DIPLOMADO DE PROFUNDIZACIÓN CISCO
(PRUEBA DE HABILIDADES PRÁCTICAS CCNA)

Presentado por:
MILTON JAVIER GARCÍA ACEVEDO

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Presentado a:
JOSE IGNACIO CARDONA
TUTOR DE CURSO

ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA
UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA UNAD
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1. TABLA DE CONTENIDO

2. INTRODUCCIÓN

Hoy en día la tecnología es un resultado de lo que con esfuerzo el ser humano ha alcanzado, las redes informáticas y telecomunicaciones son una herramienta que nos hace dependientes. El internet, intranet y entre otras clasificaciones de redes privadas son una muestra de tan importante constancia en el estudio y conocimiento que estas dejan en el presente y futuras generaciones.

CISCO siendo una compañía multinacional, ha brindado en el presente trabajo la gran oportunidad de capacitar a millones de personas a nivel mundial, y que más, en esta oportunidad de implementar su tecnología a los estudiantes de la UNAD.

En esta entrega se aplicará la herramienta Packet Tracer para la emulación de una red, que no es nada distinto a lo que realmente se aplica con dispositivos físicos reales CISCO. La arquitectura e implementación es la misma solo que esta vez es emulada.

En el presente trabajo se evalúa al especialista en redes todos los conocimientos adquiridos durante el semestre en el diplomado de profundización CCNA, buscando que el estudiante identifique las soluciones en un escenario topológico de redes relacionado con todos los aspectos del networking.

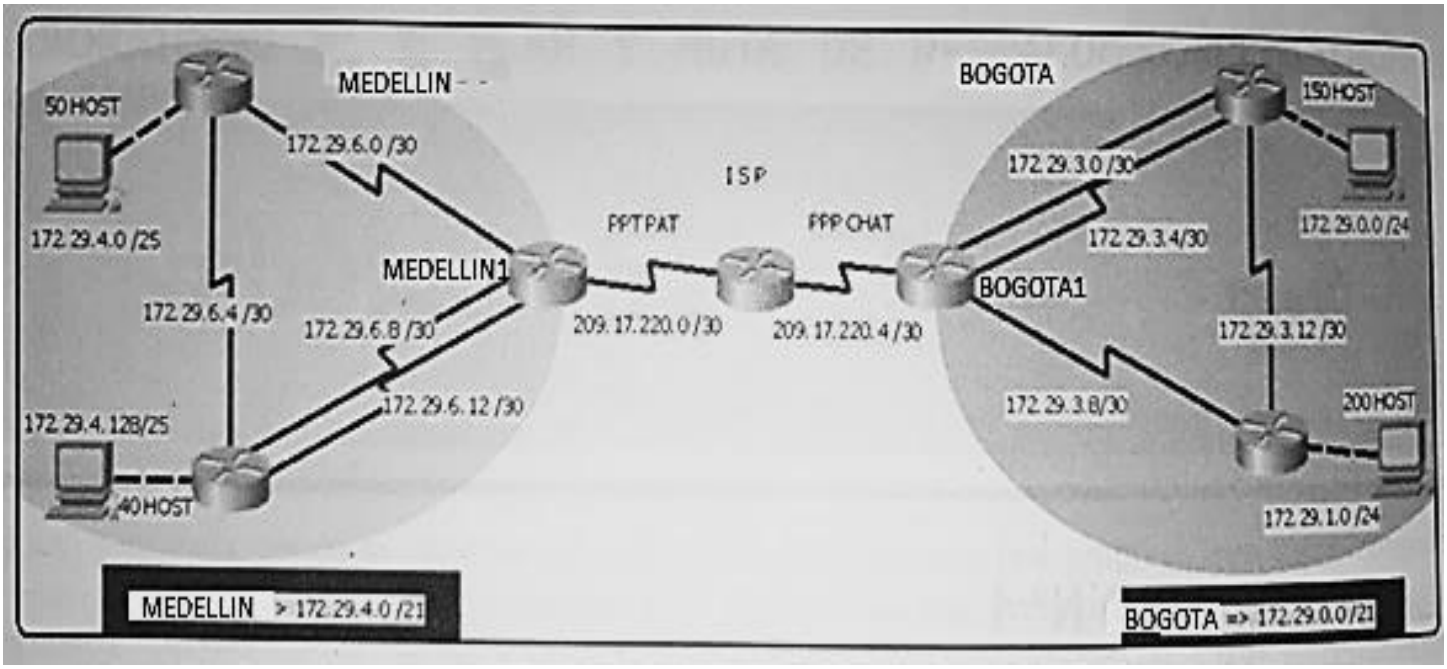
El presente documento se compone de dos escenarios que se plantean como finalización del diplomado de profundización CISCO. El objetivo principal es de dar solución a los interrogantes e instrucciones a implementar, de acuerdo con el panorama que se entrega en cada ejercicio.

3. DESARROLLO DE LOS ESCENARIOS

3.1. 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

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

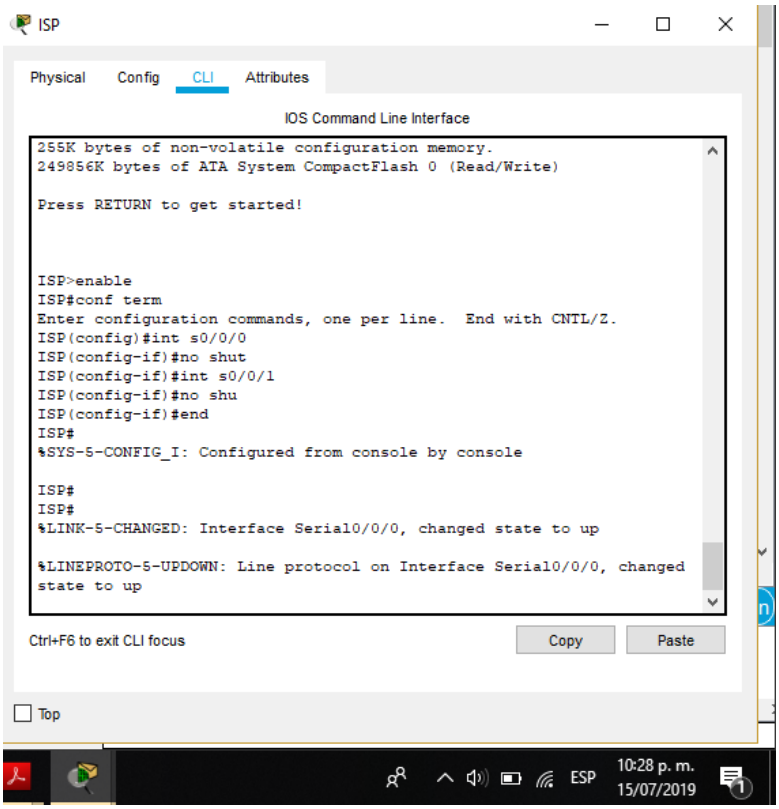
3.1.1. Parte 1: Configuración del enrutamiento

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

Iniciamos la configuracion de cada puerto acuerdo a las necesidades y encendiendolos:

ISP

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

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

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname ISP
ISP(config)#END
ISP#
%SYS-5-CONFIG_I: Configured from console by console
WR
Building configuration...
[OK]
ISP#
```



MEDELLIN-1

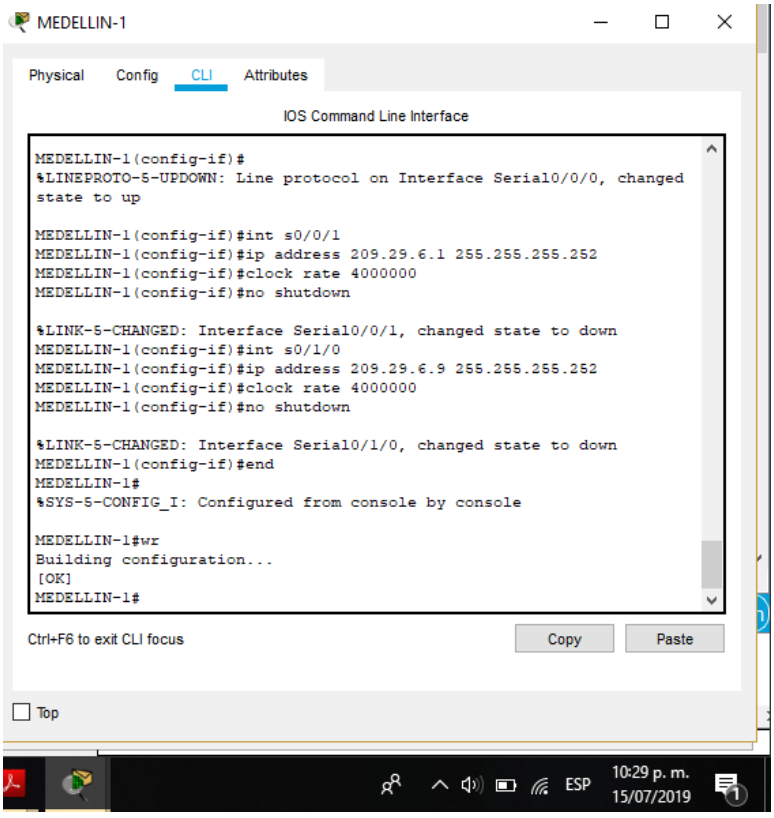
Router>
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN-1
MEDELLIN-1(config)#int s0/0/0
MEDELLIN-1(config-if)#ip address 209.17.220.2 255.255.255.252
MEDELLIN-1(config-if)#clock rate 4000000
This command applies only to DCE interfaces
MEDELLIN-1(config-if)#no shutdown

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

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

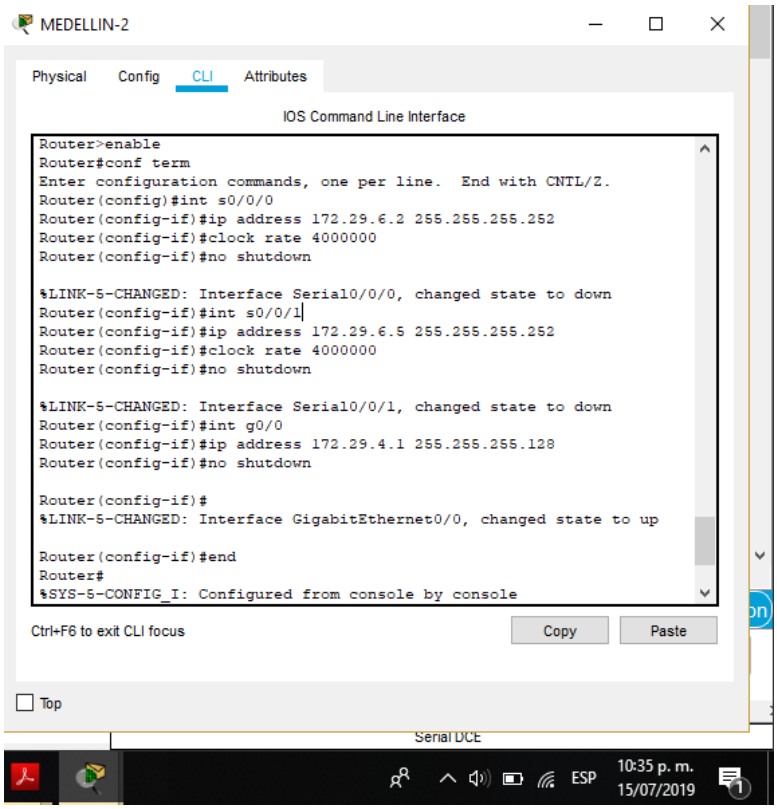
MEDELLIN-1(config-if)#int s0/0/1
MEDELLIN-1(config-if)#ip address 209.29.6.1 255.255.255.252

```
MEDELLIN-1(config-if)#clock rate 4000000
MEDELLIN-1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
MEDELLIN-1(config-if)#int s0/1/0
MEDELLIN-1(config-if)#ip address 209.29.6.9 255.255.255.252
MEDELLIN-1(config-if)#clock rate 4000000
MEDELLIN-1(config-if)#no shutdown
MEDELLIN-1(config)#int s0/1/1
MEDELLIN-1(config-if)#ip address 209.29.6.13 255.255.255.252
MEDELLIN-1(config-if)#clock rate 4000000
MEDELLIN-1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
MEDELLIN-1(config-if)#end
MEDELLIN-1#
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN-1#wr
Building configuration...
[OK]
MEDELLIN-1#
```



MEDELLIN-2

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.6.2 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.5 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

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

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

Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN-2
MEDELLIN-2(config)#
```



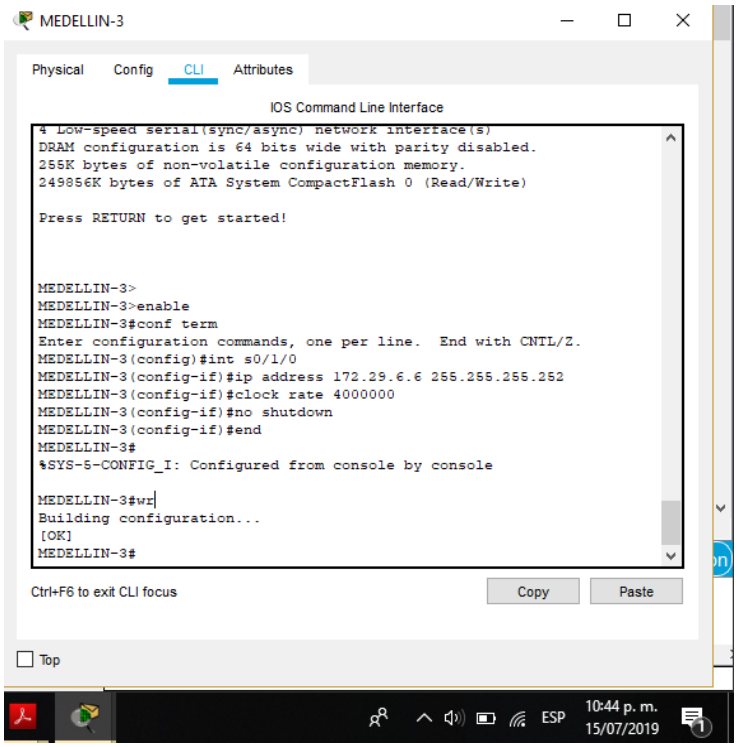
MEDELLIN-3

Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN-3
MEDELLIN-3(config)#int s0/0/0
MEDELLIN-3(config-if)#ip address 172.29.6.10 255.255.255.252
MEDELLIN-3(config-if)#clock rate 4000000
MEDELLIN-3(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
MEDELLIN-3(config-if)#int s0/0/1
MEDELLIN-3(config-if)#ip address 172.29.6.14 255.255.255.252
MEDELLIN-3(config-if)#clock rate 4000000
MEDELLIN-3(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
MEDELLIN-3(config-if)#int s0/1/0
%Invalid interface type and number

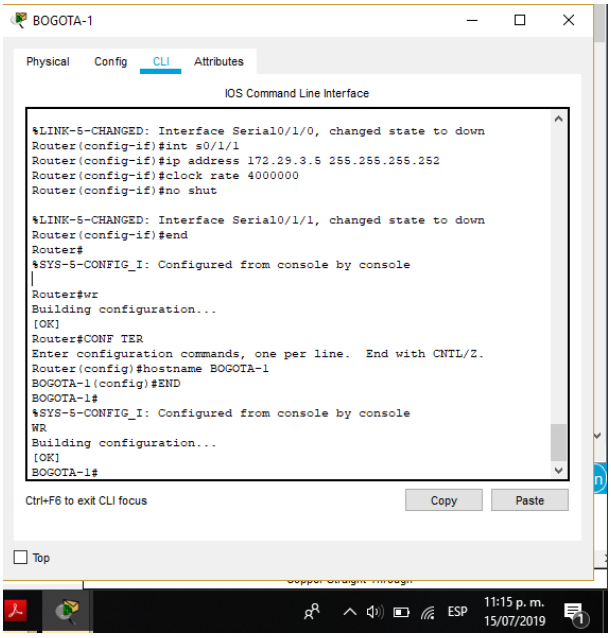
```
MEDELLIN-3(config)#int g0/0
MEDELLIN-3(config-if)#ip address 172.29.4.129 255.255.255.128
MEDELLIN-3(config-if)#no shutdown

MEDELLIN-3(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
MEDELLIN-3(config)#int s0/1/0
MEDELLIN-3(config-if)#ip address 172.29.6.6 255.255.255.252
MEDELLIN-3(config-if)#clock rate 4000000
MEDELLIN-3(config-if)#no shutdown
MEDELLIN-3(config-if)#end
MEDELLIN-3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
MEDELLIN-3#
```



BOGOTA-1

```
Router>en
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.6 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Router(config-if)#int s0/0/1
Router(config-if)#ip address 209.29.3.9 255.255.255.252
Router(config-if)#clock rate 4000000
This command applies only to DCE interfaces
Router(config-if)#ip address 172.29.3.9 255.255.255.252
Router(config-if)#clock rate 4000000
This command applies only to DCE interfaces
Router(config-if)#no shut

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

Router(config-if)#clock rate 4000000
This command applies only to DCE interfaces
Router(config-if)#ip address 209.29.3.9 255.255.255.252
%LINEPROTO-5-UPDOWN: Line protocol on Interf
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.3.1 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut

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

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Router#wr
Building configuration...
[OK]
Router#
Router(config)#hostname BOGOTA-1
BOGOTA-1(config)#END
BOGOTA-1#



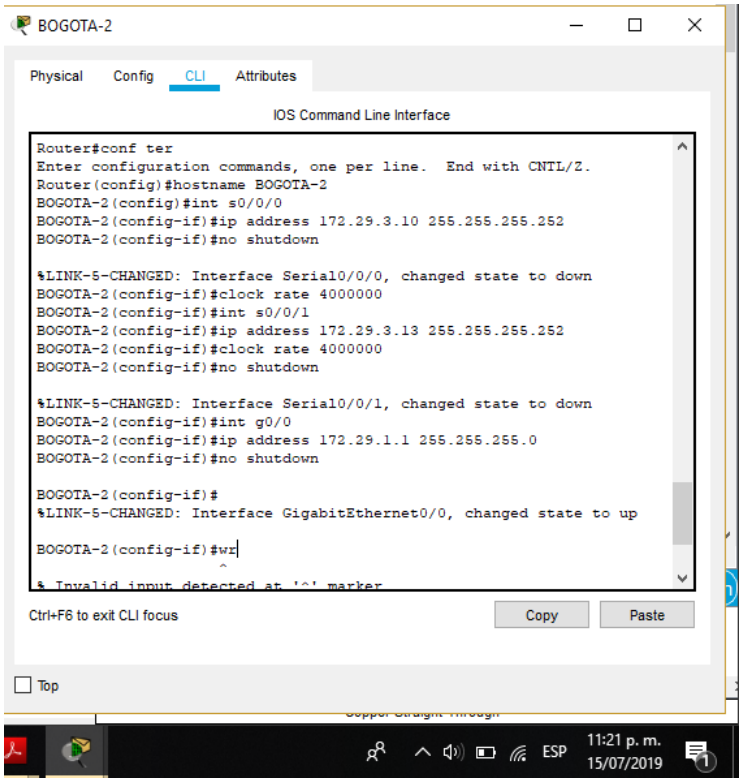
BOGOTA-2

Router>
Router>EN
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA-2
BOGOTA-2(config)#int s0/0/0
BOGOTA-2(config-if)#ip address 172.29.3.10 255.255.255.252
BOGOTA-2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
BOGOTA-2(config-if)#clock rate 4000000
BOGOTA-2(config-if)#int s0/0/1
BOGOTA-2(config-if)#ip address 172.29.3.13 255.255.255.252
BOGOTA-2(config-if)#clock rate 4000000
BOGOTA-2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
BOGOTA-2(config-if)#int g0/0

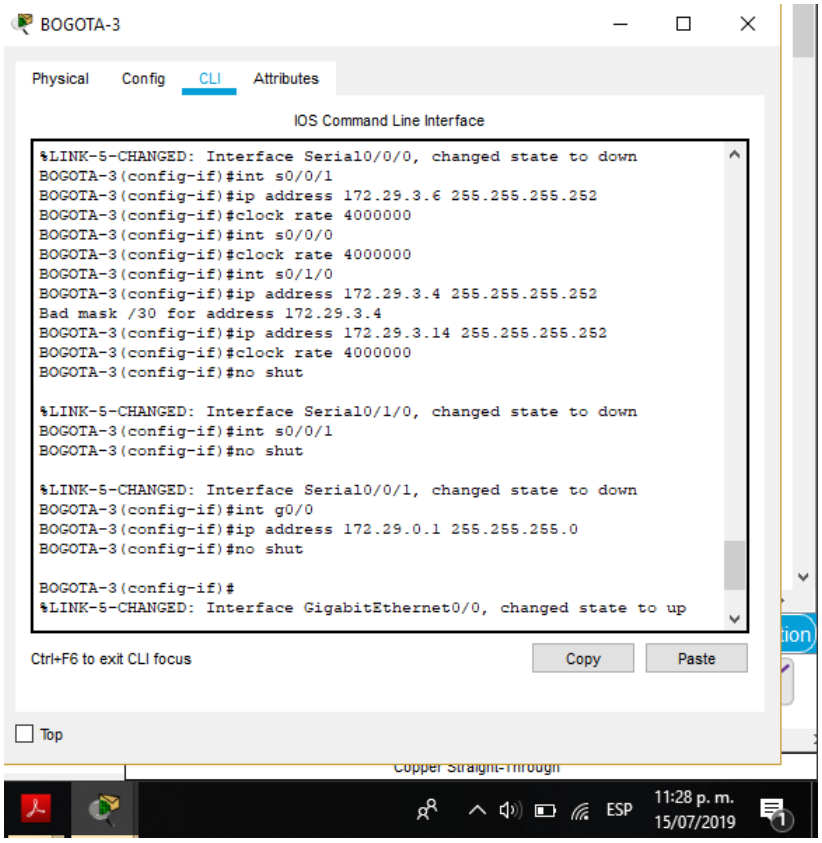
```
BOGOTA-2(config-if)#ip address 172.29.1.1 255.255.255.0
BOGOTA-2(config-if)#no shutdown

BOGOTA-2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

BOGOTA-2(config-if)#wr
^
% Invalid input detected at '^' marker.
BOGOTA-2(config-if)#end
BOGOTA-2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
BOGOTA-2#
```



BOGOTA-3

```
Router>EN
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname
% Incomplete command.
Router(config)#hostname BOGOTA-3
BOGOTA-3(config)#int 0/0/0
^
% Invalid input detected at '^' marker.
BOGOTA-3(config)#ip address 172.29.3.2 255.255.255.252
^
% Invalid input detected at '^' marker.
BOGOTA-3(config)#int s0/0/0
BOGOTA-3(config-if)#ip address 172.29.3.2 255.255.255.252
BOGOTA-3(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
BOGOTA-3(config-if)#int s0/0/1
BOGOTA-3(config-if)#ip address 172.29.3.6 255.255.255.252
BOGOTA-3(config-if)#clock rate 4000000
BOGOTA-3(config-if)#int s0/0/0
BOGOTA-3(config-if)#clock rate 4000000
BOGOTA-3(config-if)#int s0/1/0
BOGOTA-3(config-if)#ip address 172.29.3.4 255.255.255.252
Bad mask /30 for address 172.29.3.4
BOGOTA-3(config-if)#ip address 172.29.3.14 255.255.255.252
BOGOTA-3(config-if)#clock rate 4000000
BOGOTA-3(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
BOGOTA-3(config-if)#int s0/0/1
BOGOTA-3(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
BOGOTA-3(config-if)#int g0/0
BOGOTA-3(config-if)#ip address 172.29.0.1 255.255.255.0
BOGOTA-3(config-if)#no shut

BOGOTA-3(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

BOGOTA-3(config-if)#end
BOGOTA-3#
%SYS-5-CONFIG_I: Configured from console by console
```

BOGOTA-3#wr
Building configuration...
[OK]
BOGOTA-3#

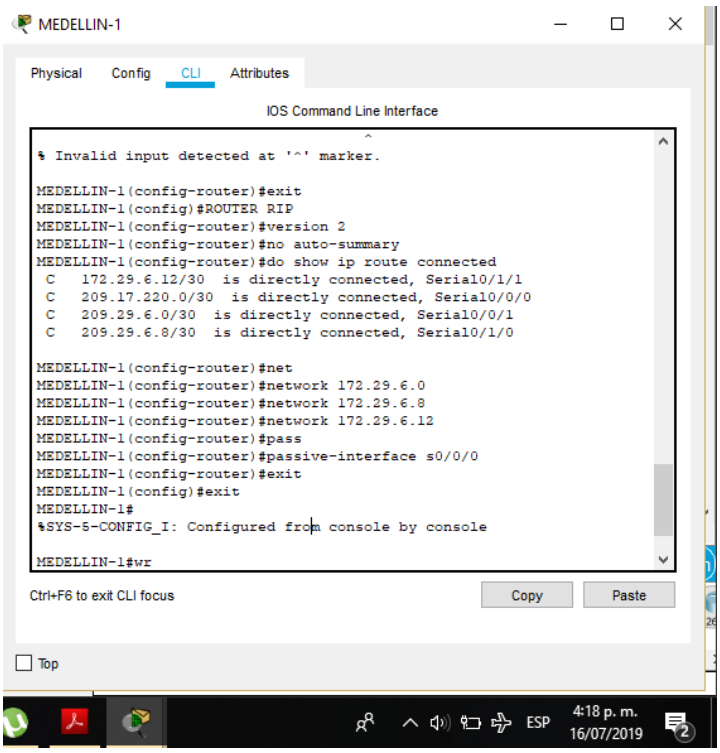


Configuración de la RIP

MEDELLIN-1

MEDELLIN-1>
MEDELLIN-1>ENABLE
MEDELLIN-1#CONF TERM
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-1(config)#ROUTER RIP
MEDELLIN-1(config-router)#version 2
MEDELLIN-1(config-router)#no auto-sumary
^
% Invalid input detected at '^' marker.
MEDELLIN-1(config-router)#exit

```
MEDELLIN-1(config)#ROUTER RIP
MEDELLIN-1(config-router)#version 2
MEDELLIN-1(config-router)#no auto-summary
MEDELLIN-1(config-router)#do show ip route connected
C 172.29.6.12/30 is directly connected, Serial0/1/1
C 209.17.220.0/30 is directly connected, Serial0/0/0
C 209.29.6.0/30 is directly connected, Serial0/0/1
C 209.29.6.8/30 is directly connected, Serial0/1/0

MEDELLIN-1(config-router)#net
MEDELLIN-1(config-router)#network 172.29.6.0
MEDELLIN-1(config-router)#network 172.29.6.8
MEDELLIN-1(config-router)#network 172.29.6.12
MEDELLIN-1(config-router)#pass
MEDELLIN-1(config-router)#passive-interface s0/0/0
MEDELLIN-1(config-router)#exit
MEDELLIN-1(config)#exit
MEDELLIN-1#
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN-1#wr
Building configuration...
[OK]
MEDELLIN-1#
MEDELLIN-1#
```

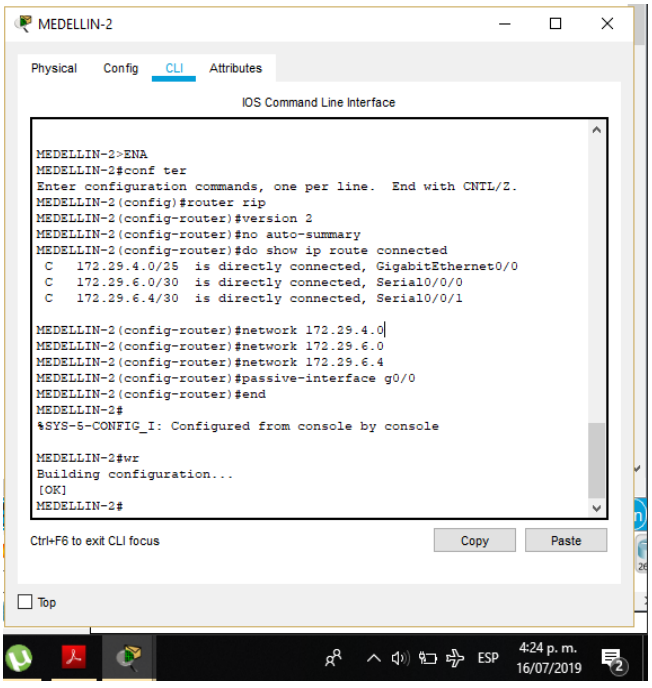


MEDELLIN-2

MEDELLIN-2>ENA
MEDELLIN-2#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-2(config)#router rip
MEDELLIN-2(config-router)#version 2
MEDELLIN-2(config-router)#no auto-summary
MEDELLIN-2(config-router)#do show ip route connected
C 172.29.4.0/25 is directly connected, GigabitEthernet0/0
C 172.29.6.0/30 is directly connected, Serial0/0/0
C 172.29.6.4/30 is directly connected, Serial0/0/1

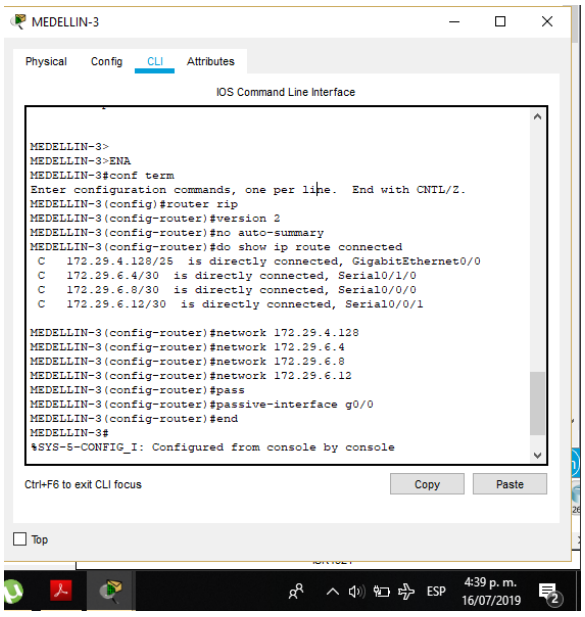
MEDELLIN-2(config-router)#network 172.29.4.0
MEDELLIN-2(config-router)#network 172.29.6.0
MEDELLIN-2(config-router)#network 172.29.6.4
MEDELLIN-2(config-router)#passive-interface g0/0
MEDELLIN-2(config-router)#end
MEDELLIN-2#
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN-2#wr
Building configuration...
[OK]
MEDELLIN-2#



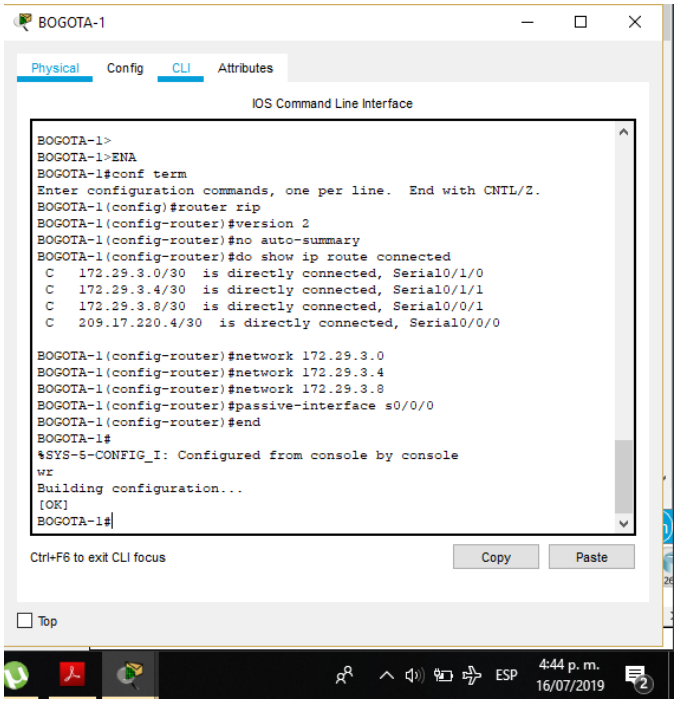
MEDELLIN-3

