Cisco Networking Academy® Mind Wide Open™

# DIPLOMADO DE PROFUNDIZACION CISCO PRUEBA DE HABILIDADES PRÁCTICAS CCNA


**Asignatura**

Diplomado Cisco CCNA

**Presenta**

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**Grupo203092_14**

**Tutor**

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Bucaramanga – Colombia 2019

**NOTA DE ACEPTACION**

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Presidente del jurado

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Jurado

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Jurado

Bucaramanga (Santander) agosto 2019

## AGRADECIMIENTOS

Quiero agradecer en primer lugar a Dios, por guiarme durante el proceso y ser mi pilar fundamental a lo largo de mi vida en todos los proyectos que he puesto en nombre de él, demostrándome que a pesar de las adversidades y obstáculos que se presenten a lo largo de todo proceso, al final de todo gran esfuerzo vienen la recompensa y el fruto glorioso de los mismos.

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## AGRADECIMIENTOS

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De igual forma es muy importante resaltar mi agradecimiento absoluto al staff de tutores que a lo largo del proceso educativo me brindaron conocimiento de calidad, logrando así obtener las bases necesarias para ser un excelente ing. De Sistemas.

**TABLA DE CONTENIDO**

**Núm pág.**

## RESUMEN

A nivel corporativo grandes organizaciones a nivel mundial han optado por la implementación de los servicios prestados mediante los servicios que presta Cisco. Combinar la tecnología y el negocio de formas que antes se pensaban imposibles mediante el uso de herramientas que permiten la implementación de conexiones a internet, comunicaciones de voz, video y datos. El mundo digital crece a pasos agigantados, lo cual hacen de cisco el socio ideal para la nueva proyección de futuros servicios que conjugaran las conexiones a la red de la gente, los procesos, los datos y las cosas entregando un resultado sin precedente. El poder de las conexiones da paso a nuevos tipos de datos y conocimientos, así como a entornos físicos y virtuales que se combinan perfectamente.

El objetivo de realizar el Diplomado de profundización en CCNA es introducirnos en el mundo de capacitación que ofrece cisco mediante la plataforma netAcad con el fin de afianzar los conocimientos necesarios que nos permita tener autoridad al momento de explotar los servicios que el mundo cisco nos ofrece como por ejemplo herramientas robustas, software y servicios profesionales de seguridad informática, la nube, el Internet de las Cosas y la movilidad, entre otros.

Como futuro ingeniero de sistemas es de vital importancia tener conocimiento y las habilidades necesarias para gestionar, personalizar y brindar soluciones a las problemáticas relacionados con equipos de redes Cisco, brindándonos las bases necesarias para tener un manejo estructural en el diseño e implementación de soluciones integradas LAN / WAN.

**ABSTRACT**

At corporate level big organizations on a global scale have chosen for the implementation of the services given by means of the services that gives Slack. To combine the technology and the business of forms that earlier were thinking impossible by means of the use of hardware that allow the connections implementation Internet, communications of voice, video and information. The digital world grows to massive steps, which they do of slack the ideal associate for the new projection of future services that they were bringing together the connections to the network of the people, the processes, the information and the things delivering a result without precedent. The power of the connections passes to new types of information and knowledge, as well as to physical and virtual environments that get together perfectly.

The target to realize the deepening Qualified one in CCNA is to introduce us in the world of training that offers slack by means of the platform netAcad in order to strengthen the necessary knowledge that authority allows us to have at the moment of exploiting the services that the world slack offers us like for example robust hardware, software and professional services of computer safety, the cloud, the Internet of the Things and the mobility, between others.

As future system engineer is of vital importance to have knowledge and the necessary skills to manage, to personalize and to offer solutions to the problematic ones related to teams of networks Slack, offering to us the necessary bases to have a structural handling in the design and implementation of integrated solutions LAN / WAN.

# INTRODUCCIÓN

Por medio del presente documento se realizan las actividades prácticas propuestas en la fase final del diplomado CCNA 1 y CCNA 2 cursado a lo largo del periodo, con lo cual se busca demostrar los conocimientos adquiridos en cada una de las fases desarrolladas en la plataforma de Certificación Cisco dispuesta con un plan de capacitación en tecnología de redes informáticas que la empresa Cisco ofrece para obtener el Cisco Certified Network Associate, más conocida por sus siglas CCNA.

Para el desarrollo de los escenarios propuestos se hizo uso del programa Packet Tracer, en el cual se llevó a cabo cada una de las topologías presentadas, con el objetivo de demostrar las habilidades adquiridas y la aplicabilidad que tiene en el mundo laboral, recordando siempre su importancia en la ingeniería de sistemas y carreras afines.

# OBJETIVOS

## OBJETIVO GENERAL

Aplicar los conceptos básicos que nos permitan entender el funcionamiento interno de las máquinas y como desarrolla su conectividad, implementando IPv4, seguridad en la red, configuración de diferentes dispositivos y pruebas realizadas por medio de la plataforma Packet Tracer.

## OBJETIVOS ESPECIFICOS

- Desarrollar las topologías propuestas con sus respectivas especificaciones y pruebas de conectividad.
- Al realizar el estudio de los módulos propuestos en la plataforma cisco, se obtienen conceptos básicos que permiten entender el funcionamiento de las redes, permitiéndonos llevar a la práctica mediante el desarrollo de topologías de red.
- Realizar un informe general en donde se detalle el paso a paso aplicado para obtener resultados satisfactorios en las pruebas realizadas a los escenarios propuestos con el fin de emular entornos reales.

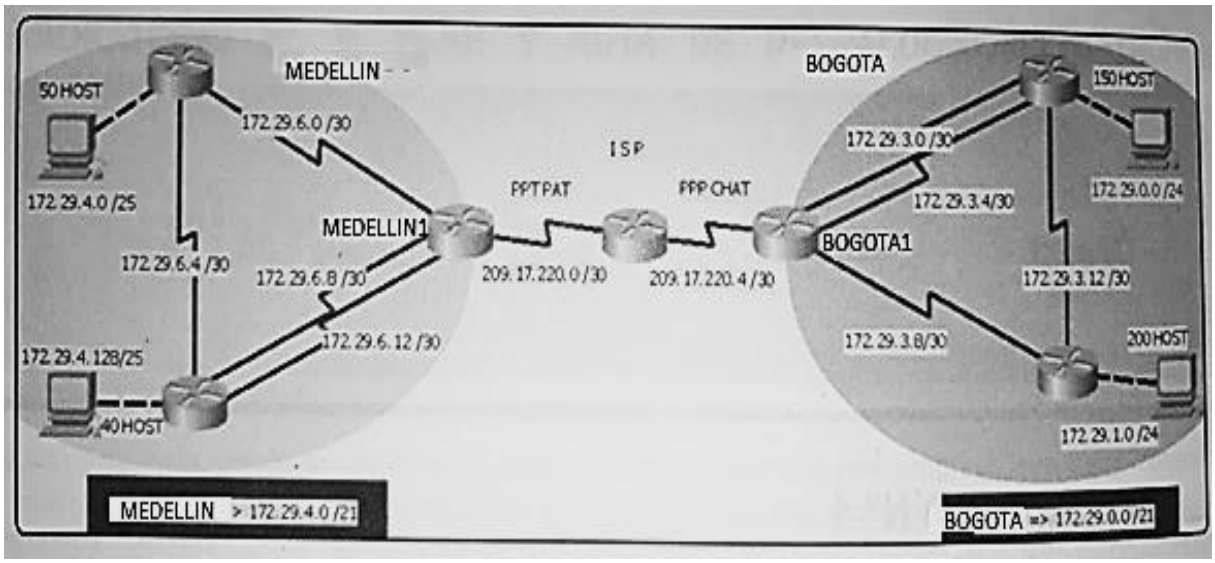
## DESARROLLO DE LA ACTIVIDAD

### 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

**Clave: cisco**




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.

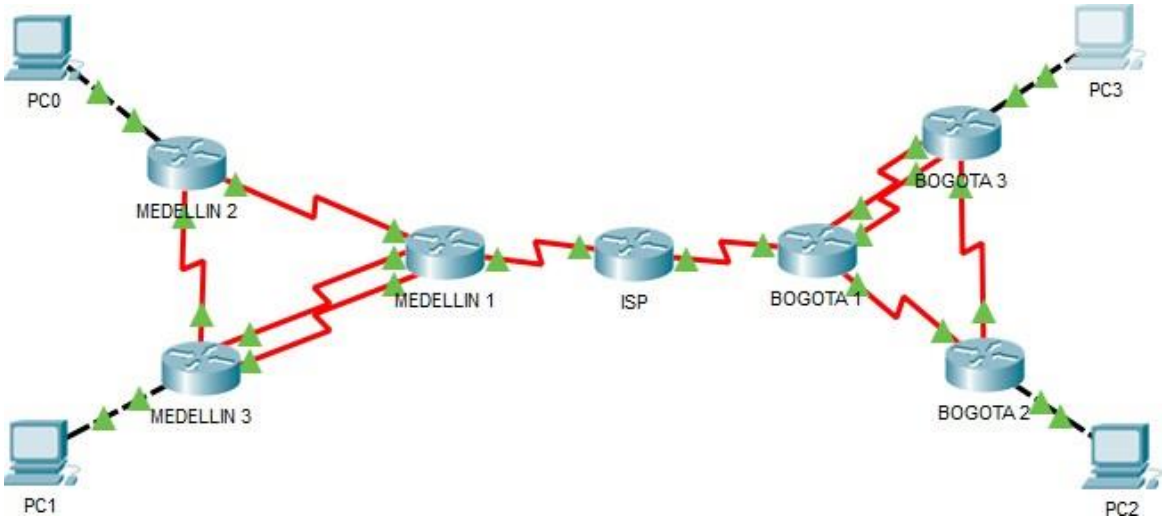
### Desarrollo

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.

**Topología**




**Configuración en router Medellin 1**

MEDELLIN_1#sh run
Building configuration...

Current configuration : 1536 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname MEDELLIN_1
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
no ip cef
no ipv6 cef
!
username ISP password 7 0822455D0A16
!

```
license udi pid CISCO1941/K9 sn FTX152455YM-
!
spanning-tree mode pvst!
!
interface GigabitEthernet0/0
no ip address
duplex auto
speed auto
shutdown
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/0/0
ip address 172.29.6.13 255.255.255.252
encapsulation ppp
ppp authentication pap
ppp pap sent-username MEDELLIN password 0 cisco
ip nat outside
clock rate 2000000
!
interface Serial0/0/1
ip address 209.17.220.1 255.255.255.252
ip nat outside
!
interface Serial0/1/0
ip address 172.29.6.9 255.255.255.252
!
interface Serial0/1/1
ip address 172.29.6.2 255.255.255.252
ip nat outside
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
!
router rip
version 2
passive-interface Serial0/0/0
network 172.29.0.0
```

```
default-information originate
!
ip nat inside source list 1 interface Serial0/0/0 overload
ip classless
ip route 0.0.0.0 0.0.0.0 209.17.220.2
ip route 172.29.4.0 255.255.252.0 209.17.220.2
ip route 172.29.0.0 255.255.252.0 209.17.220.6
!
ip flow-export version 9
!
access-list 1 permit 172.29.4.0 0.0.3.255
!
line con 0
password 7 0822455D0A16
login
!
line aux 0
!
line vty 0 4
password 7 0822455D0A16
login
!
end
```

**Configuración en router Medellin 2**

```
MEDELLIN_2#sh run
Building configuration...

Current configuration : 1462 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname MEDELLIN_2
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
ip dhcp excluded-address 172.29.4.1 172.29.4.5
ip dhcp excluded-address 172.29.4.129 172.129.4.133
!
ip dhcp pool MEDELLIN_2
```

```
network 172.29.4.0 255.255.255.128
default-router 172.29.4.1
dns-server 8.8.8.8
ip dhcp pool MEDELLIN_3
network 172.29.4.128 255.255.255.128
default-router 172.29.4.129
dns-server 8.8.8.8
ip dhcp pool BOGOTA_2
network 172.29.0.0 255.255.255.0
default-router 172.29.0.1
ip dhcp pool BOGOTA_3
network 172.29.1.0 255.255.255.0
default-router 172.29.1.1
!
no ip cef
no ipv6 cef
!
license udi pid CISCO1941/K9 sn FTX1524A4RD-
!
spanning-tree mode pvst
!
interface GigabitEthernet0/0
ip address 172.29.4.1 255.255.255.128
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/1/0
ip address 172.29.6.5 255.255.255.252
clock rate 2000000
!
interface Serial0/1/1
ip address 172.29.6.1 255.255.255.252
!
interface Vlan1
no ip address
shutdown
!
router rip
```

```
version 2
passive-interface GigabitEthernet0/0
network 172.29.0.0
no auto-summary
!
ip classless
!
ip flow-export version 9
!
line con 0
password 7 0822455D0A16
login
!
line aux 0
!
line vty 0 4
password 7 0822455D0A16
login
!
End
```

**Configuración en router Medellín 3**

```
MEDELLIN_3#sh run
Building configuration...

Current configuration : 1135 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname MEDELLIN_3
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
no ip cef
no ipv6 cef
!
license udi pid CISCO1941/K9 sn FTX1524TIT8-
!
spanning-tree mode pvst
!
```

```
interface GigabitEthernet0/0
ip address 172.29.4.129 255.255.255.128
ip helper-address 172.29.6.5
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/0/0
ip address 172.29.6.13 255.255.255.252
!
interface Serial0/0/1
no ip address
clock rate 2000000
!
interface Serial0/1/0
ip address 172.29.6.6 255.255.255.252
!
interface Serial0/1/1
ip address 172.29.6.10 255.255.255.252
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
!
router rip
version 2
passive-interface GigabitEthernet0/0
network 172.29.0.0
no auto-summary
!
ip classless
!
ip flow-export version 9
!
line con 0
password 7 0822455D0A16
login
!
```

```
line aux 0
!
line vty 0 4
password 7 0822455D0A16
login
!
End
```

**Configuración en router ISP**

```
ISP#sh run
Building configuration...

Current configuration : 1078 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname ISP
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
no ip cef
no ipv6 cef
!
username BOGOTA password 7 0822455D0A16
username MEDELLIN password 7 0822455D0A16
!
license udi pid CISCO1941/K9 sn FTX152440Y3-
!
spanning-tree mode pvst
!
interface GigabitEthernet0/0
no ip address
duplex auto
speed auto
shutdown
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
```

```
shutdown
!
interface Serial0/1/0
ip address 209.17.220.2 255.255.255.252
encapsulation ppp
ppp authentication pap
ppp pap sent-username ISP password 0 cisco
clock rate 2000000
!
interface Serial0/1/1
ip address 209.17.220.5 255.255.255.252
encapsulation ppp
ppp authentication chap
!
interface Vlan1
no ip address
shutdown
!
ip classless
!
ip flow-export version 9
!
line con 0
password 7 0822455D0A16
login
!
line aux 0
!
line vty 0 4
password 7 0822455D0A16
login
!
end
```

**Configuración en router Bogotá 1**

```
BOGOTA_1#sh run
Building configuration...

Current configuration : 1341 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
```

```
service password-encryption
!
hostname BOGOTA_1
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
no ip cef
no ipv6 cef
!
license udi pid CISCO1941/K9 sn FTX15245SPP-
!
spanning-tree mode pvst
!
interface GigabitEthernet0/0
no ip address
duplex auto
speed auto
shutdown
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/0/0
ip address 172.29.3.1 255.255.255.252
ip nat outside
clock rate 2000000
!
interface Serial0/0/1
ip address 172.29.3.5 255.255.255.252
clock rate 2000000
!
interface Serial0/1/0
ip address 209.17.220.6 255.255.255.252
ip nat inside
clock rate 2000000
!
interface Serial0/1/1
ip address 172.29.3.9 255.255.255.252
ip nat inside
!
interface Vlan1
```

```
no ip address
shutdown
!
router rip
version 2
passive-interface Serial0/1/0
network 172.29.0.0
default-information originate
no auto-summary
!
ip nat inside source list 1 interface Serial0/0/0 overload
ip classless
ip route 0.0.0.0 0.0.0.0 209.17.220.5
!
ip flow-export version 9
!
access-list 1 permit 172.29.0.0 0.0.3.255
!
line con 0
password 7 0822455D0A16
login
!
line aux 0
!
line vty 0 4
password 7 0822455D0A16
login
!
end
```

**Configuración en router Bogotá 2**

```
BOGOTA_2#sh run
Building configuration...

Current configuration : 1427 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname BOGOTA_2
!
```

```
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
ip dhcp excluded-address 172.29.1.1 172.29.1.5
ip dhcp excluded-address 172.29.0.1 172.29.0.5
!
ip dhcp pool BOGOTA3
network 172.29.1.0 255.255.255.0
default-router 172.29.1.1
dns-server 8.8.8.8
ip dhcp pool BOGOTA2
network 172.29.0.0 255.255.255.0
default-router 172.29.0.1
dns-server 8.8.8.8
!
no ip cef
no ipv6 cef
!
license udi pid CISCO1941/K9 sn FTX1524S68X-
!
spanning-tree mode pvst
!
interface GigabitEthernet0/0
ip address 172.29.0.1 255.255.255.0
ip helper-address 172.29.3.13
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/0/0
ip address 172.29.3.6 255.255.255.252
!
interface Serial0/0/1
no ip address
clock rate 2000000
!
interface Serial0/1/0
ip address 172.29.3.13 255.255.255.252
clock rate 2000000
!
```

```
interface Serial0/1/1
ip address 172.29.3.2 255.255.255.252
!
interface Vlan1
no ip address
shutdown
!
router rip
version 2
passive-interface GigabitEthernet0/0
network 172.29.0.0
no auto-summary
!
ip classless
!
ip flow-export version 9
!
line con 0
password 7 0822455D0A16
login
!
line aux 0
!
line vty 0 4
password 7 0822455D0A16
login
!
end
```

**Configuración en router Bogotá 3**

```
BOGOTA_3#sh run
Building configuration...

Current configuration : 1038 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname BOGOTA_3
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
```

```
!
no ip cef
no ipv6 cef
!
license udi pid CISCO1941/K9 sn FTX15249E6L-
!
spanning-tree mode pvst
!
interface GigabitEthernet0/0
ip address 172.29.1.1 255.255.255.0
ip helper-address 172.29.3.13
ip helper-address 172.29.6.5
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/1/0
ip address 172.29.3.14 255.255.255.252
!
interface Serial0/1/1
ip address 172.29.3.10 255.255.255.252
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
!
router rip
version 2
passive-interface GigabitEthernet0/0
network 172.29.0.0
no auto-summary
!
ip classless
!
ip flow-export version 9
!
line con 0
password 7 0822455D0A16
```

```
login
!
line aux 0
!
line vty 0 4
password 7 0822455D0A16
login
!
end
```

**Parte 1: Configuración del enrutamiento**

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

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.

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.

