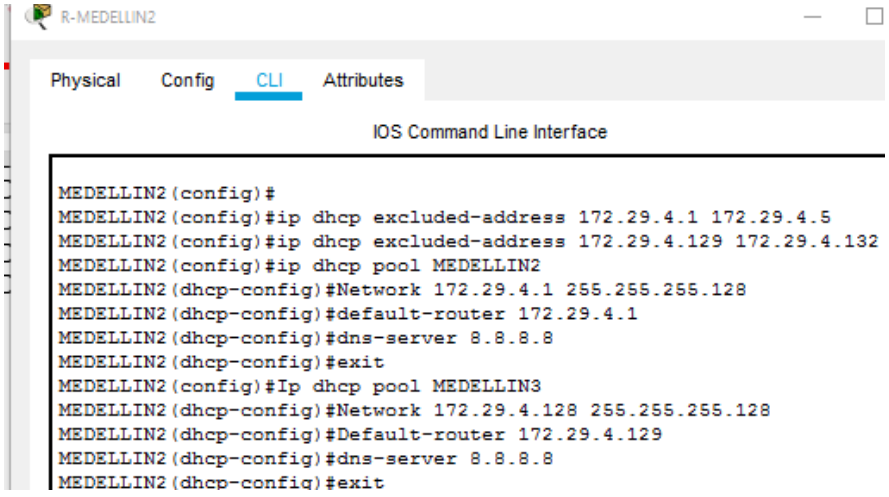
MEDELLIN2(dhcp-config)#Network 172.29.4.128 255.255.255.128

MEDELLIN2(dhcp-config)#Default-router 172.29.4.129

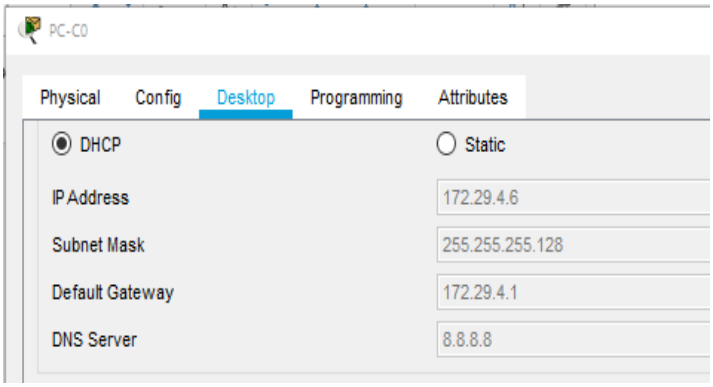
MEDELLIN2(dhcp-config)#dns-server 8.8.8.8

MEDELLIN2(dhcp-config)#exit

MEDELLIN2(config)#



Configuramos la IP en el pc-c0 que está directamente conectado al router de MEDELLIN2



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

Ahora habilitamos MEDELLIN3 como paso de mensajes Broadcats

MEDELLIN3

MEDDELIN3>enable

MEDDELIN3#

MEDDELIN3#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

MEDDELIN3(config)#int f0/0

MEDDELIN3(config-if)#ip helper-address 172.29.6.5

MEDDELIN3(config-if)#exit

MEDDELIN3(config)#exit

MEDDELIN3#

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

MEDDELIN3#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

MEDDELIN3#

```
MEDDELIN3>enable
MEDDELIN3#
MEDDELIN3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z
MEDDELIN3(config)#interfase f0/0
                  ^
% Invalid input detected at '^' marker.

MEDDELIN3(config)#int f0/0
MEDDELIN3(config-if)#ip helper-address 172.29.6.5
MEDDELIN3(config-if)#exit
MEDDELIN3(config)#exit
MEDDELIN3#
%SYS-5-CONFIG_I: Configured from console by console

MEDDELIN3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
MEDDELIN3#
```

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

BOGOTA2

BOGOTA2(config)#Ip dhcp excluded-address 172.29.1.1 172.29.1.5

BOGOTA2(config)#p dhcp excluded-address 172.29.0.1 172.29.0.5

% Ambiguous command: "p dhcp excluded-address 172.29.0.1 172.29.0.5"

BOGOTA2(config)#Ip dhcp pool BOGOTA2

BOGOTA2(dhcp-config)#Network 172.29.1.0 255.255.255.0

BOGOTA2(dhcp-config)#default-router 172.29.1.1

BOGOTA2(dhcp-config)#dns-server 5.5.5.5

BOGOTA2(dhcp-config)#exit

BOGOTA2(config)#ip dhcp pool BOGOTA3

BOGOTA2(dhcp-config)#Network 172.29.4.128 255.255.255.128

BOGOTA2(dhcp-config)#Default-router 172.29.0.1

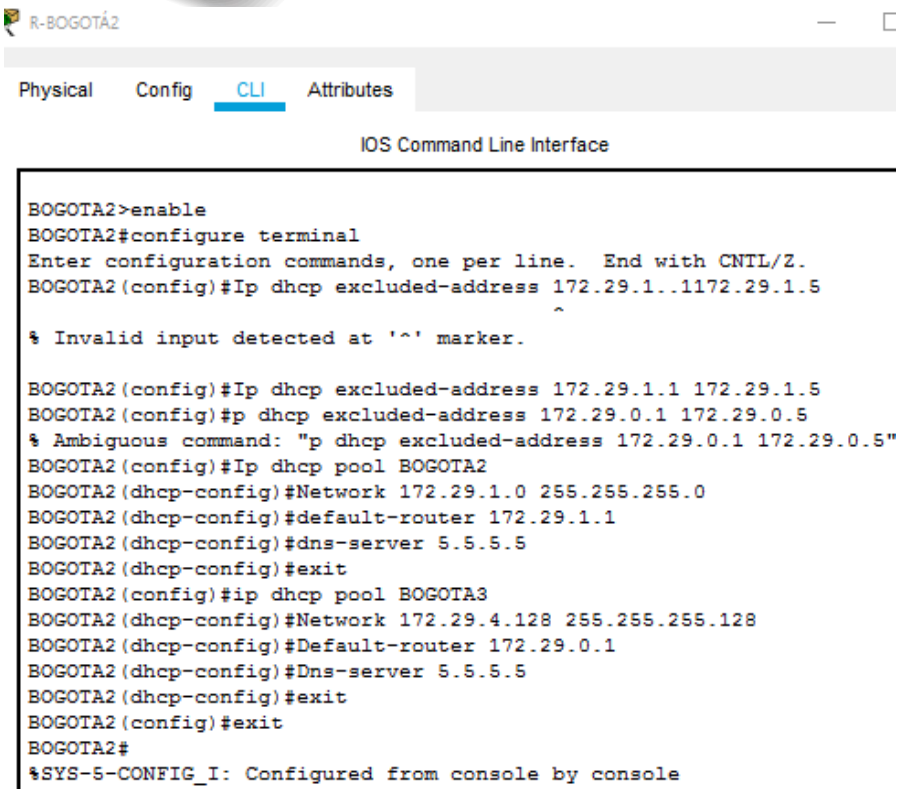
BOGOTA2(dhcp-config)#Dns-server 5.5.5.5

BOGOTA2(dhcp-config)#exit

BOGOTA2(config)#exit

BOGOTA2#

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



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

Vamos a configurar

BOGOTA3

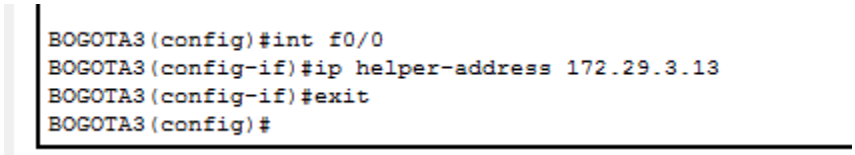
Ahora configuramos en Router BOGOTA3

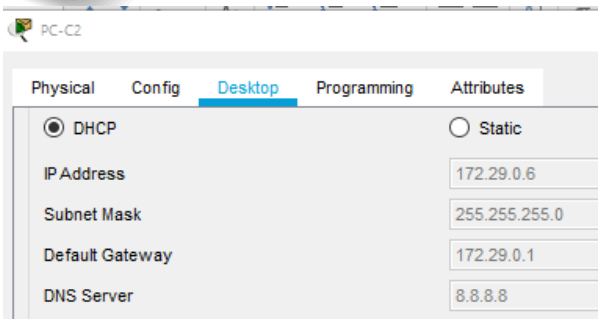
BOGOTA3(config)#int f0/0

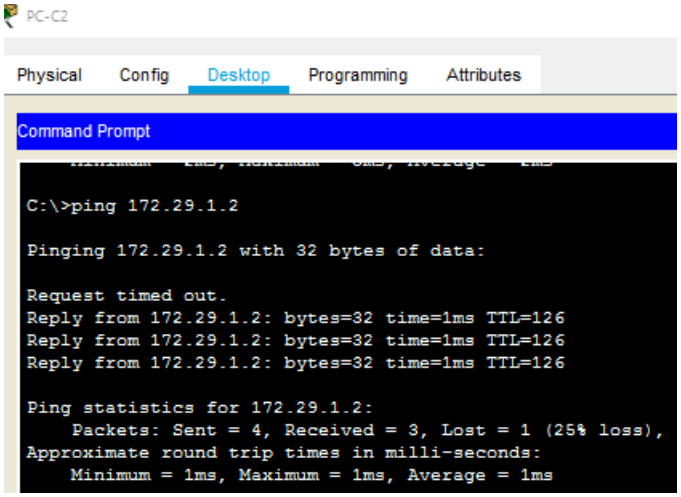
BOGOTA3(config-if)#ip helper-address 172.29.3.13