```
MEDELLIN-3>
MEDELLIN-3>ENA
MEDELLIN-3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-3(config)#router rip
MEDELLIN-3(config-router)#version 2
MEDELLIN-3(config-router)#no auto-summary
MEDELLIN-3(config-router)#do show ip route connected
C 172.29.4.128/25 is directly connected, GigabitEthernet0/0
C 172.29.6.4/30 is directly connected, Serial0/1/0
C 172.29.6.8/30 is directly connected, Serial0/0/0
C 172.29.6.12/30 is directly connected, Serial0/0/1

MEDELLIN-3(config-router)#network 172.29.4.128
MEDELLIN-3(config-router)#network 172.29.6.4
MEDELLIN-3(config-router)#network 172.29.6.8
MEDELLIN-3(config-router)#network 172.29.6.12
MEDELLIN-3(config-router)#pass
MEDELLIN-3(config-router)#passive-interface g0/0
MEDELLIN-3(config-router)#end
MEDELLIN-3#
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN-3#wr
Building configuration...
[OK]
MEDELLIN-3#
```



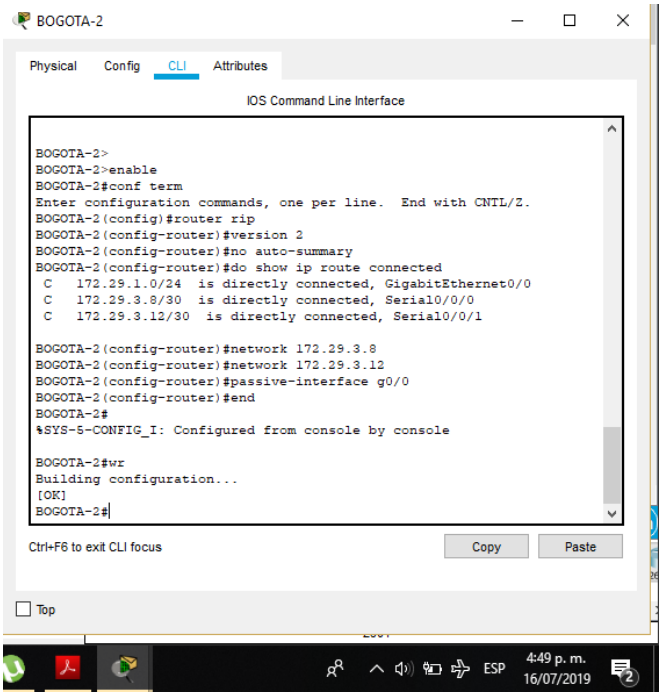
BOGOTA-1

```
BOGOTA-1>
BOGOTA-1>ENA
BOGOTA-1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-1(config)#router rip
BOGOTA-1(config-router)#version 2
BOGOTA-1(config-router)#no auto-summary
BOGOTA-1(config-router)#do show ip route connected
C 172.29.3.0/30 is directly connected, Serial0/1/0
C 172.29.3.4/30 is directly connected, Serial0/1/1
C 172.29.3.8/30 is directly connected, Serial0/0/1
C 209.17.220.4/30 is directly connected, Serial0/0/0

BOGOTA-1(config-router)#network 172.29.3.0
BOGOTA-1(config-router)#network 172.29.3.4
BOGOTA-1(config-router)#network 172.29.3.8
BOGOTA-1(config-router)#passive-interface s0/0/0
BOGOTA-1(config-router)#end
BOGOTA-1#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
BOGOTA-1#
```



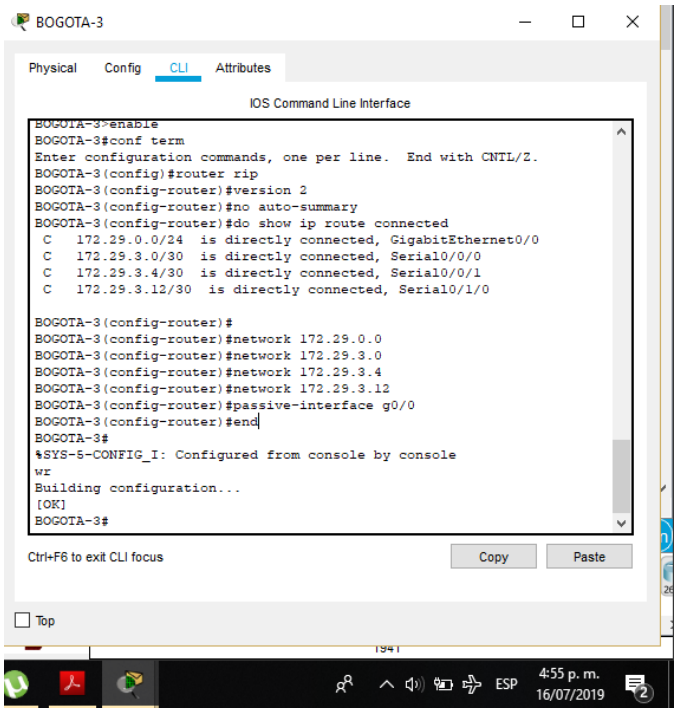
BOGOTA-2

```
BOGOTA-2>
BOGOTA-2>enable
BOGOTA-2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-2(config)#router rip
BOGOTA-2(config-router)#version 2
BOGOTA-2(config-router)#no auto-summary
BOGOTA-2(config-router)#do show ip route connected
C 172.29.1.0/24 is directly connected, GigabitEthernet0/0
C 172.29.3.8/30 is directly connected, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/0/1

BOGOTA-2(config-router)#network 172.29.3.8
BOGOTA-2(config-router)#network 172.29.3.12
BOGOTA-2(config-router)#passive-interface g0/0
BOGOTA-2(config-router)#end
BOGOTA-2#
%SYS-5-CONFIG_I: Configured from console by console

BOGOTA-2#wr
Building configuration...
[OK]
BOGOTA-2#
```

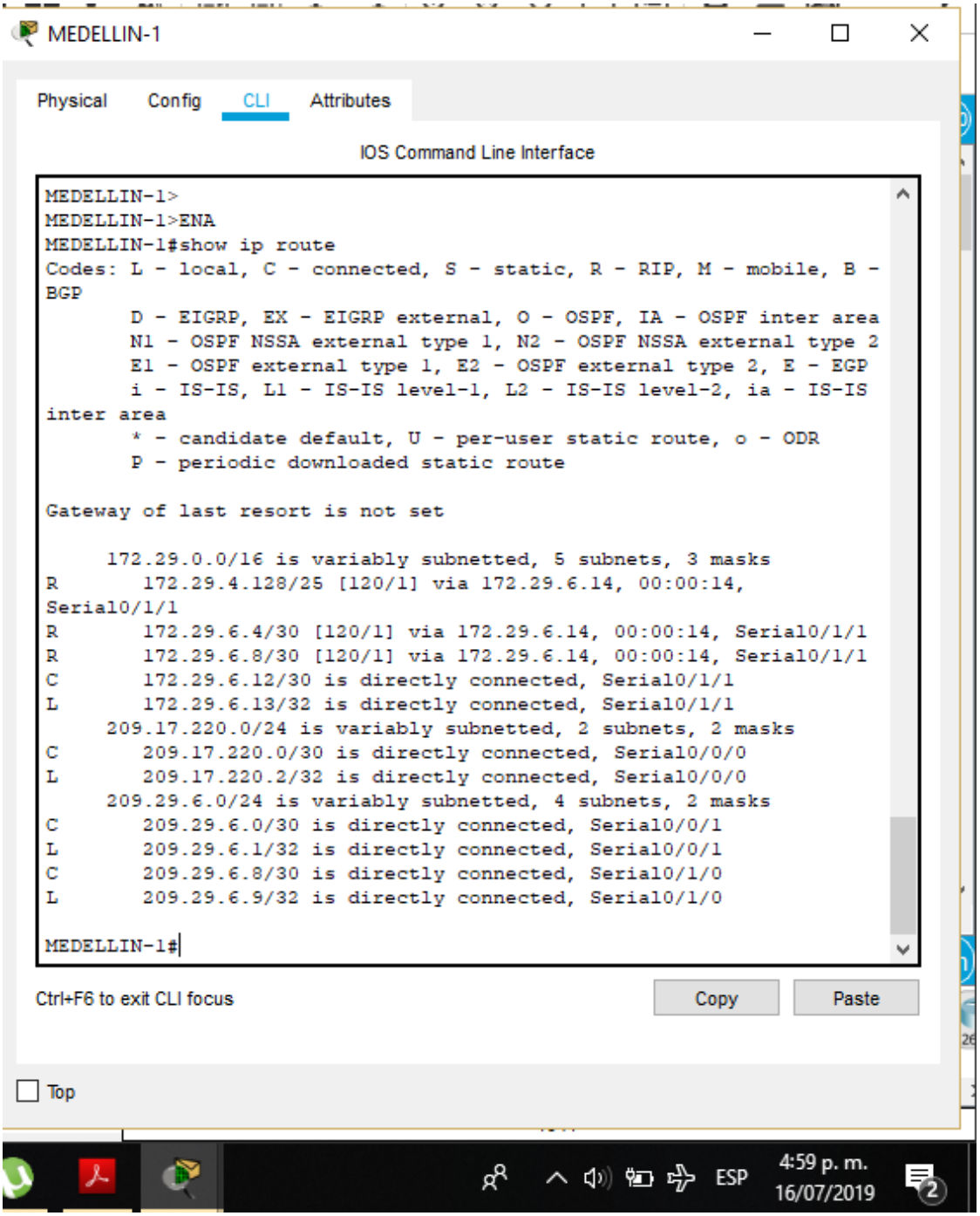


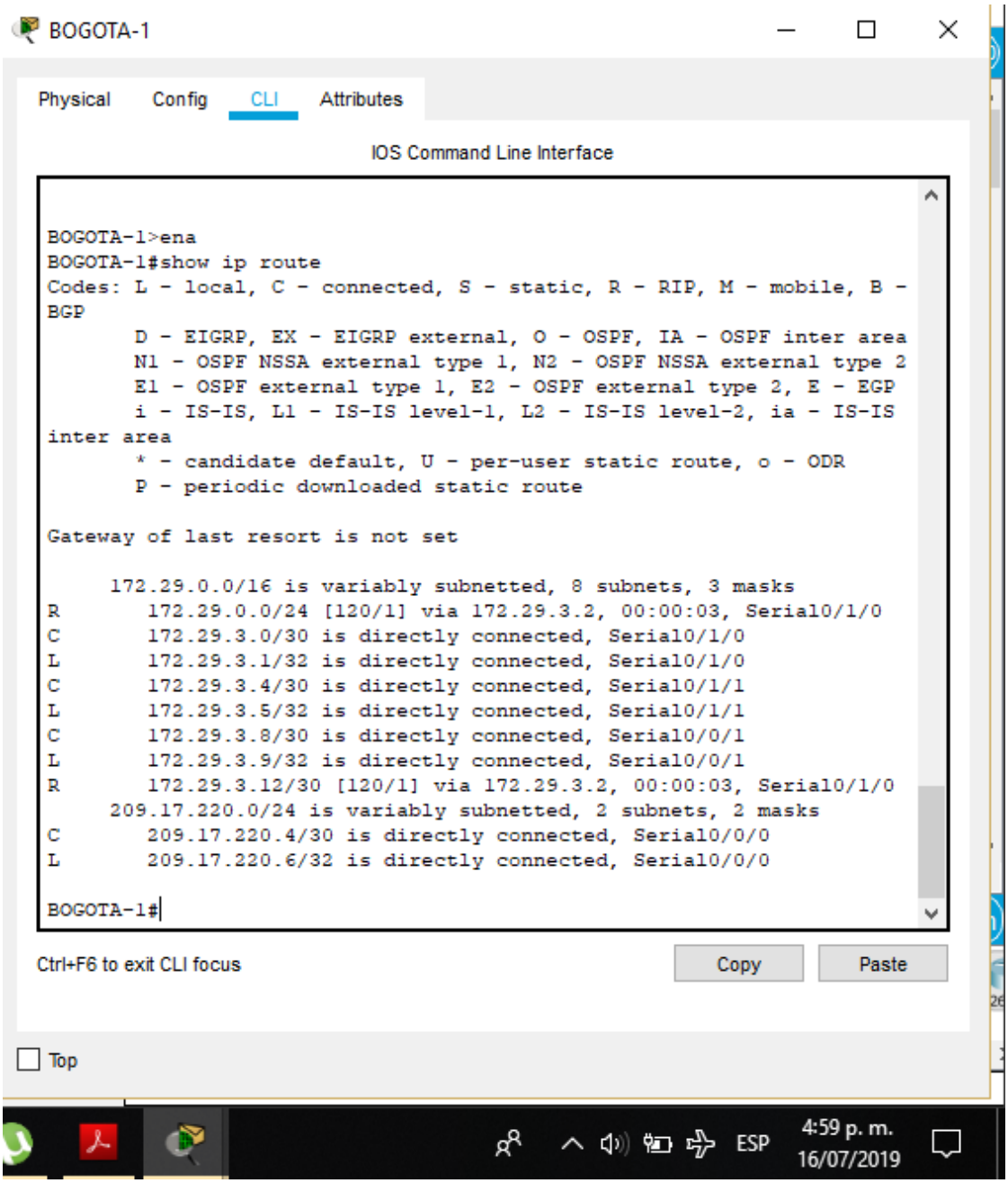
BOGOTA-3

```
BOGOTA-3>enable
BOGOTA-3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-3(config)#router rip
BOGOTA-3(config-router)#version 2
BOGOTA-3(config-router)#no auto-summary
BOGOTA-3(config-router)#do show ip route connected
C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
C 172.29.3.0/30 is directly connected, Serial0/0/0
C 172.29.3.4/30 is directly connected, Serial0/0/1
C 172.29.3.12/30 is directly connected, Serial0/1/0

BOGOTA-3(config-router)#
BOGOTA-3(config-router)#network 172.29.0.0
BOGOTA-3(config-router)#network 172.29.3.0
BOGOTA-3(config-router)#network 172.29.3.4
BOGOTA-3(config-router)#network 172.29.3.12
BOGOTA-3(config-router)#passive-interface g0/0
BOGOTA-3(config-router)#end
BOGOTA-3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
BOGOTA-3#
```



Verificación de las redes conectadas en MEDELLIN-1 y BOGOTA-1:

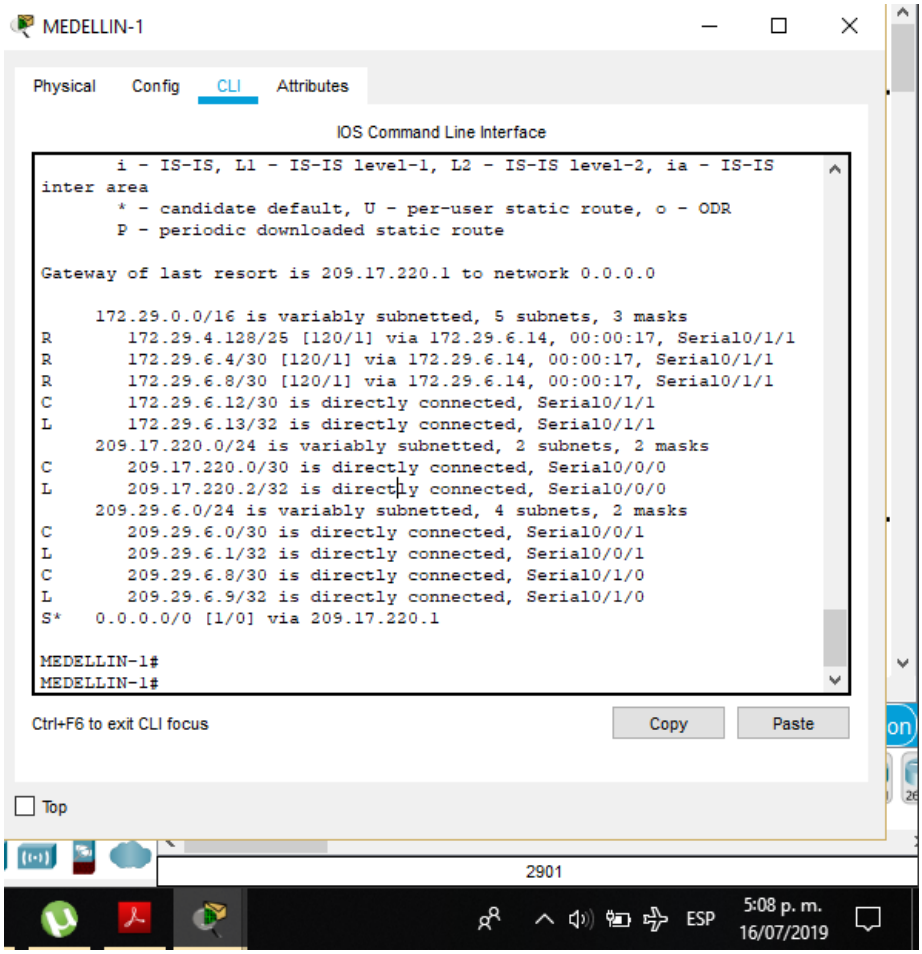



BOGOTA-1
Physical
Config
CLI
Attributes
IOS Command Line Interface
BOGOTA-1>ena
BOGOTA-1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is not set
172.29.0.0/16 is variably subnetted, 8 subnets, 3 masks
R 172.29.0.0/24 [120/1] via 172.29.3.2, 00:00:03, Serial0/1/0
C 172.29.3.0/30 is directly connected, Serial0/1/0
L 172.29.3.1/32 is directly connected, Serial0/1/0
C 172.29.3.4/30 is directly connected, Serial0/1/1
L 172.29.3.5/32 is directly connected, Serial0/1/1
C 172.29.3.8/30 is directly connected, Serial0/0/1
L 172.29.3.9/32 is directly connected, Serial0/0/1
R 172.29.3.12/30 [120/1] via 172.29.3.2, 00:00:03, Serial0/1/0
209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C 209.17.220.4/30 is directly connected, Serial0/0/0
L 209.17.220.6/32 is directly connected, Serial0/0/0
BOGOTA-1#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
ESP
4:59 p. m.
16/07/2019

3.1.1.B. Los routers Bogota1 y Medellín deberán añadir a su configuración de enrutamiento una ruta por defecto hacia el ISP y, a su vez, redistribuirla dentro de las publicaciones de RIP.

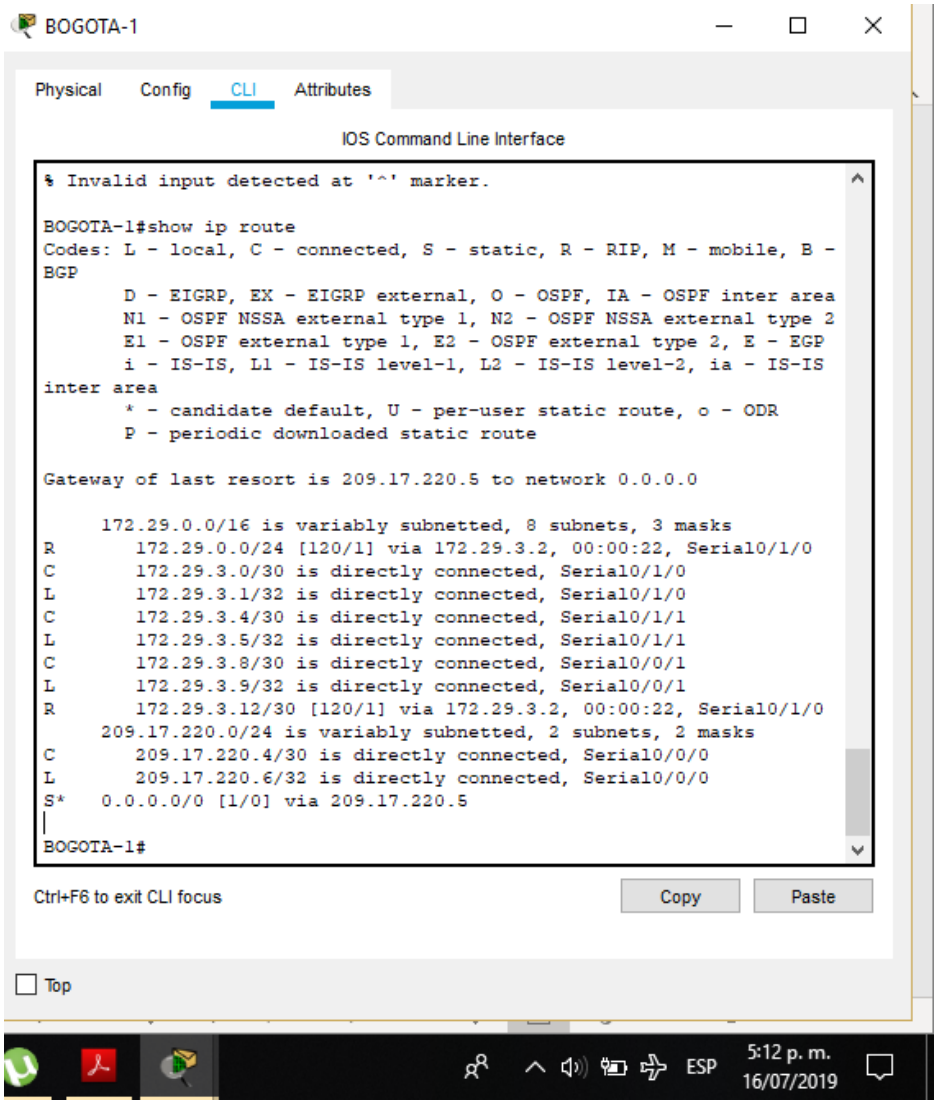
MEDELLIN-1

MEDELLIN-1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-1(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.1
MEDELLIN-1(config)#router rip
MEDELLIN-1(config-router)#default-information originate
MEDELLIN-1(config-router)#show ip-route
^
% Invalid input detected at '^' marker.
MEDELLIN-1(config-router)#end
MEDELLIN-1#
%SYS-5-CONFIG_I: Configured from console by console
show ip route



BOGOTA-1

BOGOTA-1#CONF TERM
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-1(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.5
BOGOTA-1(config)#router rip
BOGOTA-1(config-router)#default-information originate
BOGOTA-1(config-router)#end
BOGOTA-1#



3.1.1.C. El router ISP deberá tener una ruta estática dirigida hacia cada red interna de Bogotá y Medellín para el caso se sumarizan las subredes de cada uno a /22.

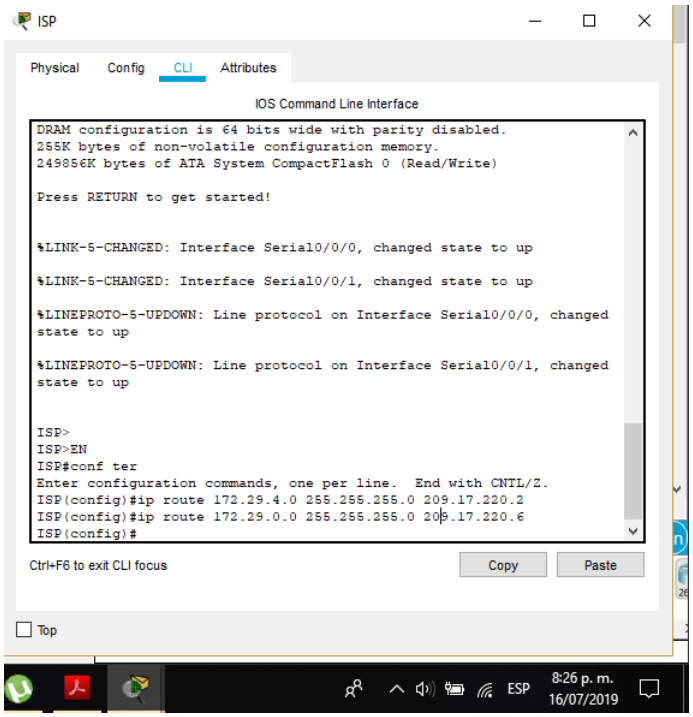
Se calcula y se procede a configurar las rutas en el ISP:

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

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

ISP