**Parte 2: Tabla de Enrutamiento.**

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

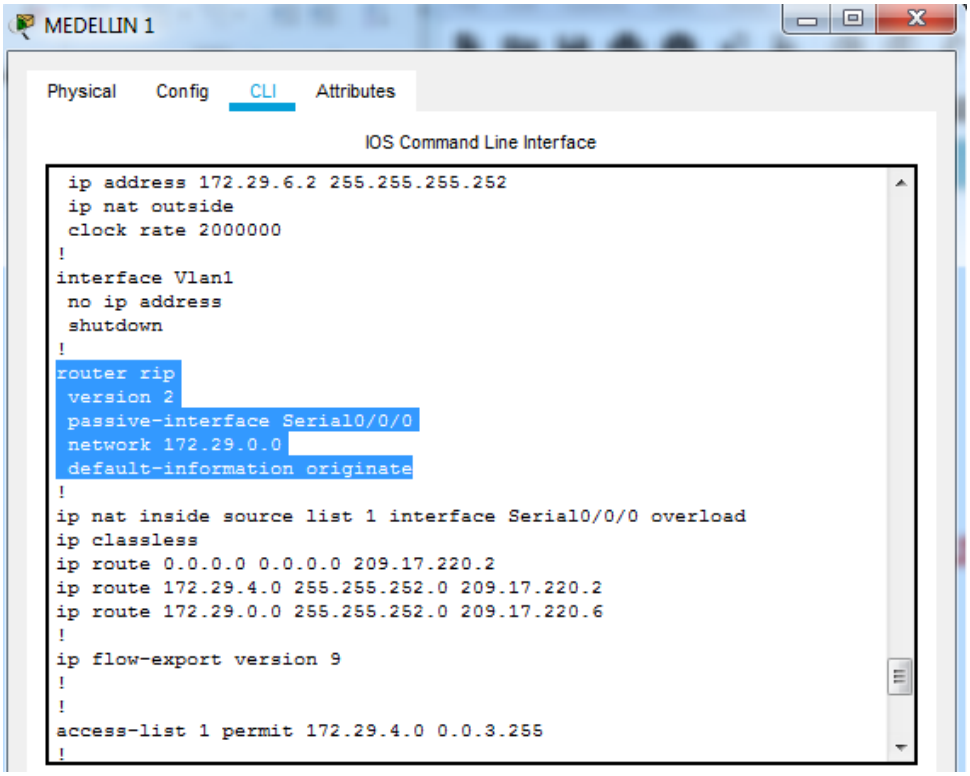
b. Verificar el balanceo de carga que presentan los routers.

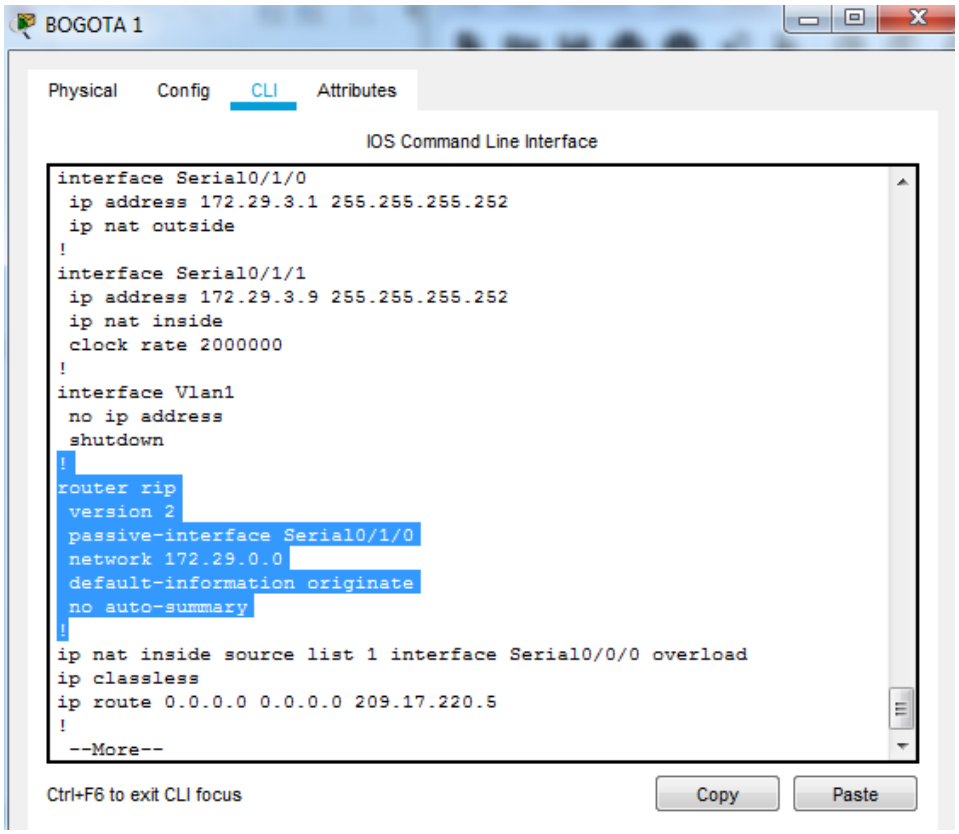
c. Obsérvese en los routers Bogotá1 y Medellín1 cierta similitud por su ubicación, por tener dos enlaces de conexión hacia otro router y por la ruta por defecto que manejan.

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

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

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


MEDELLIN 1
Physical
Config
CLI
Attributes
IOS Command Line Interface
ip address 172.29.6.2 255.255.255.252
ip nat outside
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
!
router rip
version 2
passive-interface Serial0/0/0
network 172.29.0.0
default-information originate
!
ip nat inside source list 1 interface Serial0/0/0 overload
ip classless
ip route 0.0.0.0 0.0.0.0 209.17.220.2
ip route 172.29.4.0 255.255.252.0 209.17.220.2
ip route 172.29.0.0 255.255.252.0 209.17.220.6
!
ip flow-export version 9
!
!
access-list 1 permit 172.29.4.0 0.0.3.255
!


BOGOTA 1
Physical
Config
CLI
Attributes
IOS Command Line Interface
interface Serial0/1/0
ip address 172.29.3.1 255.255.255.252
ip nat outside
!
interface Serial0/1/1
ip address 172.29.3.9 255.255.255.252
ip nat inside
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
!
router rip
version 2
passive-interface Serial0/1/0
network 172.29.0.0
default-information originate
no auto-summary
!
ip nat inside source list 1 interface Serial0/0/0 overload
ip classless
ip route 0.0.0.0 0.0.0.0 209.17.220.5
!
--More--
Ctrl+F6 to exit CLI focus
Copy
Paste

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

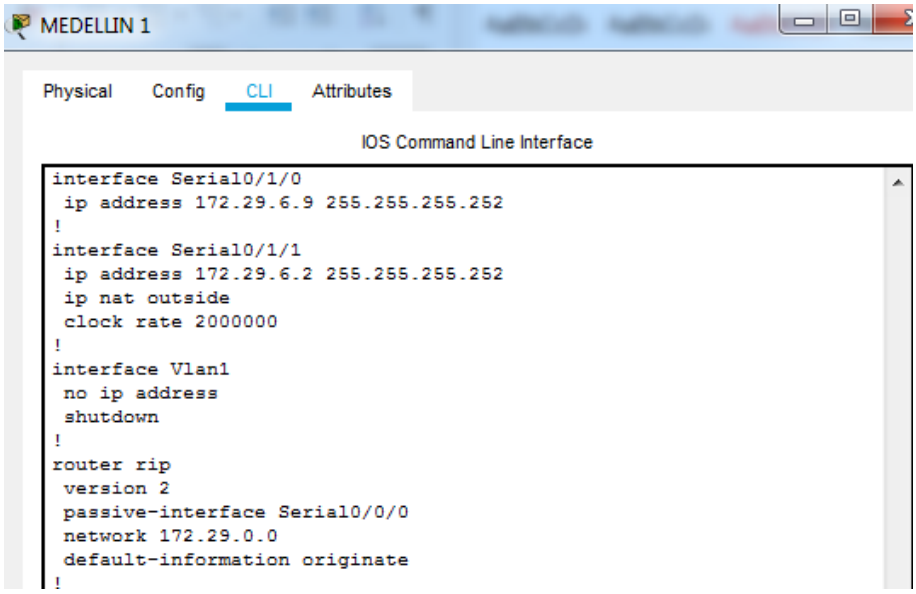
a. Para no propagar las publicaciones por interfaces que no lo requieran se debe deshabilitar la propagación del protocolo RIP, en la siguiente tabla se indican las interfaces de cada router que no necesitan desactivación.

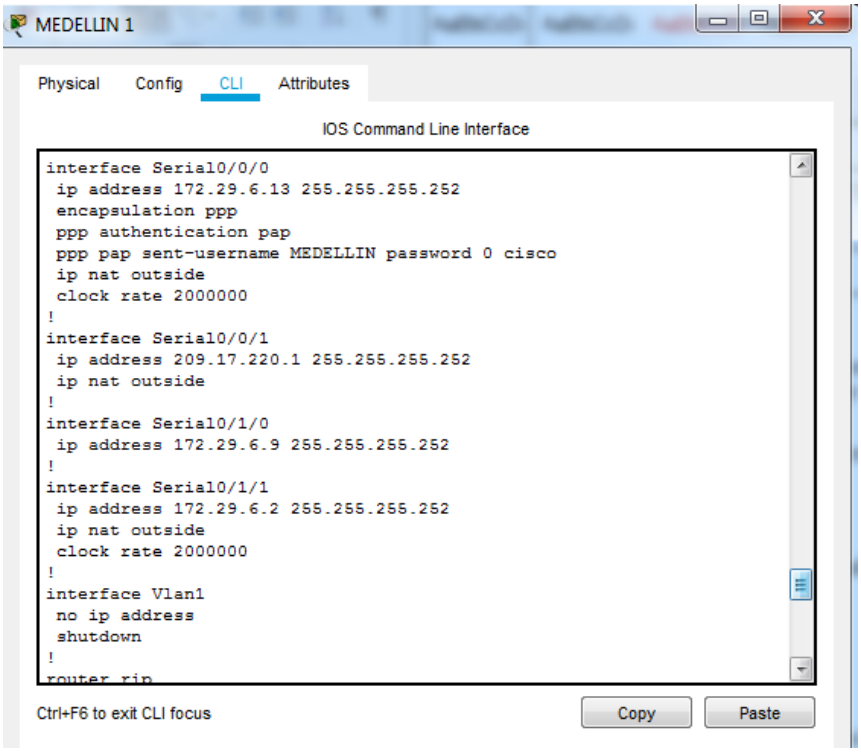
| ROUTER | INTERFAZ |
|---|---|
| **Bogota1** | SERIAL0/0/1; SERIAL0/1/0; SERIAL0/1/1<br>`BOGOTA_1#sh ip route connected`<br>`C  172.29.3.0/30  is directly connected, Serial0/1/0`<br>`C  172.29.3.4/30  is directly connected, Serial0/0/1`<br>`C  172.29.3.8/30  is directly connected, Serial0/1/1` |
| **Bogota2** | SERIAL0/0/0; SERIAL0/0/1<br>`BOGOTA_2#sh ip route connected`<br>`C  172.29.0.0/24  is directly connected, GigabitEthernet0/0`<br>`C  172.29.3.4/30  is directly connected, Serial0/0/0`<br>`C  172.29.3.8/30  is directly connected, Serial0/0/1` |
| **Bogota3** | SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0<br>`BOGOTA_3#sh ip route connected`<br>`C  172.29.0.0/24  is directly connected, GigabitEthernet0/0`<br>`C  172.29.3.4/30  is directly connected, Serial0/0/1`<br>`C  172.29.3.8/30  is directly connected, Serial0/1/1`<br>`C  172.29.3.12/30  is directly connected, Serial0/1/0` |
| **Medellín1** | SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/1<br>`MEDELLIN_1#sh ip route connected`<br>`C  172.29.6.0/30  is directly connected, Serial0/1/1`<br>`C  172.29.6.8/30  is directly connected, Serial0/1/0` |
| **Medellín2** | SERIAL0/0/0; SERIAL0/0/1<br>`MEDELLIN_2#sh ip route connected`<br>`C  172.29.4.0/25  is directly connected, GigabitEthernet0/0`<br>`C  172.29.6.0/30  is directly connected, Serial0/1/1`<br>`C  172.29.6.4/30  is directly connected, Serial0/1/0` |
| **Medellín3** | SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0<br>`MEDELLIN_3#sh ip route connected`<br>`C  172.29.4.128/25  is directly connected, GigabitEthernet0/0`<br>`C  172.29.6.4/30  is directly connected, Serial0/1/0`<br>`C  172.29.6.8/30  is directly connected, Serial0/1/1` |
| **ISP** | No lo requiere |

**Parte 4: Verificación del protocolo RIP.**

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

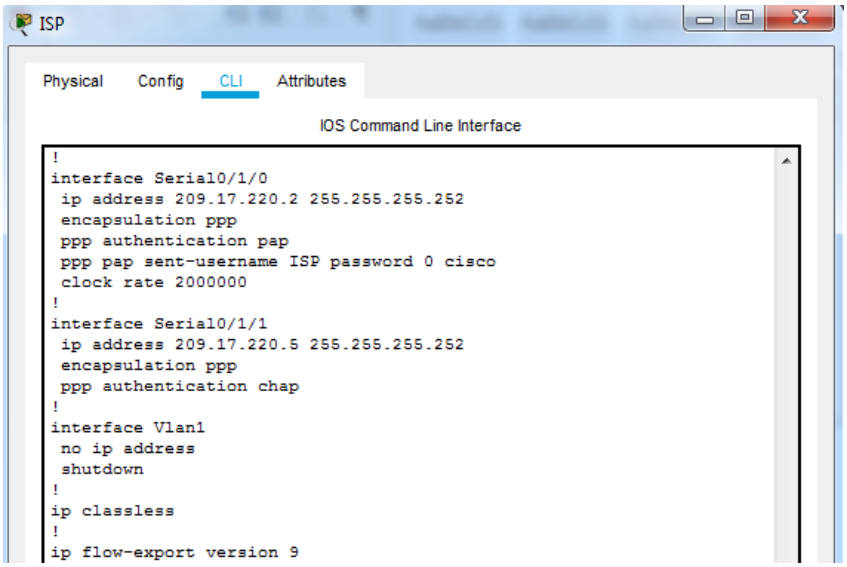
b. Verificar y documentar la base de datos de RIP de cada router, donde se informa de manera detallada de todas las rutas hacia cada red.



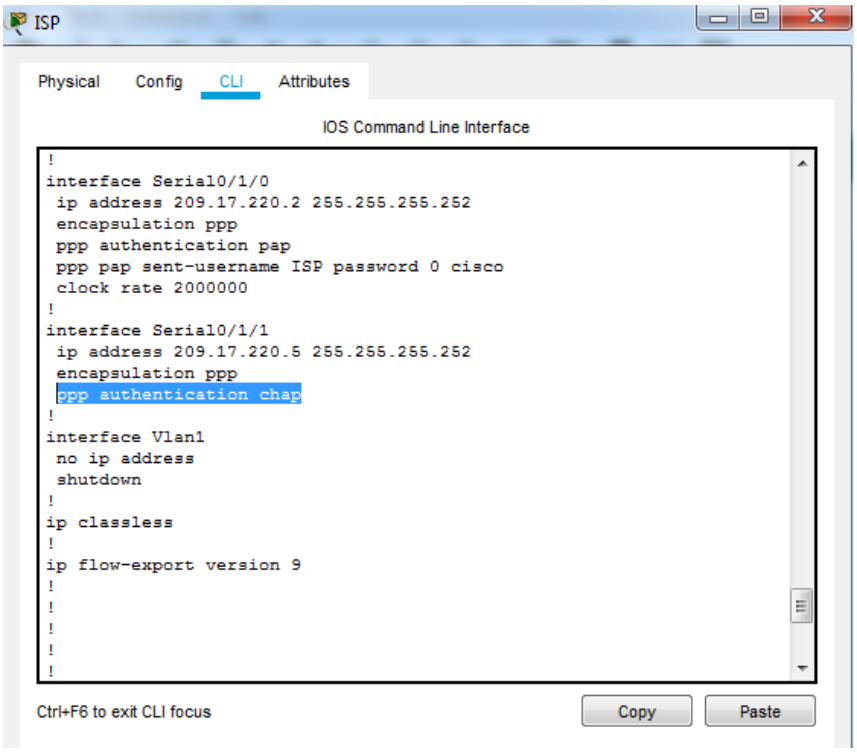



**Parte 5: Configurar encapsulamiento y autenticación PPP.**

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



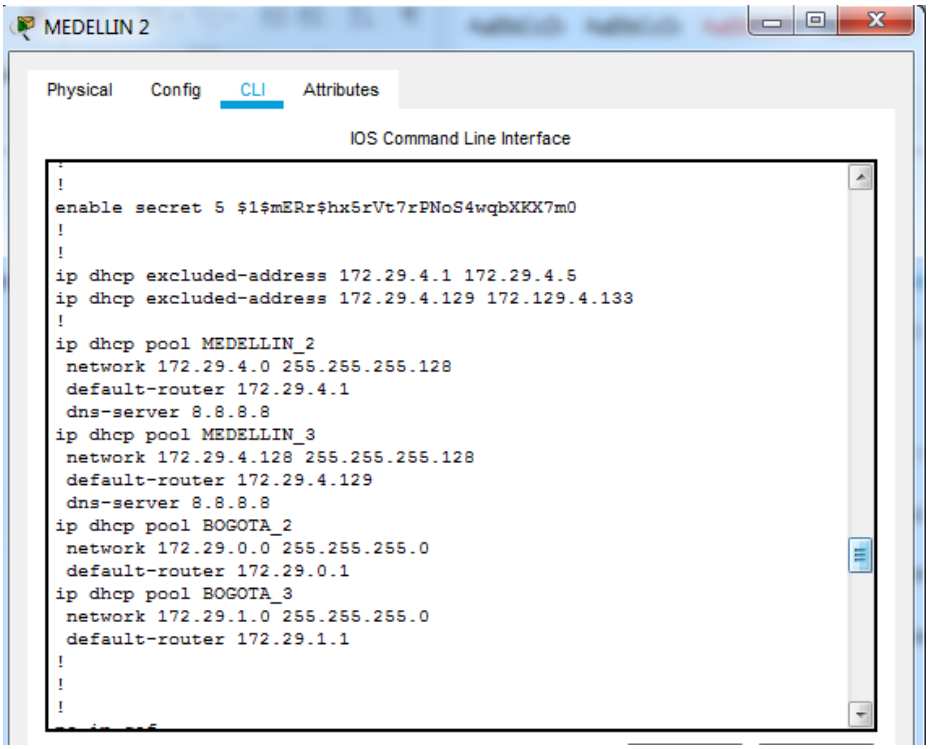

b. El enlace Bogotá1 con ISP se debe configurar con autenticación CHAT.