BOGOTA3(config-if)#exit

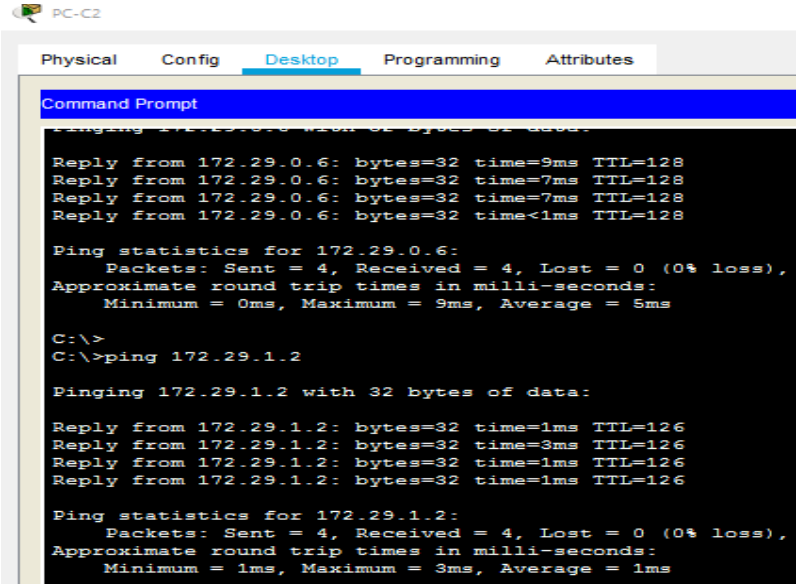
BOGOTA3(config)#





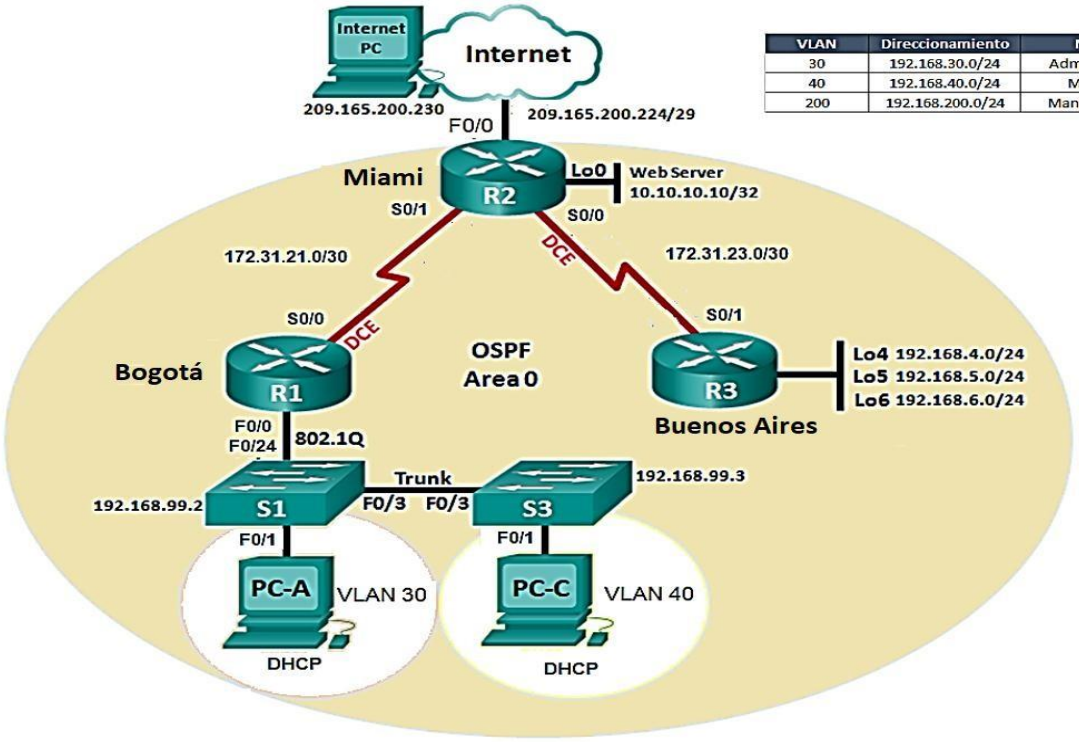


Verificamos funcionamiento Realizando un ping de pc-c2 a pc-c3

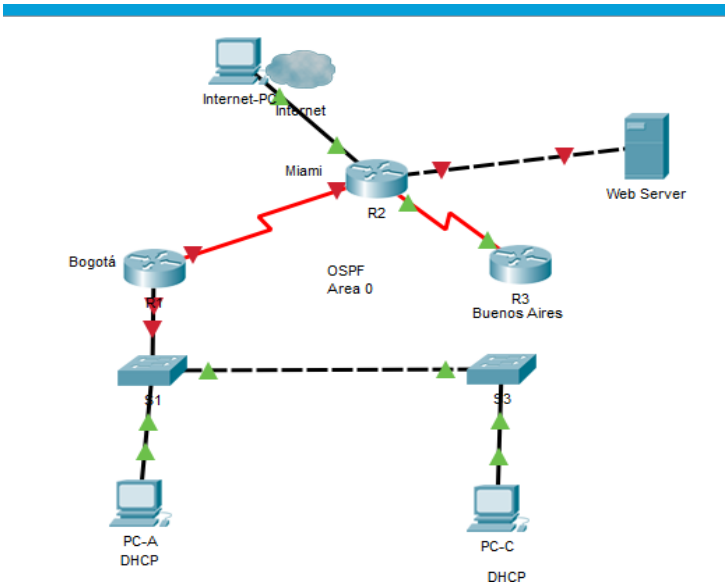


Escenario 2

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.

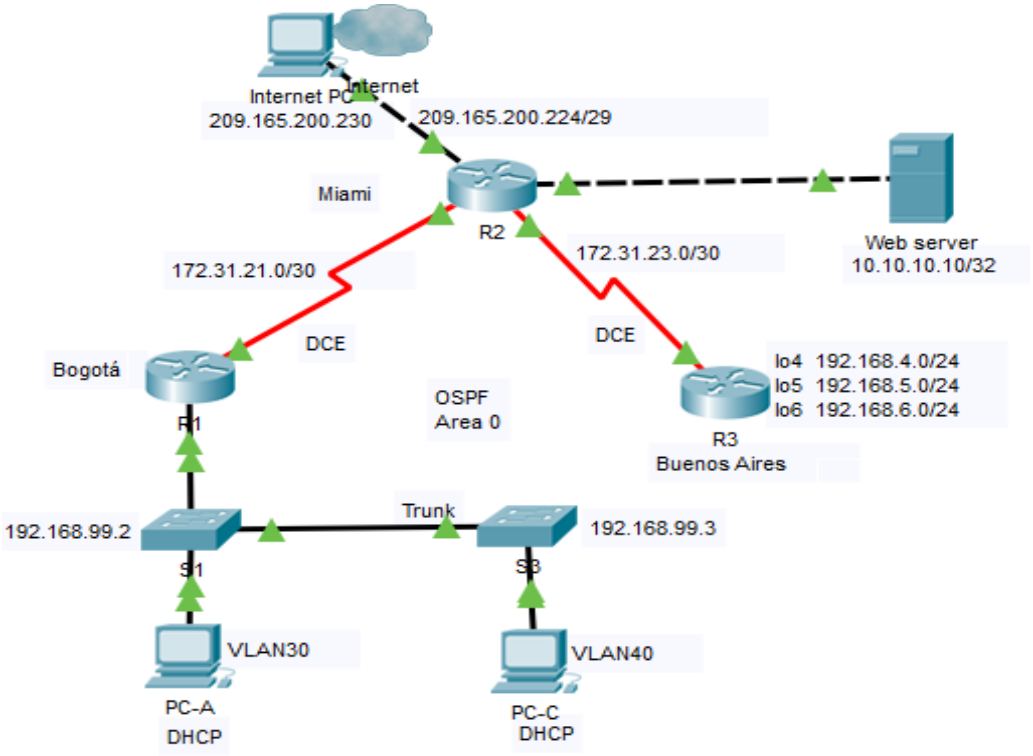


VLAN	Direccionamiento	Nombre
30	192.168.30.0/24	Administración
40	192.168.40.0/24	Mercadeo
200	192.168.200.0/24	Mantenimiento



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

Para iniciar con la topología de esta red, en primer lugar utilizamos 3 router 1841, 2 switch y 3 pc y un DNS.