```
ISP>
ISP>EN
ISP#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#ip route 172.29.4.0 255.255.255.0 209.17.220.2
ISP(config)#ip route 172.29.0.0 255.255.255.0 209.17.220.6
ISP(config)#
```

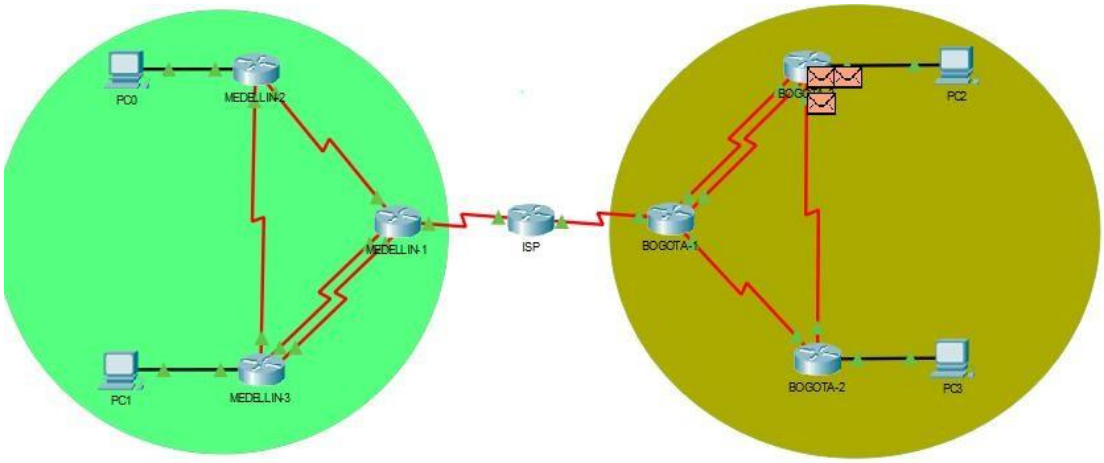


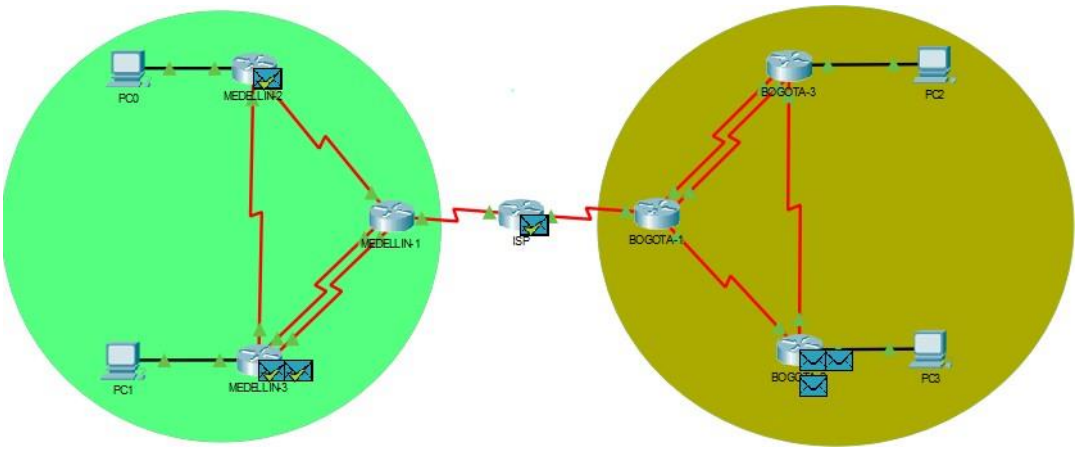
3.1.2. Parte 2: Tabla de Enrutamiento.

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

3.1.2.B.

Se verifica envío de paquetes y el enrutamiento:



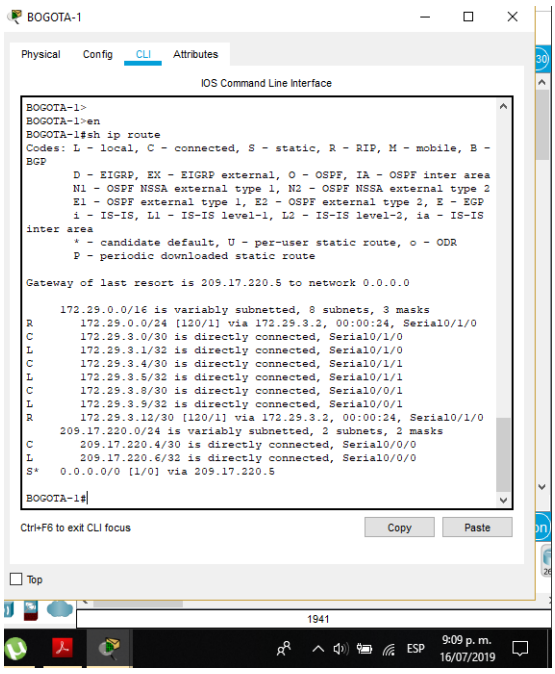


3.1.2.C. Verificar el balanceo de carga que presentan los routers.

A continuación se visualiza en la imagen las rutas de transito que se encuentran balanceadas:

BOGOTA-1

BOGOTA-1>en
BOGOTA-1#sh ip route

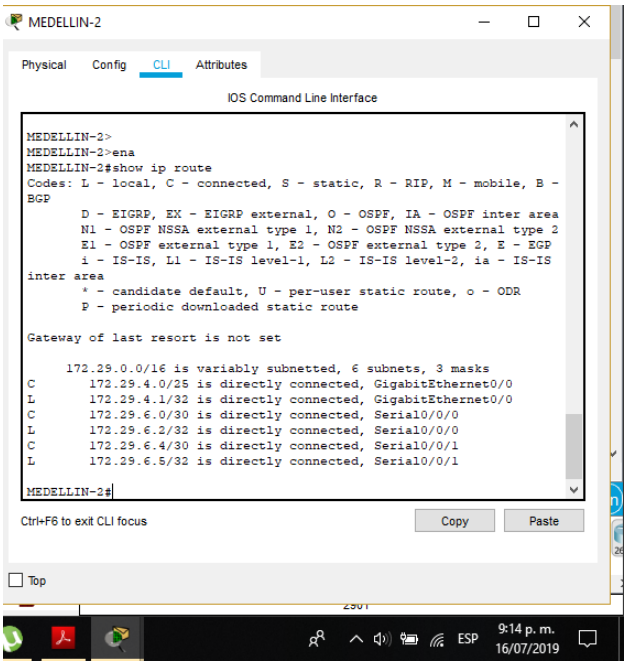


3.1.2.D.Obsérvese en los routers Bogotá1 y Medellín1 cierta similitud por su ubicación, por tener dos enlaces de conexión hacia otro router y por la ruta por defecto que manejan.

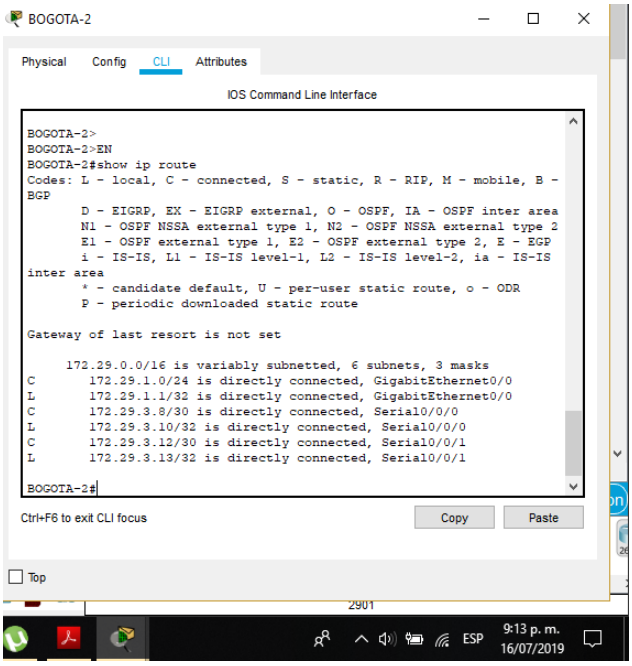
Se analiza que MEDELLIN-1 y BOGOTA-1 poseen conexiones similares con ISP y su comportamiento es igual por la misma cantidad de conexiones y enlaces.

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

MEDELLIN-2



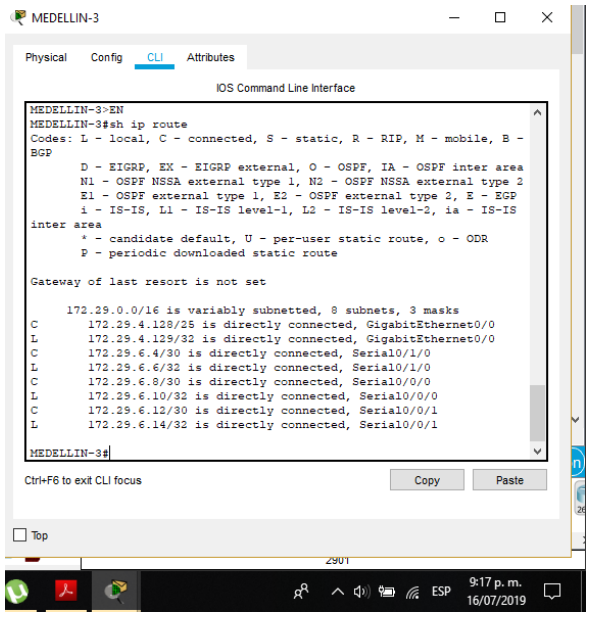
BOGOTA-2



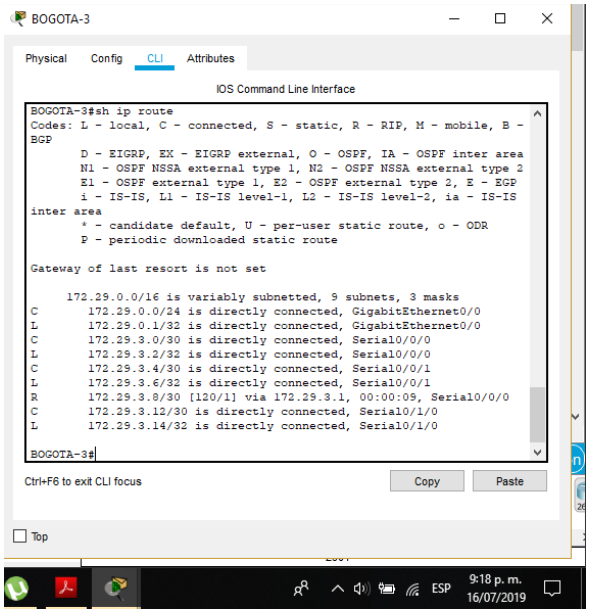
3.1.2.F. Las tablas de los routers restantes deben permitir visualizar rutas redundantes para el caso de la ruta por defecto.

De igual manera las conexiones redundantes se muestran en el blanceo de cargas con MEDELLIN-3 y BOGOTA-3

MEDELLIN-3



BOGOTA-3



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

Una vez se configura RIP, se visualiza que las interfases pasivas de los router se encuentran implementadas a los asignados.

Passive-interface s0/0/0 MEDELLIN-1

Passive-interface g0/0 MEDELLIN-2

Passive-interface g0/0 MEDELLIN-3

Passive-interface s0/0/0 BOGOTA-1

Passive-interface g0/0 BOGOTA-2

Passive-interface g0/0 BOGOTA-3

3.1.3. Parte 3: Deshabilitar la propagación del protocolo RIP.

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

ROUTER	**INTERFAZ**
Bogota1	SERIAL0/0/1; SERIAL0/1/0; SERIAL0/1/1
Bogota2	SERIAL0/0/0; SERIAL0/0/1
Bogota3	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0
Medellín1	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/1
Medellín2	SERIAL0/0/0; SERIAL0/0/1
Medellín3	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0
ISP	No lo requiere

Este paso se realizó en la parte 1 en donde solo se habilitan las interfases que se encuentran conectadas y funcionando, las demás se encuentran apagadas y sin asignación de direccionamiento.

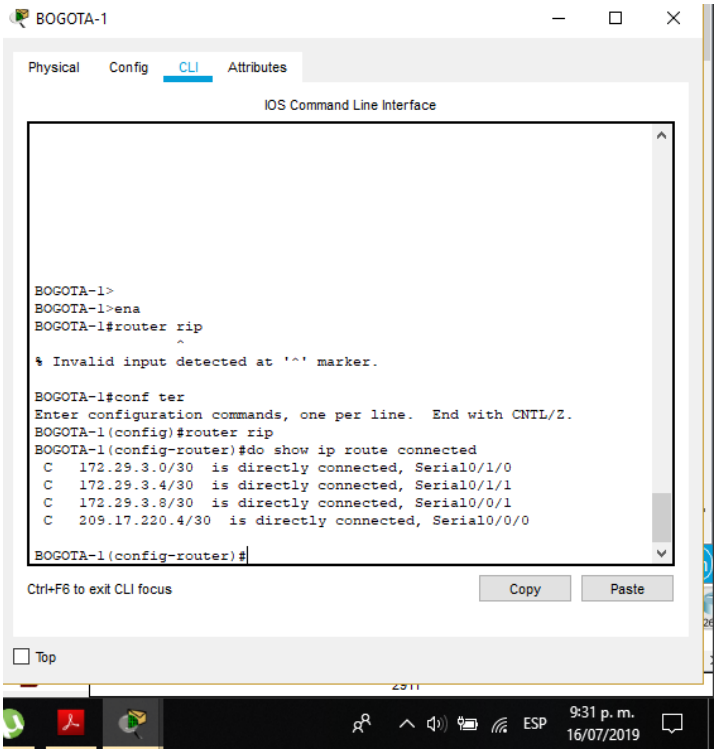
3.1.4. Parte 4: Verificación del protocolo RIP.

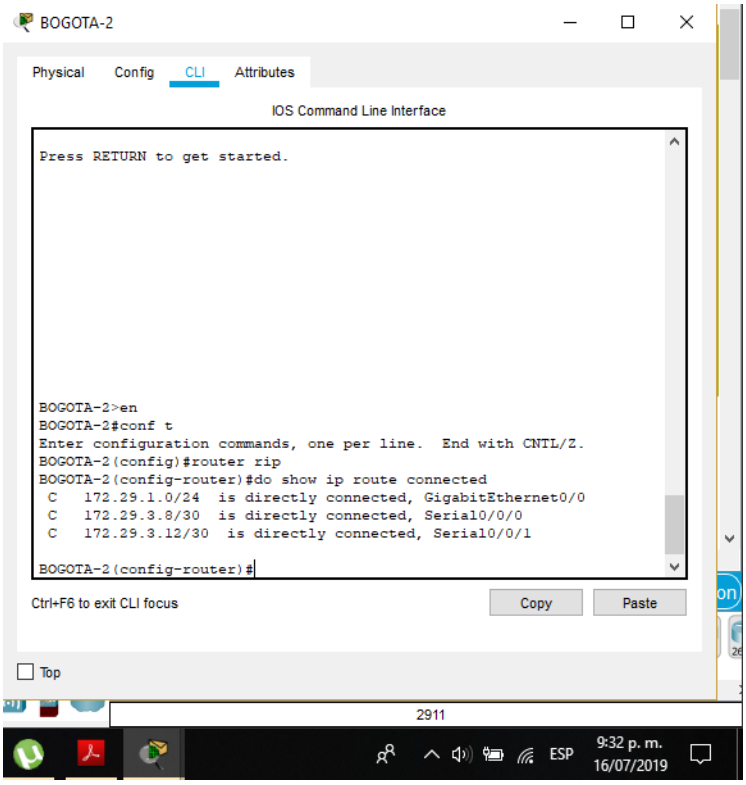
3.1.4.A. Verificar y documentar las opciones de enrutamiento configuradas en los routers, como el passive interface para la conexión hacia el ISP, la versión de RIP y las interfaces que participan de la publicación entre otros datos.

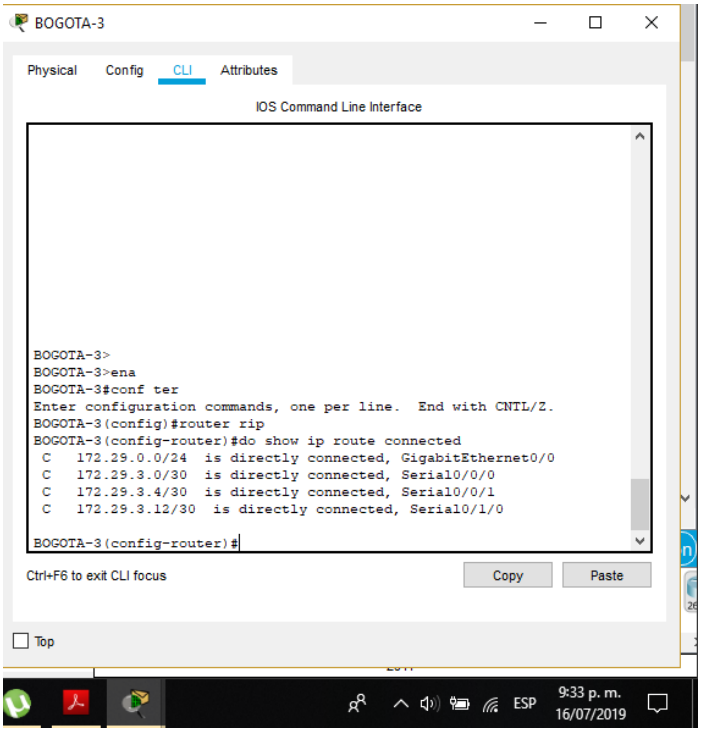
Rip version 2: Estas soportan subredes, CIDR y VLSM, autenticación usando uno de los siguientes mecanismos: no autentificación, autentificación mediante contraseña, autentificación mediante contraseña codificada.

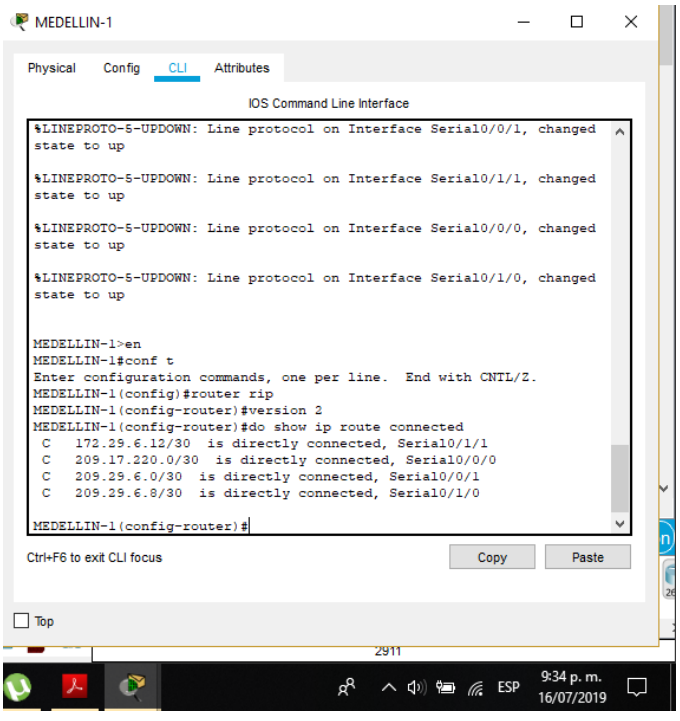
passive interface: Es una interface pasiva lo que hace es que no envía ningún tipo de paquete, ni hellos ni cualquier otro tipo de paquetes. O más bien que por esta interface no se puede tener neighbors o vecinos pero si anunciara las redes de dichas interfaces.

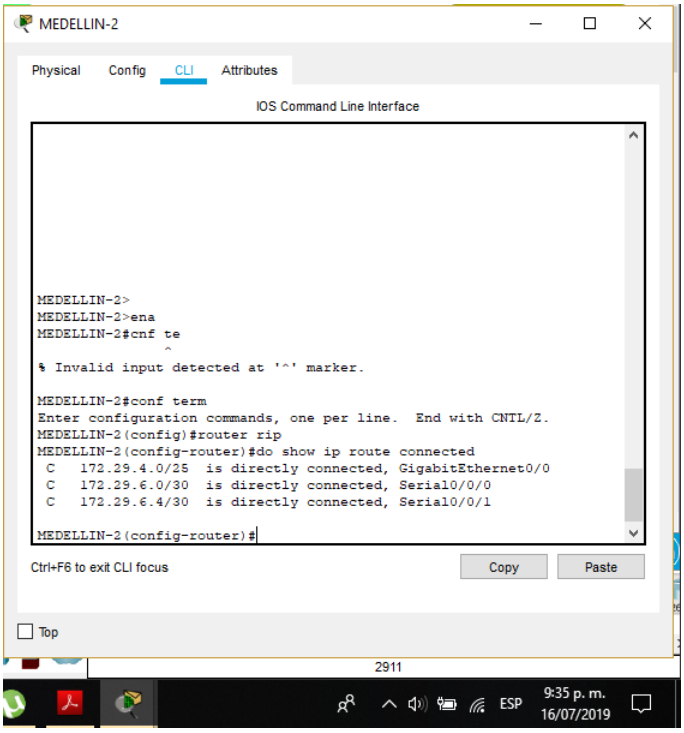
3.1.4.B.Verificar y documentar la base de datos de RIP de cada router, donde se informa de manera detallada de todas las rutas hacia cada red.

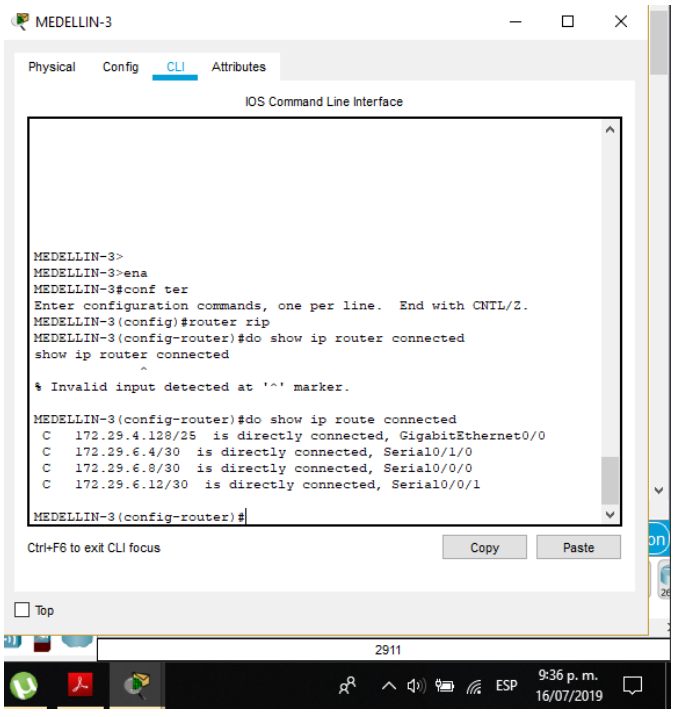





BOGOTA-3
Physical
Config
CLI
Attributes
IOS Command Line Interface
BOGOTA-3>
BOGOTA-3>ena
BOGOTA-3#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-3(config)#router rip
BOGOTA-3(config-router)#do show ip route connected
C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
C 172.29.3.0/30 is directly connected, Serial0/0/0
C 172.29.3.4/30 is directly connected, Serial0/0/1
C 172.29.3.12/30 is directly connected, Serial0/1/0
BOGOTA-3(config-router)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
ESP
9:33 p. m.
16/07/2019


MEDELLIN-1
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
MEDELLIN-1>en
MEDELLIN-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-1(config)#router rip
MEDELLIN-1(config-router)#version 2
MEDELLIN-1(config-router)#do show ip route connected
C 172.29.6.12/30 is directly connected, Serial0/1/1
C 209.17.220.0/30 is directly connected, Serial0/0/0
C 209.29.6.0/30 is directly connected, Serial0/0/1
C 209.29.6.8/30 is directly connected, Serial0/1/0
MEDELLIN-1(config-router)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
2911
ESP
9:34 p. m.
16/07/2019


MEDELLIN-2
Physical
Config
CLI
Attributes
IOS Command Line Interface
MEDELLIN-2>
MEDELLIN-2>ena
MEDELLIN-2#cnf te
% Invalid input detected at '^' marker.
MEDELLIN-2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-2(config)#router rip
MEDELLIN-2(config-router)#do show ip route connected
C 172.29.4.0/25 is directly connected, GigabitEthernet0/0
C 172.29.6.0/30 is directly connected, Serial0/0/0
C 172.29.6.4/30 is directly connected, Serial0/0/1
MEDELLIN-2(config-router)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
2911
ESP
9:35 p. m.
16/07/2019

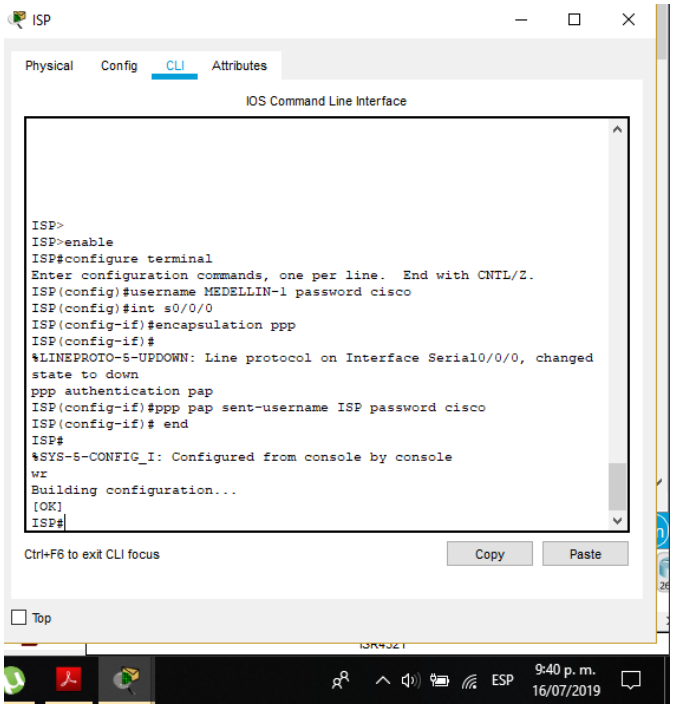

MEDELLIN-3
Physical
Config
CLI
Attributes
IOS Command Line Interface
MEDELLIN-3>
MEDELLIN-3>ena
MEDELLIN-3#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-3(config)#router rip
MEDELLIN-3(config-router)#do show ip router connected
show ip router connected
% Invalid input detected at '^' marker.
MEDELLIN-3(config-router)#do show ip route connected
C 172.29.4.128/25 is directly connected, GigabitEthernet0/0
C 172.29.6.4/30 is directly connected, Serial0/1/0
C 172.29.6.8/30 is directly connected, Serial0/0/0
C 172.29.6.12/30 is directly connected, Serial0/0/1
MEDELLIN-3(config-router)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
2911
ESP
9:36 p. m.
16/07/2019

3.1.5. Parte 5: Configurar encapsulamiento y autenticación PPP.

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

ISP

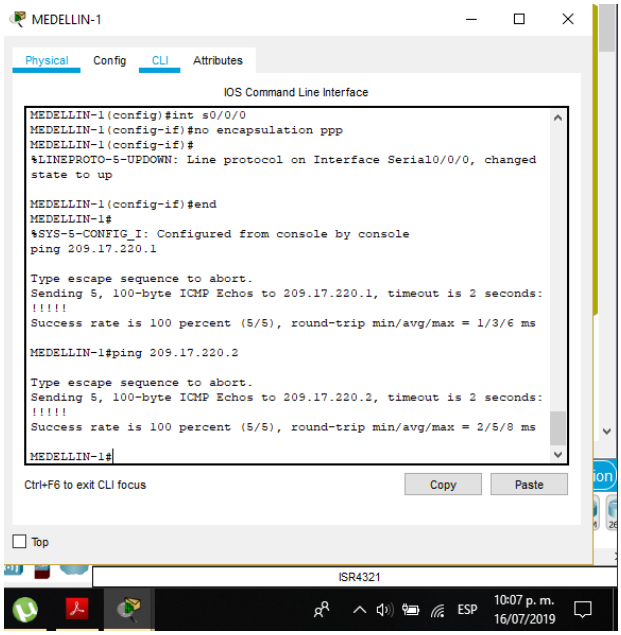
```
ISP>
ISP>enable
ISP#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#username MEDELLIN-1 password cisco
ISP(config)#int s0/0/0
ISP(config-if)#encapsulation ppp
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to down
ppp authentication pap
ISP(config-if)#ppp pap sent-username ISP password cisco
ISP(config-if)# end
ISP#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
ISP#
```



MEDELLIN-1

MEDELLIN-1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-1(config)#username ISP password cisco
MEDELLIN-1(config)#int 0/0/0
^
% Invalid input detected at '^' marker.
MEDELLIN-1(config)#exit
MEDELLIN-1#
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN-1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-1(config)#inter s0/0/0
MEDELLIN-1(config-if)#encapsulation ppp
MEDELLIN-1(config-if)#ppp authentication pap
MEDELLIN-1(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.
MEDELLIN-1(config-if)#



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

BOGOTA-1

```
BOGOTA-1#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-1(config)#username ISP password cisco
BOGOTA-1(config)#int s0/0/0
BOGOTA-1(config-if)#encapsulation ppp
BOGOTA-1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to down
ppp authentication chap
BOGOTA-1(config-if)#end
BOGOTA-1#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
BOGOTA-1#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-1(config)#int s0/0/0
BOGOTA-1(config-if)#no encapsulation ppp
BOGOTA-1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

BOGOTA-1(config-if)#end
BOGOTA-1#
%SYS-5-CONFIG_I: Configured from console by console

BOGOTA-1#
BOGOTA-1#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 = 1/2/5 ms

BOGOTA-1#
```

ISP

```
ISP#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#int s0/0/0
ISP(config-if)#no ppp authentication chap
```

Must set encapsulation to PPP before using PPP subcommands
ISP(config-if)#end
ISP#
%SYS-5-CONFIG_I: Configured from console by console

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

3.1.6. Parte 6: Configuración de PAT.

3.1.6.A. En la topología, si se activa NAT en cada equipo de salida (Bogotá1 y Medellín1), los routers internos de una ciudad no podrán llegar hasta los routers internos en el otro extremo, sólo existirá comunicación hasta los routers Bogotá1, ISP y Medellín1.

3.1.6.B. Después de verificar lo indicado en el paso anterior proceda a configurar el NAT en el router Medellín1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/0 del router Medellín1, cómo diferente puerto.

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

BOGOTA-1

BOGOTA-1#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-1(config)#ip nat inside source list 1 interface s0/0/0 overload
BOGOTA-1(config)#access-list 1 permit 172.29.0.0 0.0.3.255
BOGOTA-1(config)#int 0/0/0
^
% Invalid input detected at '^' marker.
BOGOTA-1(config)#int s0/0/0
BOGOTA-1(config-if)#ip nat outside
BOGOTA-1(config-if)#int s0/0/1
BOGOTA-1(config-if)#ip nat inside
BOGOTA-1(config-if)#int s0/1/0
BOGOTA-1(config-if)#ip nat inside
BOGOTA-1(config-if)#int s0/1/1
BOGOTA-1(config-if)#ip nat inside
BOGOTA-1(config-if)#end
BOGOTA-1#
%SYS-5-CONFIG_I: Configured from console by console

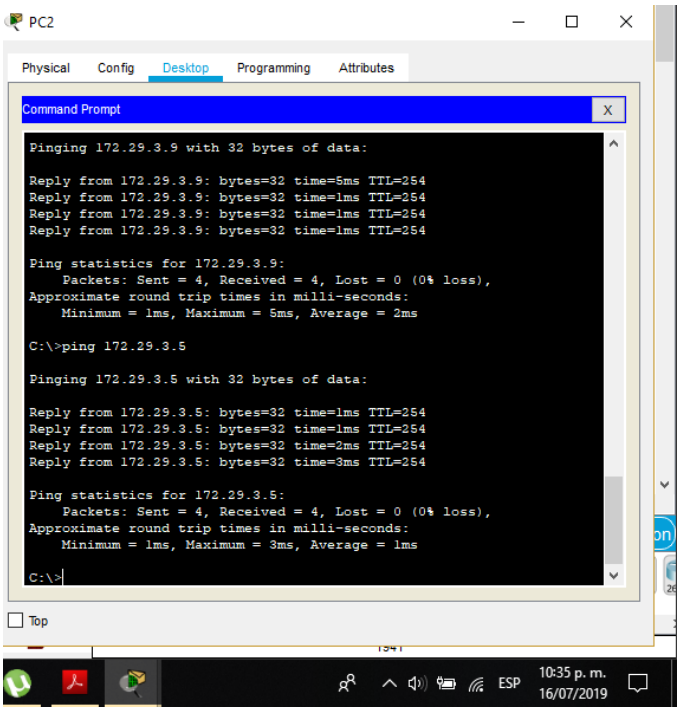
BOGOTA-1#

BOGOTA-1#
BOGOTA-1#sh ip nat translations
BOGOTA-1#

MEDELLIN.1

MEDELLIN-1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-1(config)#ip nat inside list 1 interface s0/0/0 overload
^
% Invalid input detected at '^' marker.
MEDELLIN-1(config)#ip nat inside?
inside
MEDELLIN-1(config)#ip nat insi
MEDELLIN-1(config)#ip nat inside ?
source Source address translation
MEDELLIN-1(config)#ip nat inside source list 1 interface s0/0/0 overload
MEDELLIN-1(config)#access-list 1 permit 172.29.4.0 0.0.3.255
MEDELLIN-1(config)#int s0/0/0
MEDELLIN-1(config-if)#ip nat outside
MEDELLIN-1(config-if)#int s0/0/1
MEDELLIN-1(config-if)#ip nat inside
MEDELLIN-1(config-if)#int s0/1/0
MEDELLIN-1(config-if)#ip nat inside
MEDELLIN-1(config-if)#int s0/1/1
MEDELLIN-1(config-if)#ip nat inside
MEDELLIN-1(config-if)#end
MEDELLIN-1#
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN-1#
MEDELLIN-1#
MEDELLIN-1#sh ip nat translations
MEDELLIN-1#
MEDELLIN-1#



3.1.7. Parte 7: Configuración del servicio DHCP.

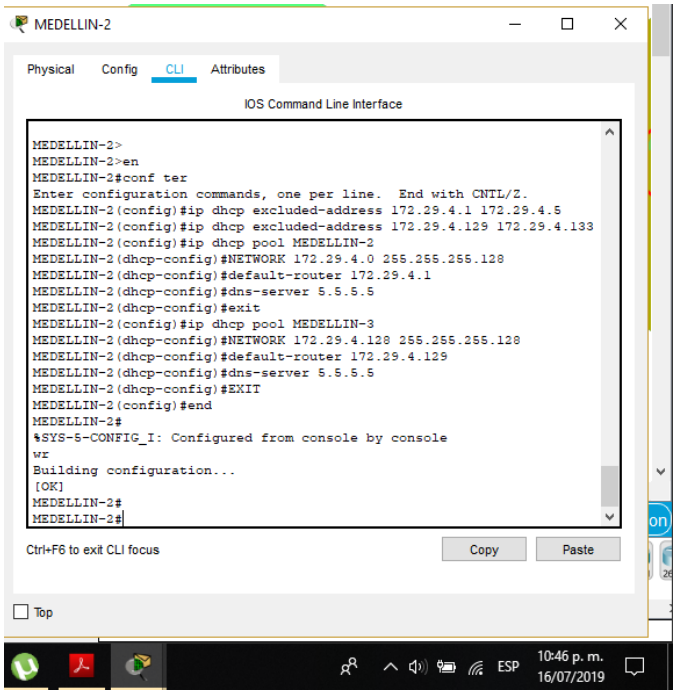
3.1.7.A. Configurar la red Medellín2 y Medellín3 donde el router Medellín 2 debe ser el servidor DHCP para ambas redes Lan.

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

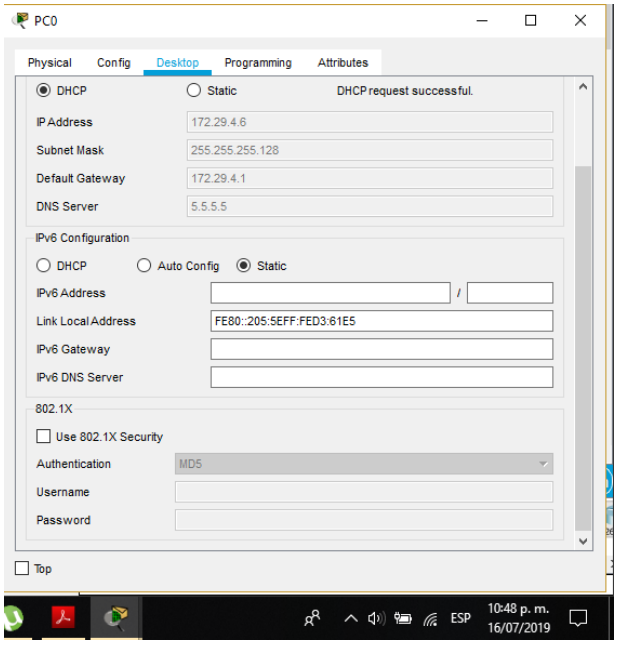
MEDELLIN-2