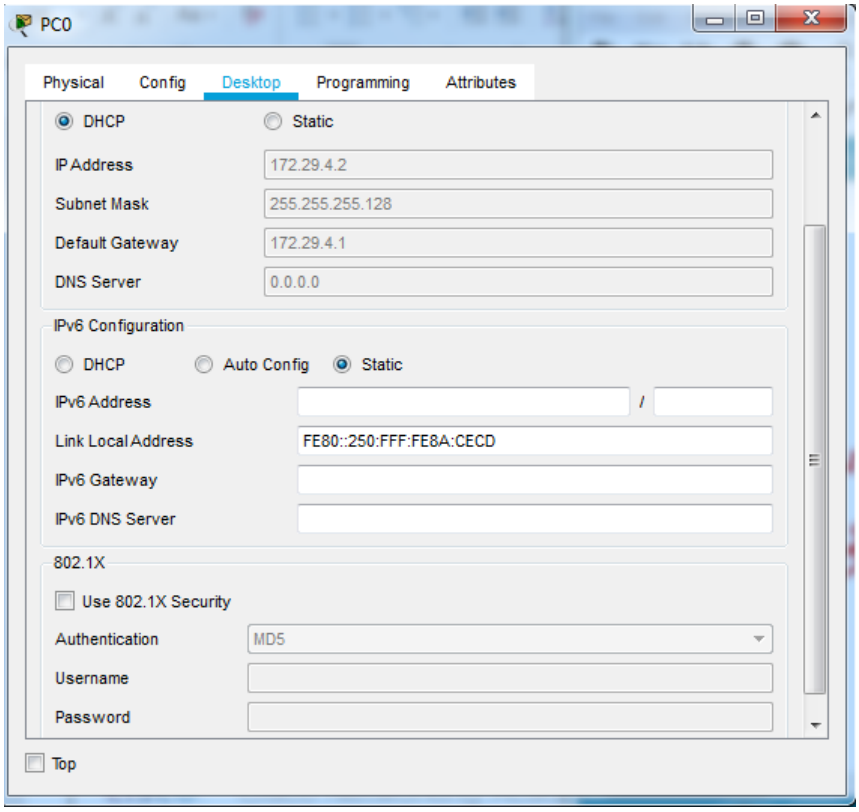


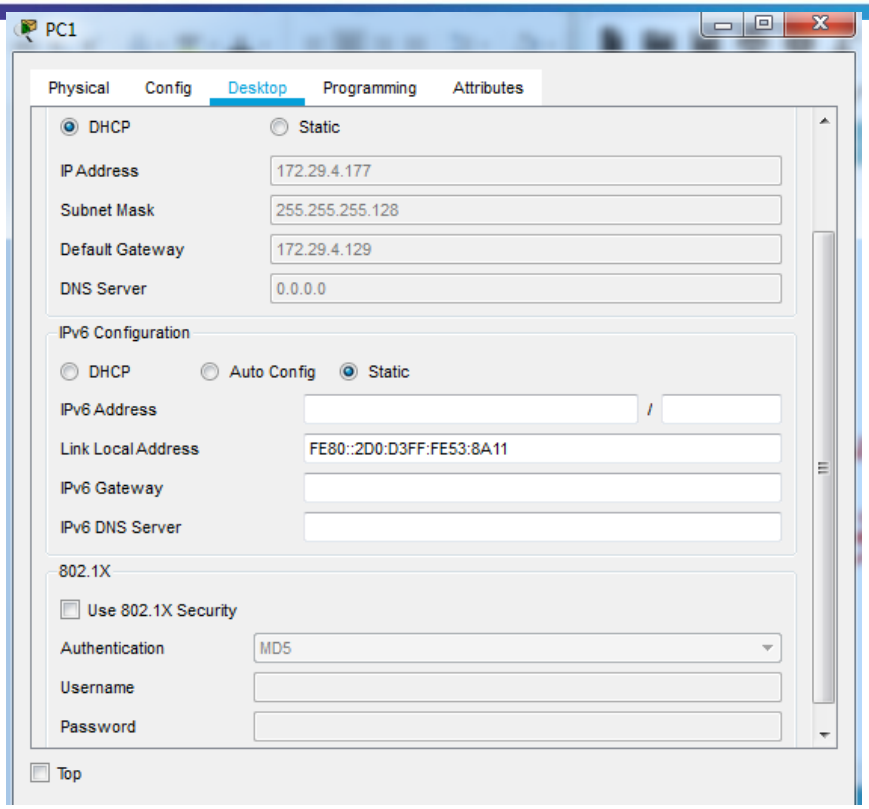
**Parte 6: Configuración de PAT.**

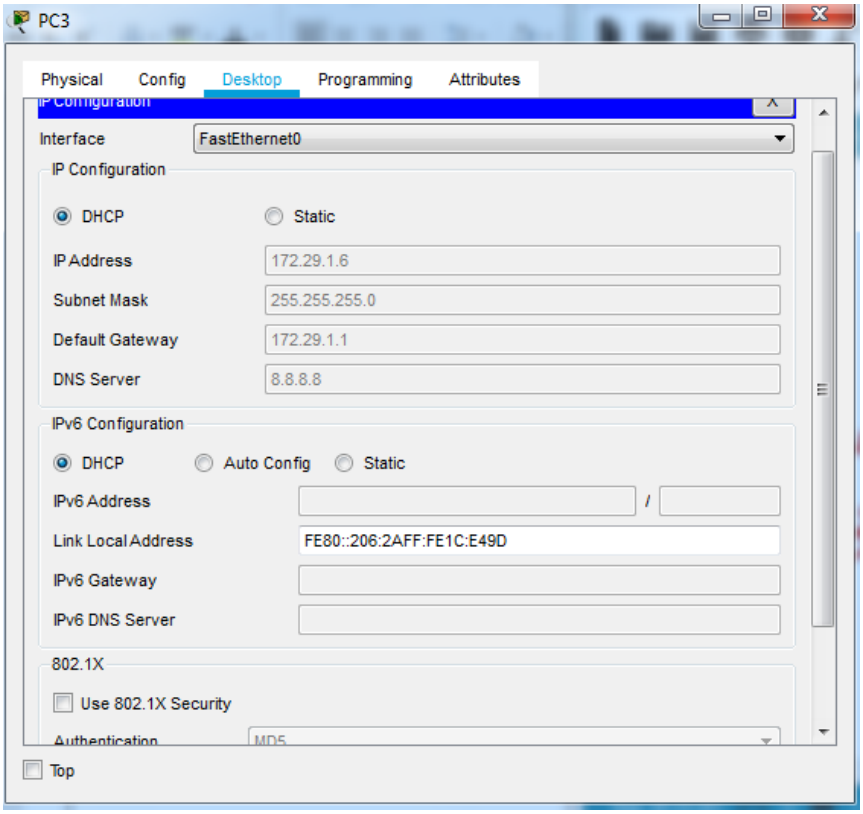
a. En la topología, si se activa NAT en cada equipo de salida (Bogotá1 y Medellín1), los routers internos de una ciudad no podrán llegar hasta los routers internos en el otro extremo, sólo existirá comunicación hasta los routers Bogotá1, ISP y Medellín1.
b. Después de verificar lo indicado en el paso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

**Parte 7: Configuración del servicio DHCP.**
a. Configurar la red Medellín2 y Medellín3 donde el router Medellín 2 debe ser el servidor DHCP para ambas redes Lan.
b. El router Medellín3 deberá habilitar el paso de los mensajes broadcast hacia la IP del router Medellín2.
c. Configurar la red Bogotá2 y Bogotá3 donde el router Medellín2 debe ser el servidor DHCP para ambas redes Lan.
d. Configure el router Bogotá1 para que habilite el paso de los mensajes Broadcast hacia la IP del router Bogotá2.


MEDELLIN 2
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
!
ip dhcp excluded-address 172.29.4.1 172.29.4.5
ip dhcp excluded-address 172.29.4.129 172.129.4.133
!
ip dhcp pool MEDELLIN_2
network 172.29.4.0 255.255.255.128
default-router 172.29.4.1
dns-server 8.8.8.8
ip dhcp pool MEDELLIN_3
network 172.29.4.128 255.255.255.128
default-router 172.29.4.129
dns-server 8.8.8.8
ip dhcp pool BOGOTA_2
network 172.29.0.0 255.255.255.0
default-router 172.29.0.1
ip dhcp pool BOGOTA_3
network 172.29.1.0 255.255.255.0
default-router 172.29.1.1
!
!
!

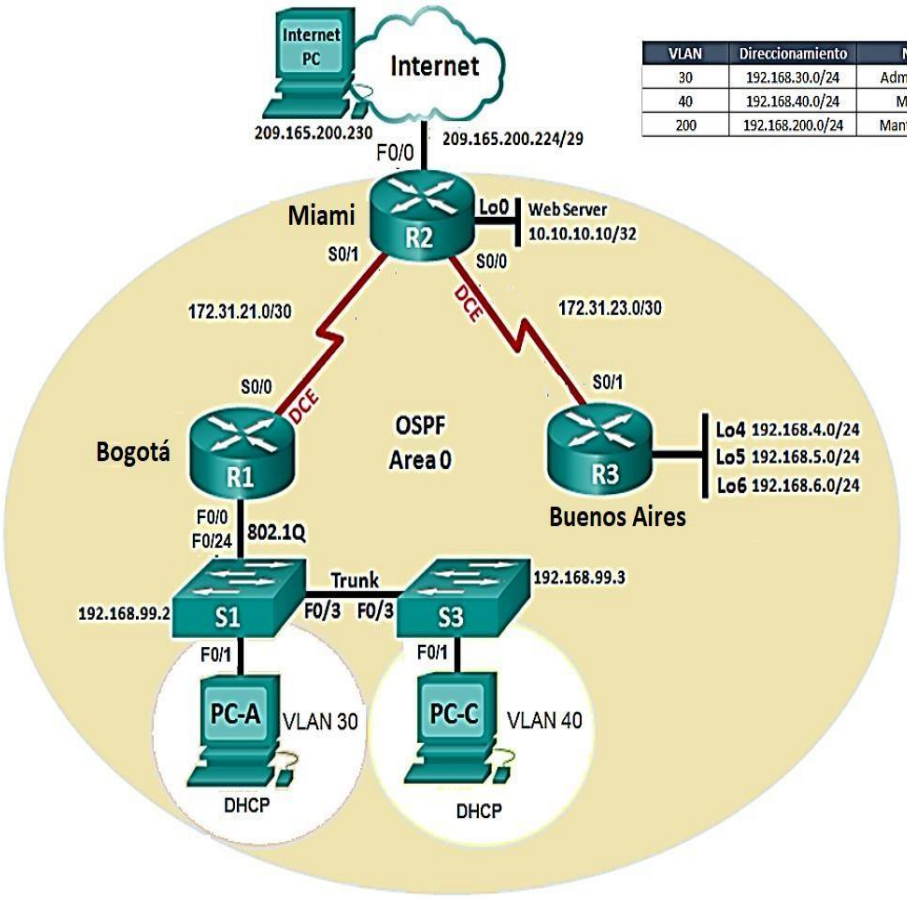

PC0
Physical
Config
Desktop
Programming
Attributes
DHCP
Static
IP Address
172.29.4.2
Subnet Mask
255.255.255.128
Default Gateway
172.29.4.1
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::250:FFF:FE8A:CECD
IPv6 Gateway
IPv6 DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top


PC1
Physical
Config
Desktop
Programming
Attributes
DHCP
Static
IP Address
172.29.4.177
Subnet Mask
255.255.255.128
Default Gateway
172.29.4.129
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::2D0:D3FF:FE53:8A11
IPv6 Gateway
IPv6 DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top


PC3
Physical
Config
Desktop
Programming
Attributes
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
172.29.1.6
Subnet Mask
255.255.255.0
Default Gateway
172.29.1.1
DNS Server
8.8.8.8
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::206:2AFF:FE1C:E49D
IPv6 Gateway
IPv6 DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Top

**Escenario 2**

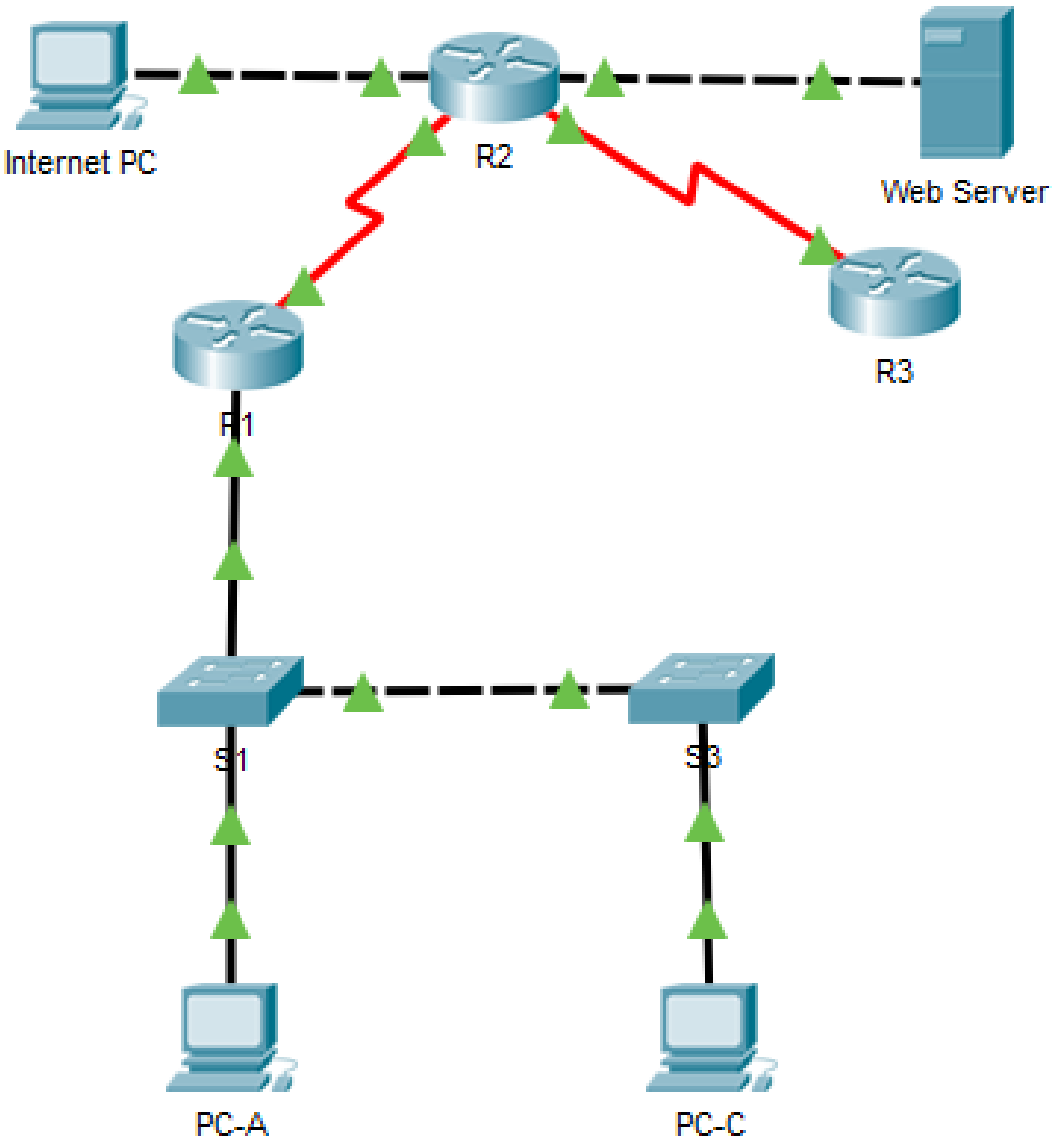
Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Miami, Bogotá y Buenos Aires, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos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



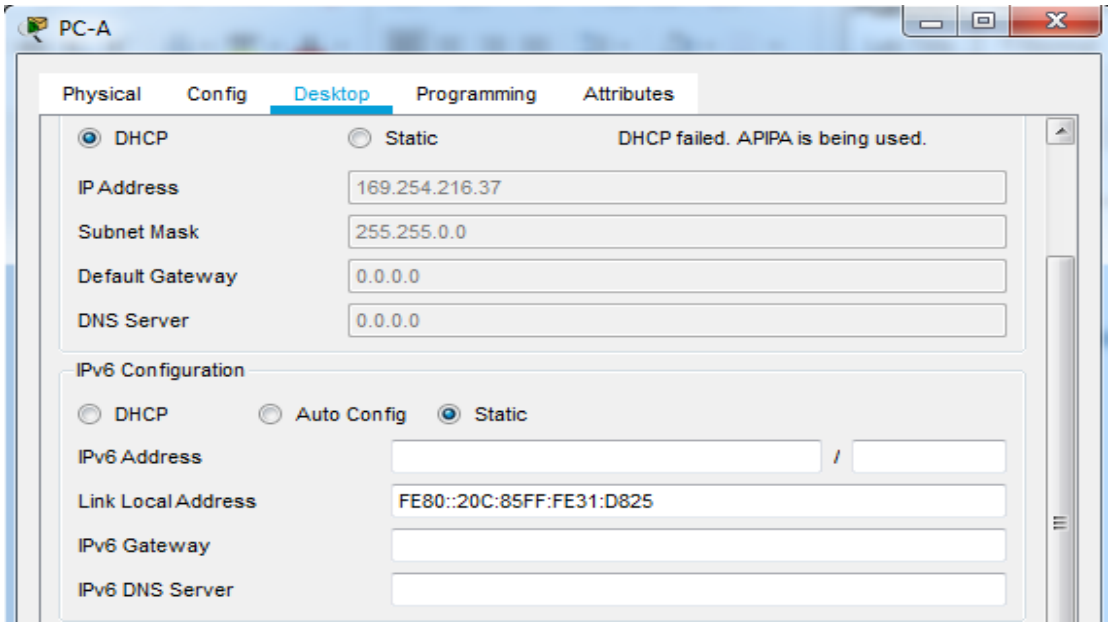

| VLAN | Direccionamiento | Nombre |
|---|---|---|
| 30 | 192.168.30.0/24 | Administración |
| 40 | 192.168.40.0/24 | Mercadeo |
| 200 | 192.168.200.0/24 | Mantenimiento |

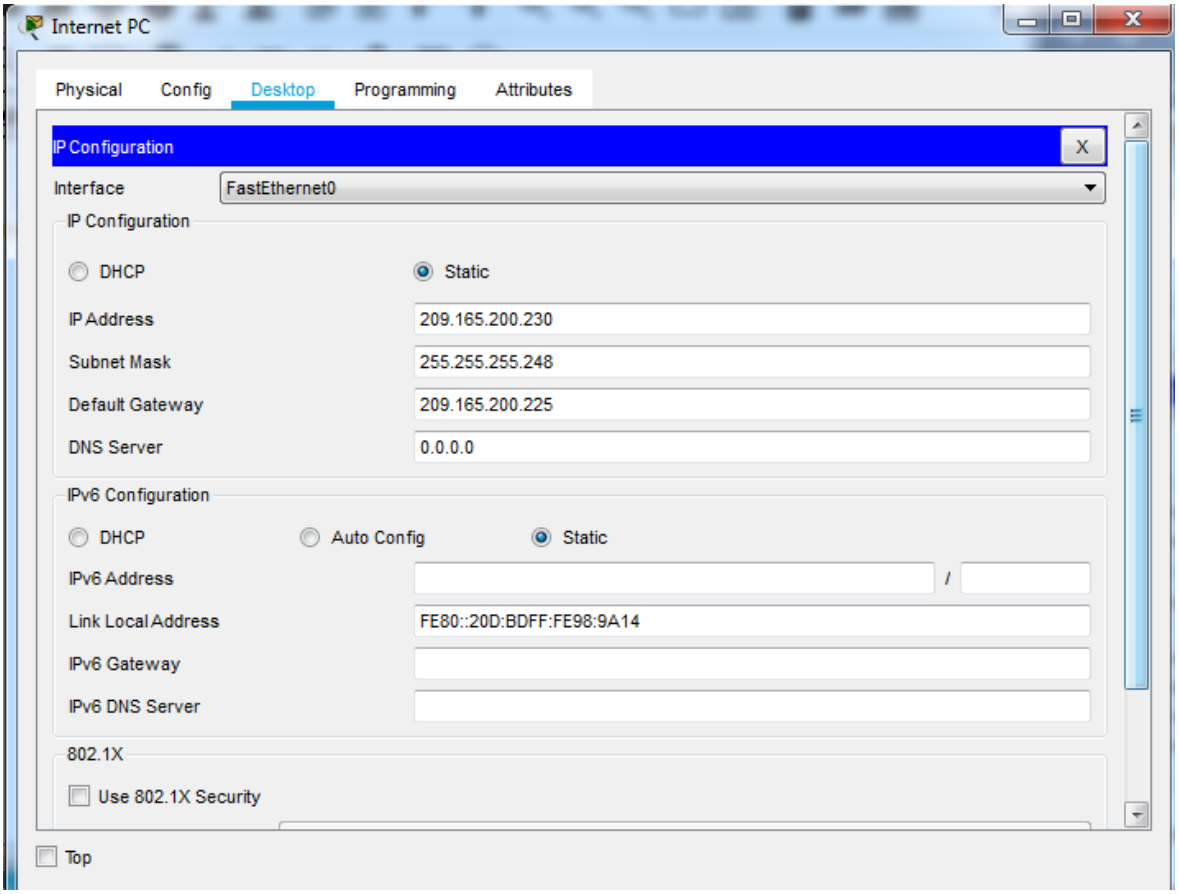
1. Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario.