En primer lugar vamos a ir configurando cada dispositivo con su respectiva dirección ip y su hostname.

Router1:

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname Bogota

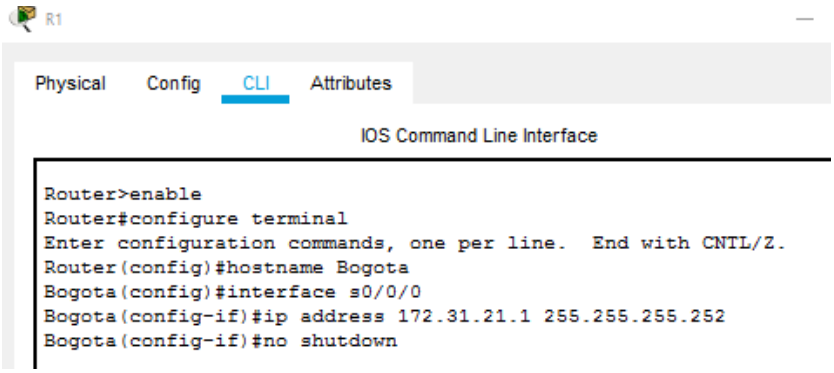
Bogota(config)#interface s0/0/0

Bogota(config-if)#ip address 172.31.21.1 255.255.255.252

Bogota(config-if)#no shutdown

Bogota(config-if)#

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



Router2:

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname Miami

Miami(config)#int loop0

Miami(config-if)#

%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

Miami(config-if)#ip address 10.10.10.10 255.255.255.255

Miami(config-if)#no shutdown

Miami(config-if)#interface s0/0/0

Miami(config-if)#ip address 172.31.23.1 255.255.255.252

Miami(config-if)#no shutdown

Miami(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

Miami(config-if)#interface s0/0/1

Miami(config-if)#ip address 172.31.21.2 255.255.255.252

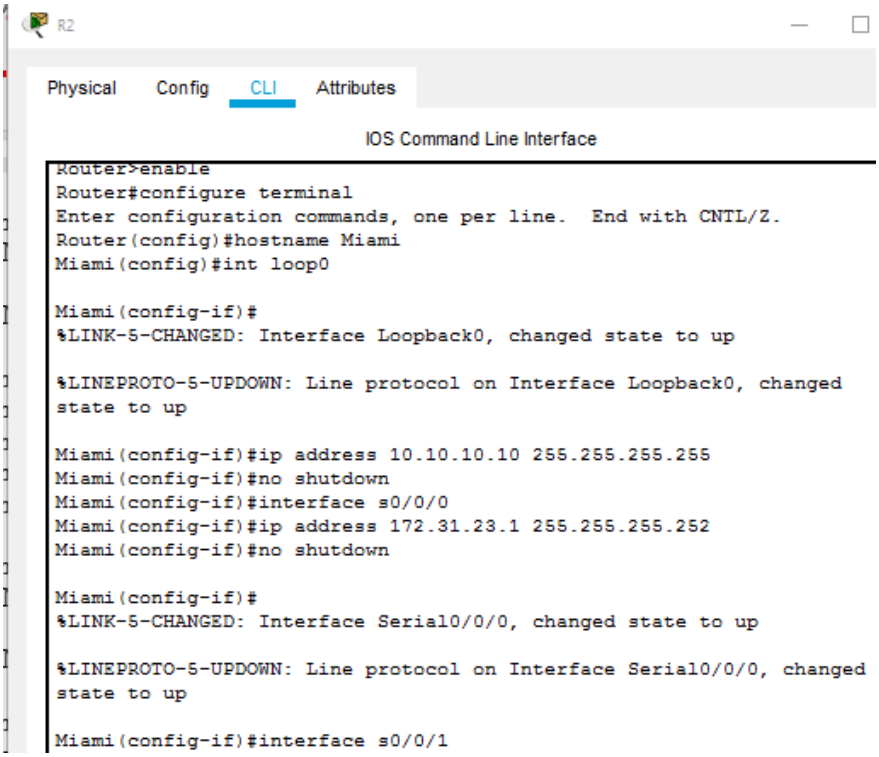
Miami(config-if)#no shutdown

Miami(config-if)#

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

Miami(config-if)#

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



Router3

Router#enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname BuenosAires

BuenosAires(config)#int loop4

BuenosAires(config-if)#ip address 192.168.4.1 255.255.255.0

BuenosAires(config-if)#no shutdown

BuenosAires(config-if)#exit

BuenosAires(config)#int loop5

BuenosAires(config-if)#ip address 192.168.5.1 255.255.255.0

BuenosAires(config-if)#no shutdown

BuenosAires(config-if)#exit

BuenosAires(config)#int loop6

BuenosAires(config-if)#ip address 192.168.6.1 255.255.255.0

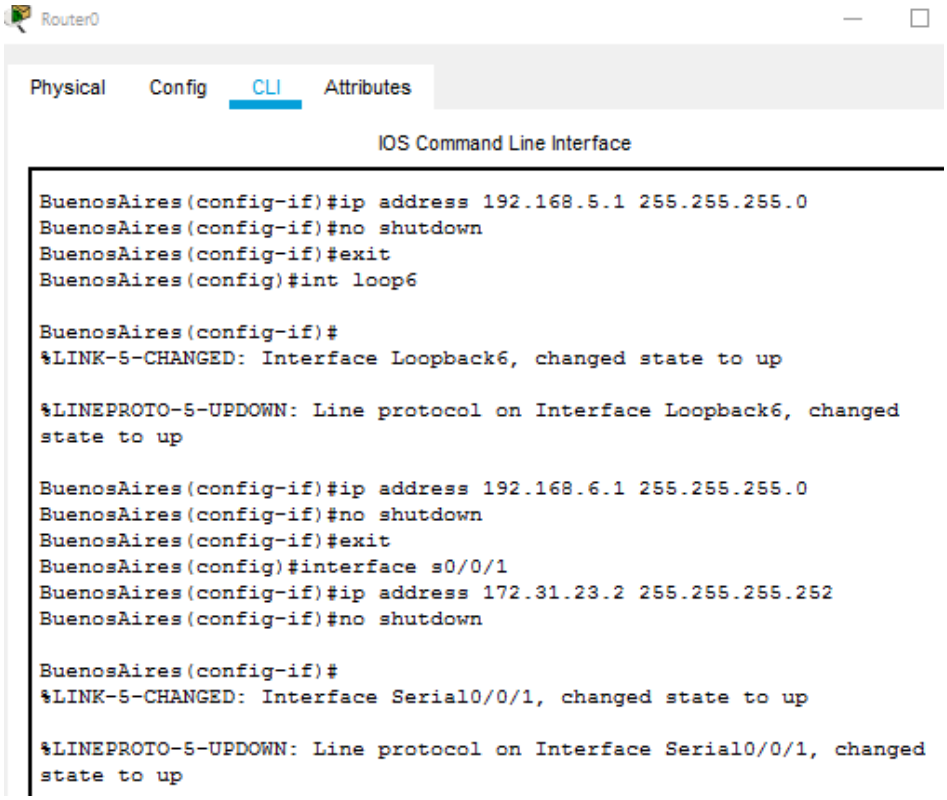
BuenosAires(config-if)#no shutdown

BuenosAires(config-if)#exit

BuenosAires(config)#interface s0/0/1

BuenosAires(config-if)#ip address 172.31.23.2 255.255.255.252

BuenosAires(config-if)#no shutdown



Ahora configuramos los switch

Switch1>enable

Switch#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname s1

s1(config)#no ip domain-lookup

s1(config)#exit

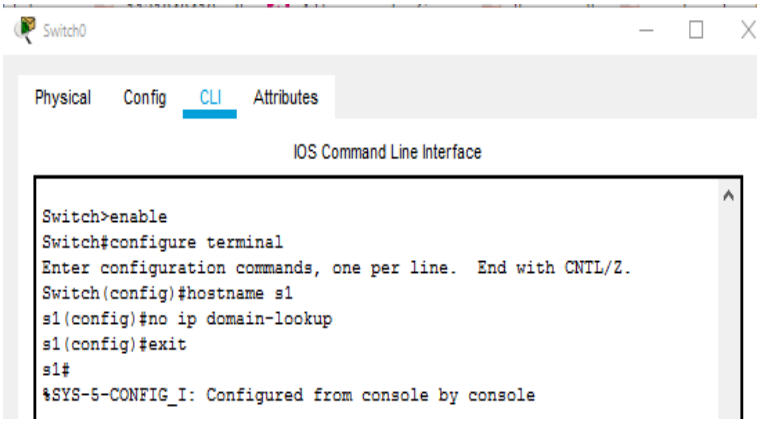
s1#

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

s1(config)#interface vlan1

s1(config-if)#ip address 192.168.99.2 255.255.255.0

s1(config-if)#no shutdown



Switch3

Switch>

Switch>enable

Switch#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname s3

s3(config)#no ip domain-lookup

s3(config)#exit

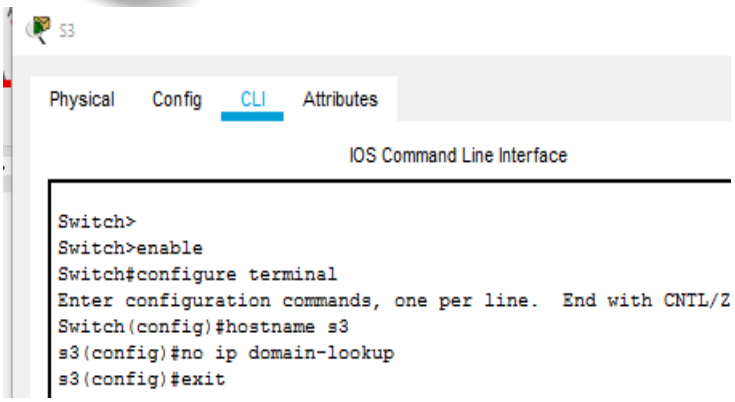
s3#

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

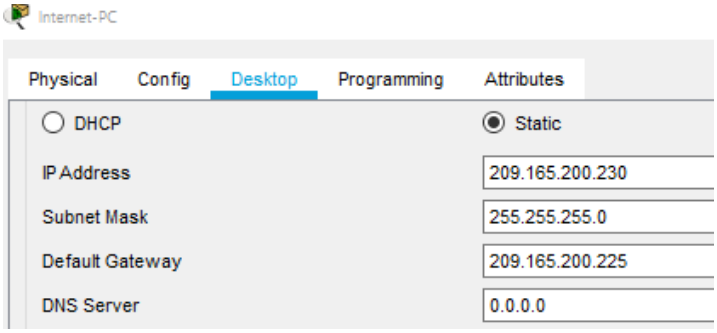
s3(config)#interface vlan1

s3(config-if)#ip address 192.168.99.3 255.255.255.0

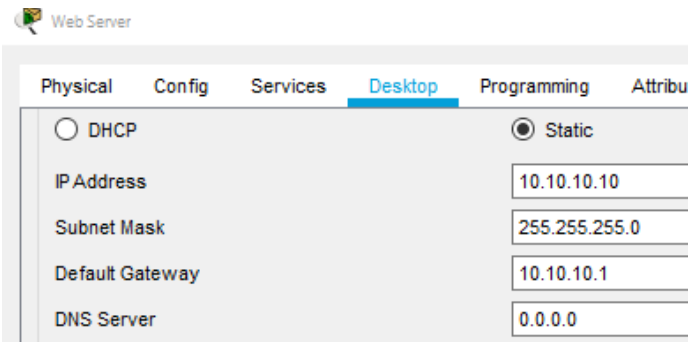
s3(config-if)#no shutdown



Ahora configuramos la internet PC



Configuración del web server



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

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.

Configuración del protocolo OSPF2 para cada router:

Bogota:

Bogota#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

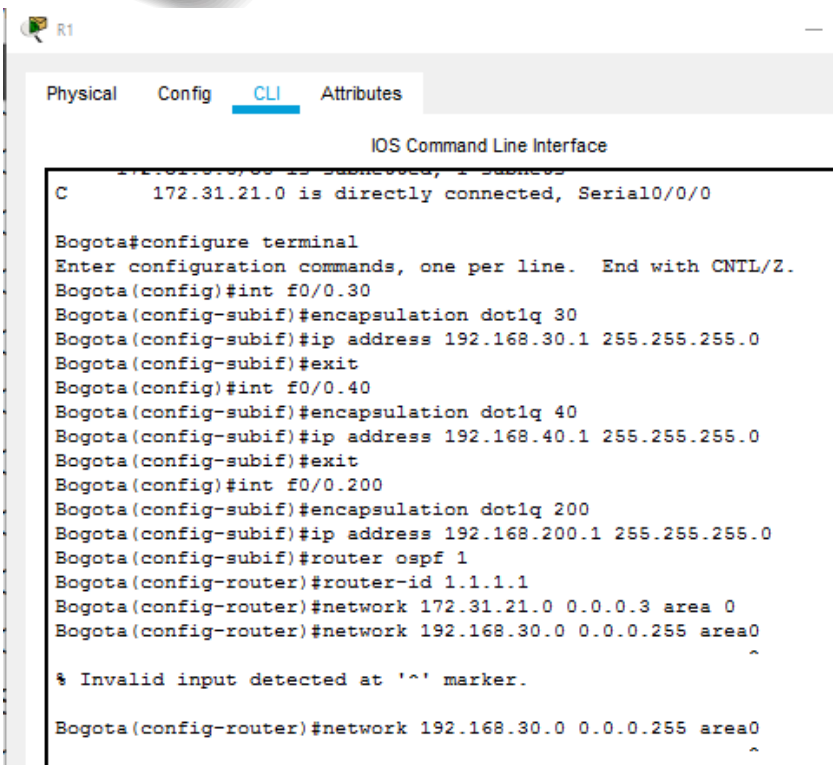
Bogota(config)#int f0/0.30

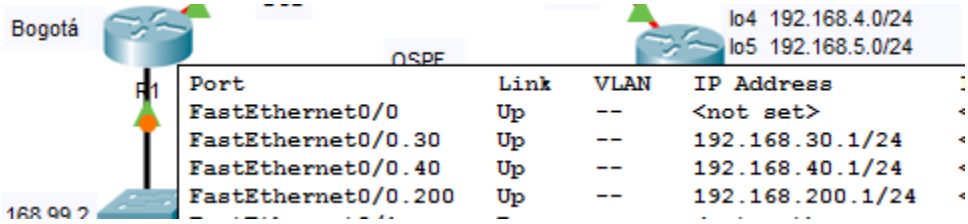
Bogota(config-subif)#encapsulation dot1q 30

Bogota(config-subif)#ip address 192.168.30.1 255.255.255.0

Bogota(config-subif)#exit

```
Bogota(config)#int f0/0.40
Bogota(config-subif)#encapsulation dot1q 40
Bogota(config-subif)#ip address 192.168.40.1 255.255.255.0
Bogota(config-subif)#exit
Bogota(config)#int f0/0.200
Bogota(config-subif)#encapsulation dot1q 200
Bogota(config-subif)#ip address 192.168.200.1 255.255.255.0
Bogota(config-subif)#router ospf 1
Bogota(config-router)#router-id 1.1.1.1
Bogota(config-router)#network 172.31.21.0 0.0.0.3 area 0
Bogota(config-router)#network 192.168.30.0 0.0.0.255 area0
Bogota(config-router)# network 192.168.40.0 0.0.0.255 area 0
Bogota(config-router)#network 192.168.30.0 0.0.0.255 area 0
Bogota(config-router)#network 192.168.200.0 0.0.0.255 area 0
Bogota(config-router)#passive-interface f0/0.30
Bogota(config-router)#passive-interface f0/0.40
Bogota(config-router)#passive-interface f0/0.200
Bogota(config-router)#exit
Bogota(config)#int s0/0/0
Bogota(config-if)#bandwidth 256
Bogota(config-if)#ip ospf cost 9500
Bogota(config-if)#exit
Bogota(config)#exit
Bogota#
%SYS-5-CONFIG_I: Configured from console by console
```





Miami:

Miami>enable

Miami#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Miami(config)#router ospf 1