```
MEDELLIN-2>
MEDELLIN-2>en
MEDELLIN-2#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-2(config)#ip dhcp excluded-address 172.29.4.1 172.29.4.5
MEDELLIN-2(config)#ip dhcp excluded-address 172.29.4.129 172.29.4.133
MEDELLIN-2(config)#ip dhcp pool MEDELLIN-2
MEDELLIN-2(dhcp-config)#NETWORK 172.29.4.0 255.255.255.128
MEDELLIN-2(dhcp-config)#default-router 172.29.4.1
MEDELLIN-2(dhcp-config)#dns-server 5.5.5.5
```

```
MEDELLIN-2(dhcp-config)#exit
MEDELLIN-2(config)#ip dhcp pool MEDELLIN-3
MEDELLIN-2(dhcp-config)#NETWORK 172.29.4.128 255.255.255.128
MEDELLIN-2(dhcp-config)#default-router 172.29.4.129
MEDELLIN-2(dhcp-config)#dns-server 5.5.5.5
MEDELLIN-2(dhcp-config)#EXIT
MEDELLIN-2(config)#end
MEDELLIN-2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
MEDELLIN-2#
```



Verificamos configuración en DHCP de PCo



MEDELLIN-3>
MEDELLIN-3>ena
MEDELLIN-3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-3(config)#int g0/0
MEDELLIN-3(config-if)#ip helper-address 172.29.6.5
MEDELLIN-3(config-if)#end
MEDELLIN-3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
MEDELLIN-3#

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

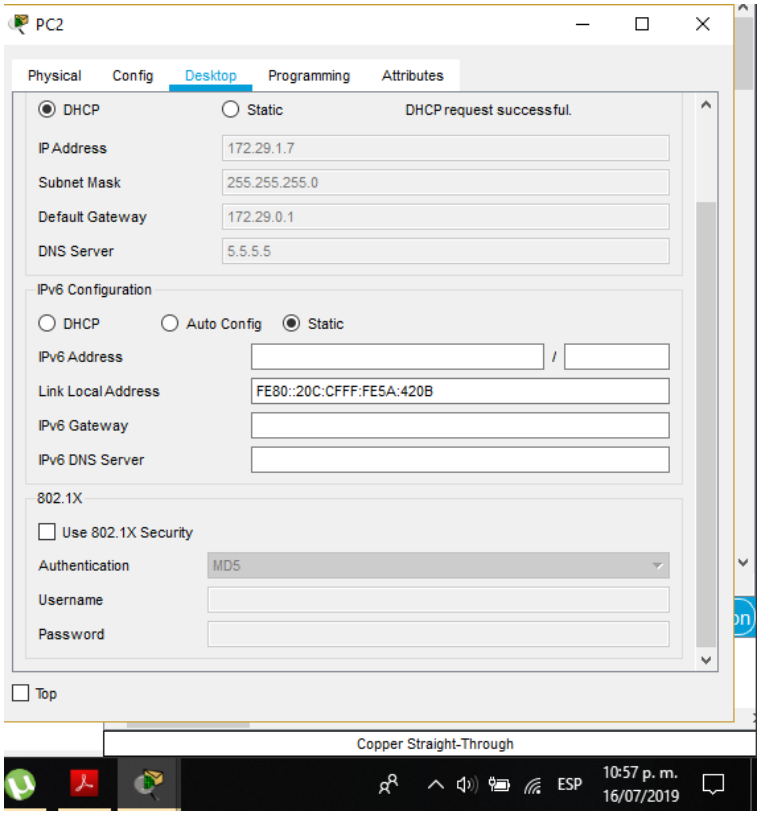
3.1.7.D. Configure el router Bogotá1 para que habilite el paso de los mensajes Broadcast hacia la IP del router Bogotá2.

BOGOTA-2

BOGOTA-2>
BOGOTA-2>ENA
BOGOTA-2#conf term

```
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-2(config)#ip dhcp excluded-address 172.29.1.1 172.29.1.5
BOGOTA-2(config)#ip dhcp excluded-address 172.29.0.1 172.29.0.5
BOGOTA-2(config)#ip dhcp pool BOGOTA-2
BOGOTA-2(dhcp-config)#network 172.29.1.0 255.255.255.0
BOGOTA-2(dhcp-config)#default-router 172.29.0.1
BOGOTA-2(dhcp-config)#dns-server 5.5.5.5
BOGOTA-2(dhcp-config)#exit
BOGOTA-2(config)#ip dhcp pool BOGOTA-3
BOGOTA-2(dhcp-config)#network 172.29.4.1 255.255.255.128
BOGOTA-2(dhcp-config)#default-router 172.29.0.1
BOGOTA-2(dhcp-config)#dns-server 5.5.5.5
BOGOTA-2(dhcp-config)#exit
BOGOTA-2(config)#end
BOGOTA-2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
BOGOTA-2#
```

Verificamos el DHCP en PC2

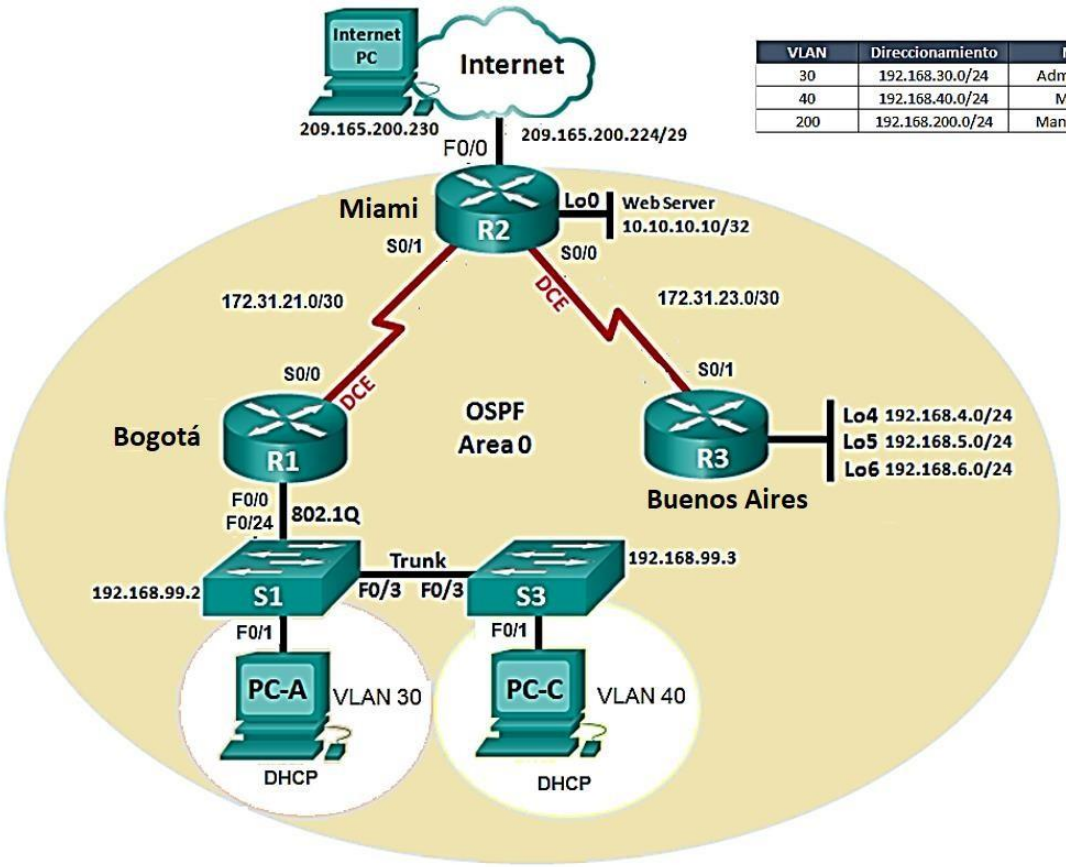


BOGOTA-3

```
BOGOTA-3>
BOGOTA-3>ena
BOGOTA-3#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-3(config)#int g0/0
BOGOTA-3(config-if)#ip helper-address 172.29.3.13
BOGOTA-3(config-if)#end
BOGOTA-3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
BOGOTA-3#
```

3.2. Escenario 2

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

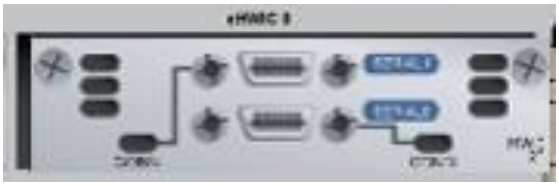


VLAN	Direccionamiento	Nombre
30	192.168.30.0/24	Administración
40	192.168.40.0/24	Mercadeo
200	192.168.200.0/24	Mantenimiento

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

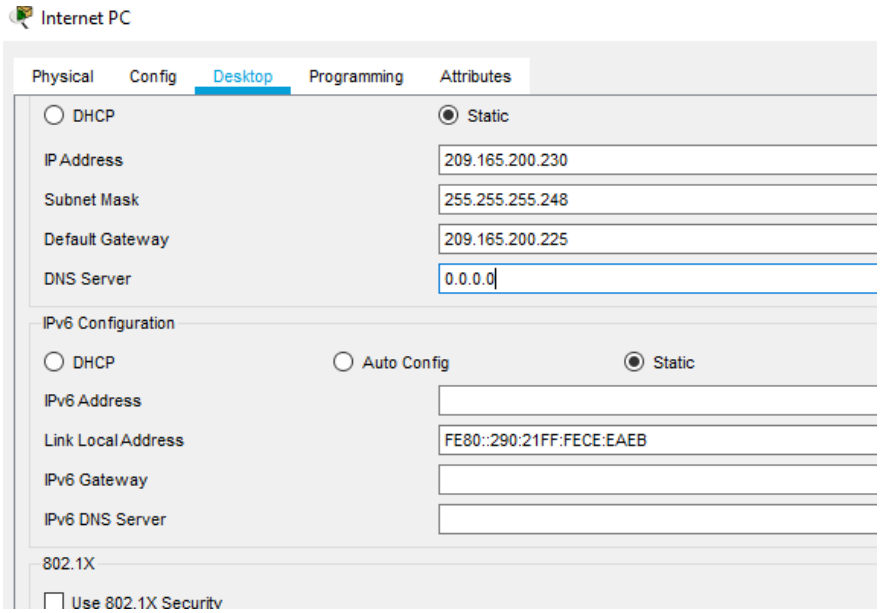
Dispositivo	Interface	Direccion IP	Masdca de Subred	Puerta de enlace predeterminada
R1 - Bogotá	G0/0	192.168.99.1	255.255.255.0	
	S0/0/0	172.31.21.1	255.255.255.252	
R2 - Miami	S0/0/1	172.31.21.2	255.255.255.252	
	S0/0/0	172.31.23.1	255.255.255.252	
	G0/1 (Lo0)	10.10.10.10	255.255.255.255	
	G0/0	209.165.200.225	255.255.255.248	
R3 - Buenos Aires	S0/0/1	172.31.23.2	255.255.255.252	
	Lo4	192.168.4.1	255.255.255.0	
	Lo5	192.168.5.1	255.255.255.0	
	Lo6	192.168.6.1	255.255.255.0	
PC-A	NIC	DHCP	DCHP	DHCP
PC-B	NIC	DHCP	DHCP	DHC
PC Internet	NIC	209.165.200.230	255.255.255.248	209.168.200.225

Inicialmente se añade el módulo HWIC-2T para realizar la conexión con cable de consola y poder así iniciar la configuración.



PC Internet

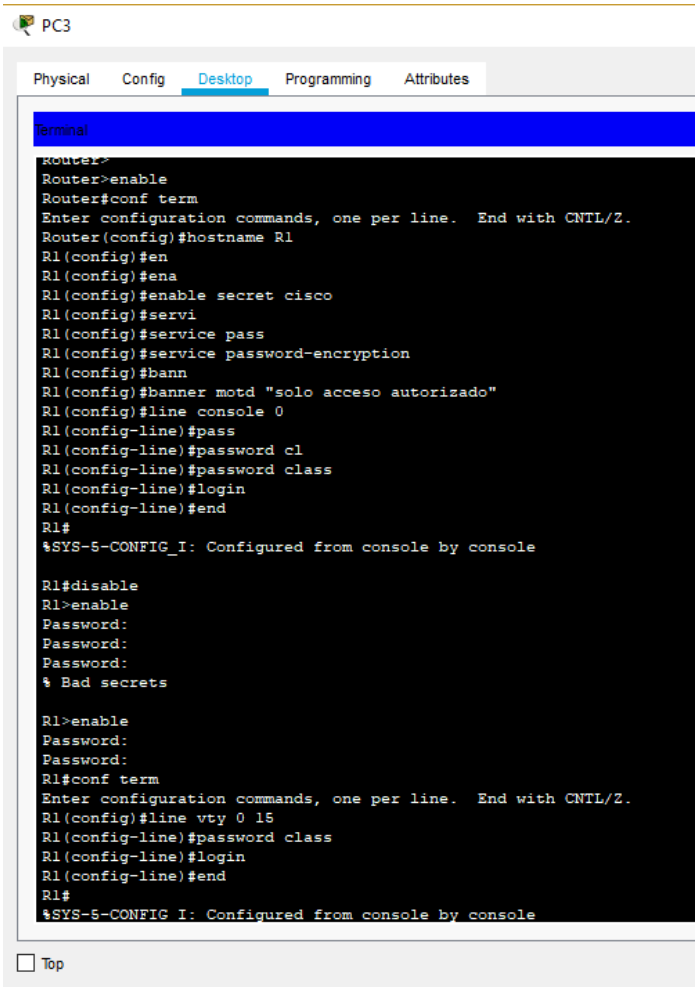
Dirección IP 209.165.200.230
Mascara de Subred 255.255.255.248
Puerta de enlace por defecto 209.165.200.225



Configuración inicial del Router 1

Router>
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#en
R1(config)#ena
R1(config)#enable secret cisco
R1(config)#servi
R1(config)#service pass
R1(config)#service password-encryption
R1(config)#bann

R1(config)#banner motd "solo acceso autorizado"
R1(config)#line console 0
R1(config-line)#pass
R1(config-line)#password cl
R1(config-line)#password class
R1(config-line)#login
R1(config-line)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console



R1#disable
R1>enable
Password:
Password:
Password:
% Bad secrets

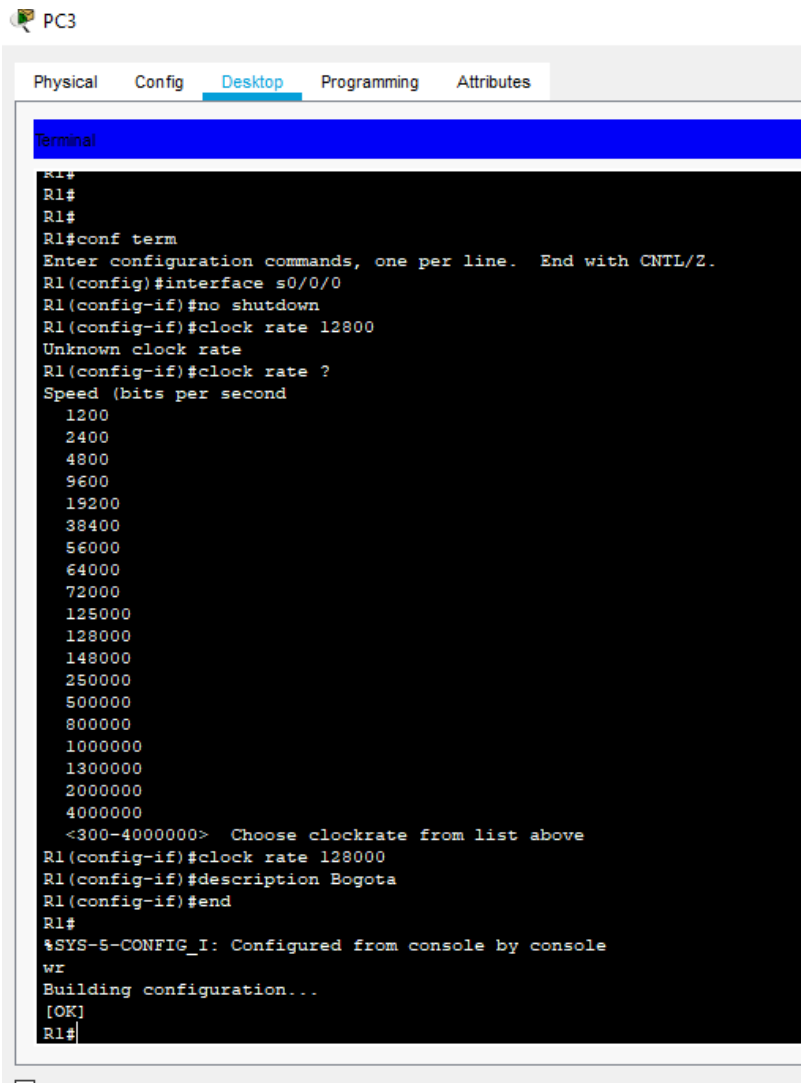
R1>enable
Password:
Password:
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#line vty 0 15
R1(config-line)#password class
R1(config-line)#login
R1(config-line)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#disable
R1>enable
Password:
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#
R1#

Configuración del direccionamiento:

R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface s0/0/0
R1(config-if)#no shutdown
R1(config-if)#clock rate 12800
Unknown clock rate
R1(config-if)#clock rate ?

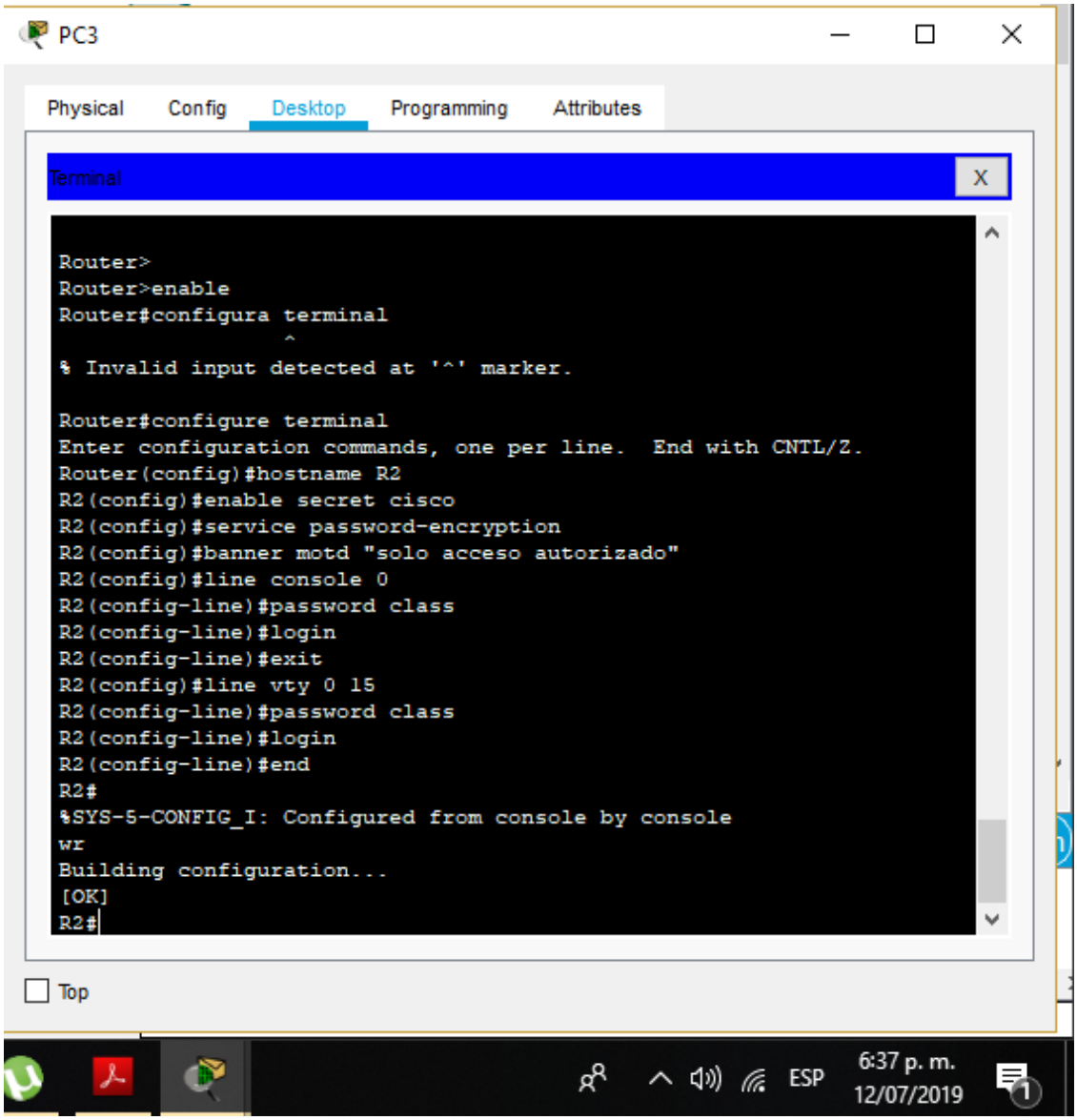
Speed (bits per second
1200
2400
4800
9600
19200
38400
56000
64000
72000
125000
128000
148000
250000
500000
800000
1000000
1300000
2000000
4000000
<300-4000000> Choose clockrate from list above R1(config-if)#clock rate 128000
R1(config-if)#description Bogota
R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]



Configuración del router 2

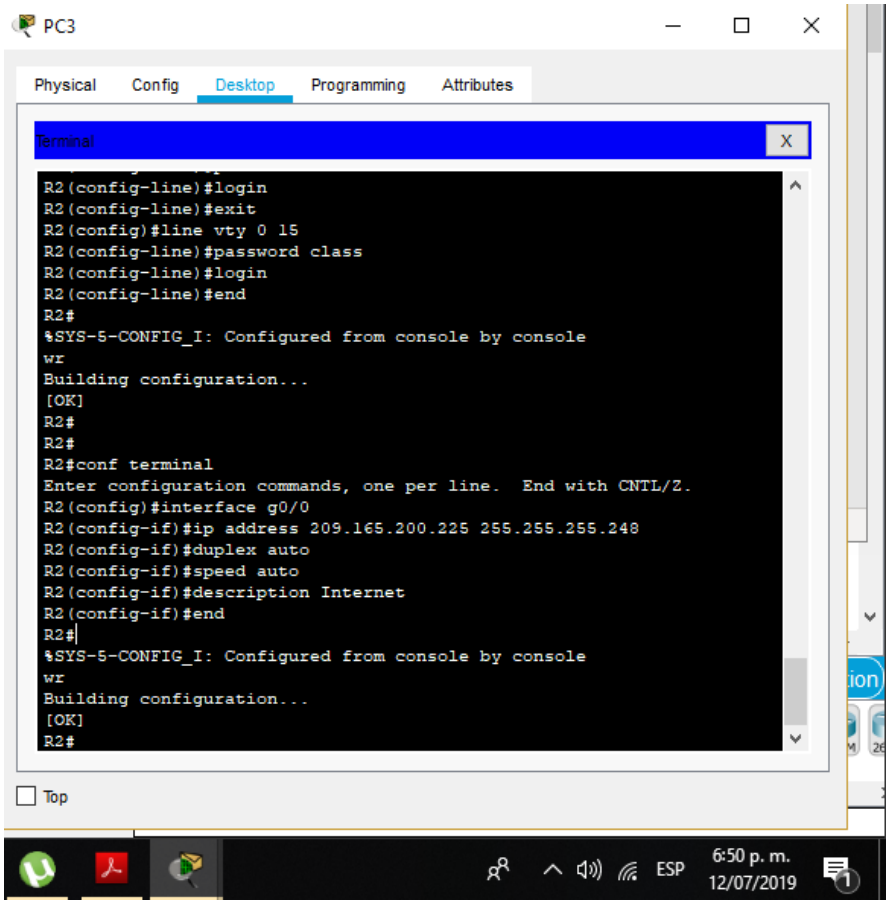
Router>
Router>enable
Router#configura terminal
^
% Invalid input detected at '^' marker.
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#enable secret cisco
R2(config)#service password-encryption
R2(config)#banner motd "solo acceso autorizado"
R2(config)#line console 0
R2(config-line)#password class

```
R2(config-line)#login
R2(config-line)#exit
R2(config)#line vty 0 15
R2(config-line)#password class
R2(config-line)#login
R2(config-line)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R2#
```



Configuración del direccionamiento:

```
R2#
R2#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface g0/0
R2(config-if)#ip address 209.165.200.225 255.255.255.248
R2(config-if)#duplex auto
R2(config-if)#speed auto
R2(config-if)#description Internet
R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R2#
```



Configuración del Web Server

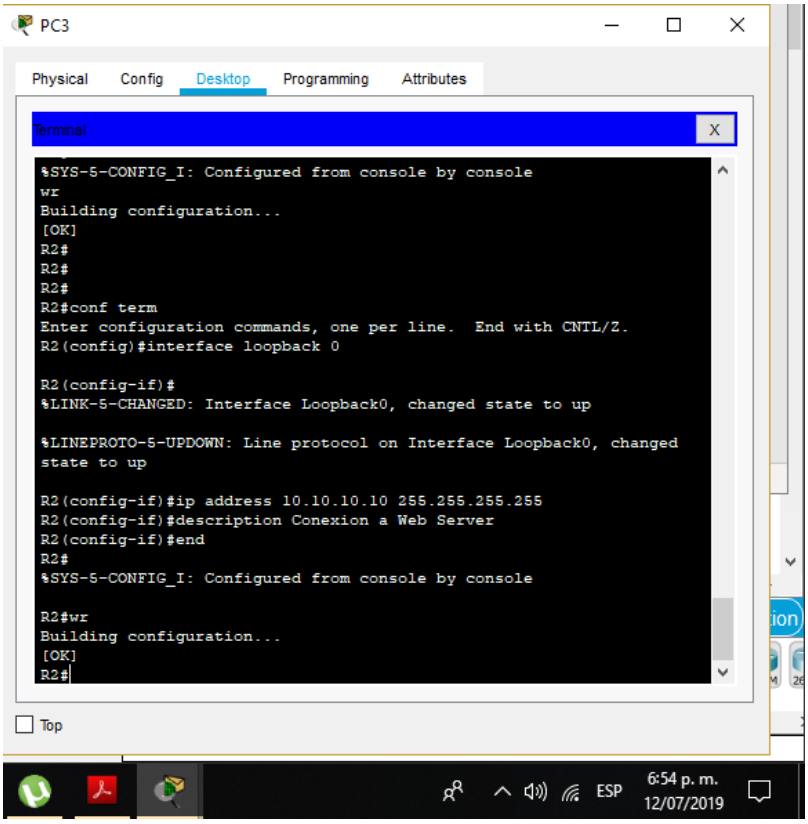
R2#
R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface loopback 0

R2(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

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

R2(config-if)#ip address 10.10.10.10 255.255.255.255
R2(config-if)#description Conexion a Web Server
R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#wr
Building configuration...
[OK]
R2#



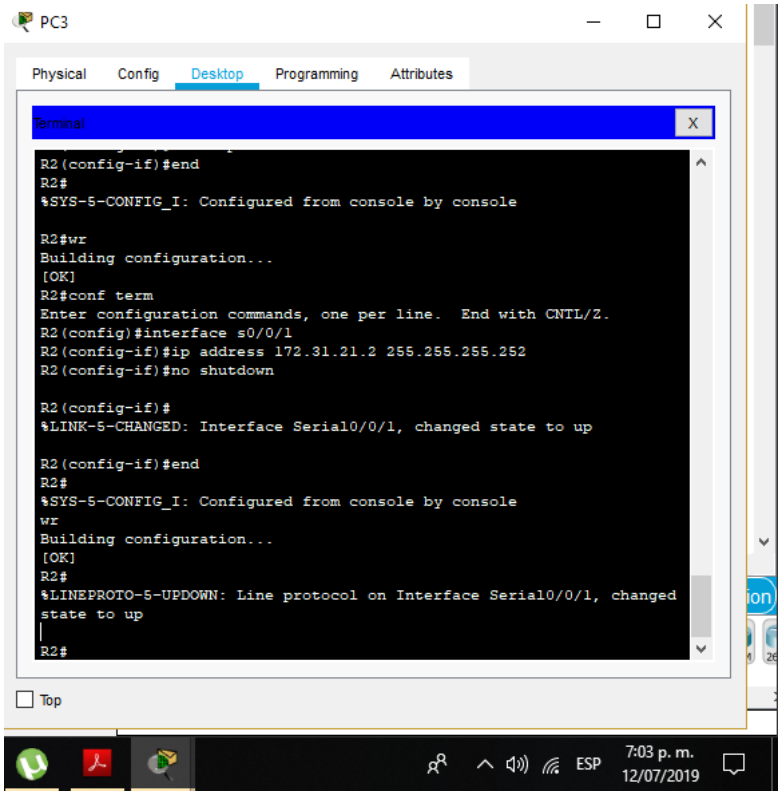
Configuración de la interface S0/0/1

R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface s0/0/1
R2(config-if)#ip address 172.31.21.2 255.255.255.252
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R2#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

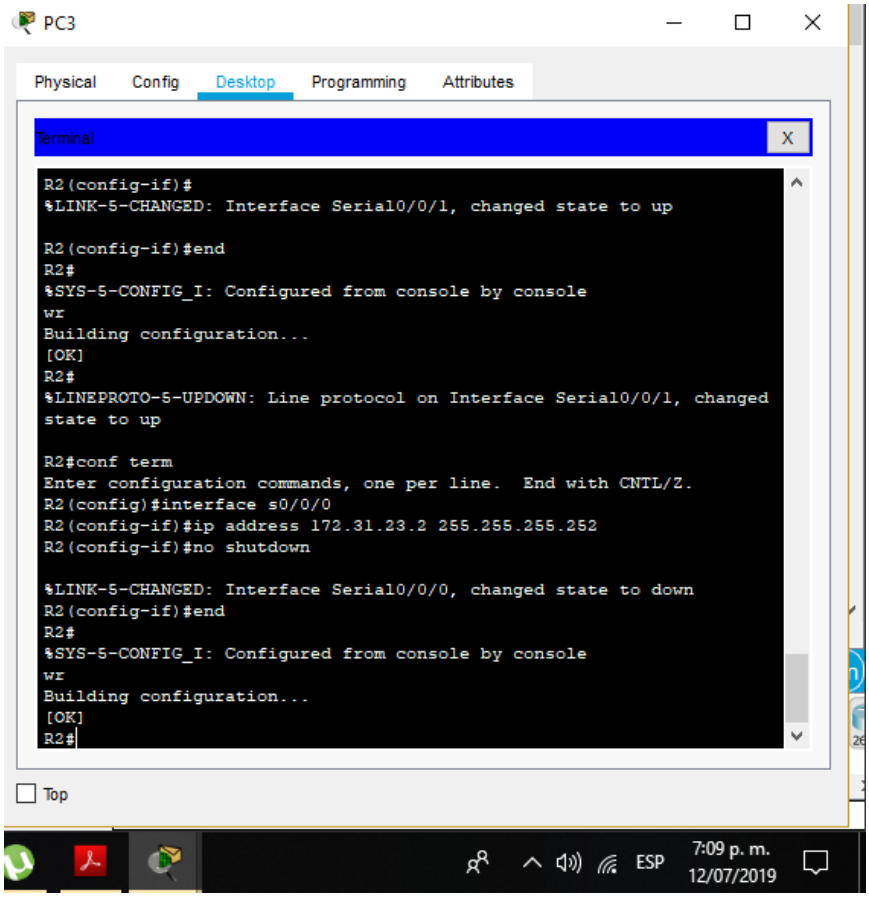
R2#



Configuración de la interface So/o/o

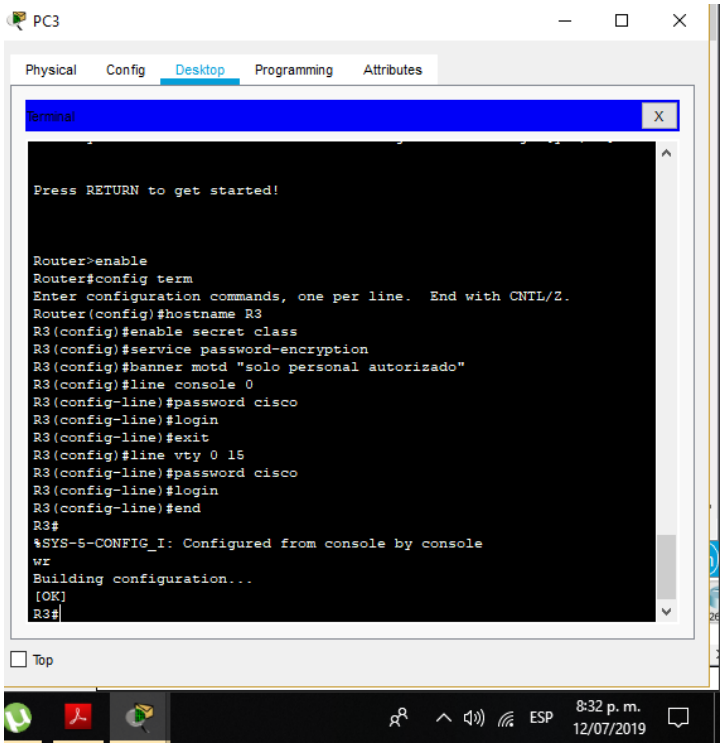
R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface s0/0/0
R2(config-if)#ip address 172.31.23.2 255.255.255.252
R2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R2#



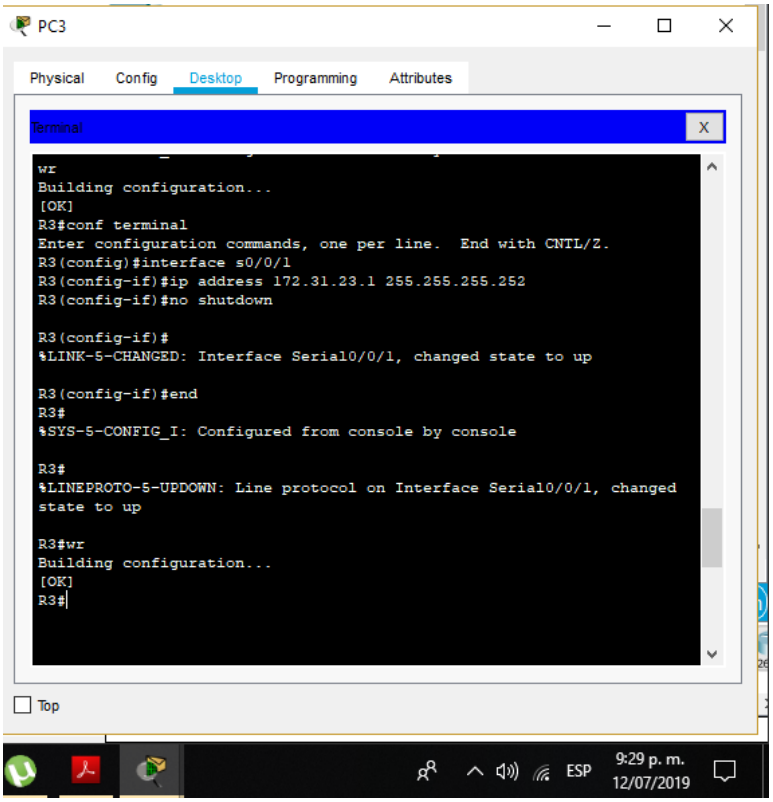
Configuración del router 3

```
Router>enable
Router#config term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#enable secret class
R3(config)#service password-encryption
R3(config)#banner motd "solo personal autorizado"
R3(config)#line console 0
R3(config-line)#password cisco
R3(config-line)#login
R3(config-line)#exit
R3(config)#line vty 0 15
R3(config-line)#password cisco
R3(config-line)#login
R3(config-line)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R3#
```



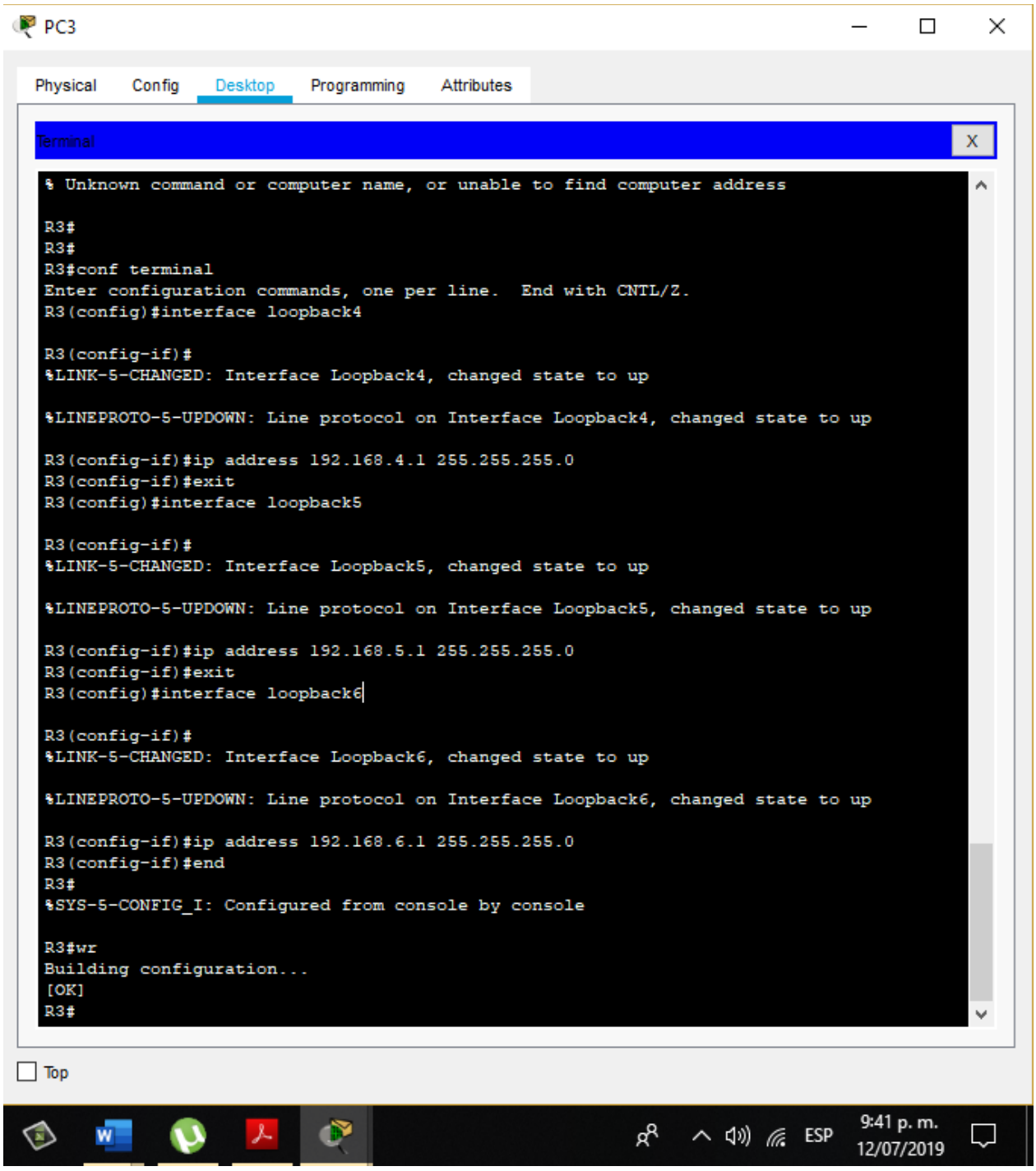
Configuración del direccionamiento IP ROUTER 3

```
R3#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface s0/0/1
R3(config-if)#ip address 172.31.23.1 255.255.255.252
R3(config-if)#no shutdown

R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

R3(config-if)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

R3#wr
Building configuration...
[OK]
R3#
```



Configuración de las loopback:

```
R3#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface loopback4

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up

R3(config-if)#ip address 192.168.4.1 255.255.255.0
R3(config-if)#exit
R3(config)#interface loopback5

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback5, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5, changed state to up

R3(config-if)#ip address 192.168.5.1 255.255.255.0
R3(config-if)#exit
R3(config)#interface loopback6

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback6, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state to up

R3(config-if)#ip address 192.168.6.1 255.255.255.0
R3(config-if)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#wr
Building configuration...
[OK]
R3#
```

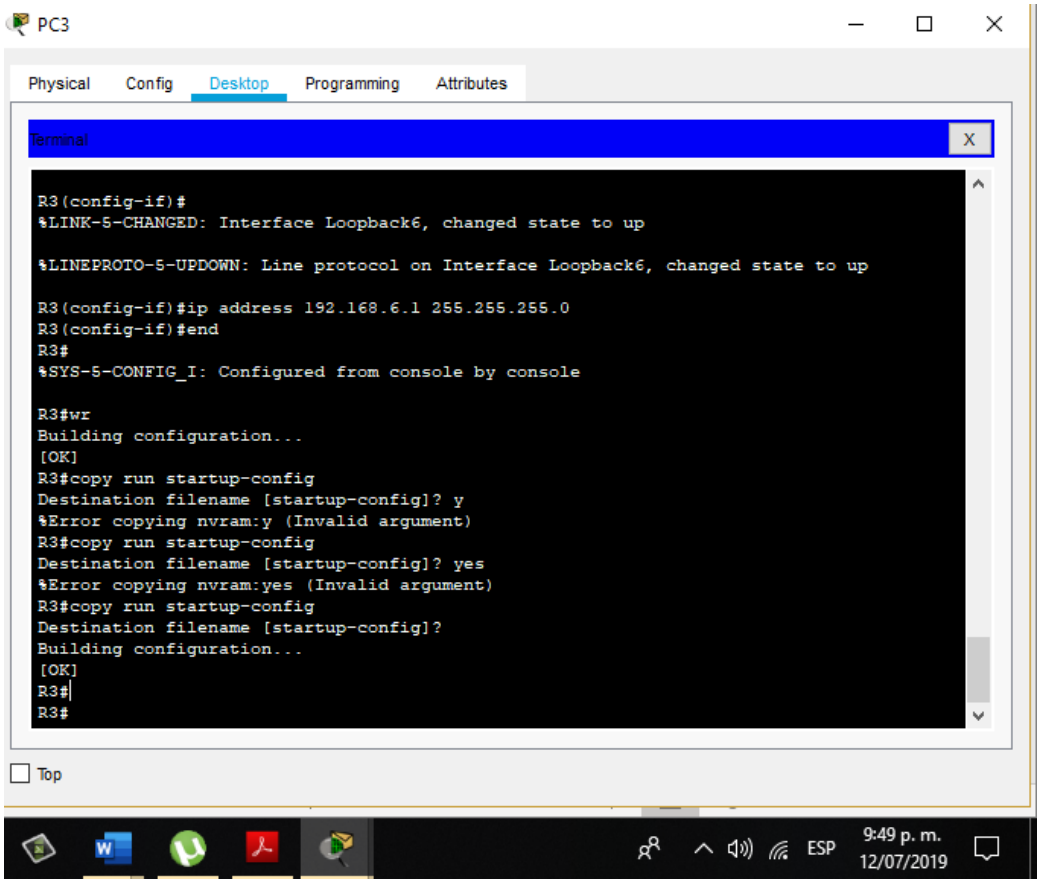


Guardamos todas las configuraciones despues de terminar los cambios realizados:

R1#copy run startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R1#

R2#copy run startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R2#

R3#copy run startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R3#



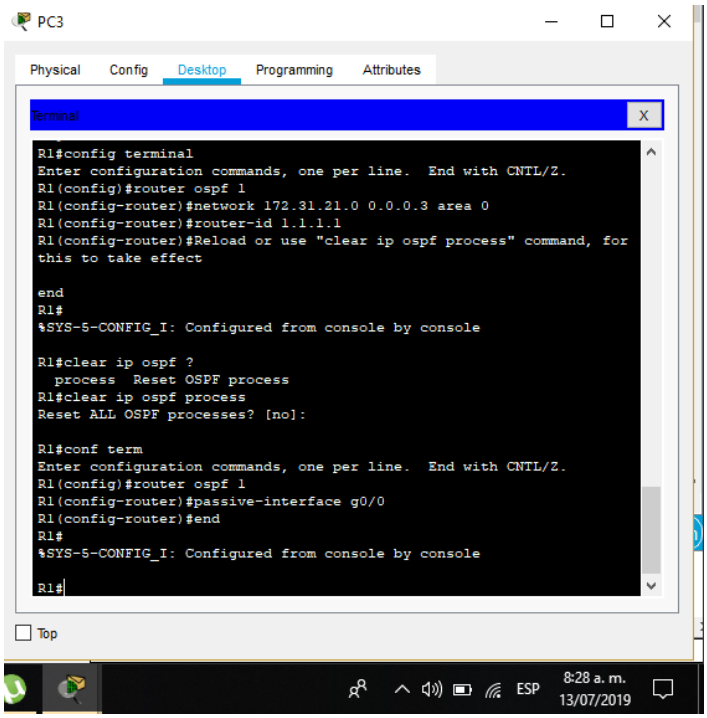
3.2.2. Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:

OSPFv2 area 0

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

Configuración del protocolo de enrutamiento OSPF en Router 1:

```
R1#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#network 172.31.21.0 0.0.0.3 area 0
R1(config-router)#router-id 1.1.1.1
R1(config-router)#Reload or use "clear ip ospf process" command, for this to take effect

end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#clear ip ospf ?
process Reset OSPF process
R1#clear ip ospf process
Reset ALL OSPF processes? [no]:

R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#passive-interface g0/0
R1(config-router)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#
```



Configuración del protocolo de enrutamiento OSPF en Router 2:

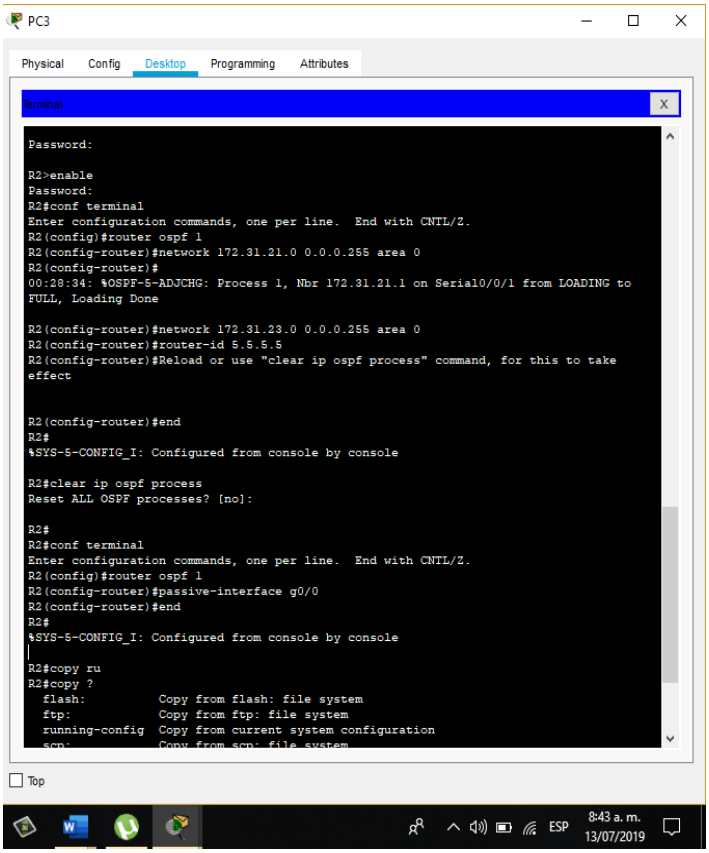
R2#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#network 172.31.21.0 0.0.0.255 area 0
R2(config-router)#
00:28:34: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.21.1 on Serial0/0/1 from LOADING to FULL, Loading Done

R2(config-router)#network 172.31.23.0 0.0.0.255 area 0
R2(config-router)#router-id 5.5.5.5
R2(config-router)#Reload or use "clear ip ospf process" command, for this to take effect

R2(config-router)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#clear ip ospf process
Reset ALL OSPF processes? [no]:

```
R2#
R2#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#passive-interface g0/0
R2(config-router)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#copy ru
R2#copy ?
flash: Copy from flash: file system
ftp: Copy from ftp: file system
running-config Copy from current system configuration
scp: Copy from scp: file system
startup-config Copy from startup configuration
tftp: Copy from tftp: file system
R2#copy start running-config
Destination filename [running-config]?