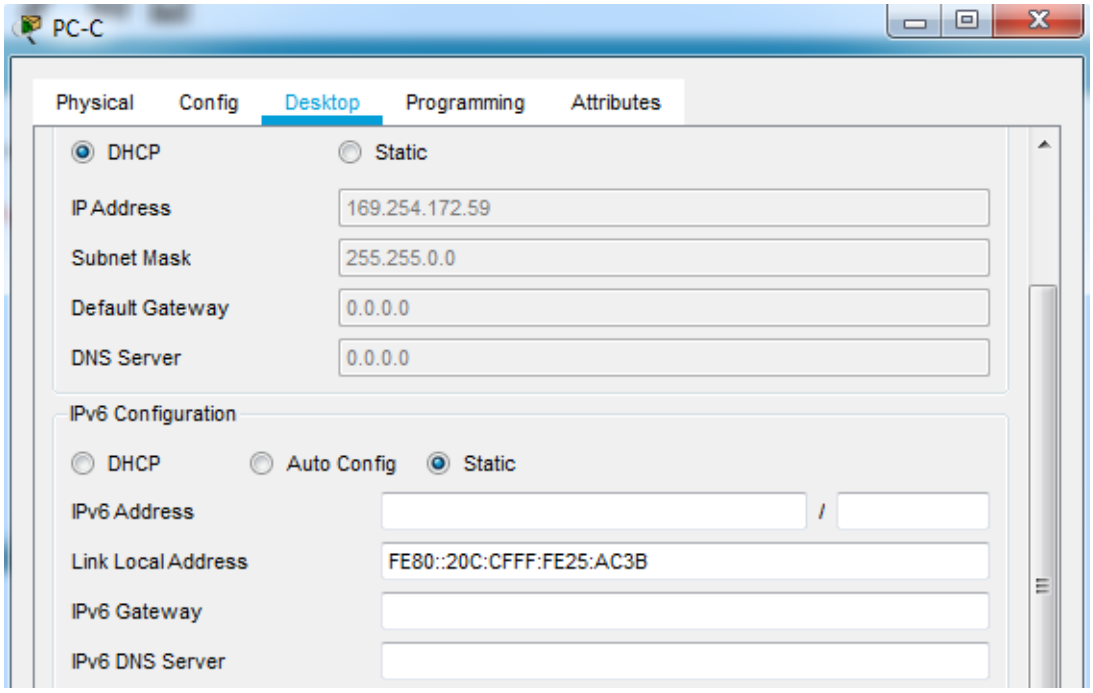
**Topología**
**Clave: cisco**



Habilitación de DHCP en PC-A y PC-C






**Configuración R1**

R1#sh run
Building configuration...

Current configuration : 2156 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname R1
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
ip dhcp excluded-address 192.168.30.1 192.168.30.30
ip dhcp excluded-address 192.168.40.1 192.168.40.30
!
ip dhcp pool ADMINISTRACION
network 192.168.30.0 255.255.255.0
default-router 192.168.30.1

```
dns-server 10.10.10.11
domain-name ccna-unad.com
ip dhcp pool mercadeo
ip dhcp pool MERCADEO
network 192.168.40.0 255.255.255.0
default-router 192.168.40.1
dns-server 10.10.10.11
domain-name ccna-unad.com
!
no ip cef
no ipv6 cef
!
license udi pid CISCO1941/K9 sn FTX1524F0R7-
!
no ip domain-lookup
!
spanning-tree mode pvst
!
interface GigabitEthernet0/0
bandwidth 256
no ip address
ip ospf cost 9500
duplex auto
speed auto
!
interface GigabitEthernet0/0.30
description "Administracion LAN"
encapsulation dot1Q 30
ip address 192.168.30.1 255.255.255.0
!
interface GigabitEthernet0/0.40
description "Mercadeo LAN"
encapsulation dot1Q 40
ip address 192.168.40.1 255.255.255.0
!
interface GigabitEthernet0/0.200
description "Mantenimiento LAN"
encapsulation dot1Q 200
ip address 192.168.200.1 255.255.255.0
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
```

```
shutdown
!
interface Serial0/1/0
description "Connection to R2"
ip address 172.31.21.1 255.255.255.252
clock rate 128000
!
interface Serial0/1/1
no ip address
clock rate 2000000
shutdown
!
interface Vlan1
no ip address
shutdown
!
router ospf 1
router-id 1.1.1.1
log-adjacency-changes
passive-interface GigabitEthernet0/0.30
passive-interface GigabitEthernet0/0.40
passive-interface GigabitEthernet0/0.200
network 172.31.21.0 0.0.0.3 area 0
network 192.168.30.0 0.0.0.255 area 0
network 192.168.40.0 0.0.0.255 area 0
network 192.168.200.0 0.0.0.255 area 0
!
ip classless
ip route 0.0.0.0 0.0.0.0 Serial0/1/0
ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/0
!
ip flow-export version 9
!
line con 0
password 7 0822455D0A16
login
!
line aux 0
!
line vty 0 4
password 7 0822455D0A16
login
!
end
```

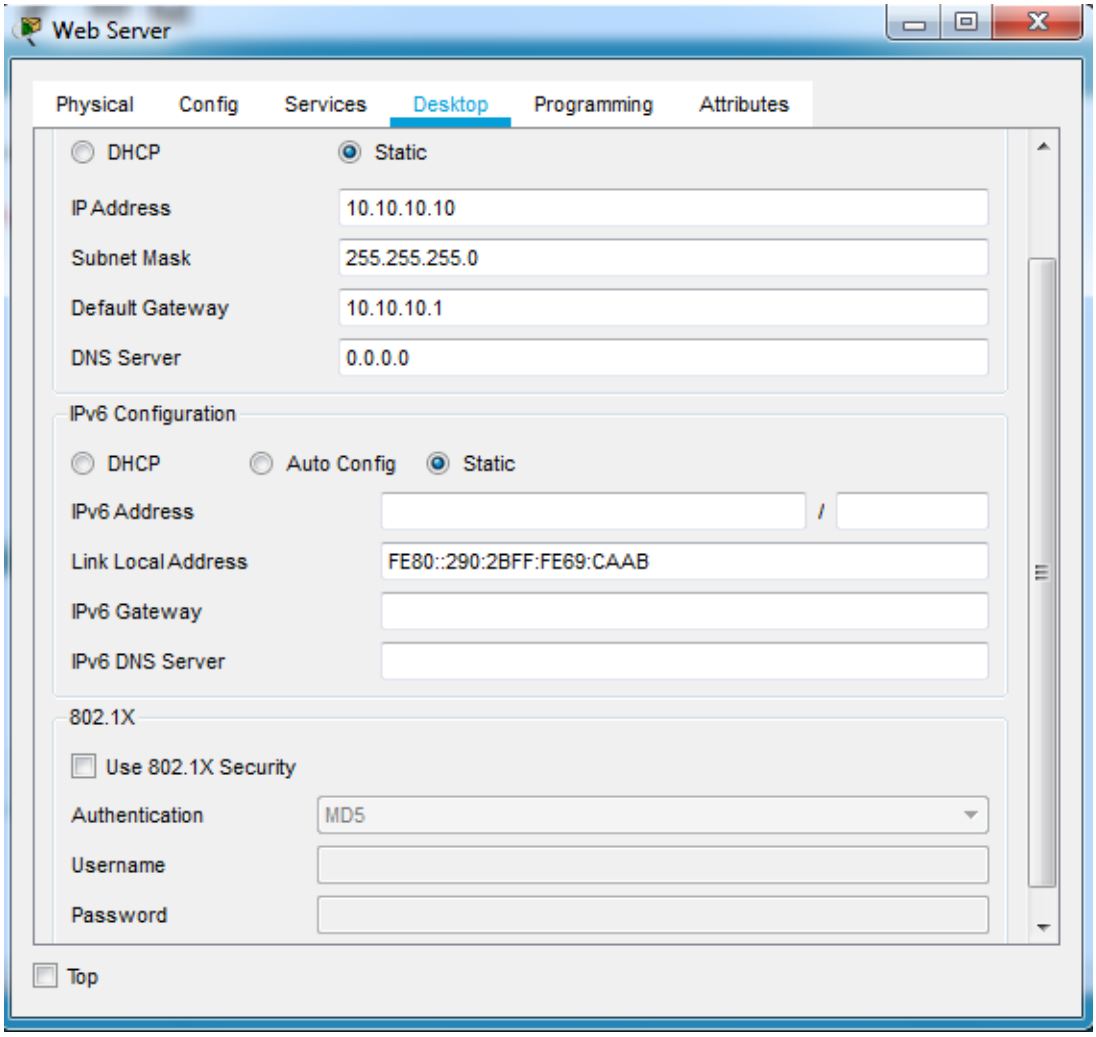
**Configuración inicial en R2**

```
R2#sh run
Building configuration...

Current configuration : 1870 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname R2
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
no ip cef
no ipv6 cef
!
license udi pid CISCO1941/K9 sn FTX15248P46-
!
no ip domain-lookup
!
spanning-tree mode pvst
!
interface GigabitEthernet0/0
description "Connection Internet PC"
ip address 209.165.200.225 255.255.255.248
ip access-group 101 in
ip nat outside
duplex auto
speed auto
!
interface GigabitEthernet0/1
description "Connection Web Server"
ip address 10.10.10.1 255.255.255.0
ip access-group 101 out
ip nat inside
duplex auto
speed auto
!
interface Serial0/1/0
```

```
description "Connection to R1"
bandwidth 256
ip address 172.31.21.2 255.255.255.252
ip ospf cost 9500
!
interface Serial0/1/1
description "Connection R3"
bandwidth 256
ip address 172.31.23.1 255.255.255.252
ip access-group 101 out
clock rate 128000
!
interface Vlan1
no ip address
shutdown
!
router ospf 1
router-id 5.5.5.5
log-adjacency-changes
passive-interface GigabitEthernet0/1
network 172.31.21.0 0.0.0.3 area 0
network 172.31.23.0 0.0.0.3 area 0
network 10.10.10.0 0.0.0.3 area 0
!
ip nat inside source list 1 pool INTERNET
ip nat inside source static 10.10.10.10 209.165.200.229
ip classless
ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/0
!
ip flow-export version 9
!
access-list 1 permit 192.168.30.0 0.0.0.255
access-list 1 permit 192.168.40.0 0.0.0.255
access-list 1 permit 192.168.4.0 0.0.3.255
ip access-list standard ADMIN_MTO
permit host 172.31.21.1
access-list 101 permit tcp any host 209.165.200.229 eq www
access-list 101 permit icmp any any echo-reply
!
line con 0
password 7 0822455D0A16
login
!
line aux 0
```

```
!
line vty 0 4
access-class ADMIN-MTO in
password 7 0822455D0A16
login
!
end
```

**Configuración de Web Server**




**Configuración en router 3**

```
R3#sh run
Building configuration...

Current configuration : 1365 bytes
```

```
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname R3
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
no ip cef
no ipv6 cef
!
license udi pid CISCO1941/K9 sn FTX1524M8GG-
!
no ip domain-lookup
!
spanning-tree mode pvst
!
interface Loopback4
ip address 192.168.4.1 255.255.255.0
!
interface Loopback5
ip address 192.168.5.1 255.255.255.0
!
interface Loopback6
ip address 192.168.6.1 255.255.255.0
!
interface GigabitEthernet0/0
no ip address
duplex auto
speed auto
shutdown
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/1/0
no ip address
ip ospf cost 9500
clock rate 2000000
```

```
shutdown
!
interface Serial0/1/1
description "Connection R2"
bandwidth 256
ip address 172.31.23.2 255.255.255.252
!
interface Vlan1
no ip address
shutdown
!
router ospf 1
router-id 8.8.8.8
log-adjacency-changes
passive-interface Loopback4
passive-interface Loopback5
passive-interface Loopback6
network 172.31.23.0 0.0.0.3 area 0
network 192.168.4.0 0.0.3.255 area 0
!
ip classless
ip route 0.0.0.0 0.0.0.0 Serial0/1/1
!
ip flow-export version 9
!
line con 0
password 7 0822455D0A16
login
!
line aux 0
!
line vty 0 4
password 7 0822455D0A16
login
!
end
```

**Configuración S1**

```
S1#sh run
Building configuration...

Current configuration : 2149 bytes
!
```

```
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname S1
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
switchport mode access
!
interface FastEthernet0/2
switchport mode access
!
interface FastEthernet0/3
switchport mode trunk
!
interface FastEthernet0/4
switchport mode access
shutdown
!
interface FastEthernet0/5
switchport mode access
shutdown
!
interface FastEthernet0/6
switchport access vlan 30
switchport mode access
shutdown
!
interface FastEthernet0/7
switchport mode access
shutdown
!
interface FastEthernet0/8
switchport mode access
shutdown
!
interface FastEthernet0/9
switchport mode access
```

```
shutdown
!
interface FastEthernet0/10
switchport mode access
shutdown
!
interface FastEthernet0/11
switchport mode access
shutdown
!
interface FastEthernet0/12
switchport mode access
shutdown
!
interface FastEthernet0/13
switchport mode access
shutdown
!
interface FastEthernet0/14
switchport mode access
shutdown
!
interface FastEthernet0/15
switchport mode access
shutdown
!
interface FastEthernet0/16
switchport mode access
shutdown
!
interface FastEthernet0/17
switchport mode access
shutdown
!
interface FastEthernet0/18
switchport mode access
shutdown
!
interface FastEthernet0/19
switchport mode access
shutdown
!
interface FastEthernet0/20
switchport mode access
```

```
shutdown
!
interface FastEthernet0/21
switchport mode access
shutdown
!
interface FastEthernet0/22
switchport mode access
shutdown
!
interface FastEthernet0/23
switchport mode access
shutdown
!
interface FastEthernet0/24
switchport mode trunk
!
interface GigabitEthernet0/1
switchport mode access
!
interface GigabitEthernet0/2
switchport mode access
!
interface Vlan1
no ip address
shutdown
!
interface Vlan200
mac-address 0004.9a0b.8801
ip address 192.168.200.2 255.255.255.0
!
ip default-gateway 192.168.200.1
!
line con 0
password 7 0822455D0A16
login
!
line vty 0 4
password 7 0822455D0A16
login
line vty 5 15
login
!
end
```

**Configuracion S3**

```
S3#sh run
Building configuration...

Current configuration : 2142 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname S3
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
no ip domain-lookup
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
!
interface FastEthernet0/2
!
interface FastEthernet0/3
switchport mode trunk
!
interface FastEthernet0/4
switchport mode access
shutdown
!
interface FastEthernet0/5
switchport mode access
shutdown
!
interface FastEthernet0/6
switchport mode access
shutdown
!
interface FastEthernet0/7
switchport mode access
shutdown
```

```
!
interface FastEthernet0/8
switchport mode access
shutdown
!
interface FastEthernet0/9
switchport mode access
shutdown
!
interface FastEthernet0/10
switchport mode access
shutdown
!
interface FastEthernet0/11
switchport mode access
shutdown
!
interface FastEthernet0/12
switchport mode access
shutdown
!
interface FastEthernet0/13
switchport mode access
shutdown
!
interface FastEthernet0/14
switchport mode access
shutdown
!
interface FastEthernet0/15
switchport mode access
shutdown
!
interface FastEthernet0/16
switchport mode access
shutdown
!
interface FastEthernet0/17
switchport mode access
shutdown
!
interface FastEthernet0/18
switchport access vlan 40
switchport mode access
```

```
!
interface FastEthernet0/19
switchport mode access
shutdown
!
interface FastEthernet0/20
switchport mode access
shutdown
!
interface FastEthernet0/21
switchport mode access
shutdown
!
interface FastEthernet0/22
switchport mode access
shutdown
!
interface FastEthernet0/23
switchport mode access
shutdown
!
interface FastEthernet0/24
switchport mode access
shutdown
!
interface GigabitEthernet0/1
switchport mode access
shutdown
!
interface GigabitEthernet0/2
switchport mode access
shutdown
!
interface Vlan1
no ip address
shutdown
!
interface Vlan200
mac-address 0009.7c89.c401
ip address 192.168.200.2 255.255.255.0
!
ip default-gateway 192.168.200.1
!
line con 0
```

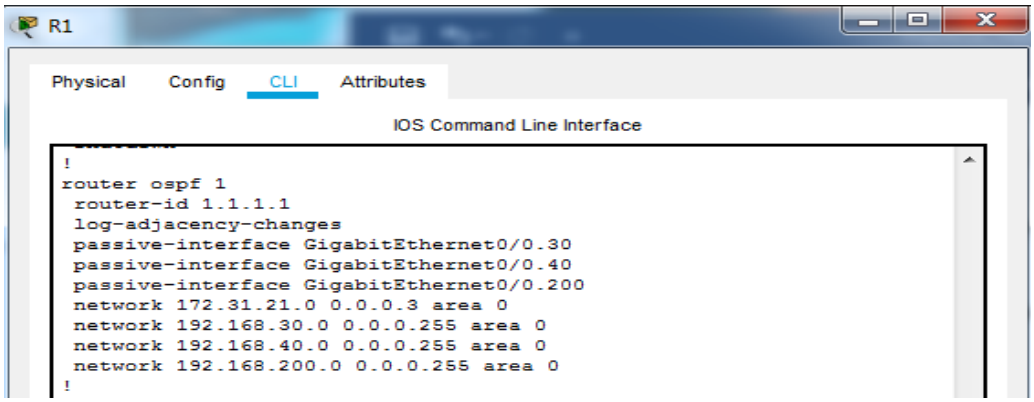
```
password 7 0822455D0A16
login
!
line vty 0 4
password 7 0822455D0A16
login
line vty 5 15
login
!
end
```

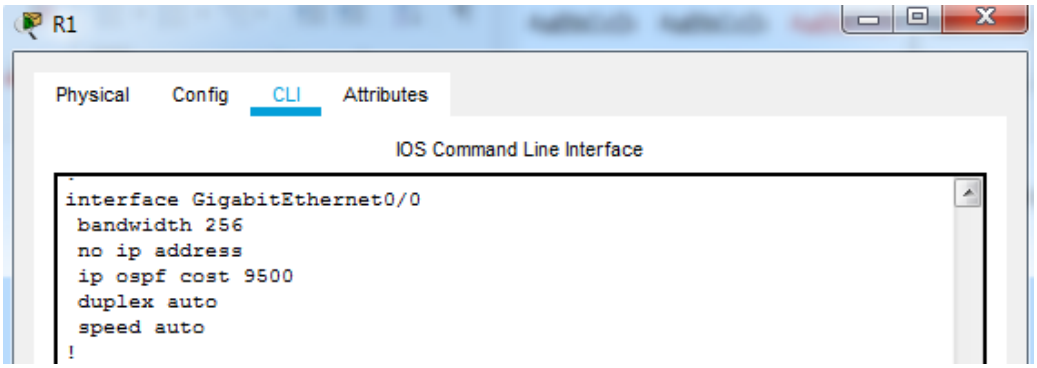
1. Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:

**OSPFv2 area 0**

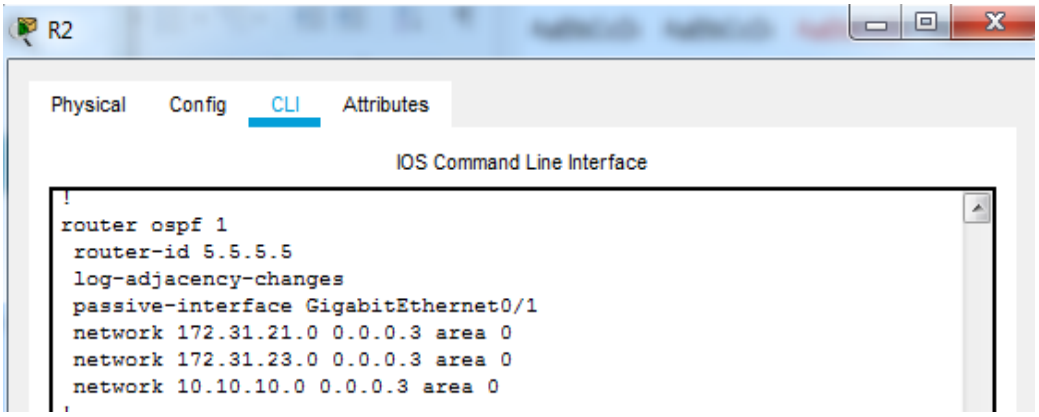
| Configuration Item or Task | Specification |
|---|---|
| Router ID R1 | 1.1.1.1 |
| Router ID R2 | 5.5.5.5 |
| Router ID R3 | 8.8.8.8 |
| Configurar todas las interfaces LAN como pasivas | |
| Establecer el ancho de banda para enlaces seriales en | 256 Kb/s |
| Ajustar el costo en la métrica de S0/0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