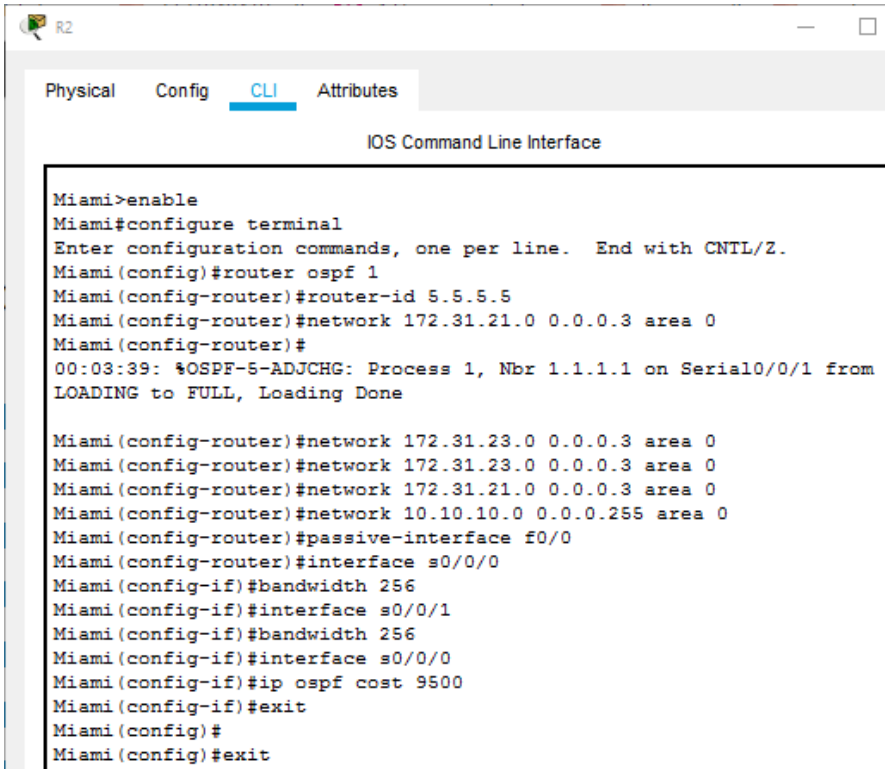
Miami(config-router)#router-id 5.5.5.5

Miami(config-router)#network 172.31.21.0 0.0.0.3 area 0

Miami(config-router)#

00:03:39: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/1 from LOADING to FULL, Loading Done

Miami(config-router)#network 172.31.23.0 0.0.0.3 area 0
Miami(config-router)#network 172.31.23.0 0.0.0.3 area 0
Miami(config-router)#network 172.31.21.0 0.0.0.3 area 0
Miami(config-router)#network 10.10.10.0 0.0.0.255 area 0
Miami(config-router)#passive-interface f0/0
Miami(config-router)#interface s0/0/0
Miami(config-if)#bandwidth 256
Miami(config-if)#interface s0/0/1
Miami(config-if)#bandwidth 256
Miami(config-if)#interface s0/0/0
Miami(config-if)#ip ospf cost 9500
Miami(config-if)#exit
Miami(config)#



BuenosAires:

BuenosAires>enable
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)#

00:10:50: %OSPF-5-ADJCHG: Process 1, Nbr 5.5.5.5 on Serial0/0/1 from LOADING to FULL, Loading Done

BuenosAires(config-router)#network 192.168.4.0 0.0.0.255 area 0

BuenosAires(config-router)#network 192.168.5.0 0.0.0.255 area 0

BuenosAires(config-router)#network 192.168.6.0 0.0.0.255 area 0

BuenosAires(config-router)#passive-interface lo4

BuenosAires(config-router)#passive-interface lo5

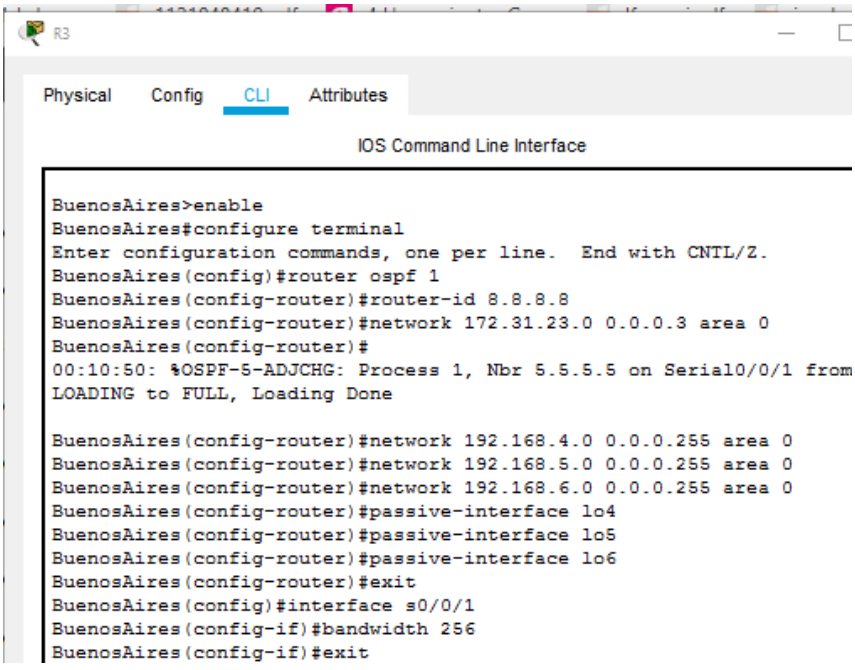
BuenosAires(config-router)#passive-interface lo6

BuenosAires(config-router)#exit

BuenosAires(config)#interface s0/0/1

BuenosAires(config-if)#bandwidth 256

BuenosAires(config-if)#exit



Verificamos las conexiones de cada router con conexión **OSPFv2**

En el router bogota, Miami, Buenos AIRES, vamos a ejecutar el comando show ip ospf neigbord para poder verificar las conexiones ospf.

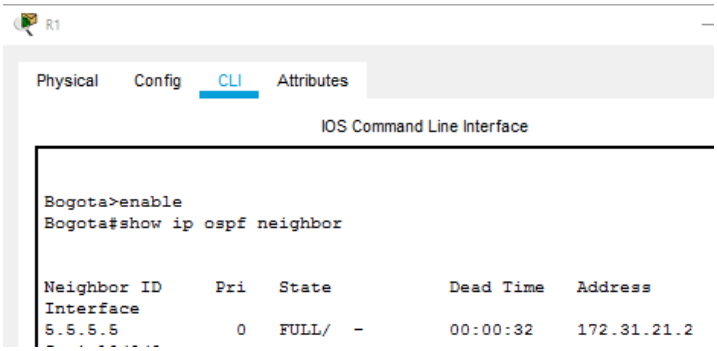
Bogota:

Bogota>enable

Bogota#show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

5.5.5.5 0 FULL/ - 00:00:32 172.31.21.2



Miami:

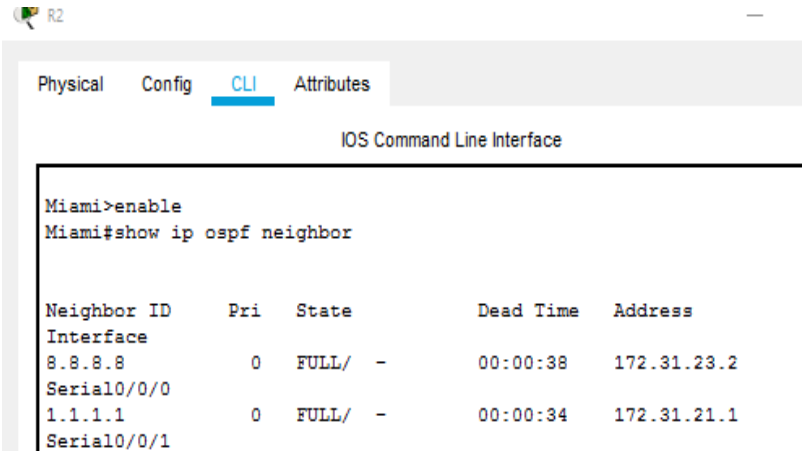
Miami>enable

Miami#show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

8.8.8.8 0 FULL/ - 00:00:38 172.31.23.2 Serial0/0/0

1.1.1.1 0 FULL/ - 00:00:34 172.31.21.1



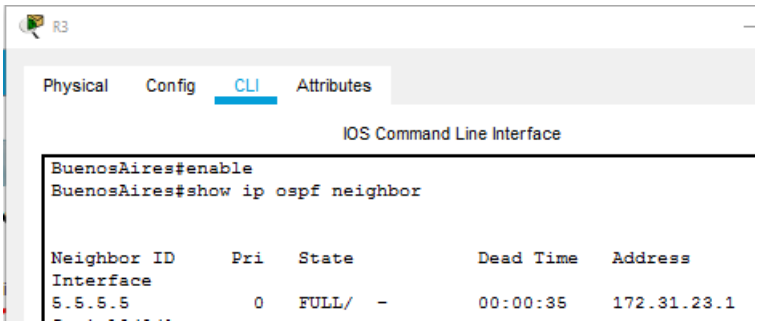
Buenos Aires:

BuenosAires#enable

BuenosAires#show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

5.5.5.5 0 FULL/ - 00:00:35 172.31.23.1



Verificamos tabla de enrutamiento

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 not set

10.0.0.0/24 is subnetted, 1 subnets

O 10.10.10.0 [110/9501] via 172.31.21.2, 00:03:09, Serial0/0/0

172.31.0.0/30 is subnetted, 2 subnets

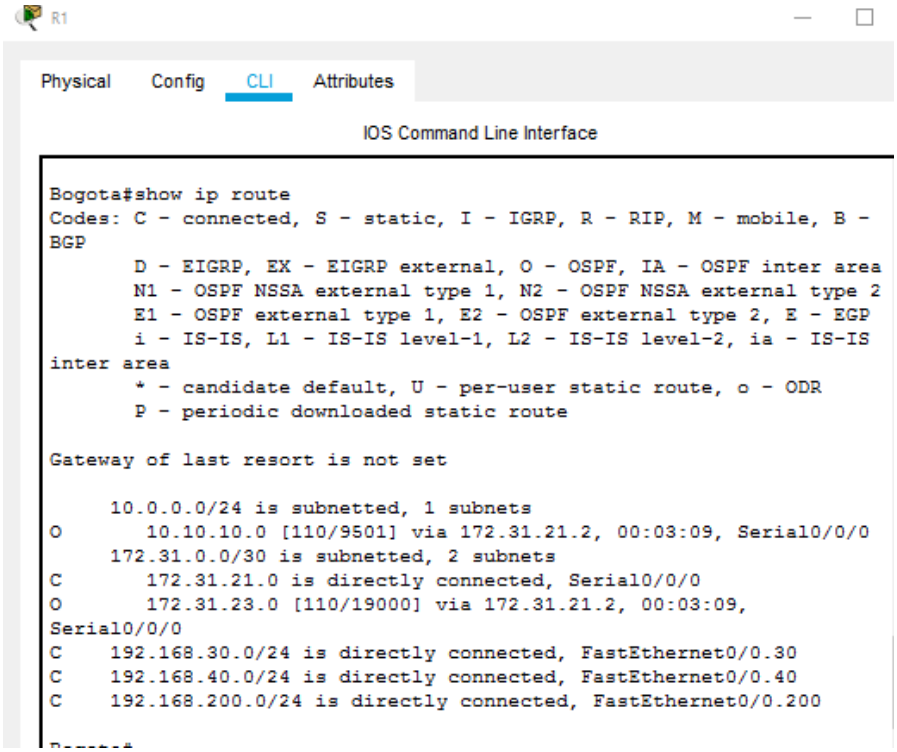
C 172.31.21.0 is directly connected, Serial0/0/0

O 172.31.23.0 [110/19000] via 172.31.21.2, 00:03:09, 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



Miami:

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 not set

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

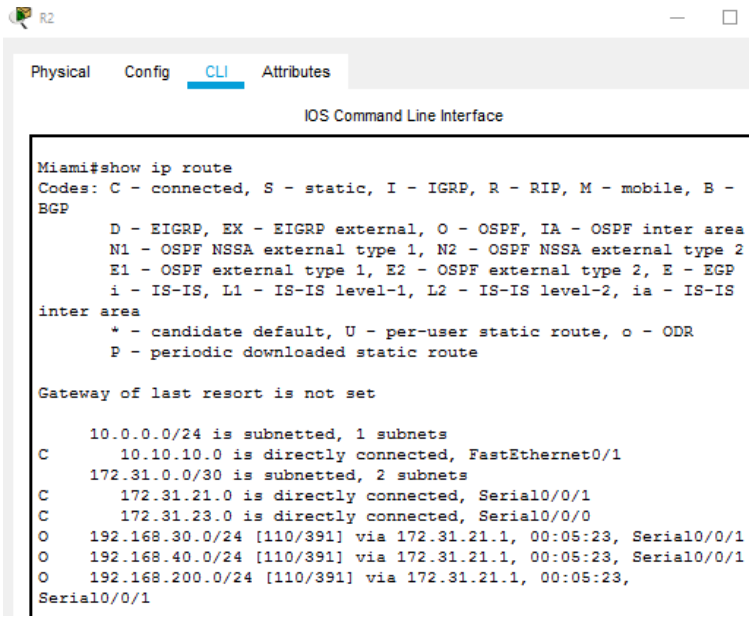
C 172.31.21.0 is directly connected, Serial0/0/1

C 172.31.23.0 is directly connected, Serial0/0/0

O 192.168.30.0/24 [110/391] via 172.31.21.1, 00:05:23, Serial0/0/1

O 192.168.40.0/24 [110/391] via 172.31.21.1, 00:05:23, Serial0/0/1

O 192.168.200.0/24 [110/391] via 172.31.21.1, 00:05:23, Serial0/0/1



BuenosAires:

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

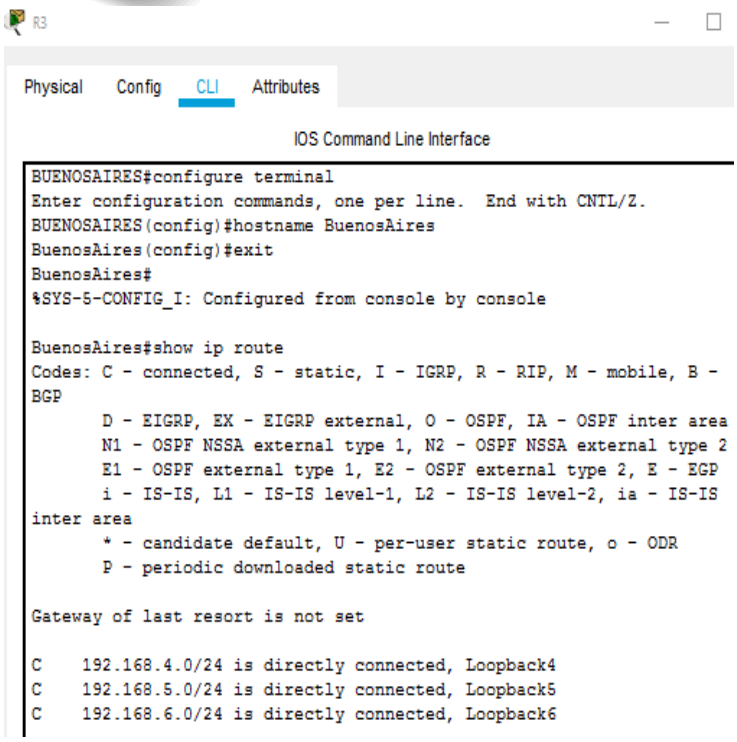
P - periodic downloaded static route

Gateway of last resort is not set

C 192.168.4.0/24 is directly connected, Loopback4

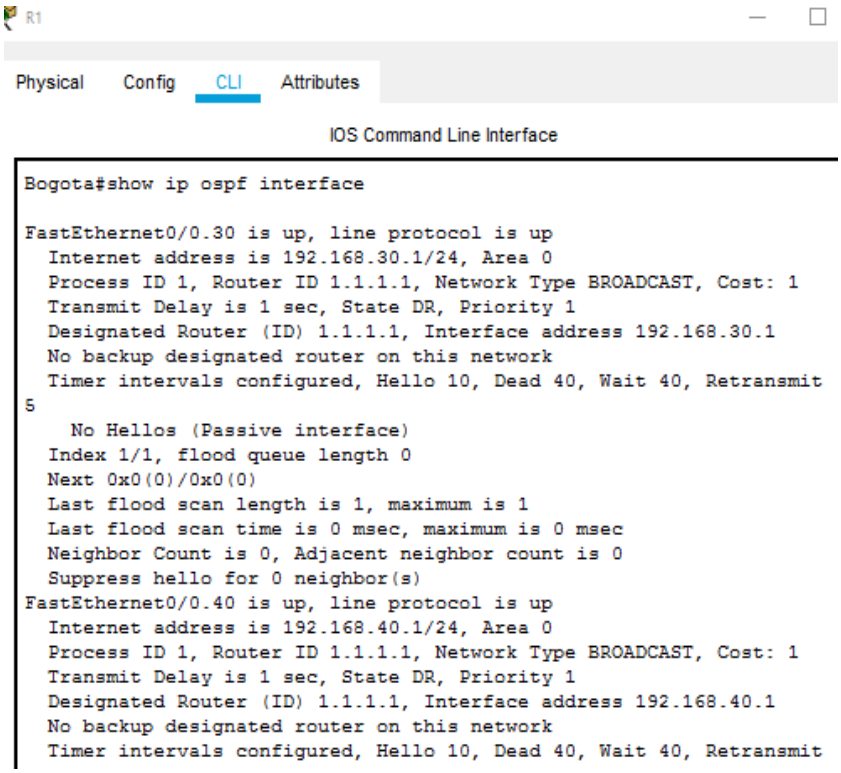
C 192.168.5.0/24 is directly connected, Loopback5