1071 bytes copied in 0.416 secs (2574 bytes/sec)
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#
```



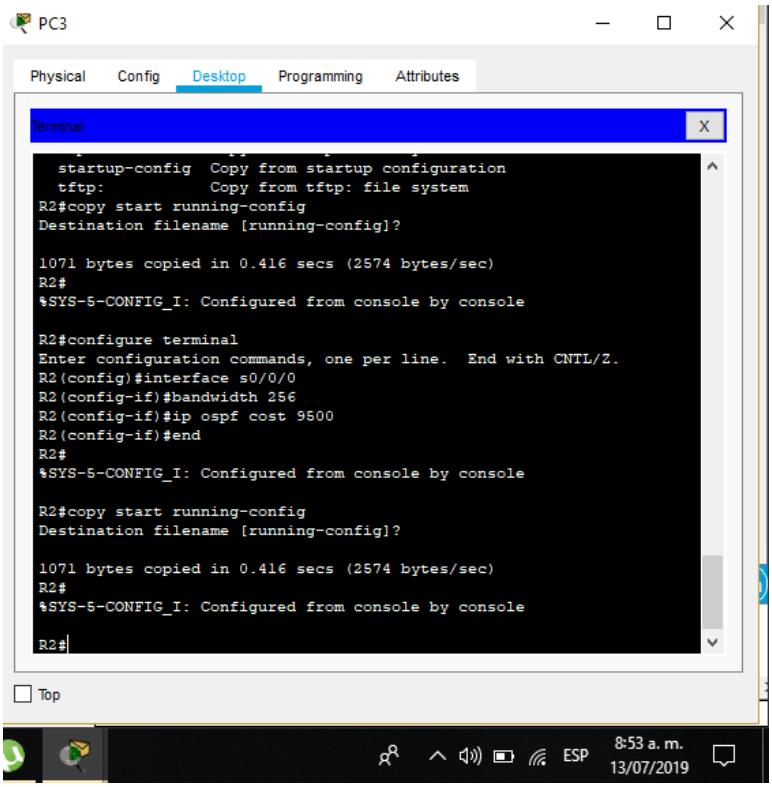
Configuración del balance de cargas en el router 2:

R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface s0/0/0
R2(config-if)#bandwidth 256
R2(config-if)#ip ospf cost 9500
R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#copy start running-config
Destination filename [running-config]?

1071 bytes copied in 0.416 secs (2574 bytes/sec)
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#



Configuración del protocolo de enrutamiento OSPF en Router 3:

R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#network 172.31.23.0 0.0.0.255 area 0
R3(config-router)#route
01:41:59: %OSPF-5-ADJCHG: Process 1, Nbr 10.10.10.10 on Serial0/0/1 from LOADING to FULL, Loading
R3(config-router)#router-id 8.8.8.8
R3(config-router)#Reload or use "clear ip ospf process" command, for this to take effect

R3(config-router)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

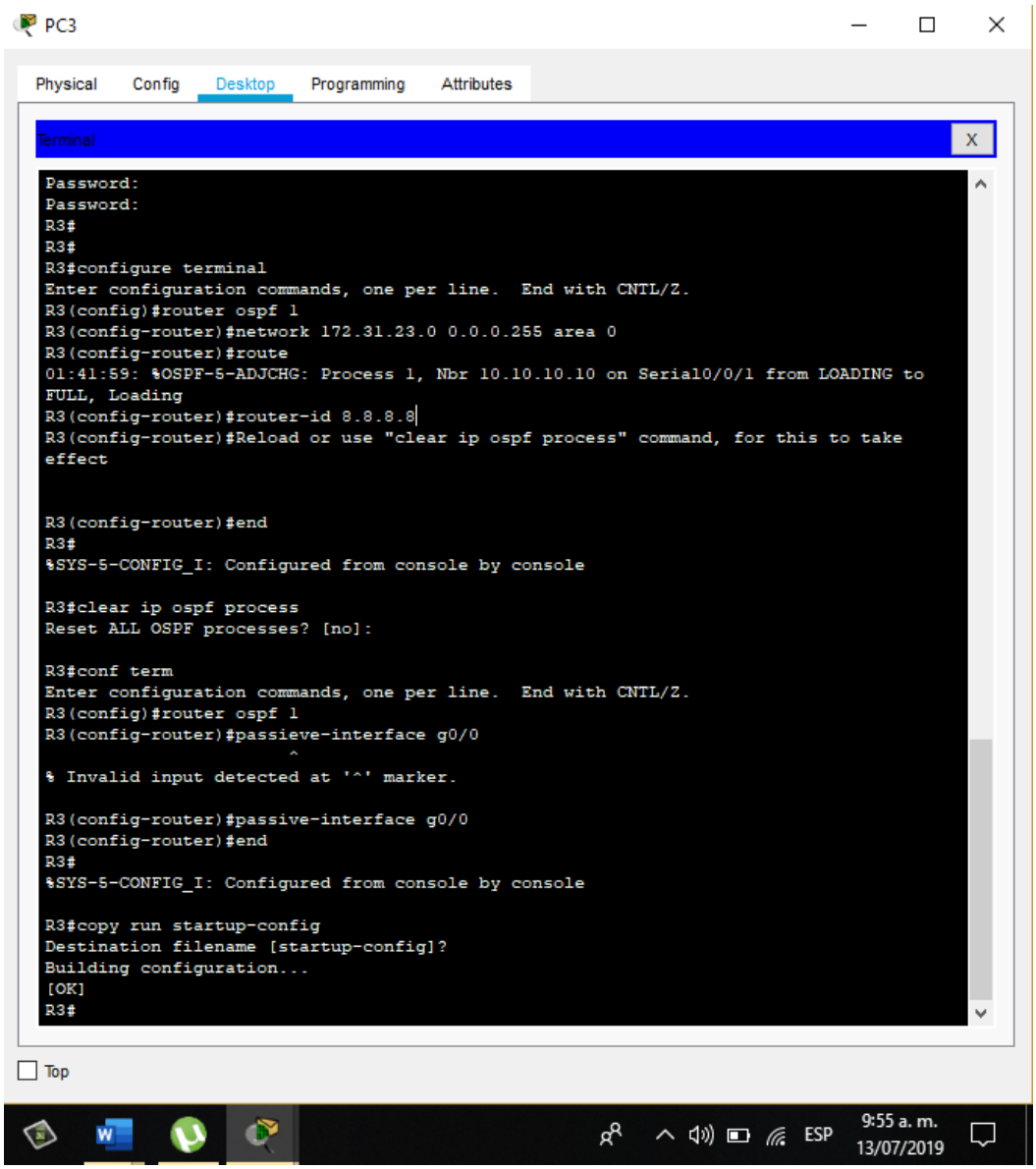
R3#clear ip ospf process

Reset ALL OSPF processes? [no]:

R3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#passieve-interface g0/0
^
% Invalid input detected at '^' marker.
R3(config-router)#passive-interface g0/0
R3(config-router)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#copy run startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

R3#


PC3
Physical
Config
Desktop
Programming
Attributes
Terminal
X
Password:
Password:
R3#
R3#
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#network 172.31.23.0 0.0.0.255 area 0
R3(config-router)#route
01:41:59: %OSPF-5-ADJCHG: Process 1, Nbr 10.10.10.10 on Serial0/0/1 from LOADING to
FULL, Loading
R3(config-router)#router-id 8.8.8.8
R3(config-router)#Reload or use "clear ip ospf process" command, for this to take
effect
R3(config-router)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console
R3#clear ip ospf process
Reset ALL OSPF processes? [no]:
R3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#passieve-interface g0/0
^
% Invalid input detected at '^' marker.
R3(config-router)#passive-interface g0/0
R3(config-router)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console
R3#copy run startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R3#
Top
ESP
9:55 a. m.
13/07/2019

Verificar información de OSPF

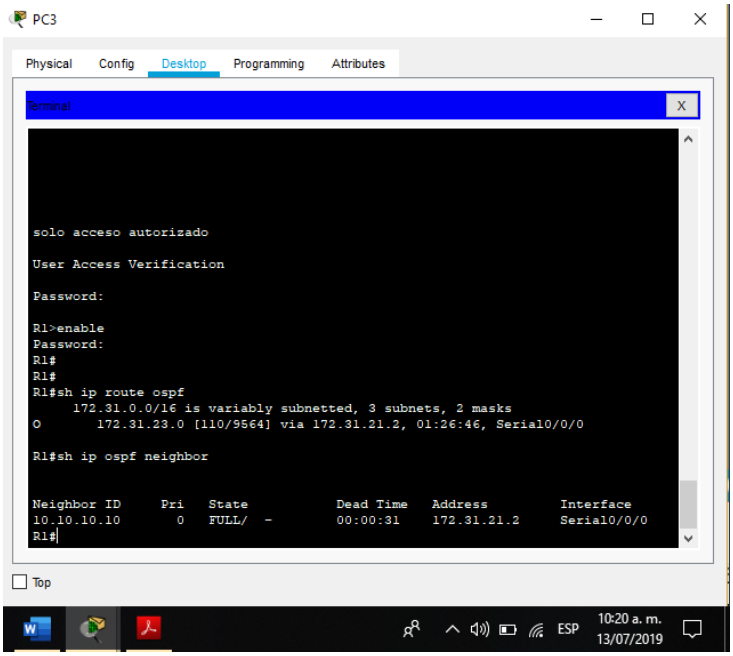
3.2.2.A. Visualizar tablas de enrutamiento y routers conectados por OSPFv2

Verificación en Router 1

R1#
R1#sh ip route ospf
172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
O 172.31.23.0 [110/9564] via 172.31.21.2, 01:26:46, Serial0/0/0

R1#sh ip ospf neighbor

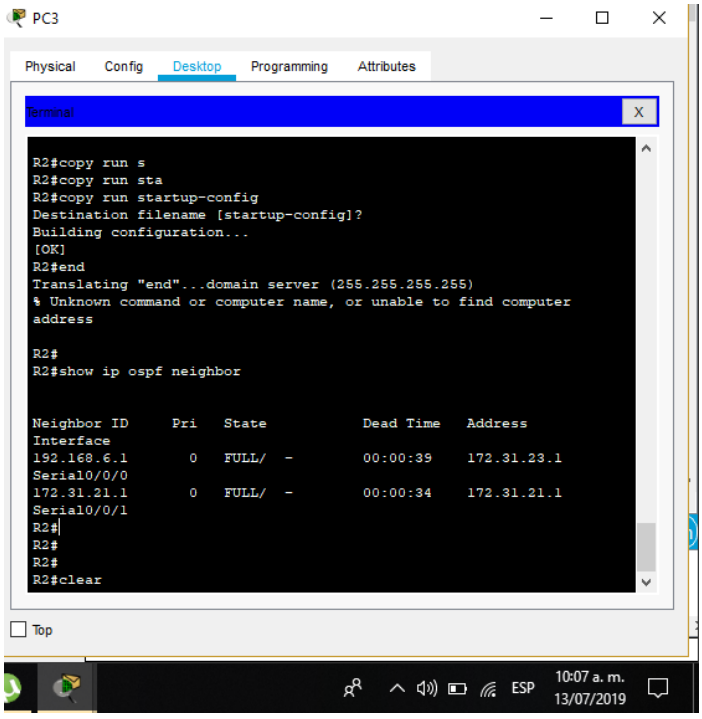
Neighbor ID Pri State Dead Time Address Interface
10.10.10.10 0 FULL/ - 00:00:31 172.31.21.2 Serial0/0/0
R1#



Verificación en Router 2

R2#
R2#show ip ospf neighbor

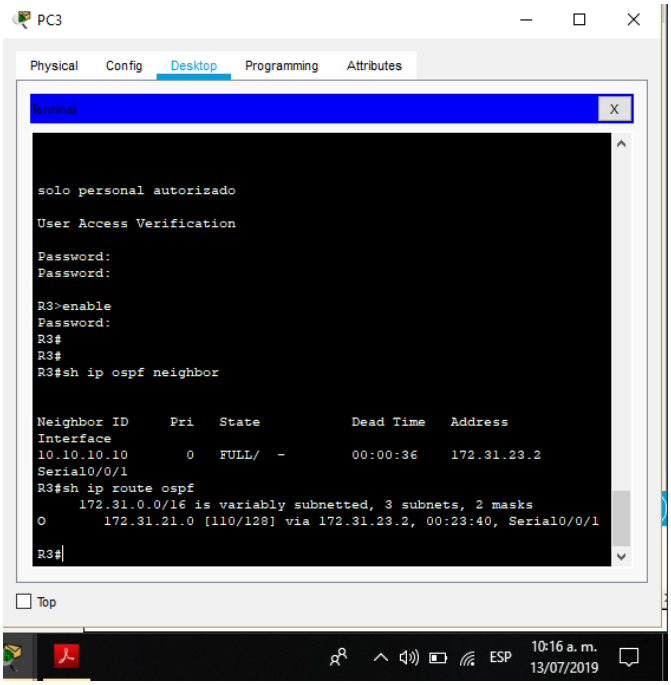
Neighbor ID Pri State Dead Time Address Interface
192.168.6.1 0 FULL/ - 00:00:39 172.31.23.1 Serial0/0/0
172.31.21.1 0 FULL/ - 00:00:34 172.31.21.1 Serial0/0/1
R2#



Verificación en Router 3

R3#sh ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
10.10.10.10 0 FULL/ - 00:00:36 172.31.23.2 Serial0/0/1
R3#sh ip route ospf
172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
O 172.31.21.0 [110/128] via 172.31.23.2, 00:23:40, Serial0/0/1

R3#

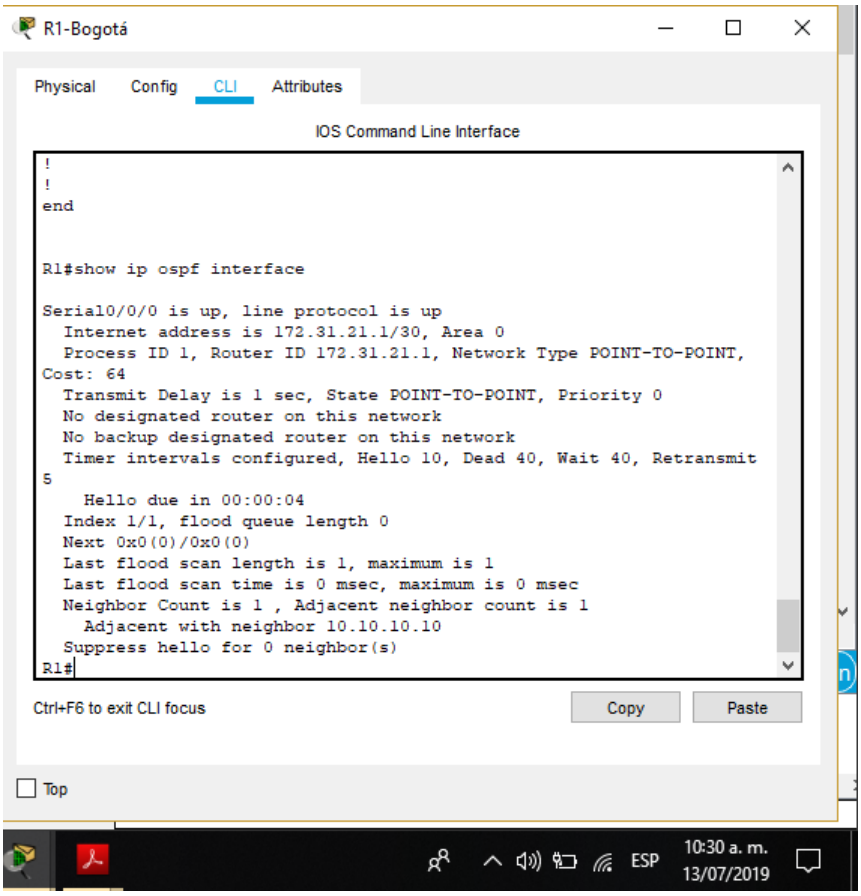


3.2.2.B. Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface

Visualización del router 1

R1#show ip ospf interface

Serial0/0/0 is up, line protocol is up
Internet address is 172.31.21.1/30, Area 0
Process ID 1, Router ID 172.31.21.1, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:04
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 10.10.10.10
Suppress hello for 0 neighbor(s)
R1#

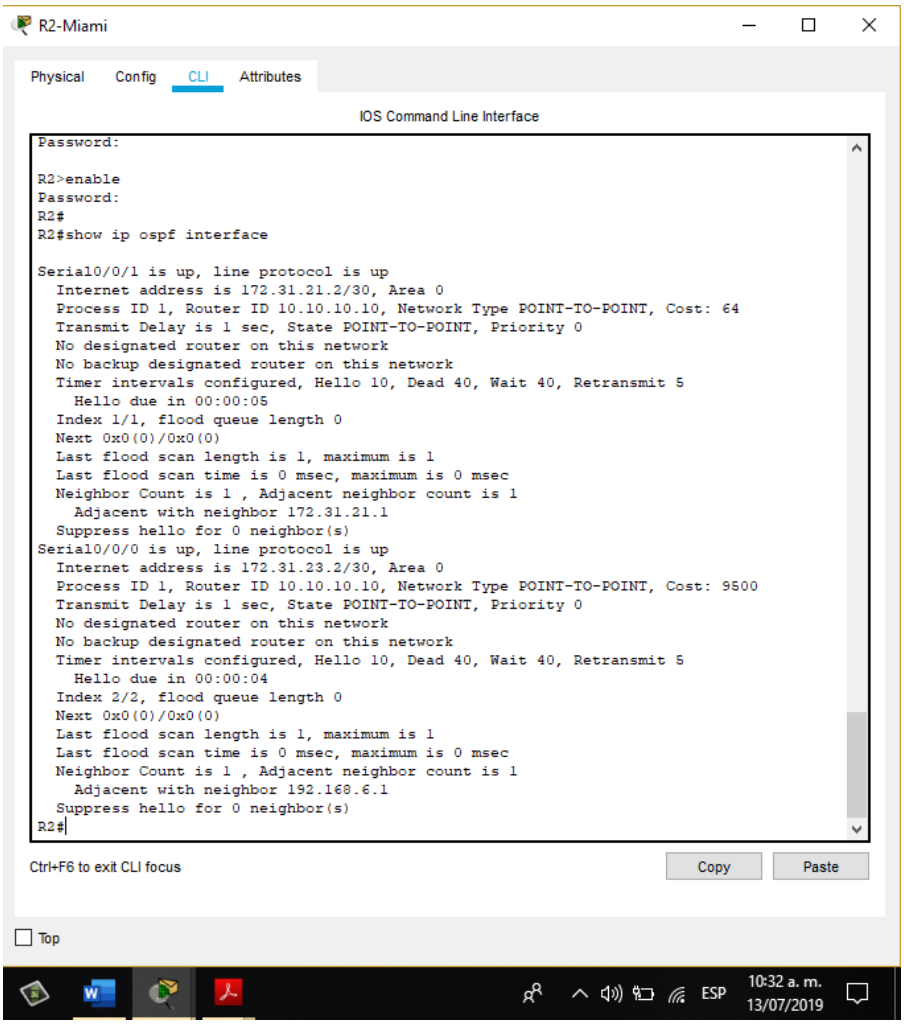


Visualización del router 2

R2#
R2#show ip ospf interface

Serial0/0/1 is up, line protocol is up
Internet address is 172.31.21.2/30, Area 0
Process ID 1, Router ID 10.10.10.10, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:05
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec

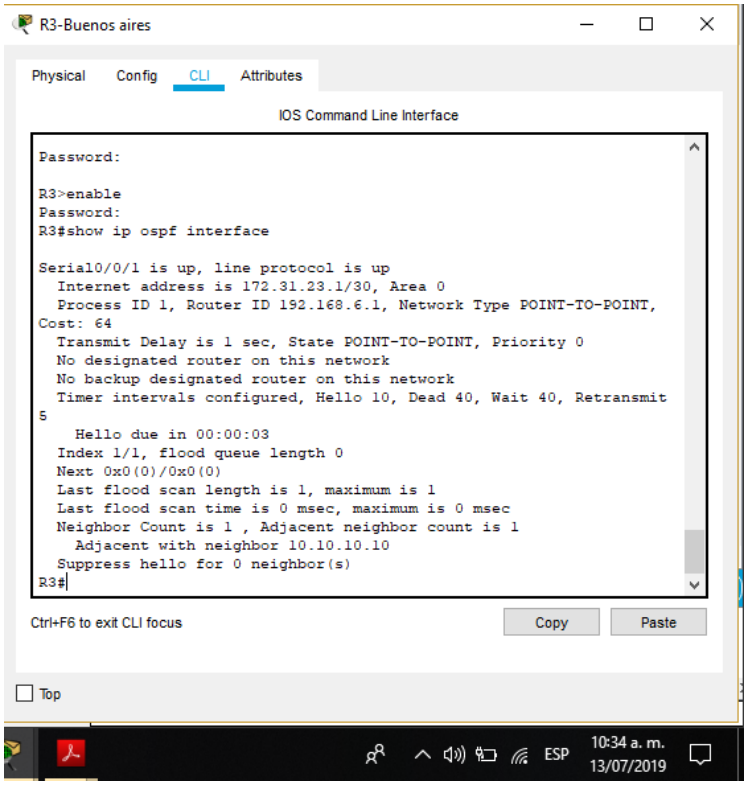
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 172.31.21.1
Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
Internet address is 172.31.23.2/30, Area 0
Process ID 1, Router ID 10.10.10.10, Network Type POINT-TO-POINT, Cost: 9500
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:04
Index 2/2, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 192.168.6.1
Suppress hello for 0 neighbor(s)
R2#



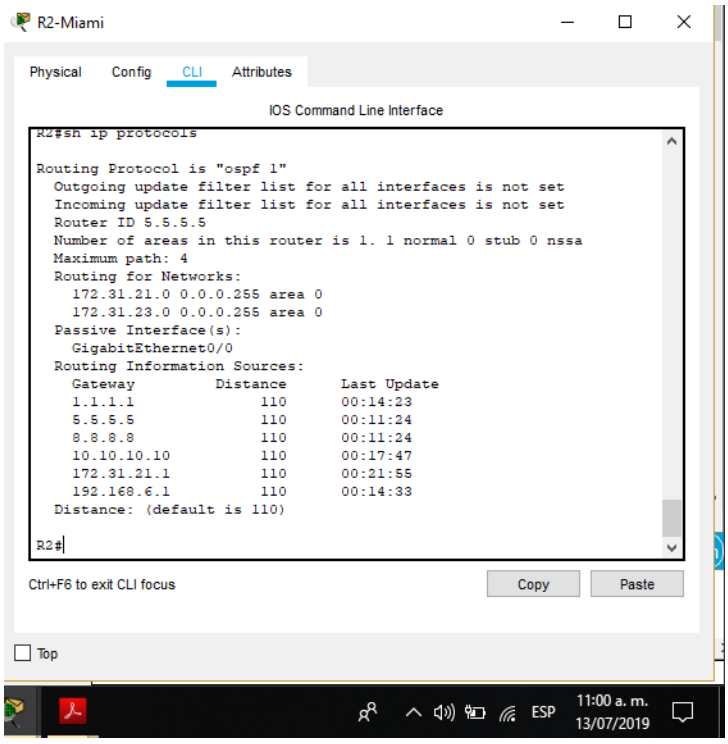
Visualización del router 3

R3#show ip ospf interface

Serial0/0/1 is up, line protocol is up
Internet address is 172.31.23.1/30, Area 0
Process ID 1, Router ID 192.168.6.1, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:03
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 10.10.10.10
Suppress hello for 0 neighbor(s)
R3#

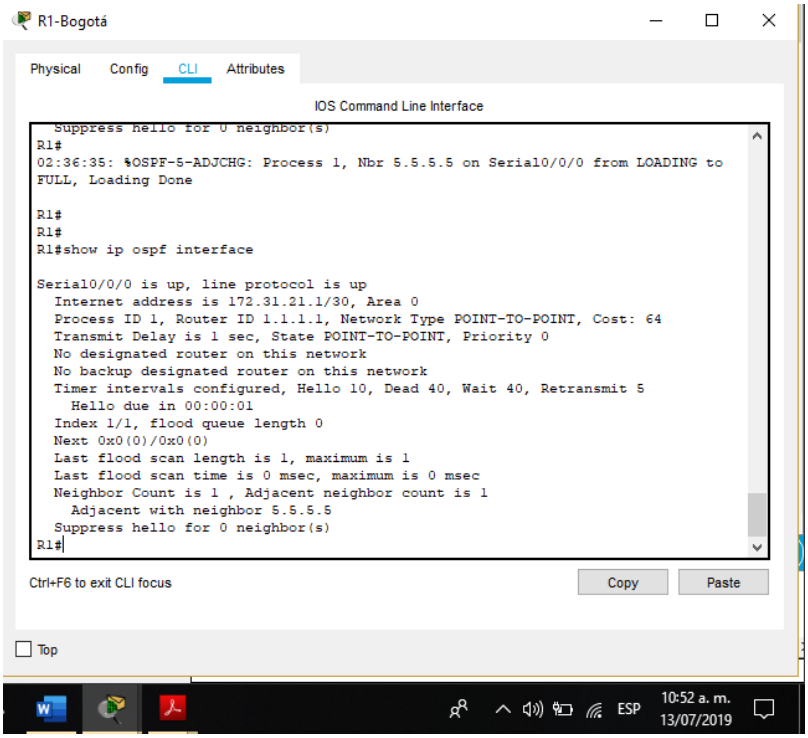


3.2.2.C. Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.



Verificando vecindades en los seriales Router 1

R1#show ip ospf interface
Serial0/0/0 is up, line protocol is up
Internet address is 172.31.21.1/30, Area 0
Process ID 1, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:01
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 5.5.5.5
Suppress hello for 0 neighbor(s)
R1#

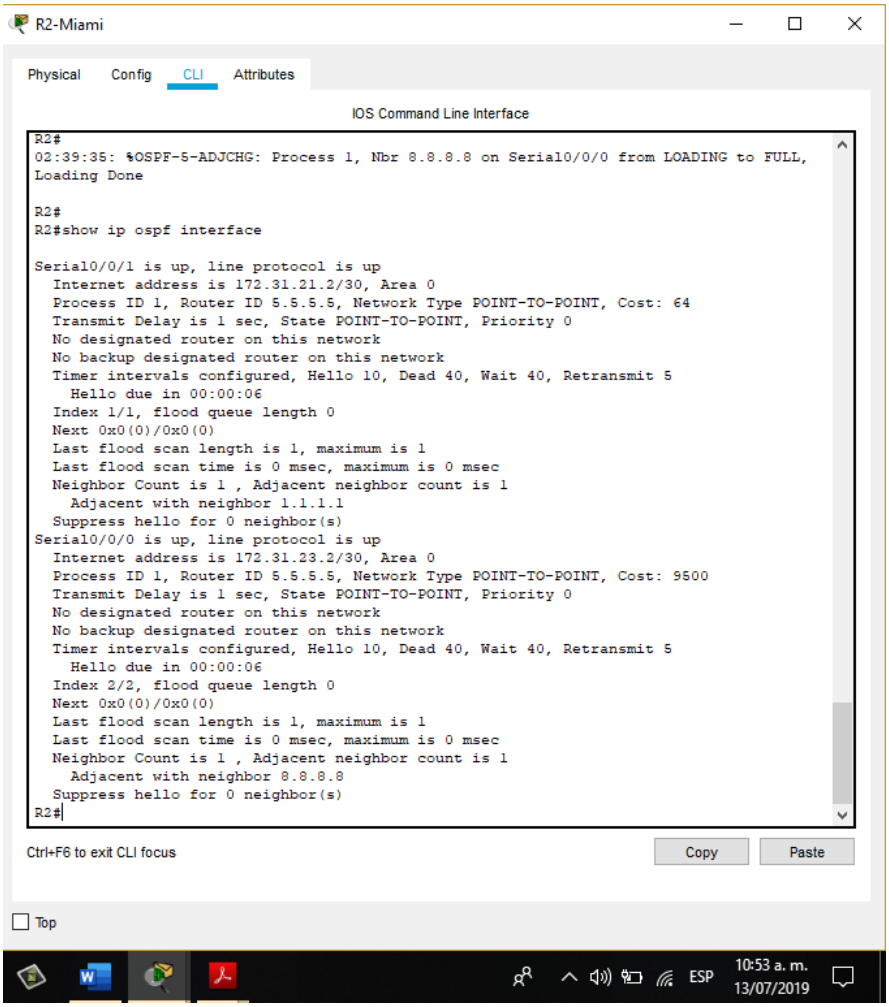


Verificando vecindades en los seriales Router 2

R2#show ip ospf interface

Serial0/0/1 is up, line protocol is up
Internet address is 172.31.21.2/30, Area 0
Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:06
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 1.1.1.1
Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
Internet address is 172.31.23.2/30, Area 0

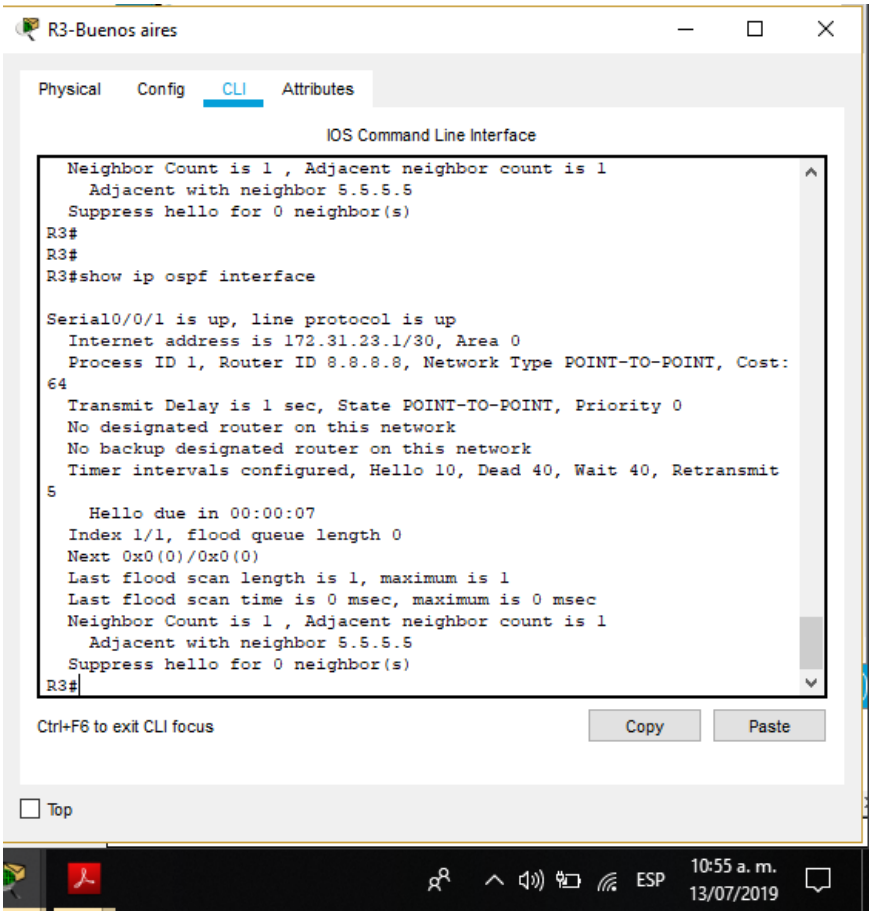
Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 9500
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:06
Index 2/2, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 8.8.8.8
Suppress hello for 0 neighbor(s)
R2#



Verificando vecindades en los seriales Router 3

R3#show ip ospf interface

Serial0/0/1 is up, line protocol is up
Internet address is 172.31.23.1/30, Area 0
Process ID 1, Router ID 8.8.8.8, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:07
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 5.5.5.5
Suppress hello for 0 neighbor(s)
R3#

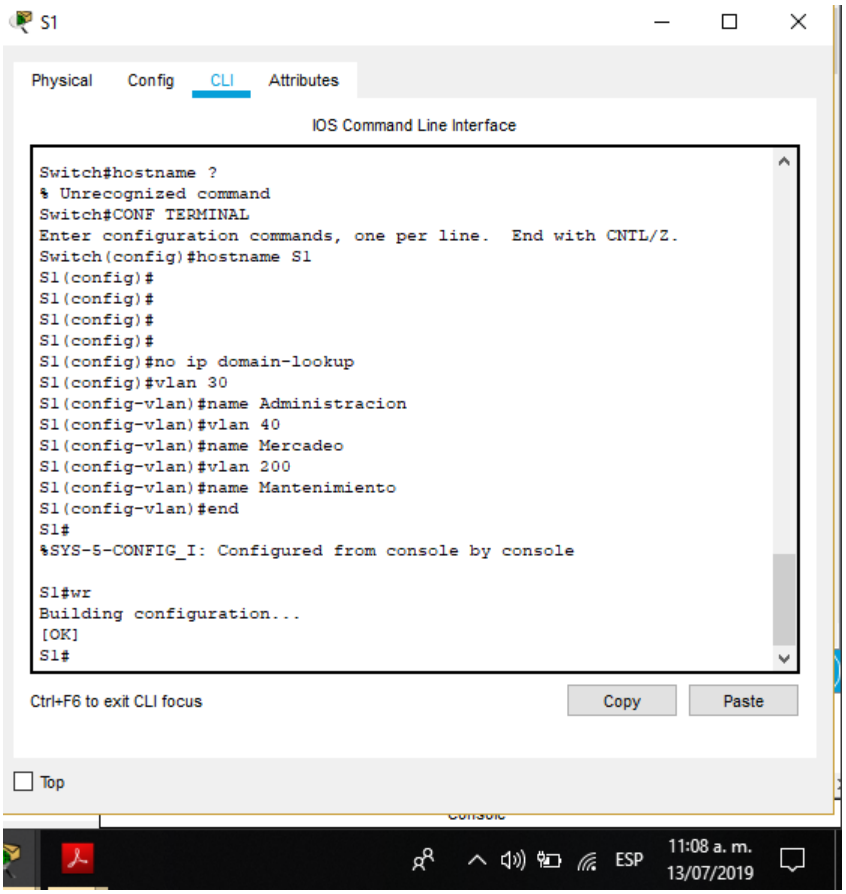


3.2.3. Configurar VLANs, Puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad en los Switches acorde a la topología de red establecida.

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

Switch 1

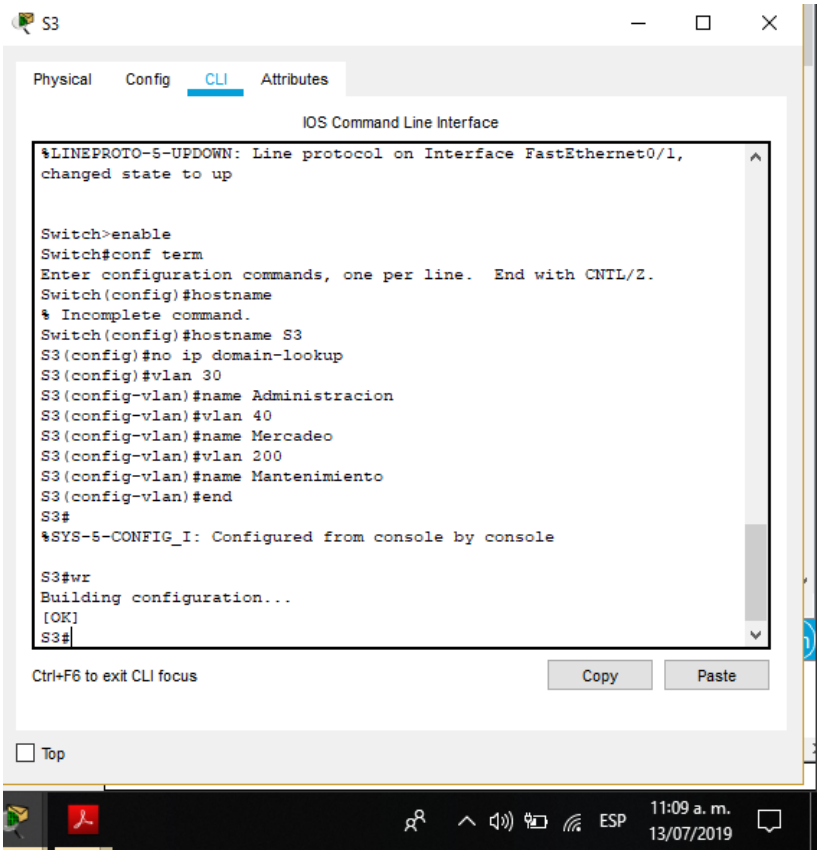
```
Switch#CONF TERMINAL
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#
S1(config)#
S1(config)#
S1(config)#
S1(config)#no ip domain-lookup
S1(config)#vlan 30
S1(config-vlan)#name Administracion
S1(config-vlan)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)#end
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#wr
Building configuration...
[OK]
S1#
```



Switch 3

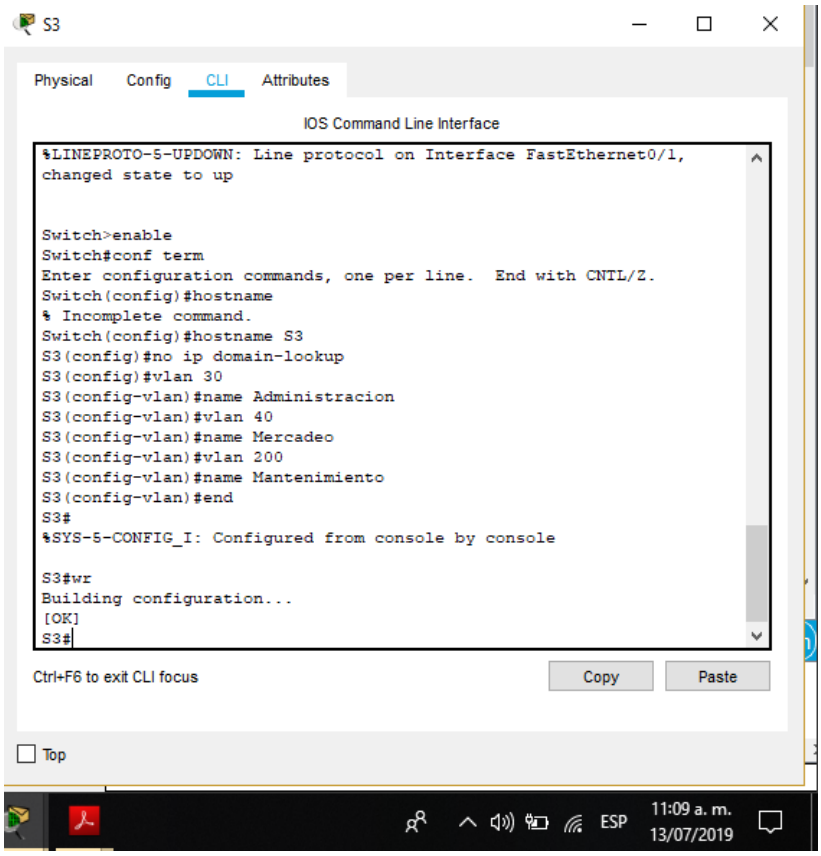
Switch>enable
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname
% Incomplete command.
Switch(config)#hostname S3
S3(config)#no ip domain-lookup
S3(config)#vlan 30
S3(config-vlan)#name Administracion
S3(config-vlan)#vlan 40
S3(config-vlan)#name Mercadeo
S3(config-vlan)#vlan 200
S3(config-vlan)#name Mantenimiento
S3(config-vlan)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#wr
Building configuration...
[OK]
S3#



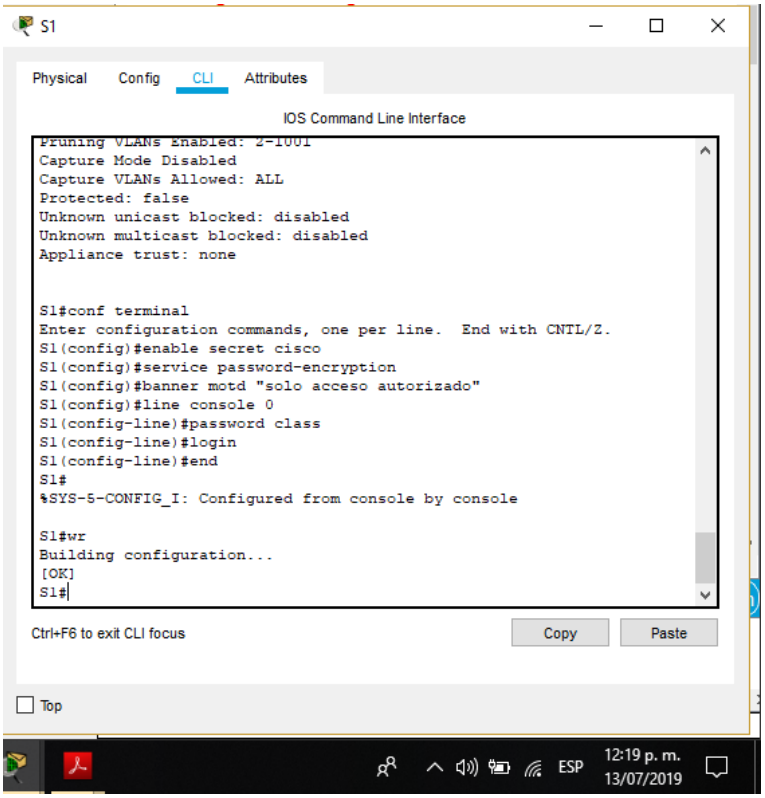
3.2.5. En el Switch 3 deshabilitar DNS lookup

S3(config)#no ip domain-lookup



S1#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#enable secret cisco
S1(config)#service password-encryption
S1(config)#banner motd "solo acceso autorizado"
S1(config)#line console 0
S1(config-line)#password class
S1(config-line)#login
S1(config-line)#end
S1#
%SYS-5-CONFIG_I: Configured from console by console

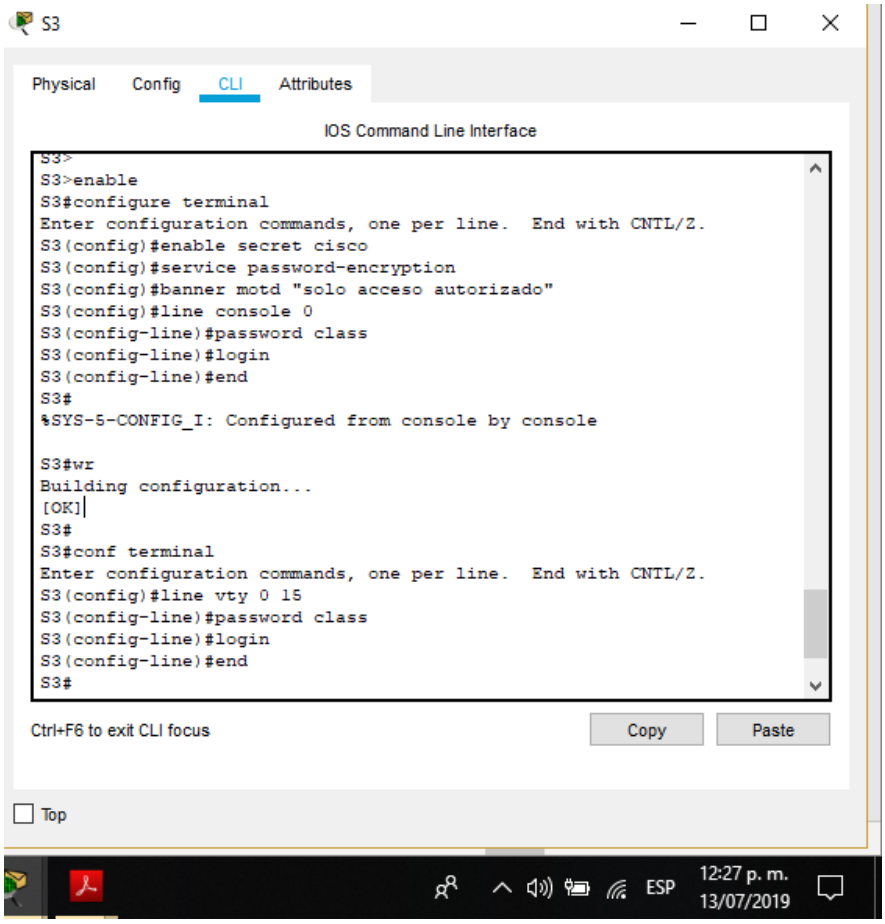
S1#wr
Building configuration...
[OK]
S1#



S3>
S3>enable
S3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#enable secret cisco
S3(config)#service password-encryption
S3(config)#banner motd "solo acceso autorizado"
S3(config)#line console 0
S3(config-line)#password class
S3(config-line)#login
S3(config-line)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console

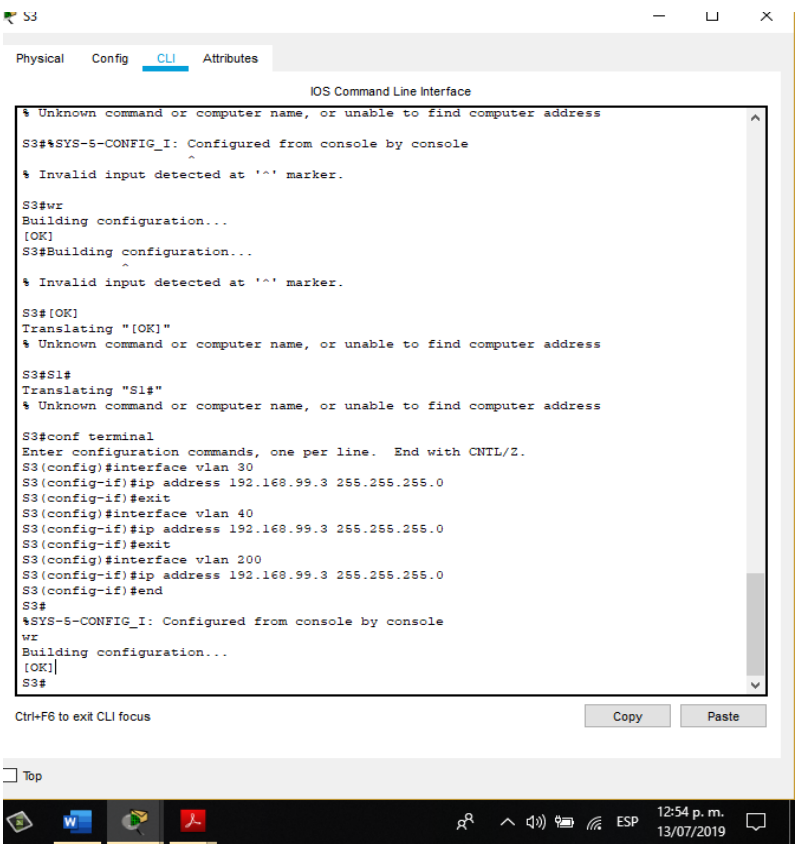
S3#wr
Building configuration...
[OK]
S3#
S3#conf terminal

Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#line vty 0 15
S3(config-line)#password class
S3(config-line)#login
S3(config-line)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
S3#

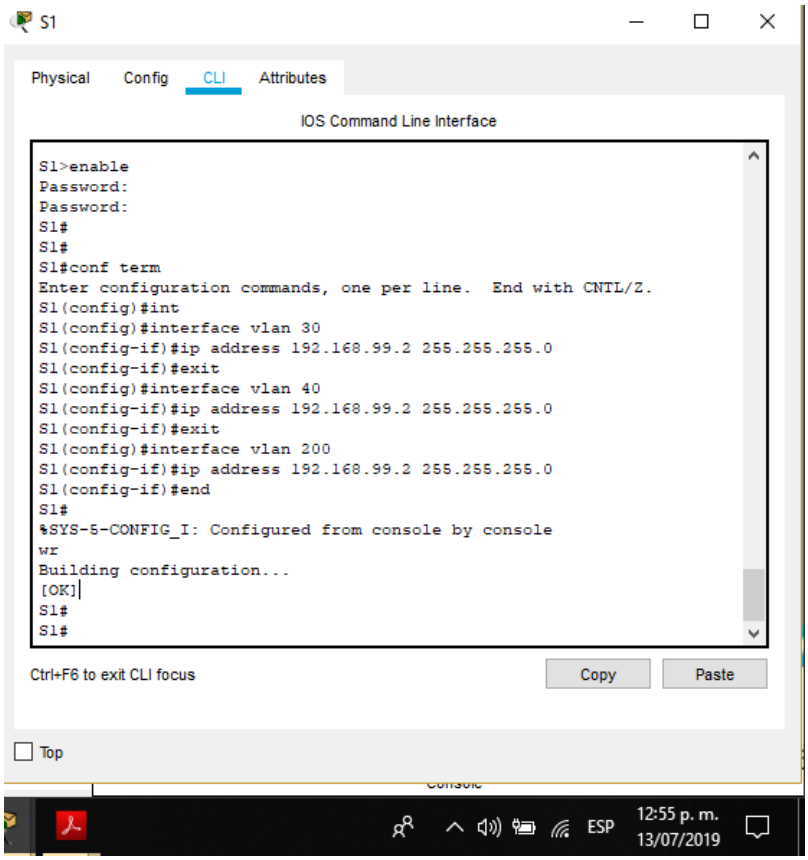


S3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#no ip domain-loockup
^
% Invalid input detected at '^' marker.
S3(config)#no ip domain-lookup
S3(config)#interface f0/3