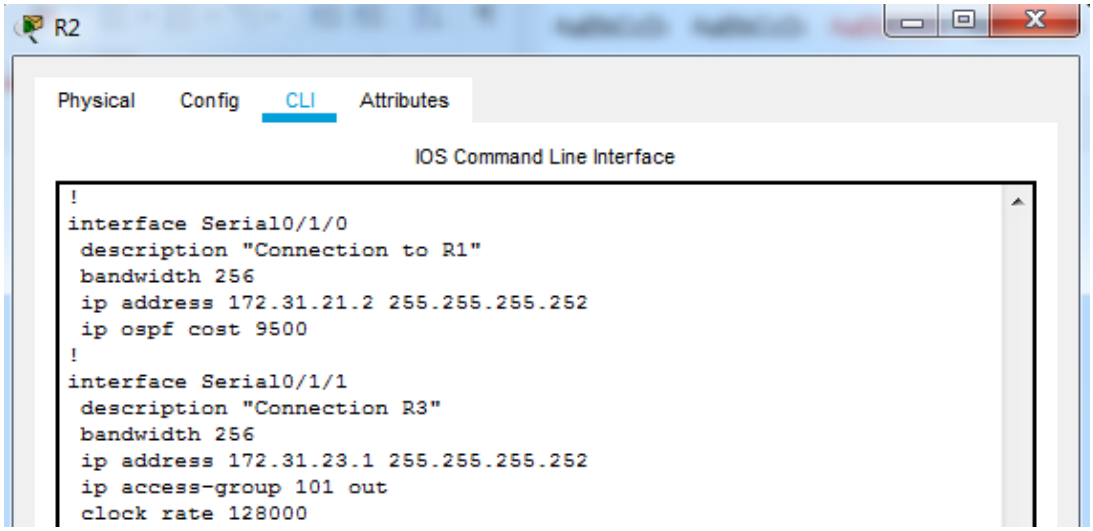
**OSPF R1**



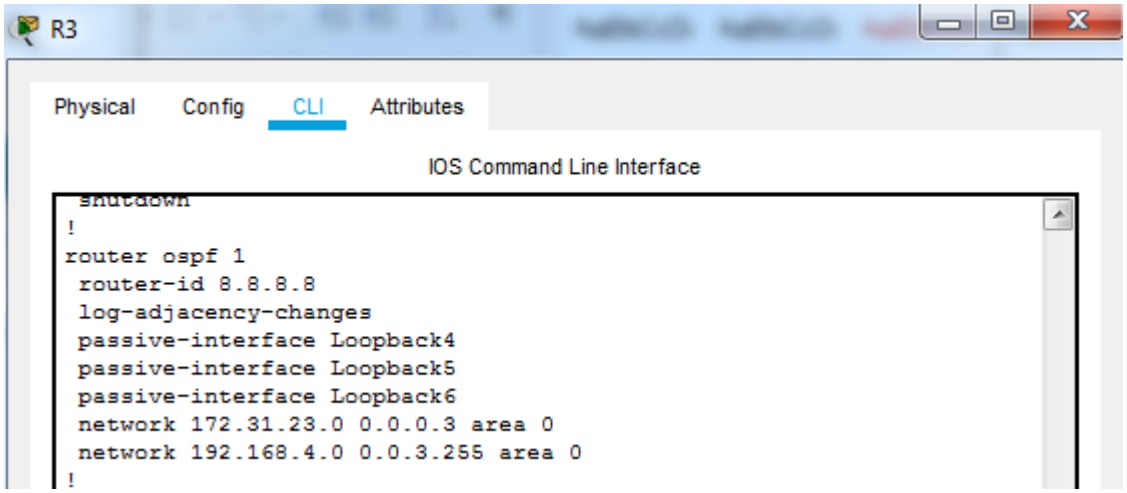

R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
interface GigabitEthernet0/0
 bandwidth 256
 no ip address
 ip ospf cost 9500
 duplex auto
 speed auto
!

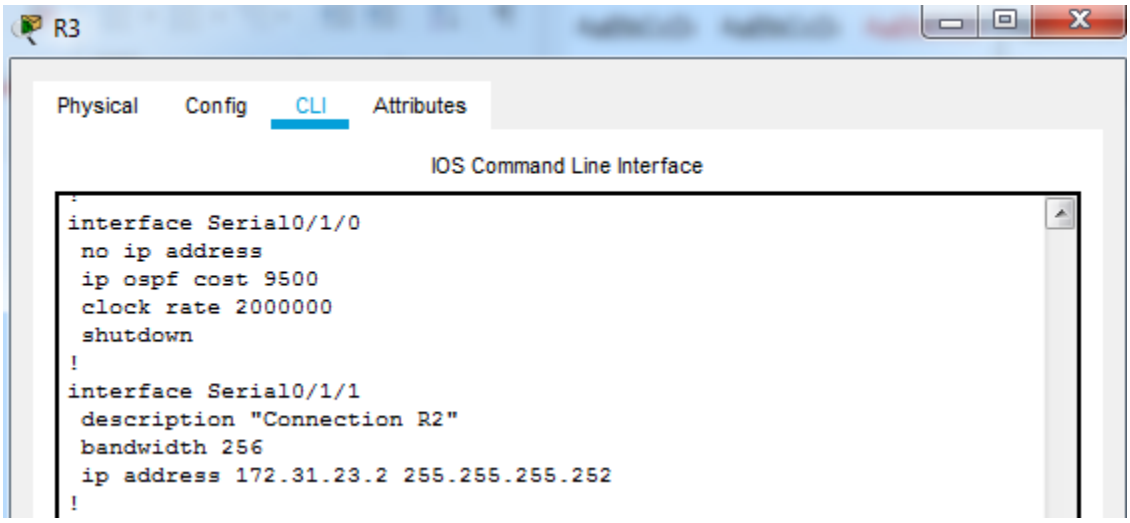
**OSPF R2**


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
router ospf 1
 router-id 5.5.5.5
 log-adjacency-changes
 passive-interface GigabitEthernet0/1
 network 172.31.21.0 0.0.0.3 area 0
 network 172.31.23.0 0.0.0.3 area 0
 network 10.10.10.0 0.0.0.3 area 0


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
interface Serial0/1/0
 description "Connection to R1"
 bandwidth 256
 ip address 172.31.21.2 255.255.255.252
 ip ospf cost 9500
!
interface Serial0/1/1
 description "Connection R3"
 bandwidth 256
 ip address 172.31.23.1 255.255.255.252
 ip access-group 101 out
 clock rate 128000

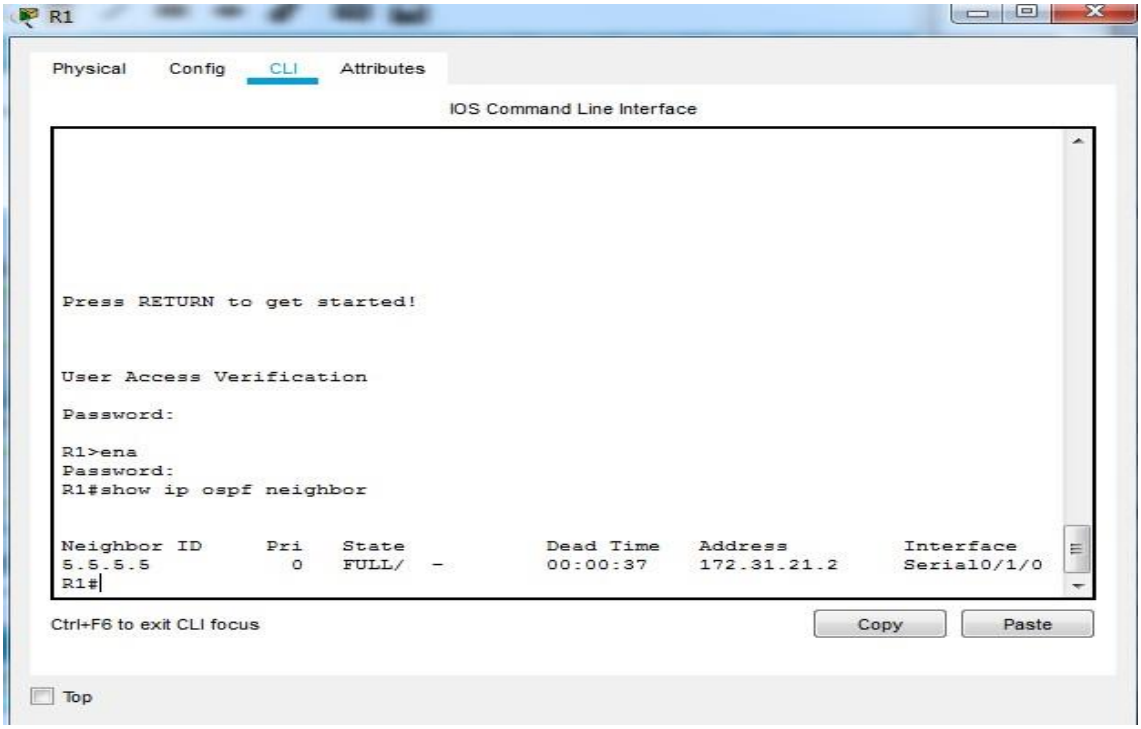
OSPF R3

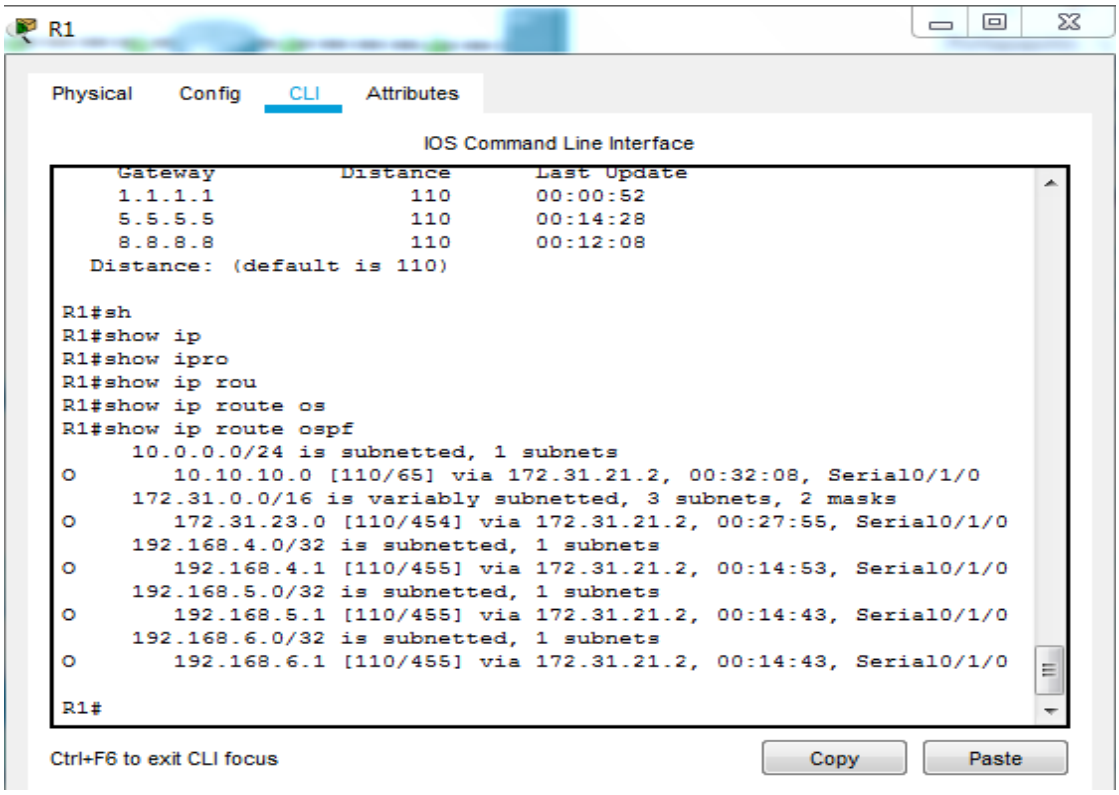

R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
 shutdown
!
router ospf 1
 router-id 8.8.8.8
 log-adjacency-changes
 passive-interface Loopback4
 passive-interface Loopback5
 passive-interface Loopback6
 network 172.31.23.0 0.0.0.3 area 0
 network 192.168.4.0 0.0.3.255 area 0
!

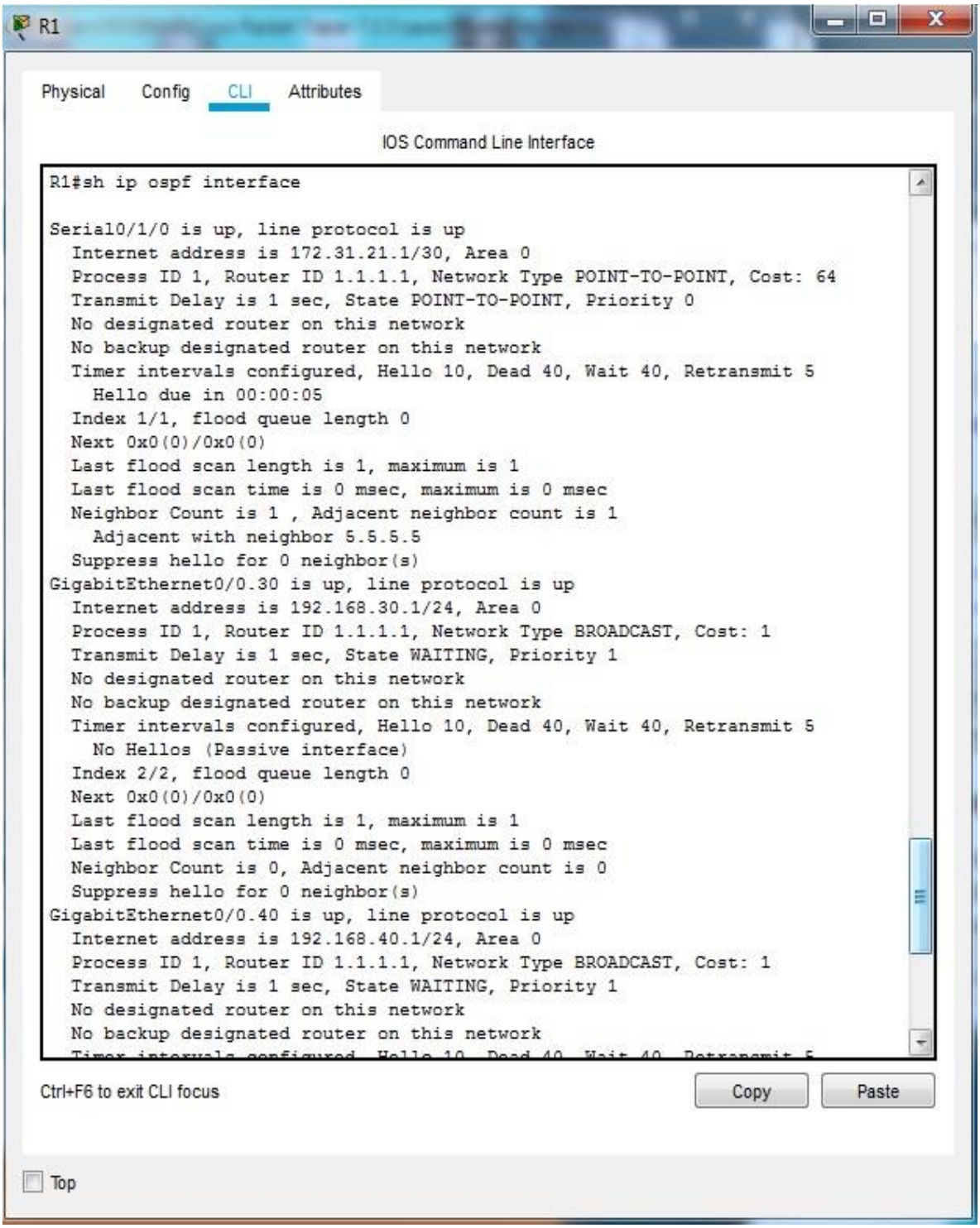


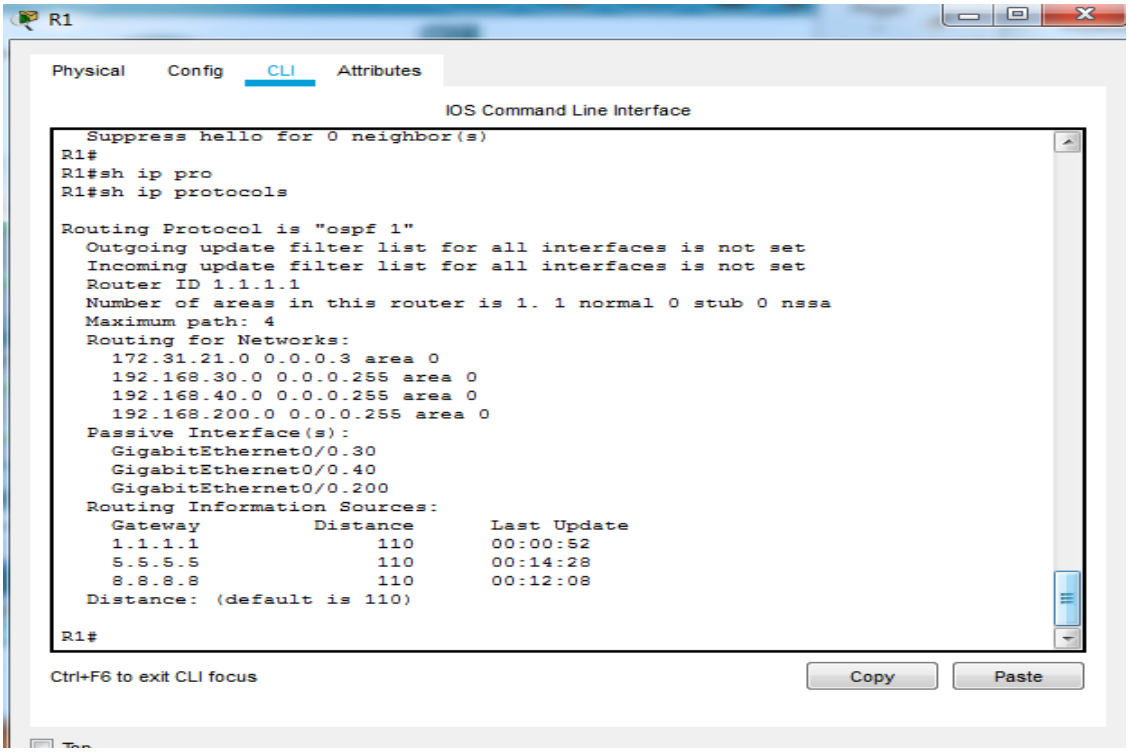

**Verificar información de OSPF R1**

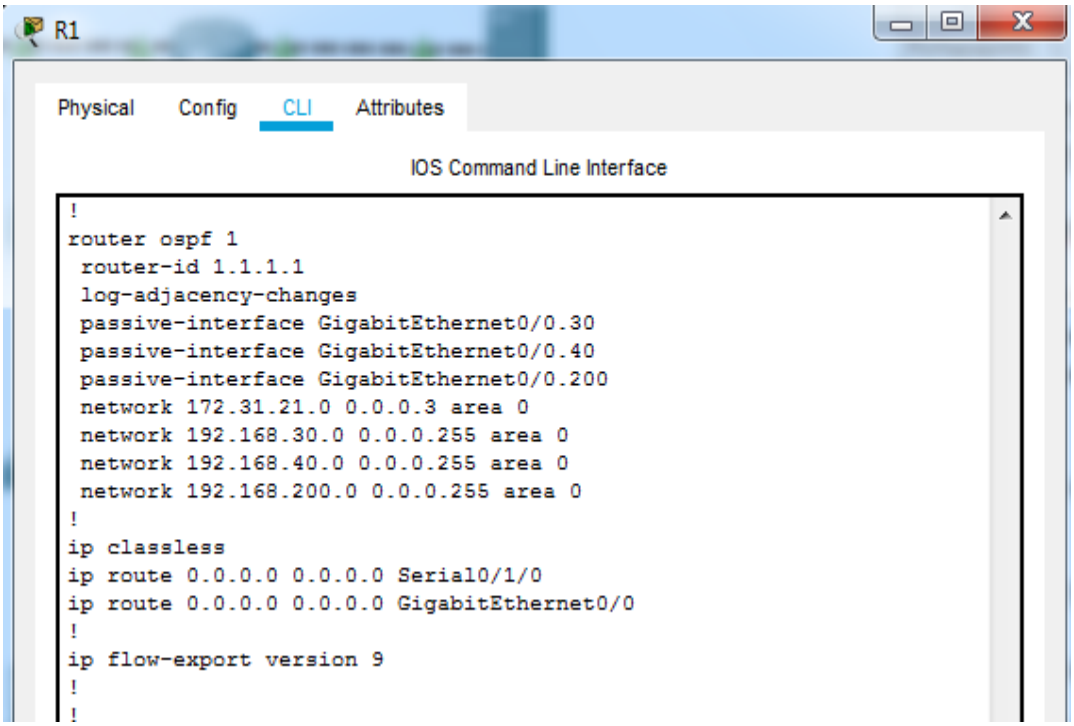
- Visualizar tablas de enrutamiento y routers conectados por OSPFv2
- Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface
- Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.