C 192.168.6.0/24 is directly connected, Loopback6

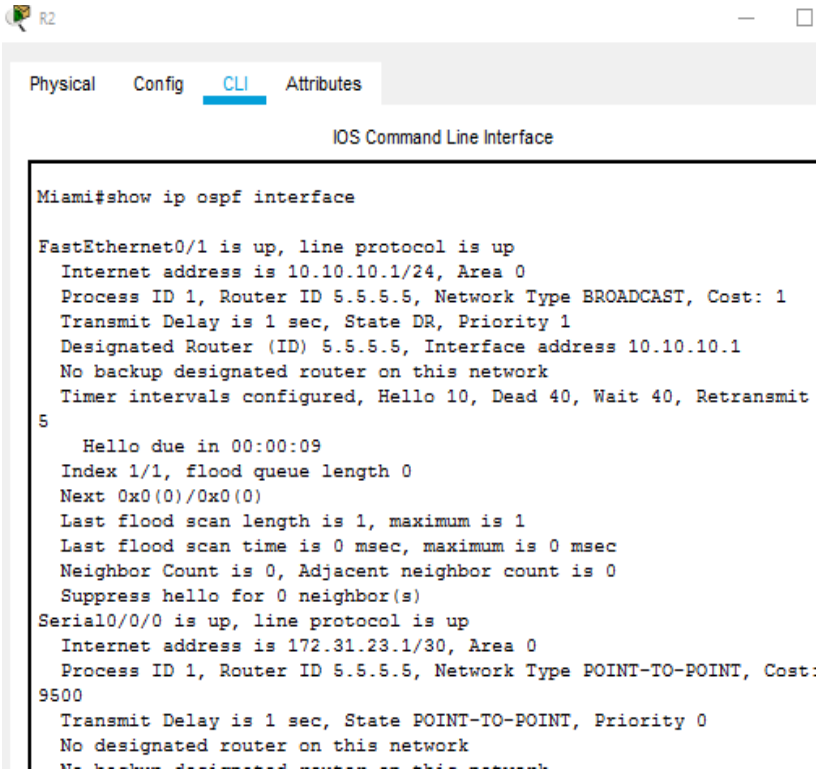


Visualizar las interfaces de cada router con OSPF

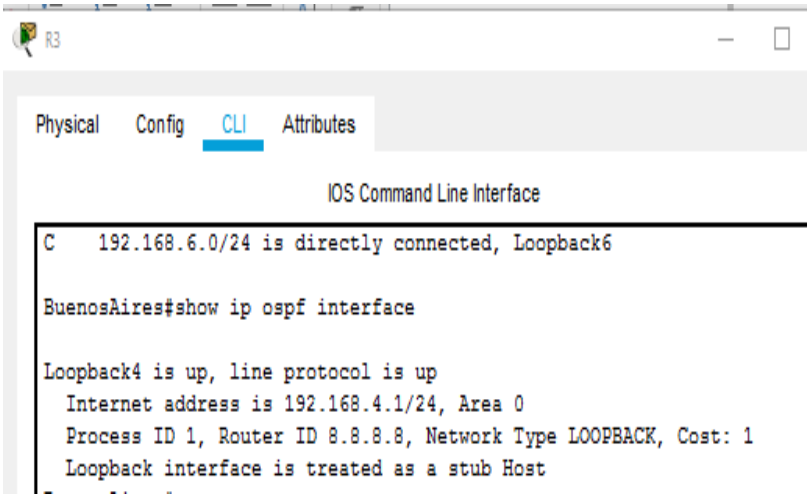
Bogota:



Miami:



BuenosAires:



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

En el switch1 vamos a configurar las VLAN con su respectivo nombre, puerto troncal, y además vamos a configurar la seguridad de s1 con claves de contraseña , linea vty y enable secret.

Switch = S1:

s1#enable

s1#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

s1(config)#vlan 30

s1(config-vlan)#

%LINK-5-CHANGED: Interface Vlan30, changed state to up

s1(config-vlan)#name Administracion

s1(config-vlan)#vlan 40

s1(config-vlan)#name Mercadeo

s1(config-vlan)#vlan 200

s1(config-vlan)#name Mantenimiento

s1(config-vlan)#exit

s1(config)#interface f0/3

s1(config-if)#Switchport mode trunk

s1(config-if)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan30, changed state to up

s1(config-if)#Switchport trunk native vlan 1

s1(config-if)#NO SHUTDOWN

s1(config-if)#EXIT

s1(config)#line console 0

s1(config-line)#password cisco

s1(config-line)#line vty 0 15

s1(config-line)#enable secret cisco
s1(config)#int range f0/1
s1(config-if-range)#Switchport mode access
s1(config-if-range)#Switchport access vlan 30
s1(config-if-range)#exit

Switch s3:

s3>enable
s3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
s3(config)#line console 0
s3(config-line)#password cisco
s3(config-line)#login
s3(config-line)#line vty 0 15
s3(config-line)#service password-encryption
s3(config)#
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

Ahora en el router Bogota vamos a configurar el encapsulamiento

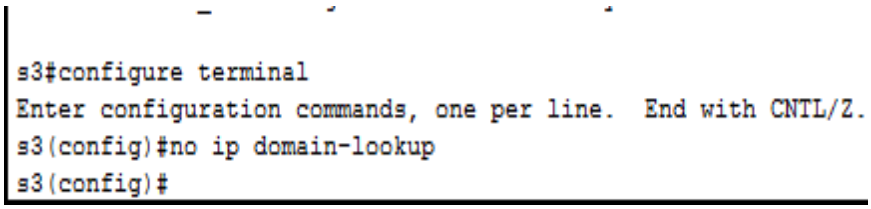
Bogota:

Bogota>enable
Bogota#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Bogota(config)#interface f0/0.30
Bogota(config-subif)#Description accounting LAN
Bogota(config-subif)#encapsulation dot1q 30

Bogota(config-subif)#ip address 192.168.30.1 255.255.255.0
Bogota(config-subif)#interface f0/0.40
Bogota(config-subif)#description accounting LAN
Bogota(config-subif)#encapsulation dot1q 40
Bogota(config-subif)#ip address 192.168.40.1 255.255.255.0
Bogota(config-subif)#interface f0/0.20
Bogota(config-subif)#description accounting LAN
Bogota(config-subif)#encapsulation dot1q 200
%Configuration of multiple subinterfaces of the same main
interface with the same VID (200) is not permitted.
This VID is already configured on FastEthernet0/0.200.
Bogota(config-subif)#ip address 192.168.200.1 255.255.255.0
% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.
Bogota(config-subif)#exit
Bogota(config)#interface f0/0
Bogota(config-if)#no shutdown

4. En el Switch 3 deshabilitar DNS lookup

s3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
s3(config)#no ip domain-lookup
s3(config)#



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

S1(config-vlan)#exit

S1(config)#int vlan1

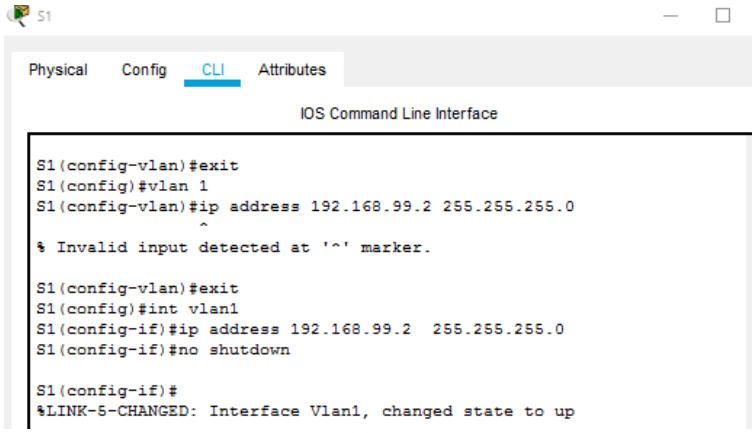
S1(config-if)#ip address 192.168.99.2 255.255.255.0

S1(config-if)#no shutdown

S1(config-if)#

%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up



S3>enable

Password:

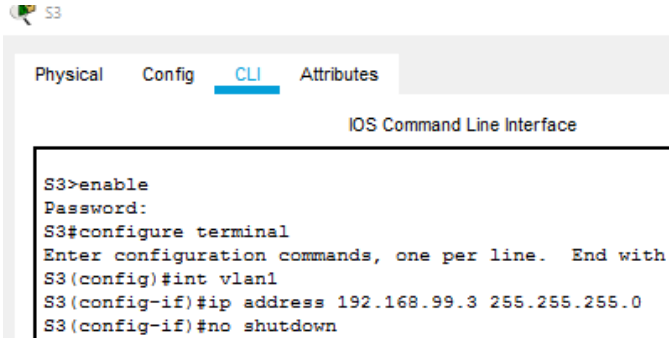
S3#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