```
S3(config-if)#switchport mode trunk native vlan 1
^
% Invalid input detected at '^' marker.
S3(config-if)#switchport mode trunk

S3(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

S3(config-if)#switchport trunk native vlan 1
S3(config-if)#exit
S3(config)#interface f0/1
S3(config-if)#switchport access vlan 40
S3(config-if)#exit
S3#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#interface vlan 30
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#exit
S3(config)#interface vlan 40
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#exit
S3(config)#interface vlan 200
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
S3#
```



S1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#int
S1(config)#interface vlan 30
S1(config-if)#ip address 192.168.99.2 255.255.255.0
S1(config-if)#exit
S1(config)#interface vlan 40
S1(config-if)#ip address 192.168.99.2 255.255.255.0
S1(config-if)#exit
S1(config)#interface vlan 200
S1(config-if)#ip address 192.168.99.2 255.255.255.0
S1(config-if)#end
S1#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
S1#
S1#



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

S1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#interface f0/2
S1(config-if)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down
S1(config-if)#exit
S1(config)#interface range f0/4-23
S1(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down

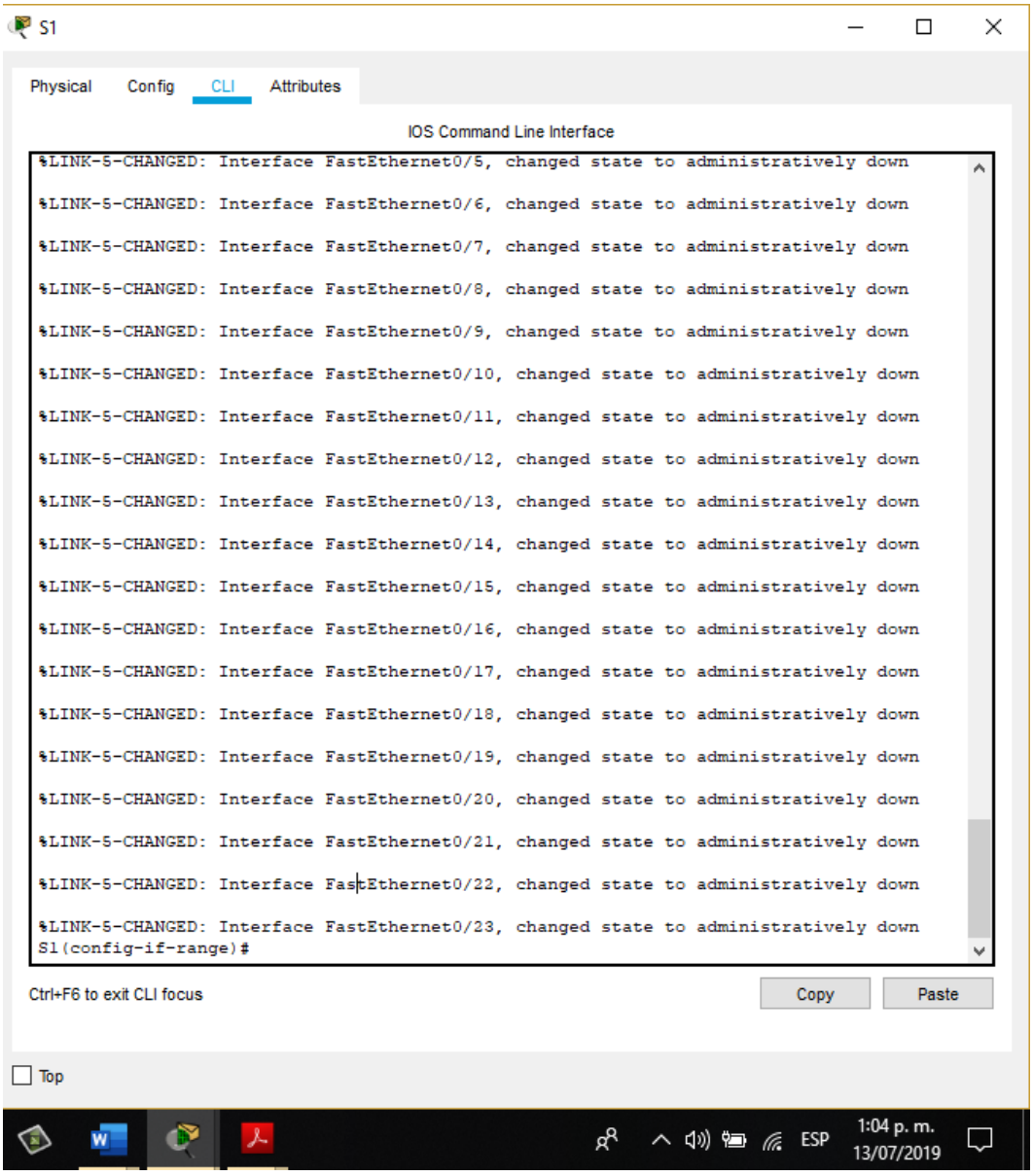
%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down

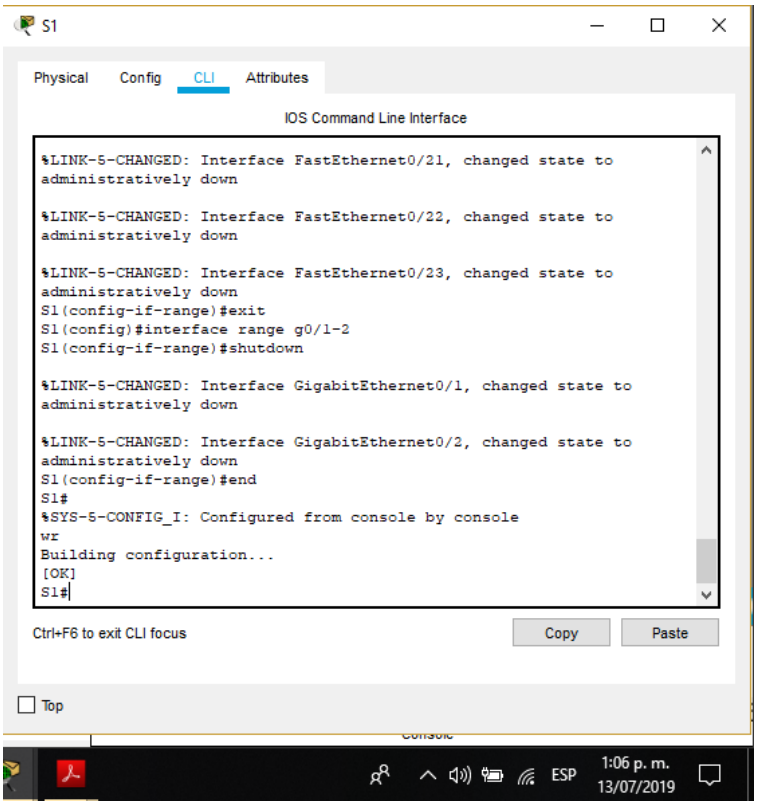
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down
S1(config-if-range)#


S1
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down
S1(config-if-range)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
ESP
1:04 p. m.
13/07/2019



S3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#interface g0/1-2
^
% Invalid input detected at '^' marker.
S3(config)#interface range g0/1-2
S3(config-if-range)#shutdown

%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down

%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down
S3(config-if-range)#exit
S3(config)#interface f0/2
S3(config-if)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down
S3(config-if)#exit
S3(config)#interface range f0/4-24
S3(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down

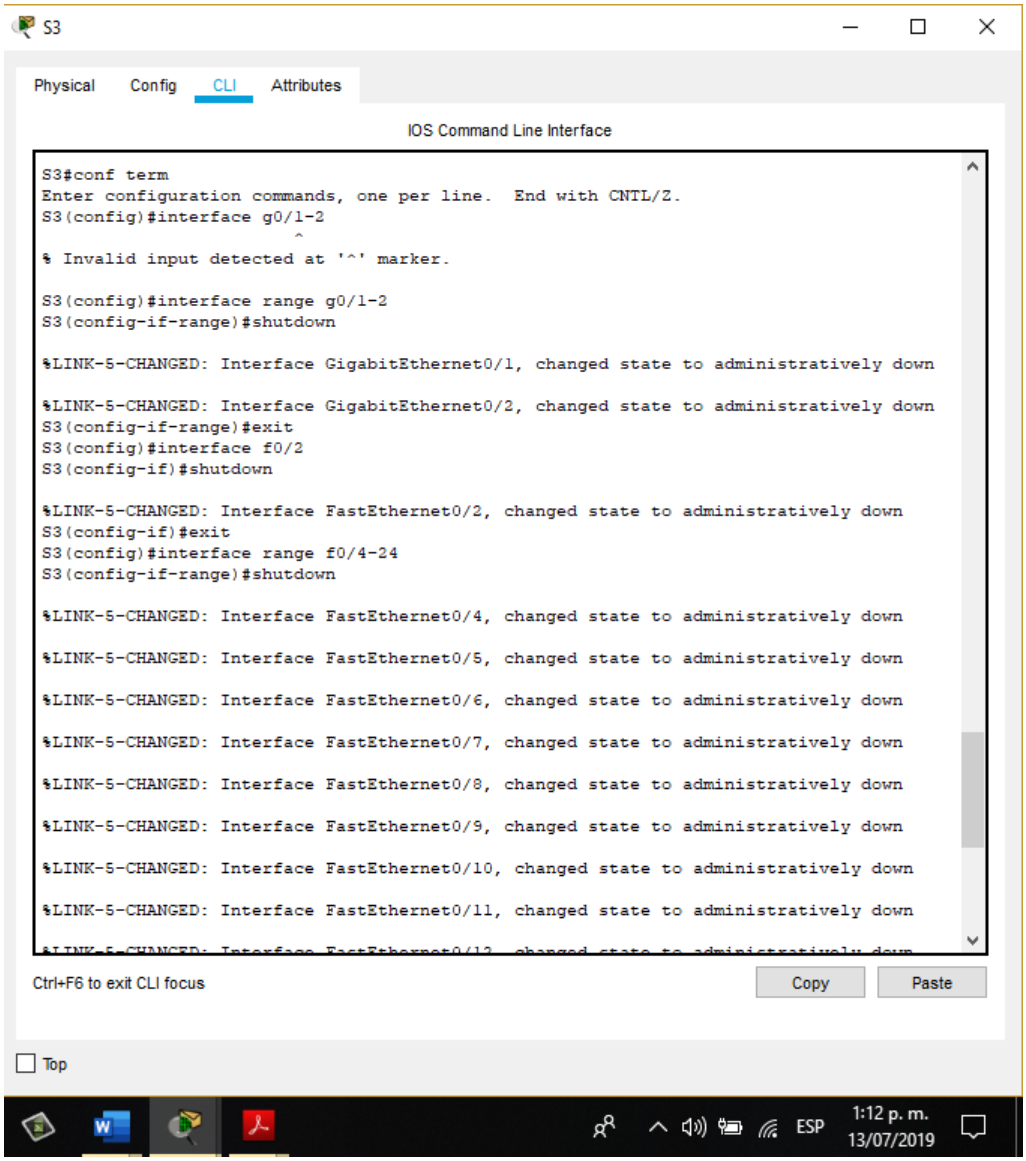
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down

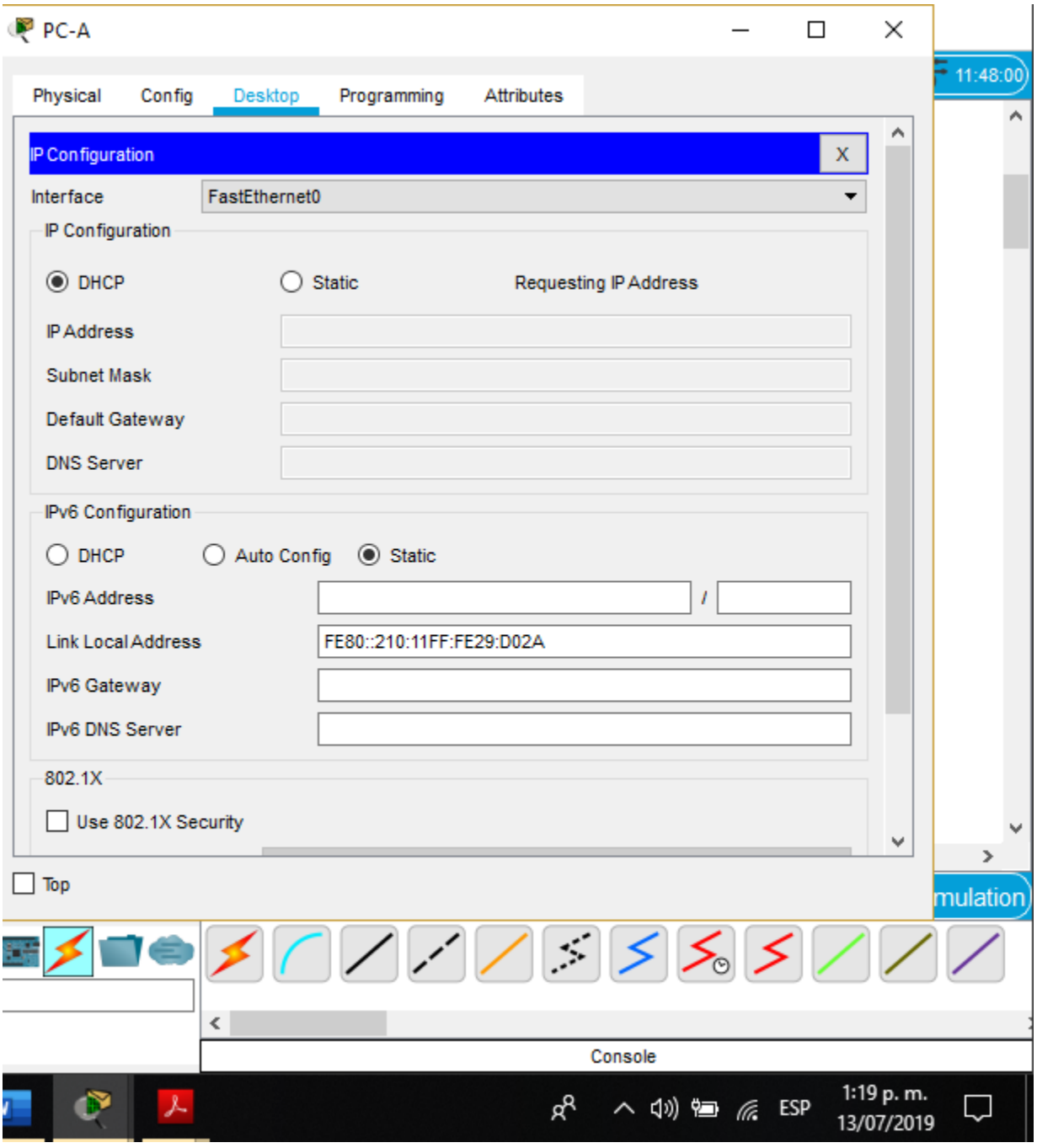
%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down

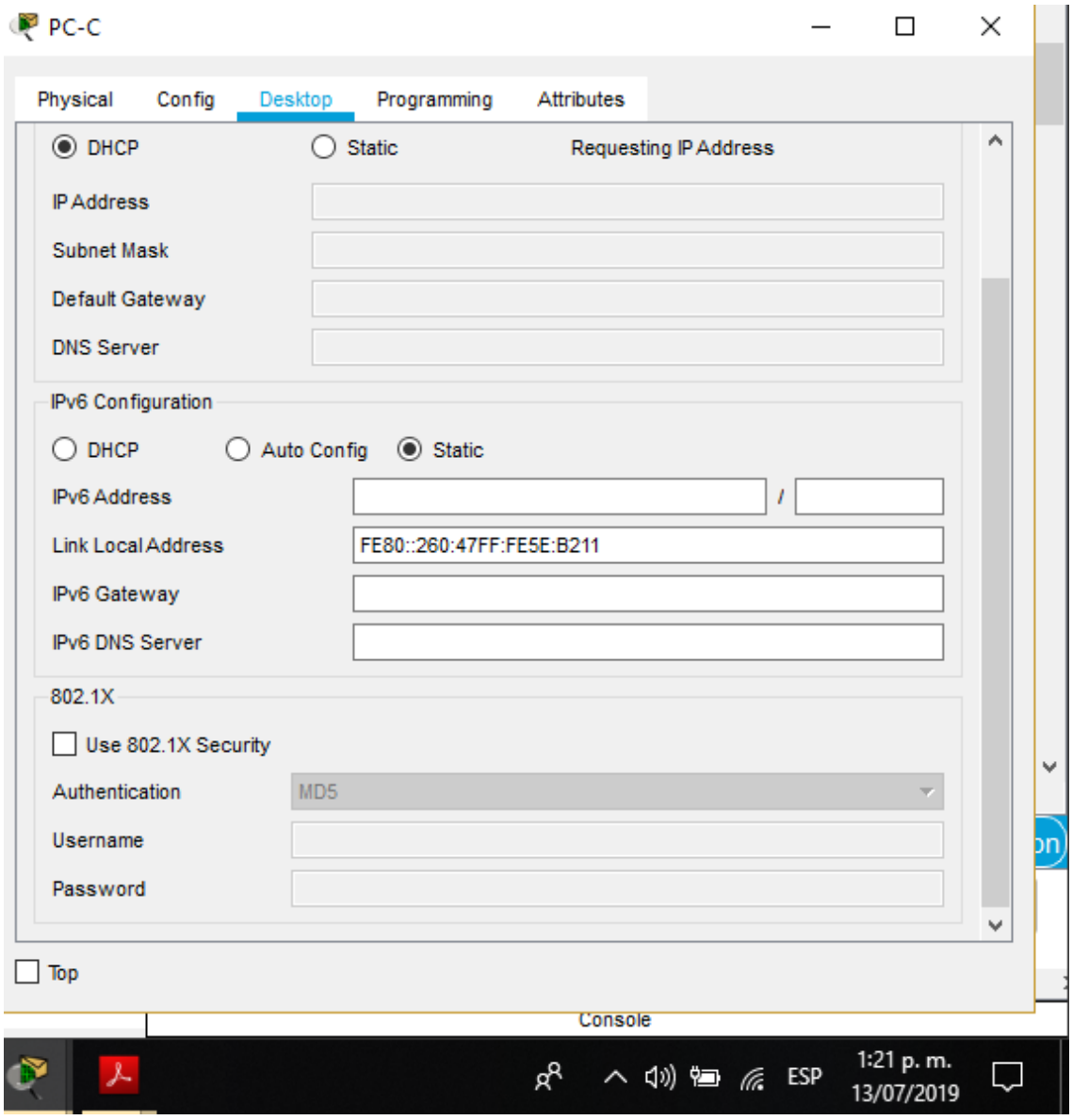
%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to administratively down
S3(config-if-range)#


S3
Physical
Config
CLI
Attributes
IOS Command Line Interface
S3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#interface g0/1-2
^
% Invalid input detected at '^' marker.
S3(config)#interface range g0/1-2
S3(config-if-range)#shutdown
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down
S3(config-if-range)#exit
S3(config)#interface f0/2
S3(config-if)#shutdown
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down
S3(config-if)#exit
S3(config)#interface range f0/4-24
S3(config-if-range)#shutdown
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
ESP
1:12 p. m.
13/07/2019

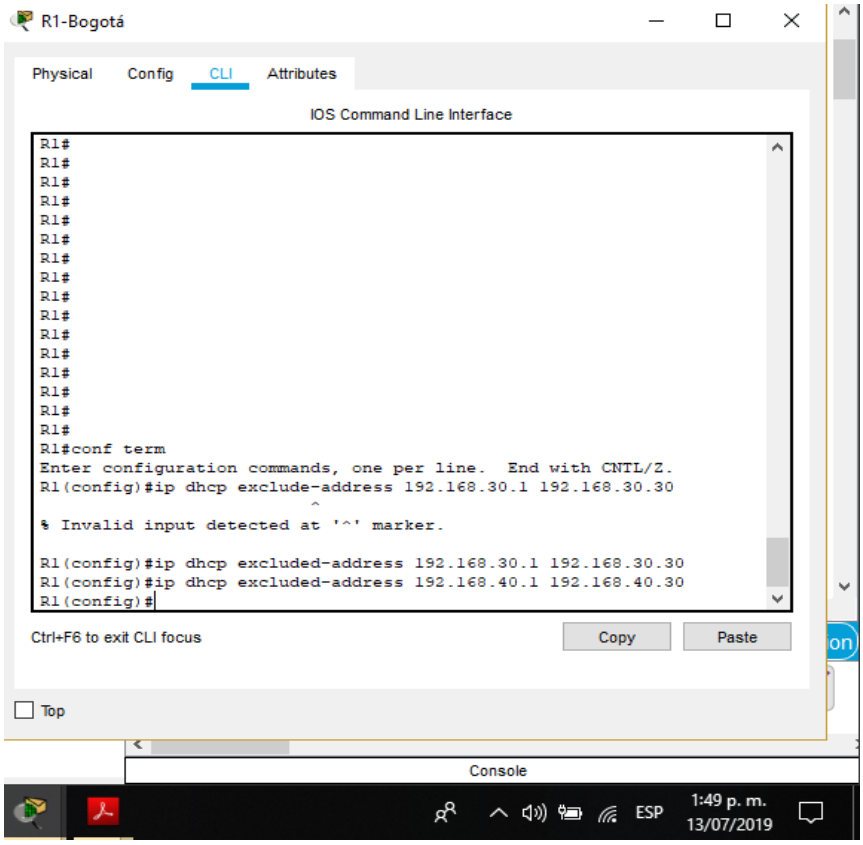
3.2.7. Implement DHCP and NAT for IPv4




PC-C
Physical
Config
Desktop
Programming
Attributes
DHCP
Static
Requesting IP Address
IP Address
Subnet Mask
Default Gateway
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::260:47FF:FE5E:B211
IPv6 Gateway
IPv6 DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Console
ESP
1:21 p. m.
13/07/2019

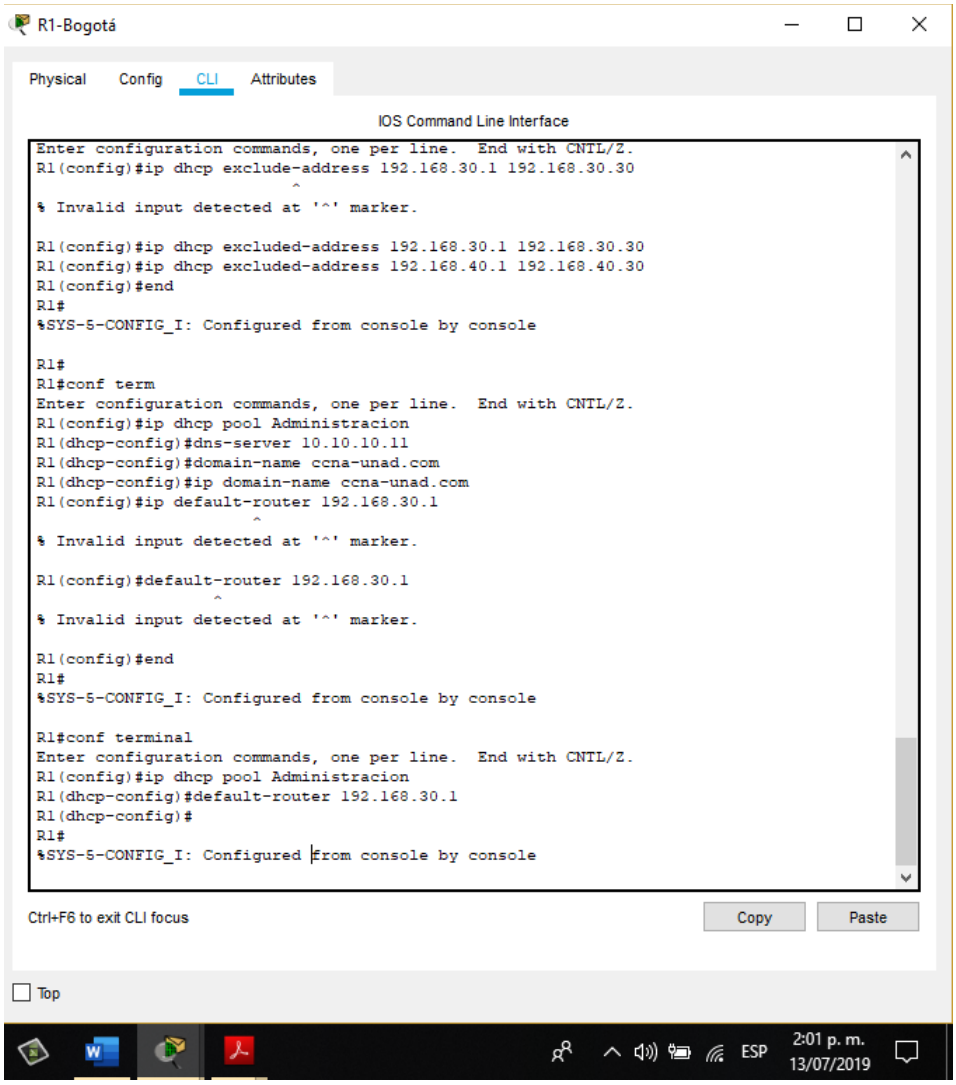
3.2.8. Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas. Así mismo Configurar R1 como servidor DHCP para las VLANs 30 y 40.