R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Gateway Distance Last Update
1.1.1.1 110 00:00:52
5.5.5.5 110 00:14:28
8.8.8.8 110 00:12:08
Distance: (default is 110)
R1#sh
R1#show ip
R1#show ipro
R1#show ip rou
R1#show ip route os
R1#show ip route ospf
10.0.0.0/24 is subnetted, 1 subnets
O 10.10.10.0 [110/65] via 172.31.21.2, 00:32:08, Serial0/1/0
172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
O 172.31.23.0 [110/454] via 172.31.21.2, 00:27:55, Serial0/1/0
192.168.4.0/32 is subnetted, 1 subnets
O 192.168.4.1 [110/455] via 172.31.21.2, 00:14:53, Serial0/1/0
192.168.5.0/32 is subnetted, 1 subnets
O 192.168.5.1 [110/455] via 172.31.21.2, 00:14:43, Serial0/1/0
192.168.6.0/32 is subnetted, 1 subnets
O 192.168.6.1 [110/455] via 172.31.21.2, 00:14:43, Serial0/1/0
R1#
Ctrl+F6 to exit CLI focus
Copy
Paste

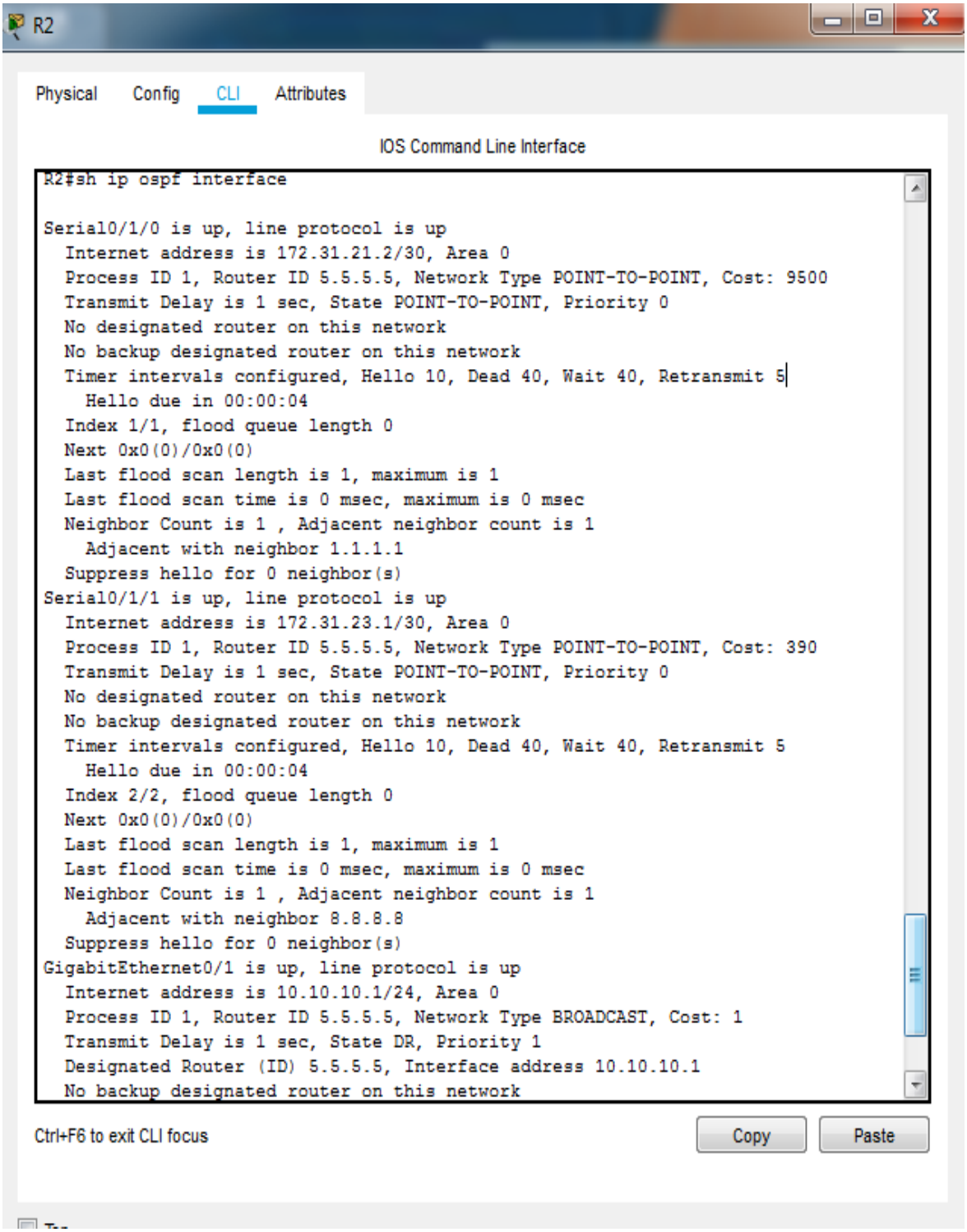

R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
R1#sh ip ospf interface
Serial0/1/0 is up, line protocol is up
Internet address is 172.31.21.1/30, Area 0
Process ID 1, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated 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 00:00:05
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 5.5.5.5
Suppress hello for 0 neighbor(s)
GigabitEthernet0/0.30 is up, line protocol is up
Internet address is 192.168.30.1/24, Area 0
Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State WAITING, Priority 1
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
No Hellos (Passive interface)
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 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
GigabitEthernet0/0.40 is up, line protocol is up
Internet address is 192.168.40.1/24, Area 0
Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State WAITING, Priority 1
No designated router on this network
No backup designated router on this network
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

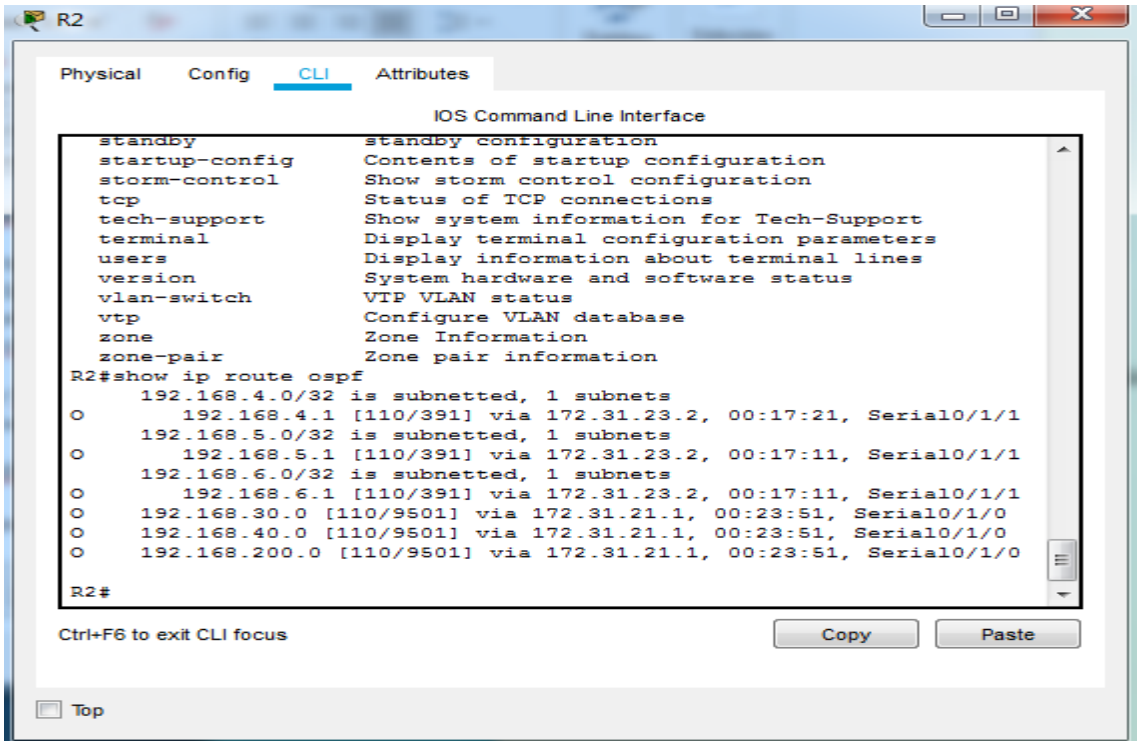

R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Suppress hello for 0 neighbor(s)
R1#
R1#sh ip pro
R1#sh ip protocols
Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 1.1.1.1
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
172.31.21.0 0.0.0.3 area 0
192.168.30.0 0.0.0.255 area 0
192.168.40.0 0.0.0.255 area 0
192.168.200.0 0.0.0.255 area 0
Passive Interface(s):
GigabitEthernet0/0.30
GigabitEthernet0/0.40
GigabitEthernet0/0.200
Routing Information Sources:
Gateway Distance Last Update
1.1.1.1 110 00:00:52
5.5.5.5 110 00:14:28
8.8.8.8 110 00:12:08
Distance: (default is 110)
R1#
Ctrl+F6 to exit CLI focus
Copy
Paste

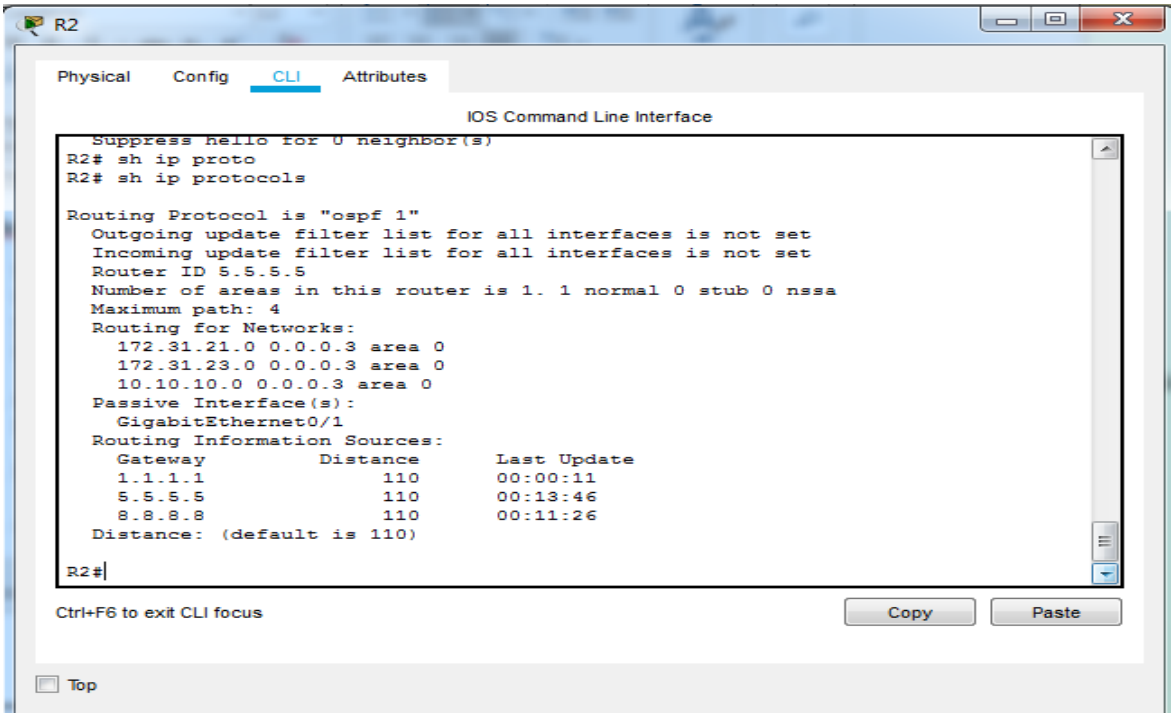

R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
router ospf 1
router-id 1.1.1.1
log-adjacency-changes
passive-interface GigabitEthernet0/0.30
passive-interface GigabitEthernet0/0.40
passive-interface GigabitEthernet0/0.200
network 172.31.21.0 0.0.0.3 area 0
network 192.168.30.0 0.0.0.255 area 0
network 192.168.40.0 0.0.0.255 area 0
network 192.168.200.0 0.0.0.255 area 0
!
ip classless
ip route 0.0.0.0 0.0.0.0 Serial0/1/0
ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/0
!
ip flow-export version 9
!
!

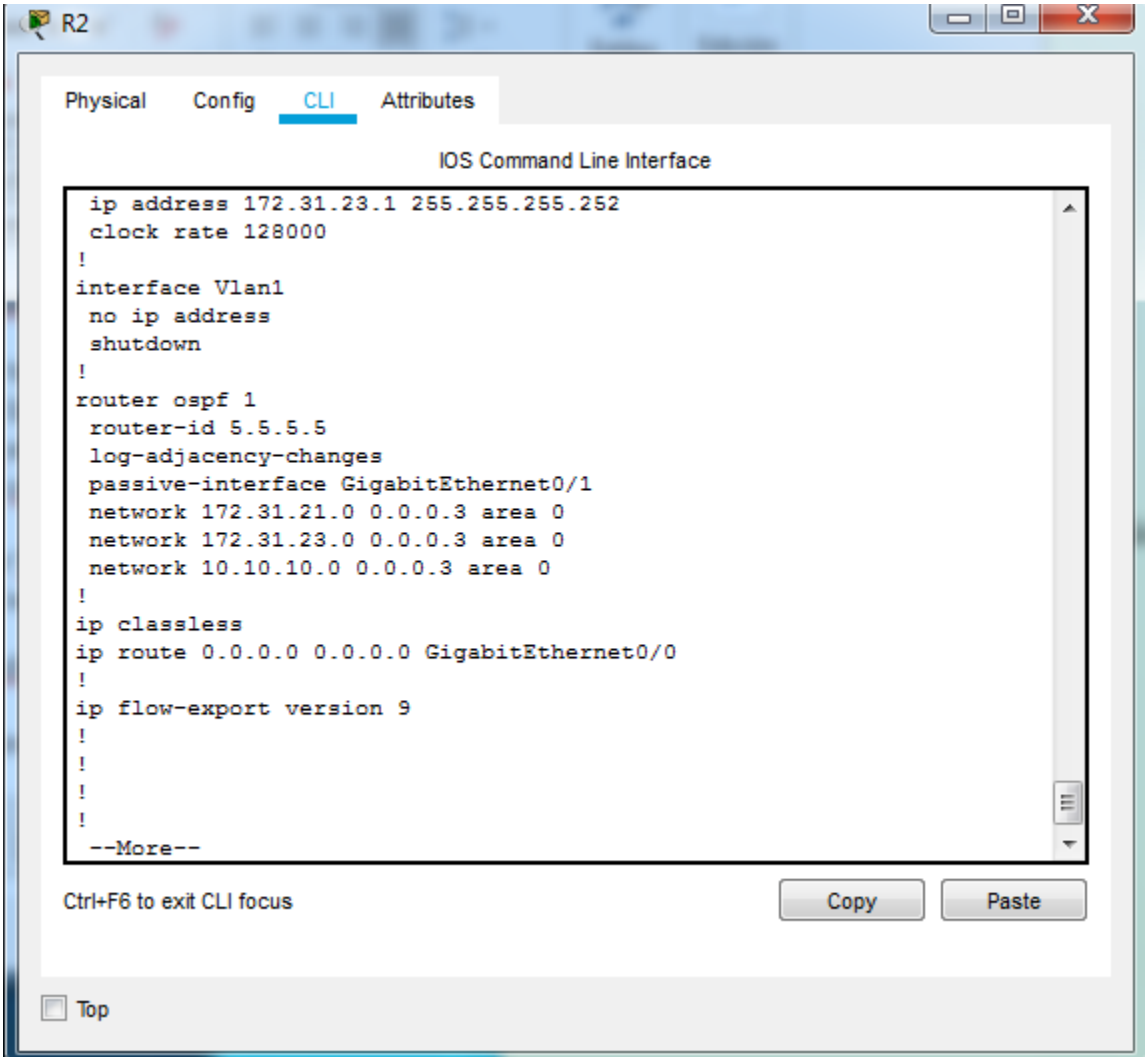
**Verificar información de OSPF R2**

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


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
R2#sh ip ospf interface
Serial0/1/0 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: 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 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)
Serial0/1/1 is up, line protocol is up
Internet address is 172.31.23.1/30, Area 0
Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 390
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:04
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 8.8.8.8
Suppress hello for 0 neighbor(s)
GigabitEthernet0/1 is up, line protocol is up
Internet address is 10.10.10.1/24, Area 0
Process ID 1, Router ID 5.5.5.5, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 5.5.5.5, Interface address 10.10.10.1
No backup designated router on this network
Ctrl+F6 to exit CLI focus
Copy
Paste