S3(config)#int vlan1

S3(config-if)#ip address 192.168.99.3 255.255.255.0

S3(config-if)#no shutdown



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

En el switch s1 vamos a desactivar el rang de interface que no se utilizan:

S1(config-if)#interface f0/1

S1(config-if)#Switchport mode access

S1(config-if)#Switch access vlan 30

S1(config-if)#int range f0/2, fa0/4-23, g0/1-2

S1(config-if-range)#exit

7.Implement DHCP and NAT for IPv4

En el router Bogota vamos a excluir la ipv4 que no queremos utilizar:

Bogota>enable

Bogota#configure terminal

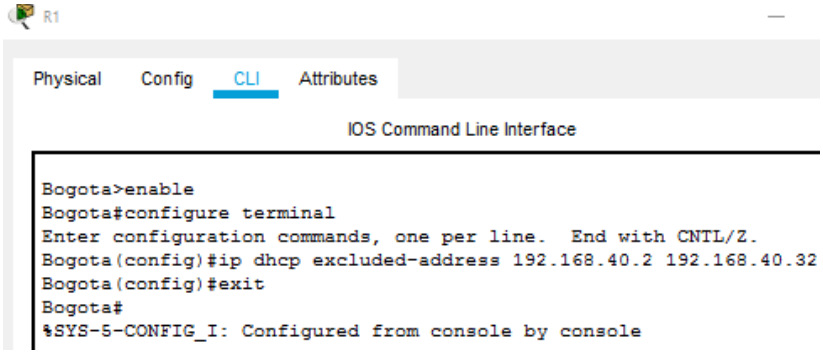
Enter configuration commands, one per line. End with CNTL/Z.

Bogota(config)#ip dhcp excluded-address 192.168.40.2 192.168.40.32

Bogota(config)#exit

Bogota#

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



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

```
Bogota>enable
Bogota#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Bogota(config)#ip dhcp pool Administracion
Bogota(dhcp-config)#dns-server 10.10.10.11
Bogota(dhcp-config)#default-router 192.168.30.1
Bogota(dhcp-config)#network 192.168.30.0 255.255.255.0
Bogota(dhcp-config)#ip dhcp pool Mercadeo
Bogota(dhcp-config)#dns-server 10.10.10.11
Bogota(dhcp-config)#default-router 192.168.40.1
Bogota(dhcp-config)#network 192.168.40.0 255.255.255.0
Bogota(dhcp-config)#exit
Bogota(config)#
Bogota(config)#
```

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.

Ahora configuramos el router bogota con la vlan 30 y vlan 40con nombre, dns-server, domain

Bogota>enable

Bogota#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Bogota(config)#ip dhcp pool Administracion

Bogota(dhcp-config)#dns-server 10.10.10.11

Bogota(dhcp-config)#default-router 192.168.30.1

Bogota(dhcp-config)#network 192.168.30.0 255.255.255.0

Bogota(dhcp-config)#ip dhcp pool Mercadeo

Bogota(dhcp-config)#dns-server 10.10.10.11

Bogota(dhcp-config)#default-router 192.168.40.1

Bogota(dhcp-config)#network 192.168.40.0 255.255.255.0

Bogota(dhcp-config)#exit

Bogota(config)#

Bogota(config)#ip dhcp pool Administracion

Bogota(dhcp-config)#ip domain-name ccna-unad.com

Bogota(config)#exit

Bogota#

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

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)#exit

Bogota#

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

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

En el outer R2 Miami configuramos la Nat en los puertos serial.

Miami(config)#interface f0/0

Miami(config-if)#ip nat inside

Miami(config-if)#exit

Miami(config)#interface s0/0/1

Miami(config-if)#ip nat inside

Miami(config-if)#exit

Miami(config)#interface s0/0/1

Miami(config-if)#ip nat outside

Miami(config-if)#exit

Miami(config)#interface s0/0/0

Miami(config-if)#ip nat inside

Miami(config-if)#exit

Miami(config)#exit

Miami#

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

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.

En el router R3 configuramos la lista de acceso.

BuenosAires>enable

BuenosAires#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

BuenosAires(config)#ip access-list standard Mantenimiento

BuenosAires(config-std-nacl)#permit host 172.31.21.1

BuenosAires(config-std-nacl)#permit host 172.31.23.2

BuenosAires(config-std-nacl)#exit

BuenosAires(config)#line vty 0 15

BuenosAires(config-line)#access-class Mantenimiento in

BuenosAires(config-line)#exit

BuenosAires(config)#exit
BuenosAires#
%SYS-5-CONFIG_I: Configured from console by console
BuenosAires#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...

Ahora configuramos el router Miami:

Miami>enable
Miami#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Miami(config)#ip access-list standard Administracion
Miami(config-std-nacl)#Permit host 172.31.21.1
Miami(config-std-nacl)#exit
Miami(config)#line vty 0 15
Miami(config-line)#acces-class Admin
Miami(config-line)#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.

En el router tres configuramos listas de acceso tipo extendido.

BuenosAires#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
BuenosAires(config)#access-list 101 permit tcp any host 209.165.200.229 eq www
BuenosAires(config)#access-list 101 permit icmp any any echo-reply
BuenosAires(config)#interface f0/0
BuenosAires(config-if)#ip access-group 101 in
BuenosAires(config-if)#interface s0/0/1
BuenosAires(config-if)#ip access-group 101 out
BuenosAires(config-if)#interface s0/0/0

BuenosAires(config-if)#ip access-group 101 out

BuenosAires(config-if)#interface f0/1

BuenosAires(config-if)#ip access-group 101 out

BuenosAires(config-if)#exit

BuenosAires(config)#

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

En el router R1 Bogota realizamos ping

Bogota>enable

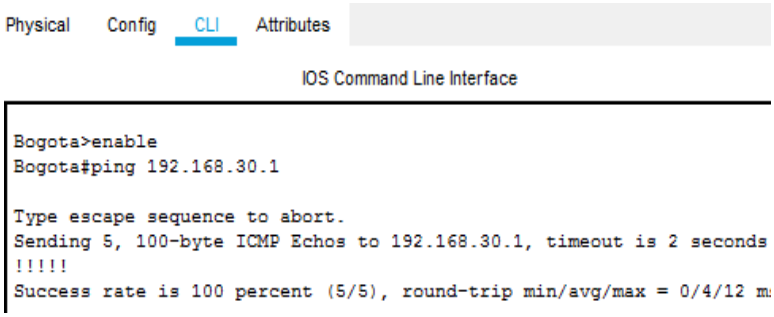
Bogota#ping 192.168.30.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.30.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/4/12 ms



Luegos realizamos ping en el router bogota a la vlan 40 Mercadeo y vlan 200 Mantenimiento:

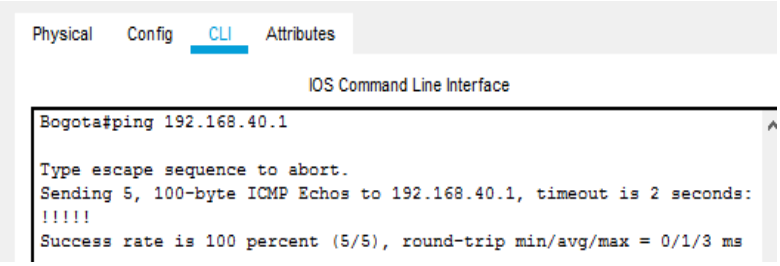
Bogota#ping 192.168.40.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.40.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/1/3 ms



Ping a vlan 200 Mantenimiento

Bogota#

Bogota#ping 192.168.200.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.200.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/2/5 m

Link de desarrollo de los Escenarios 1 Y 2 Simulador Packet Tracer

https://www.dropbox.com/sh/usjbpcpo3mvwq64/AAA8Mk8BljpfpPbC3NfHb37Oa?dl=0

CONCLUSIONES

- Se puede concluir que con la realización de el curso de profundización CISCO, nosotros como estudiantes estamos capacitados para implementar diferentes topologías de red, además nos permite concocer diferentes conceptos y temática que se fueron implementadno de forma práctica en el desarrollo de los ejercicios propuestos para ser ejecutados ya sea en herramientas como Packet Tracer, pero también en forma real como en la implementación del laboratorio remoto Smartlab.

- Se logro desarrollar la topología de los dos escenarios propuestos, configurando los dispositivos como router, switch, pc y además se implementó la conexión de los diferentess puertos como FastEthernet, serial, etc.

- Se implementó la configuración NAT, DHCP, PPP y diferentes comandos para verificar el buen funcionamiento de la red.
- Con el desarrollo de esta actividad prueba de habilidades logramos entender que somos capaces de realizar la conexión y configuración de cualquier red, ya que los conceptos, herramientas, orientación y ejercicios, nos ayudo a desarrollar nuestras habilidades para poder hacer cualquier configuración de un sistema.

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