```
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp exclude-address 192.168.30.1 192.168.30.30
^
% Invalid input detected at '^' marker.
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#
```



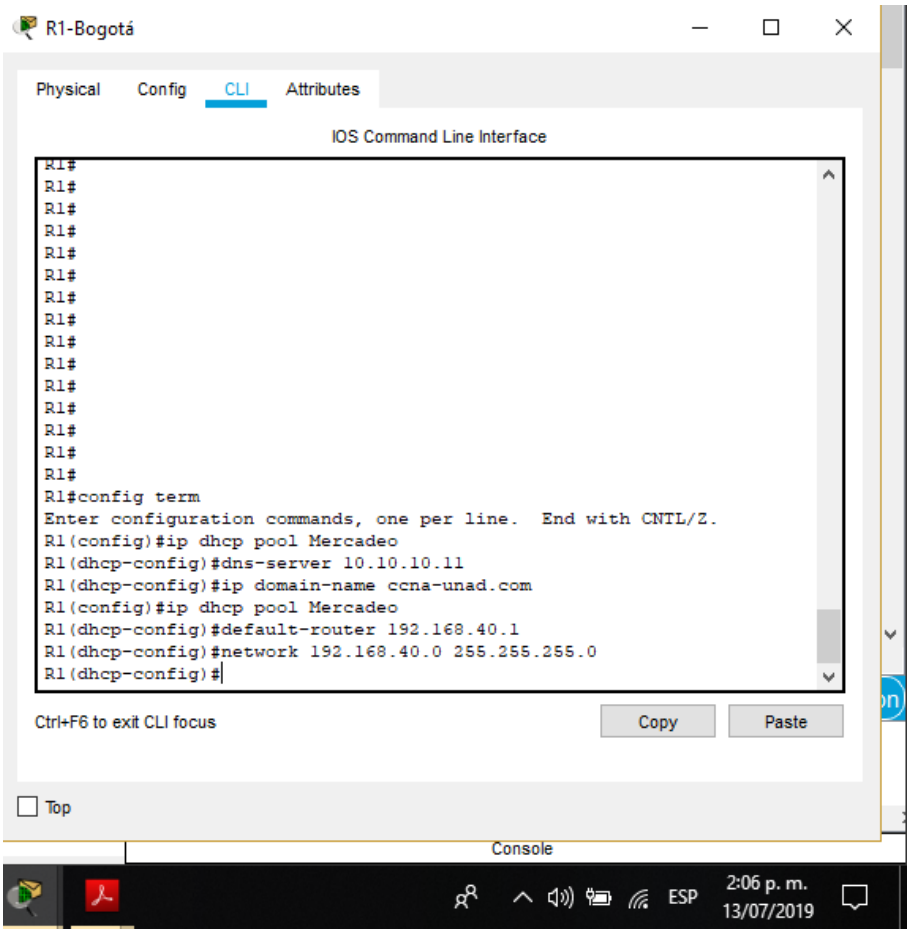
Configurar DHCP pool para VLAN 30	Name: ADMINISTRACION DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.

```
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp exclude-address 192.168.30.1 192.168.30.30
^
% Invalid input detected at '^' marker.
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp pool Administracion
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-name ccna-unad.com
R1(dhcp-config)#ip domain-name ccna-unad.com
R1(config)#ip default-router 192.168.30.1
^
% Invalid input detected at '^' marker.
R1(config)#default-router 192.168.30.1
^
% Invalid input detected at '^' marker.
R1(config)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp pool Administracion
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#
R1#
%SYS-5-CONFIG_I: Configured from console by console
```


R1-Bogotá
Physical
Config
CLI
Attributes
IOS Command Line Interface
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp exclude-address 192.168.30.1 192.168.30.30
                                ^
% Invalid input detected at '^' marker.
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
R1#
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp pool Administracion
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-name ccna-unad.com
R1(dhcp-config)#ip domain-name ccna-unad.com
R1(config)#ip default-router 192.168.30.1
                           ^
% Invalid input detected at '^' marker.
R1(config)#default-router 192.168.30.1
                          ^
% Invalid input detected at '^' marker.
R1(config)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
R1#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp pool Administracion
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#
R1#
%SYS-5-CONFIG_I: Configured from console by console
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
ESP
2:01 p. m.
13/07/2019

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

R1#config term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp pool Mercadeo
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#ip domain-name ccna-unad.com
R1(config)#ip dhcp pool Mercadeo
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#network 192.168.40.0 255.255.255.0
R1(dhcp-config)#

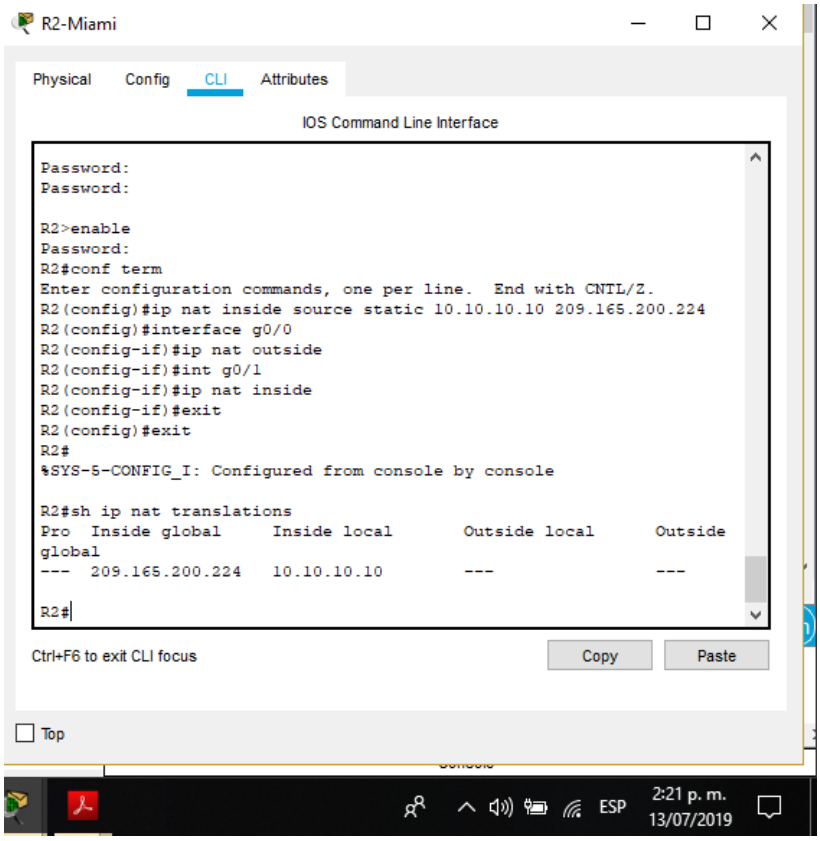


3.2.9. Configurar NAT en R2 para permitir que los host puedan salir a internet

R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.224
R2(config)#interface g0/0
R2(config-if)#ip nat outside
R2(config-if)#int g0/1
R2(config-if)#ip nat inside
R2(config-if)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console

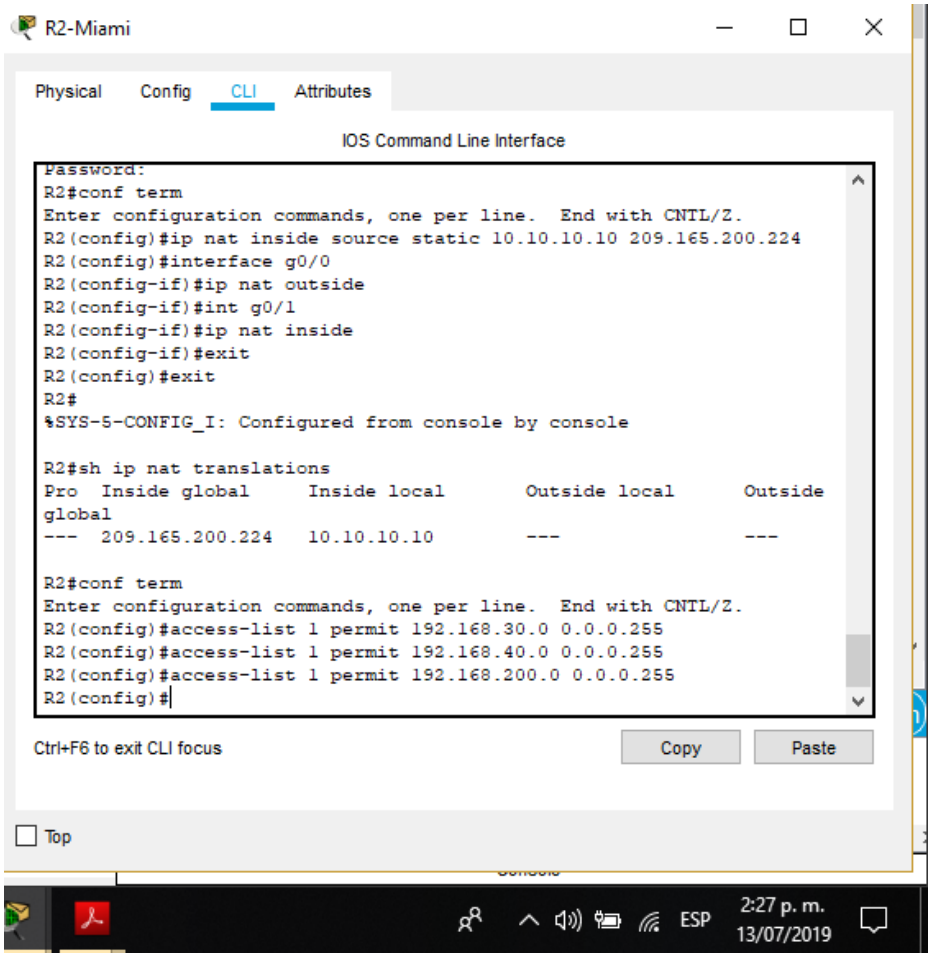
R2#sh ip nat translations
Pro Inside global Inside local Outside local Outside global
--- 209.165.200.224 10.10.10.10 --- ---

R2#



3.2.10. 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.

```
R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#access-list 1 permit 192.168.30.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.40.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.200.0 0.0.0.255
R2(config)#
```

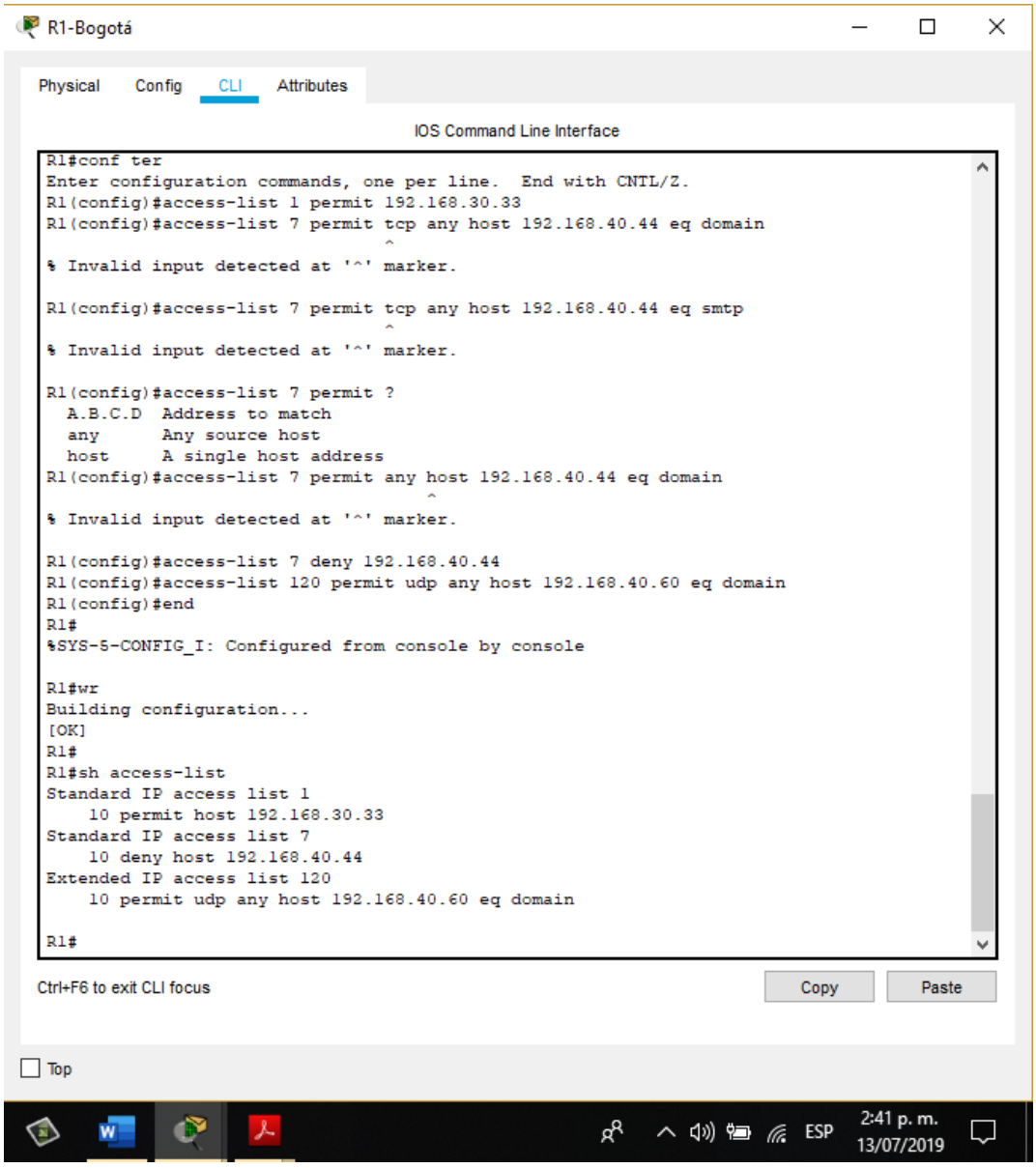


3.2.11. Configurar al menos dos listas de acceso de tipo extendido o nombradas a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

```
R1#sh acces
R1#sh access-lists
R1#sh access-lists ?
<1-199> ACL number
WORD ACL name
| Output Modifiers
<cr>
R1#sh access-list
R1#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#access-list 1 permit 192.168.30.33
R1(config)#access-list 7 permit tcp any host 192.168.40.44 eq domain
^
% Invalid input detected at '^' marker.
R1(config)#access-list 7 permit tcp any host 192.168.40.44 eq smtp
^
% Invalid input detected at '^' marker.
R1(config)#access-list 7 permit ?
A.B.C.D Address to match
any Any source host
host A single host address
R1(config)#access-list 7 permit any host 192.168.40.44 eq domain
^
% Invalid input detected at '^' marker.
R1(config)#access-list 7 deny 192.168.40.44
R1(config)#access-list 120 permit udp any host 192.168.40.60 eq domain
R1(config)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#wr
Building configuration...
[OK]
R1#
R1#sh access-list
Standard IP access list 1
10 permit host 192.168.30.33
Standard IP access list 7
10 deny host 192.168.40.44
```

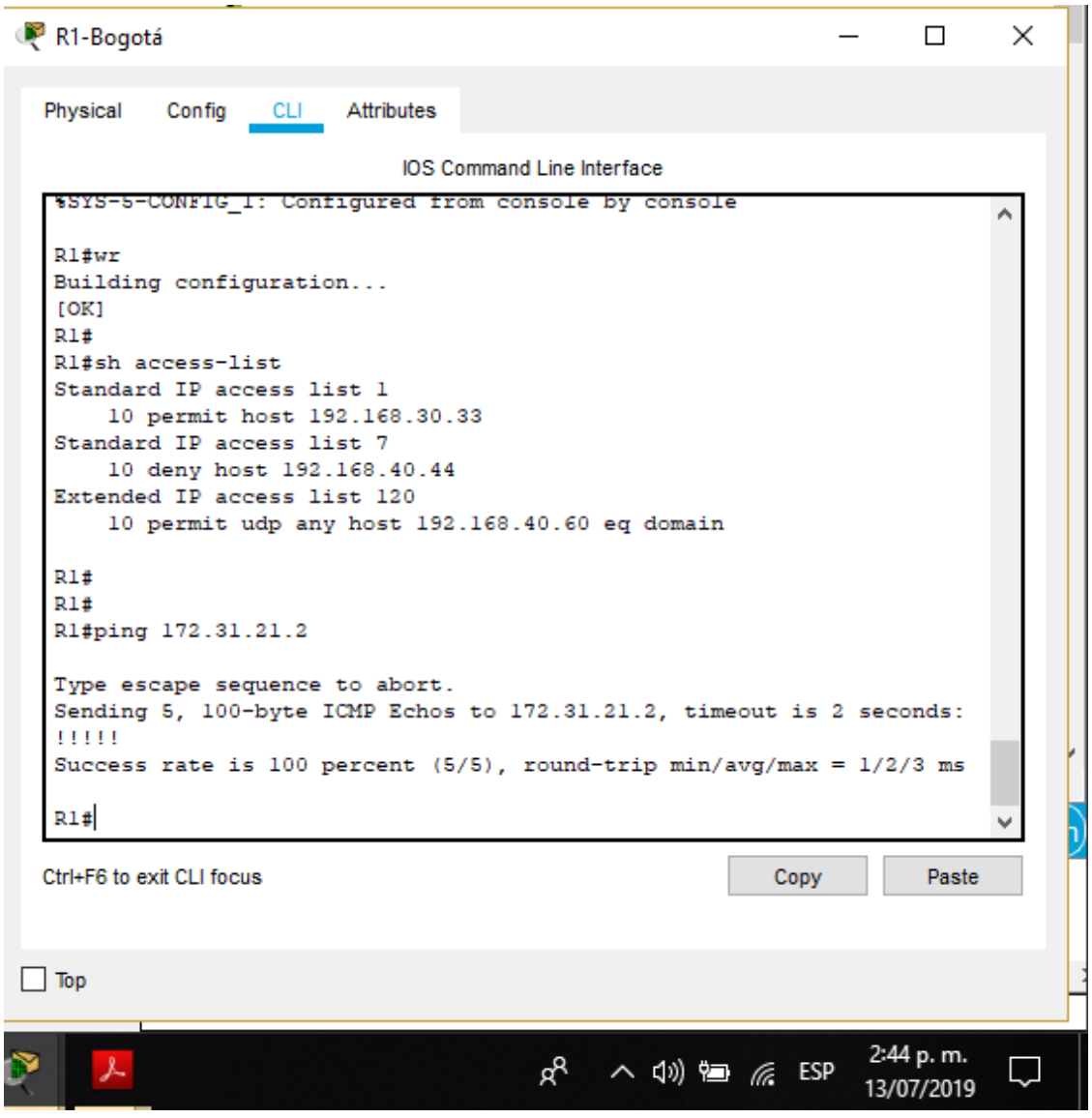
Extended IP access list 120
10 permit udp any host 192.168.40.60 eq domain

R1#

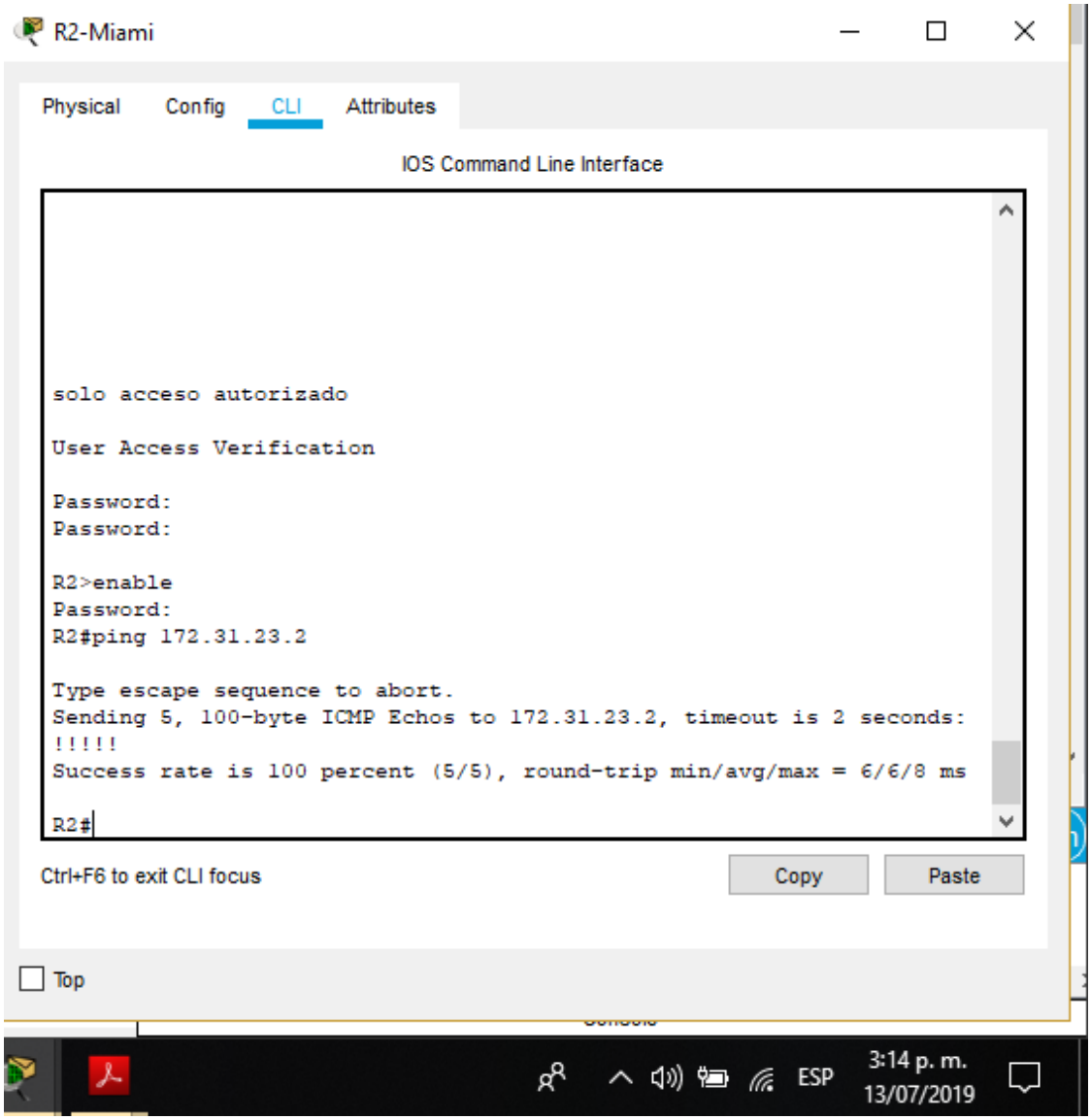


3.2.12. Verificar procesos de comunicación y redireccionamiento de tráfico en los routers mediante el uso de Ping y Traceroute.

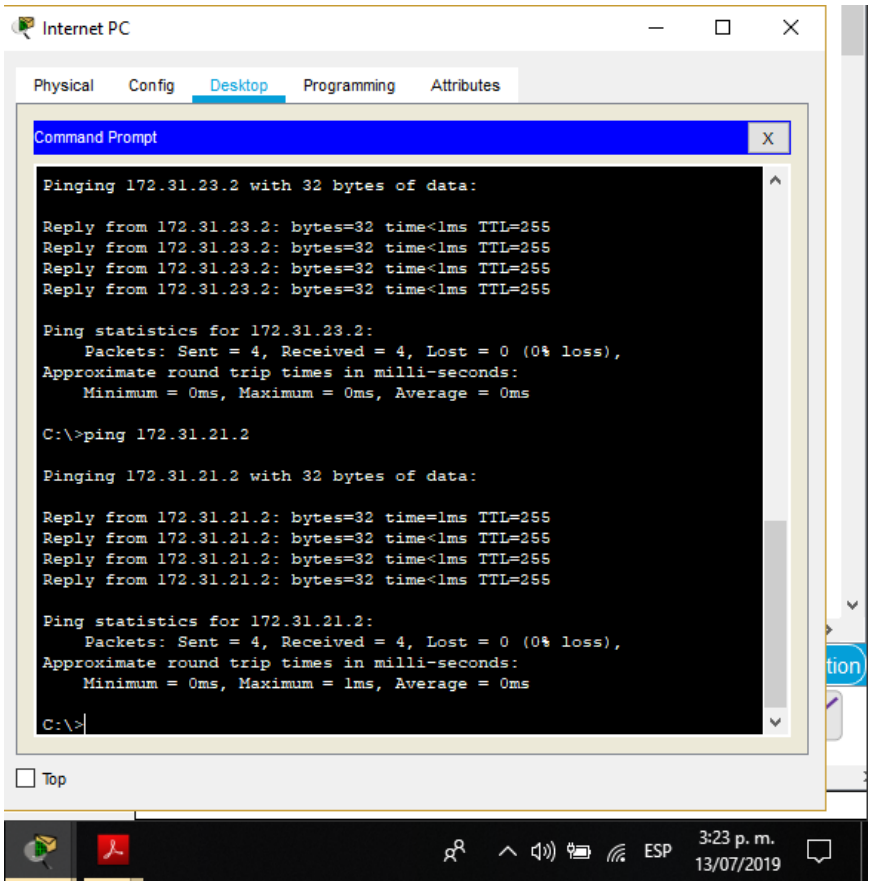
Ping y traceroute de R1 a R2



Ping y traceroute de R2 a R3



Ping y traceroute de Internet PC a interfaces de R2



4. CONCLUSIONES

Se logra emular con éxito el manejo de una red en Packet Tracer, aplicando las diversas configuraciones de routers y switchs CISCO que comercialmente se maneja. De esta forma se puede evidenciar el manejo de cada instrucción acuerdo a la necesidad a implementar. La configuración de cada router y switch se maneja como un todo ya que los dispositivos deben de comprender los protocolos y permisos que el ingeniero de redes implementa.

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