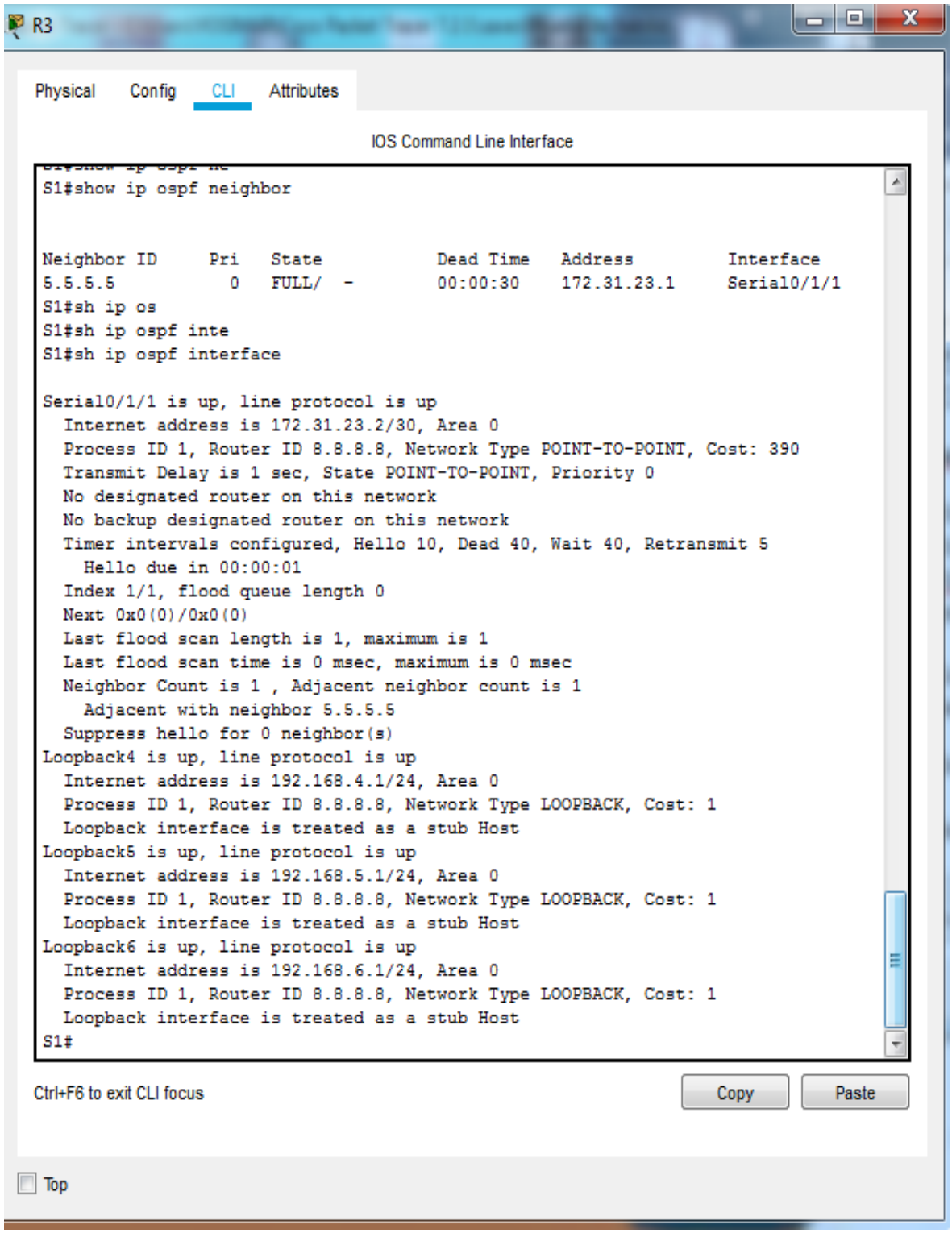

R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
standby standby configuration
startup-config Contents of startup configuration
storm-control Show storm control configuration
tcp Status of TCP connections
tech-support Show system information for Tech-Support
terminal Display terminal configuration parameters
users Display information about terminal lines
version System hardware and software status
vlan-switch VTP VLAN status
vtp Configure VLAN database
zone Zone Information
zone-pair Zone pair information
R2#show ip route ospf
192.168.4.0/32 is subnetted, 1 subnets
O 192.168.4.1 [110/391] via 172.31.23.2, 00:17:21, Serial0/1/1
192.168.5.0/32 is subnetted, 1 subnets
O 192.168.5.1 [110/391] via 172.31.23.2, 00:17:11, Serial0/1/1
192.168.6.0/32 is subnetted, 1 subnets
O 192.168.6.1 [110/391] via 172.31.23.2, 00:17:11, Serial0/1/1
O 192.168.30.0 [110/9501] via 172.31.21.1, 00:23:51, Serial0/1/0
O 192.168.40.0 [110/9501] via 172.31.21.1, 00:23:51, Serial0/1/0
O 192.168.200.0 [110/9501] via 172.31.21.1, 00:23:51, Serial0/1/0
R2#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

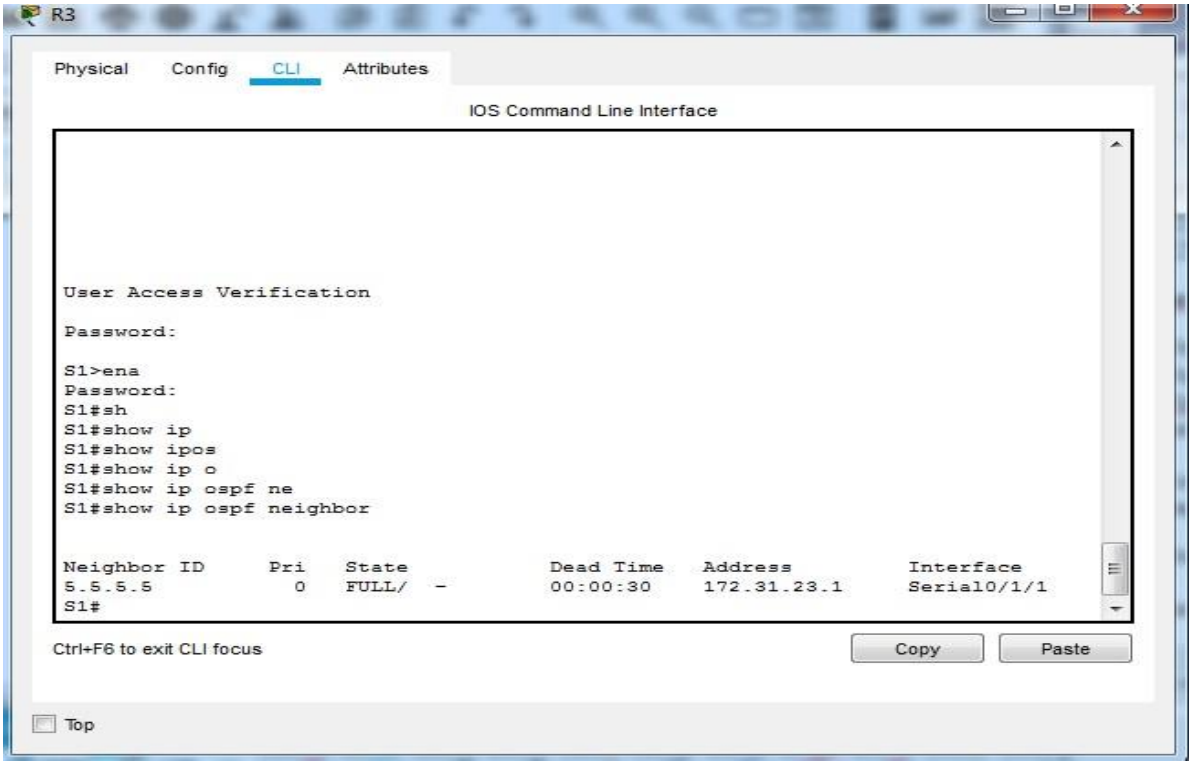

R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Suppress hello for 0 neighbor(s)
R2# sh ip proto
R2# sh ip protocols
Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 5.5.5.5
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
172.31.21.0 0.0.0.3 area 0
172.31.23.0 0.0.0.3 area 0
10.10.10.0 0.0.0.3 area 0
Passive Interface(s):
GigabitEthernet0/1
Routing Information Sources:
Gateway Distance Last Update
1.1.1.1 110 00:00:11
5.5.5.5 110 00:13:46
8.8.8.8 110 00:11:26
Distance: (default is 110)
R2#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

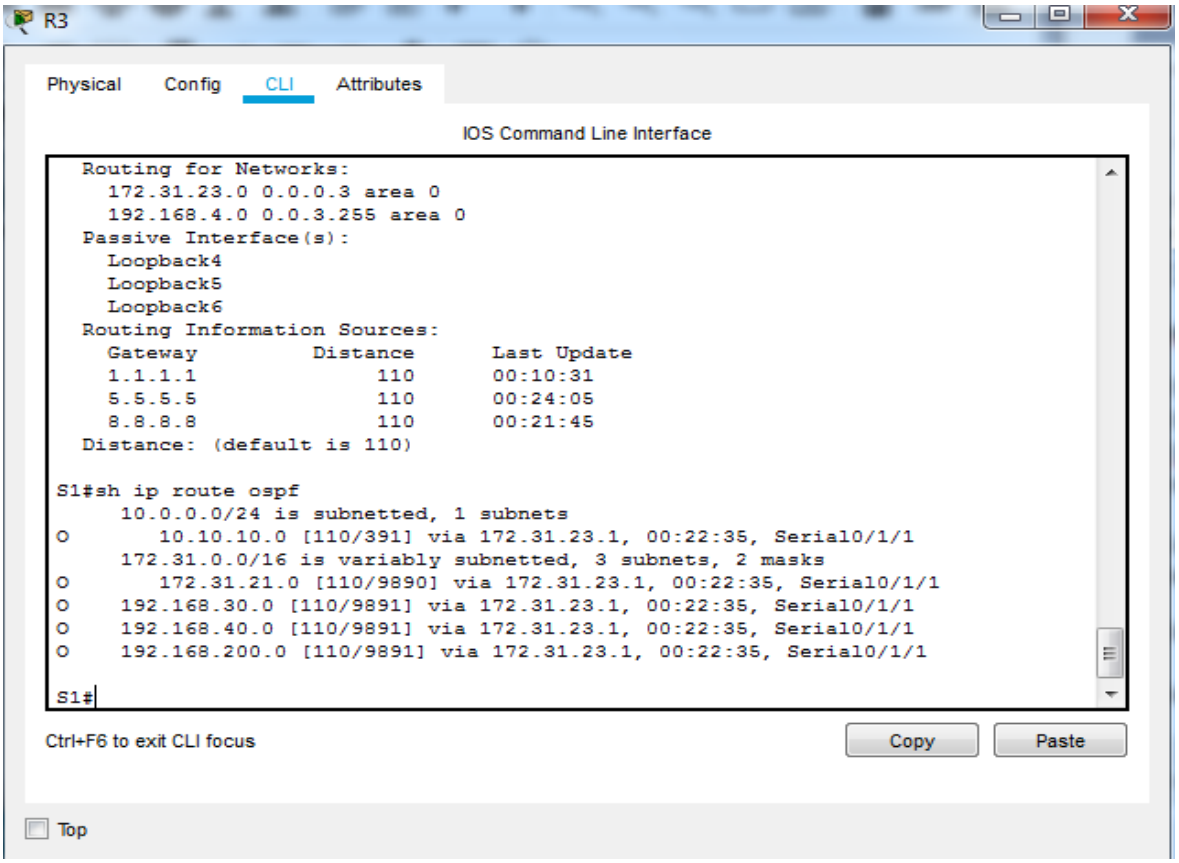


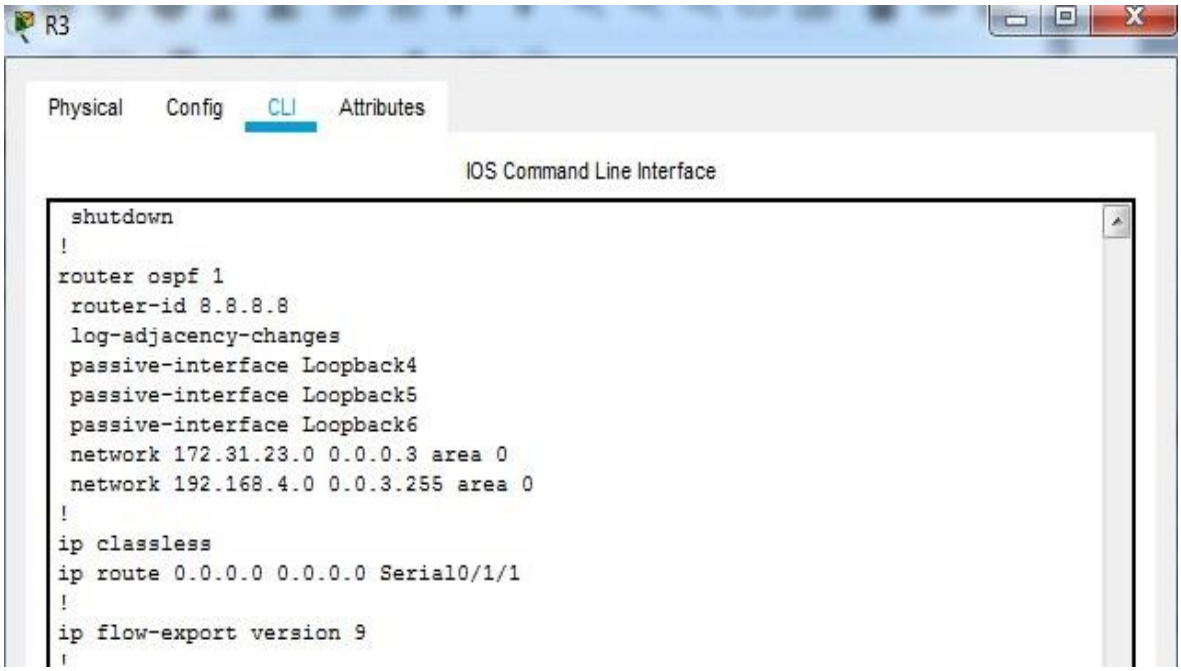

**Verificar información de OSPF R3**

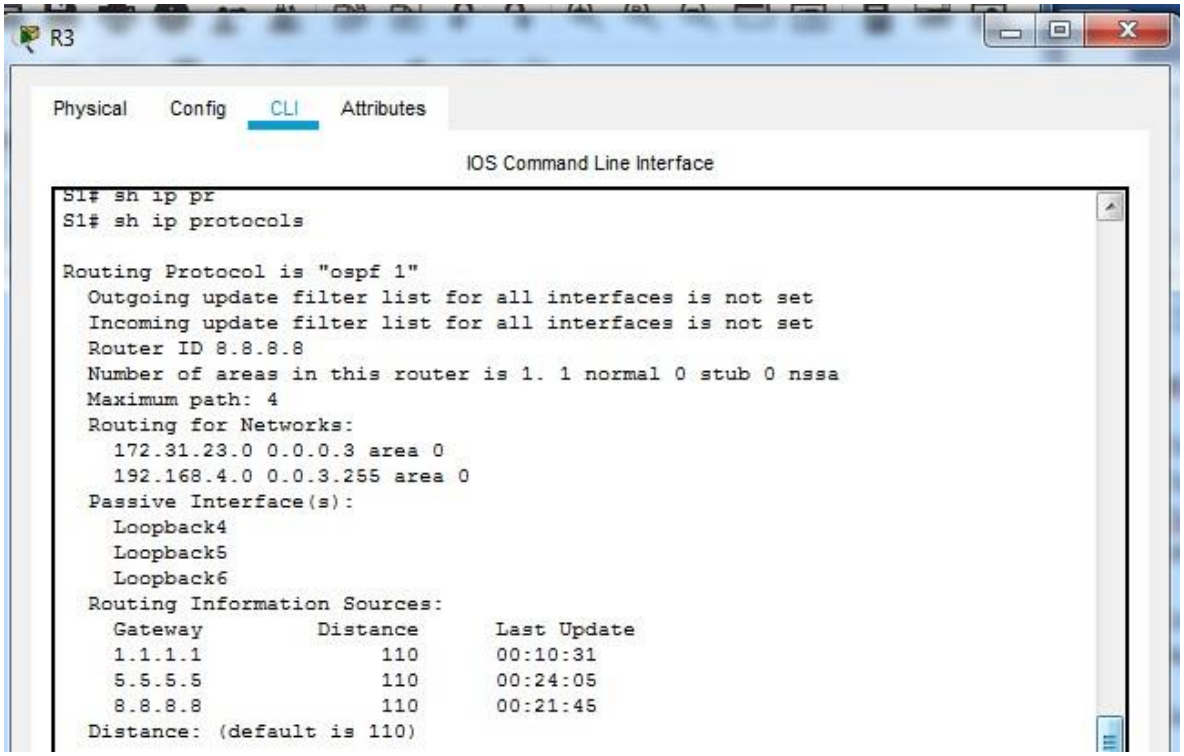
- Visualizar tablas de enrutamiento y routers conectados por OSPFv2
- Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface
- Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.


R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
S1#show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
5.5.5.5 0 FULL/ - 00:00:30 172.31.23.1 Serial0/1/1
S1#sh ip os
S1#sh ip ospf inte
S1#sh ip ospf interface
Serial0/1/1 is up, line protocol is up
Internet address is 172.31.23.2/30, Area 0
Process ID 1, Router ID 8.8.8.8, Network Type POINT-TO-POINT, Cost: 390
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:01
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)
Loopback4 is up, line protocol is up
Internet address is 192.168.4.1/24, Area 0
Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
Loopback interface is treated as a stub Host
Loopback5 is up, line protocol is up
Internet address is 192.168.5.1/24, Area 0
Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
Loopback interface is treated as a stub Host
Loopback6 is up, line protocol is up
Internet address is 192.168.6.1/24, Area 0
Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
Loopback interface is treated as a stub Host
S1#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

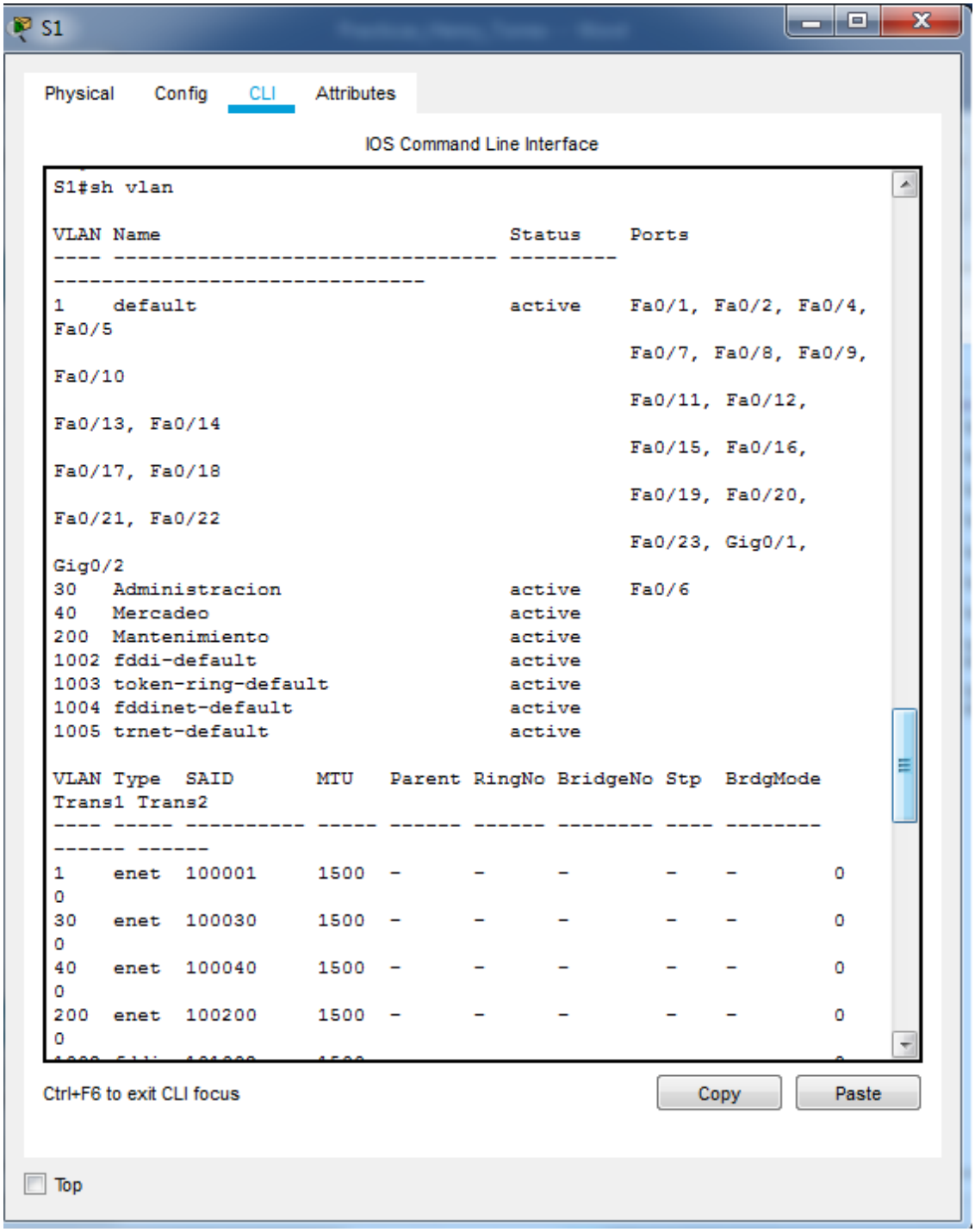

R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
User Access Verification
Password:
S1>ena
Password:
S1#sh
S1#show ip
S1#show ipos
S1#show ip o
S1#show ip ospf ne
S1#show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
5.5.5.5 0 FULL/ - 00:00:30 172.31.23.1 Serial0/1/1
S1#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

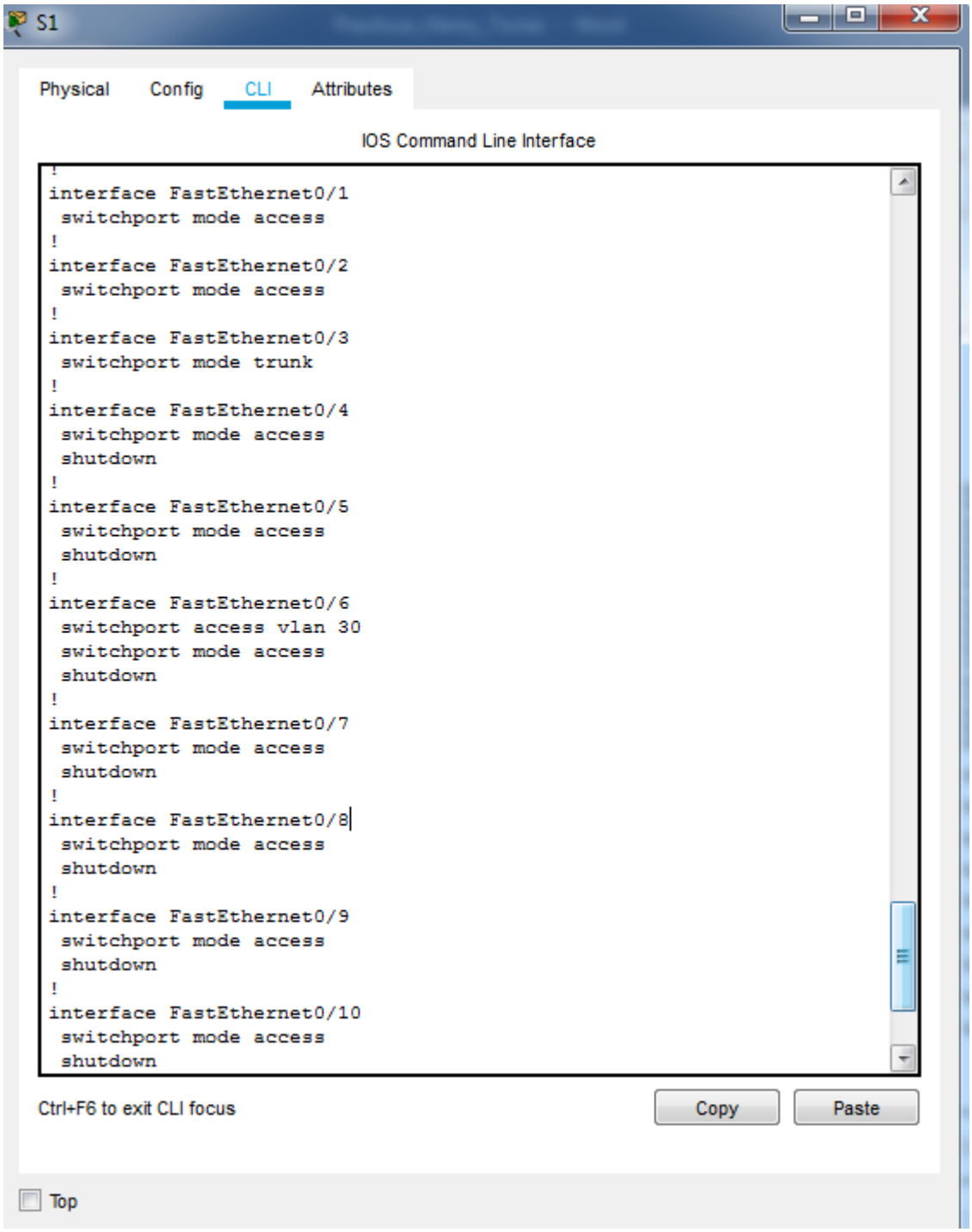

R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
Routing for Networks:
172.31.23.0 0.0.0.3 area 0
192.168.4.0 0.0.3.255 area 0
Passive Interface(s):
Loopback4
Loopback5
Loopback6
Routing Information Sources:
Gateway Distance Last Update
1.1.1.1 110 00:10:31
5.5.5.5 110 00:24:05
8.8.8.8 110 00:21:45
Distance: (default is 110)
S1#sh ip route ospf
10.0.0.0/24 is subnetted, 1 subnets
O 10.10.10.0 [110/391] via 172.31.23.1, 00:22:35, Serial0/1/1
172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
O 172.31.21.0 [110/9890] via 172.31.23.1, 00:22:35, Serial0/1/1
O 192.168.30.0 [110/9891] via 172.31.23.1, 00:22:35, Serial0/1/1
O 192.168.40.0 [110/9891] via 172.31.23.1, 00:22:35, Serial0/1/1
O 192.168.200.0 [110/9891] via 172.31.23.1, 00:22:35, Serial0/1/1
S1#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

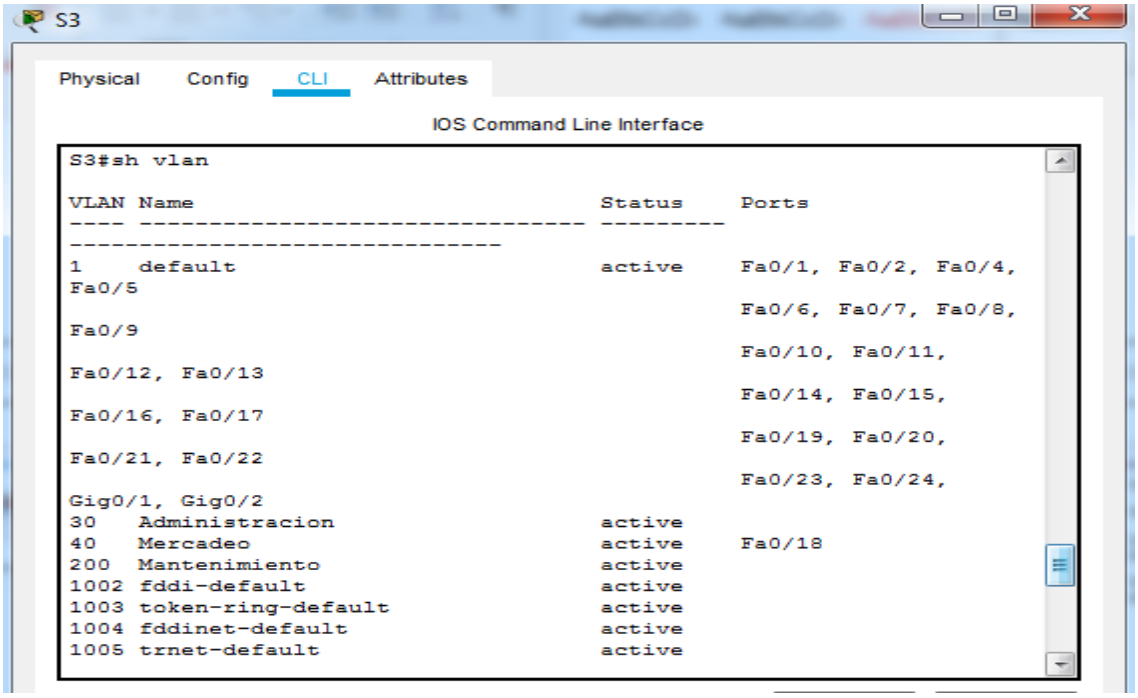

R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
shutdown
!
router ospf 1
router-id 8.8.8.8
log-adjacency-changes
passive-interface Loopback4
passive-interface Loopback5
passive-interface Loopback6
network 172.31.23.0 0.0.0.3 area 0
network 192.168.4.0 0.0.3.255 area 0
!
ip classless
ip route 0.0.0.0 0.0.0.0 Serial0/1/1
!
ip flow-export version 9

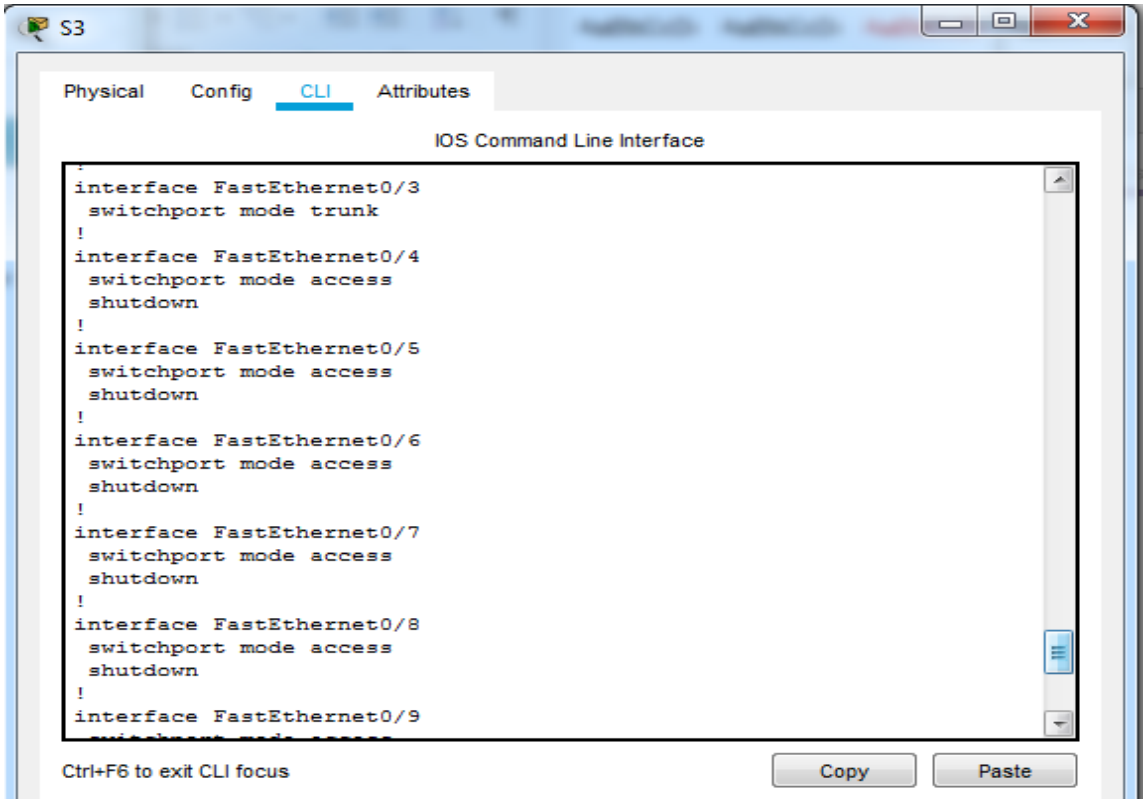

R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
S1# sh ip pr
S1# sh ip protocols
Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 8.8.8.8
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
172.31.23.0 0.0.0.3 area 0
192.168.4.0 0.0.3.255 area 0
Passive Interface(s):
Loopback4
Loopback5
Loopback6
Routing Information Sources:
Gateway Distance Last Update
1.1.1.1 110 00:10:31
5.5.5.5 110 00:24:05
8.8.8.8 110 00:21:45
Distance: (default is 110)

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

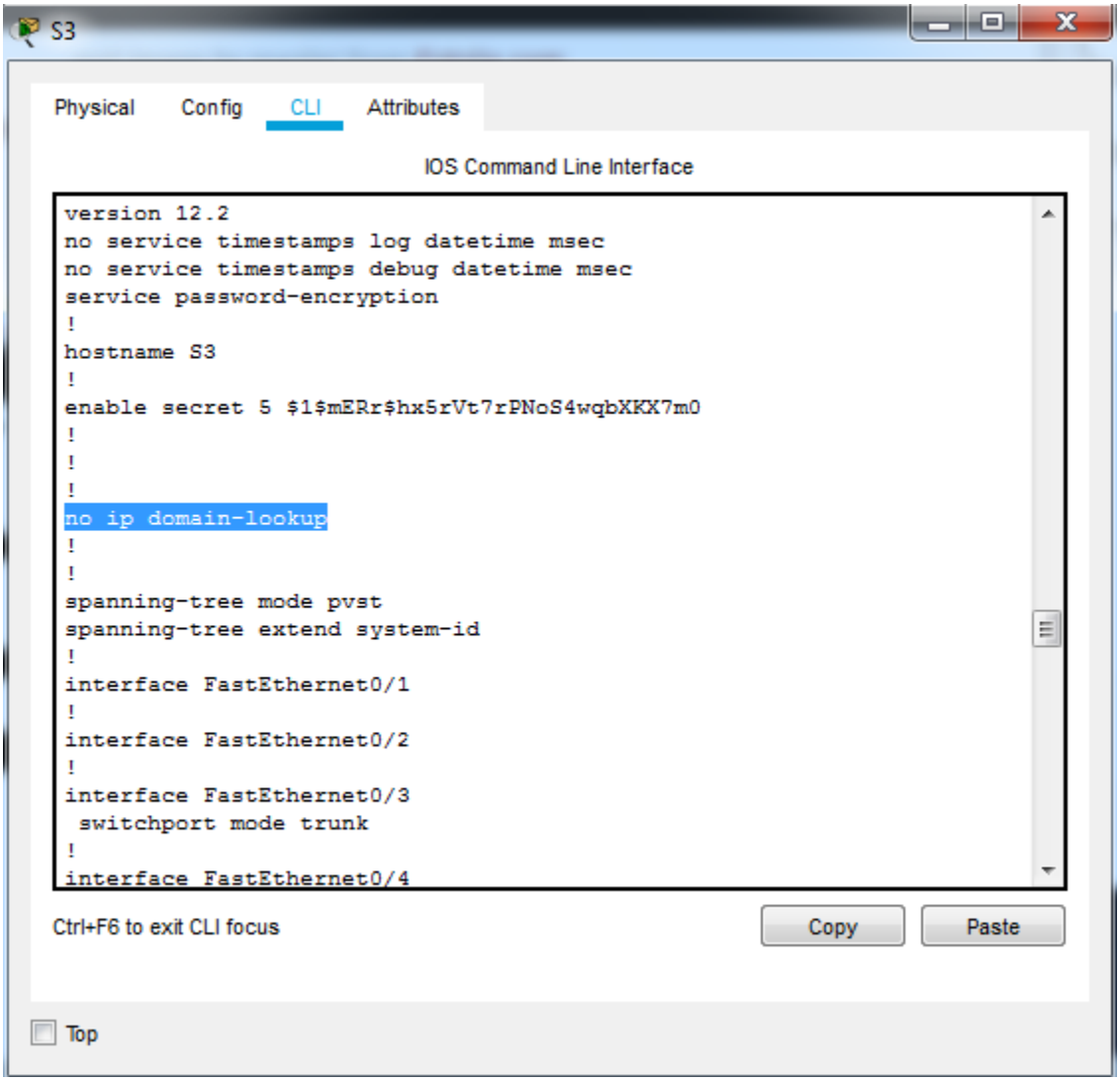



S1
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
interface FastEthernet0/1
 switchport mode access
!
interface FastEthernet0/2
 switchport mode access
!
interface FastEthernet0/3
 switchport mode trunk
!
interface FastEthernet0/4
 switchport mode access
 shutdown
!
interface FastEthernet0/5
 switchport mode access
 shutdown
!
interface FastEthernet0/6
 switchport access vlan 30
 switchport mode access
 shutdown
!
interface FastEthernet0/7
 switchport mode access
 shutdown
!
interface FastEthernet0/8
 switchport mode access
 shutdown
!
interface FastEthernet0/9
 switchport mode access
 shutdown
!
interface FastEthernet0/10
 switchport mode access
 shutdown
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


S3
Physical
Config
CLI
Attributes
IOS Command Line Interface
S3#sh vlan
VLAN Name Status Ports
---- -------------------------------- --------- -------------------------------
1 default active Fa0/1, Fa0/2, Fa0/4, Fa0/5
Fa0/6, Fa0/7, Fa0/8, Fa0/9
Fa0/10, Fa0/11, Fa0/12, Fa0/13
Fa0/14, Fa0/15, Fa0/16, Fa0/17
Fa0/19, Fa0/20, Fa0/21, Fa0/22
Fa0/23, Fa0/24, Gig0/1, Gig0/2
30 Administracion active
40 Mercadeo active Fa0/18
200 Mantenimiento active
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active


S3
Physical
Config
CLI
Attributes
IOS Command Line Interface
interface FastEthernet0/3
switchport mode trunk
!
interface FastEthernet0/4
switchport mode access
shutdown
!
interface FastEthernet0/5
switchport mode access
shutdown
!
interface FastEthernet0/6
switchport mode access
shutdown
!
interface FastEthernet0/7
switchport mode access
shutdown
!
interface FastEthernet0/8
switchport mode access
shutdown
!
interface FastEthernet0/9
Ctrl+F6 to exit CLI focus
Copy
Paste

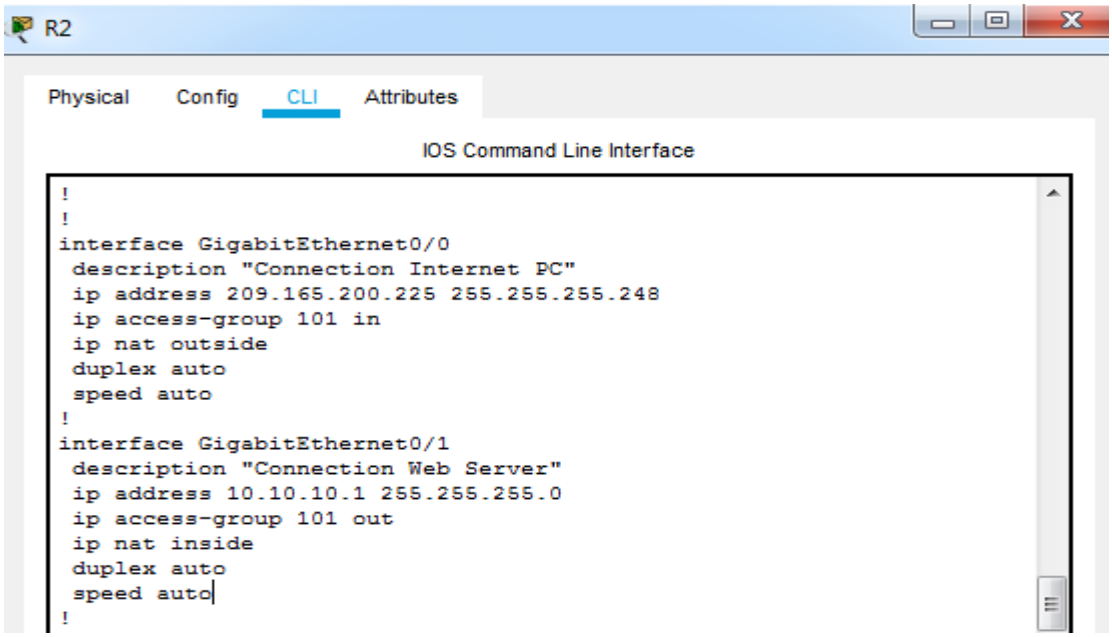
3. En el Switch 3 deshabilitar DNS lookup



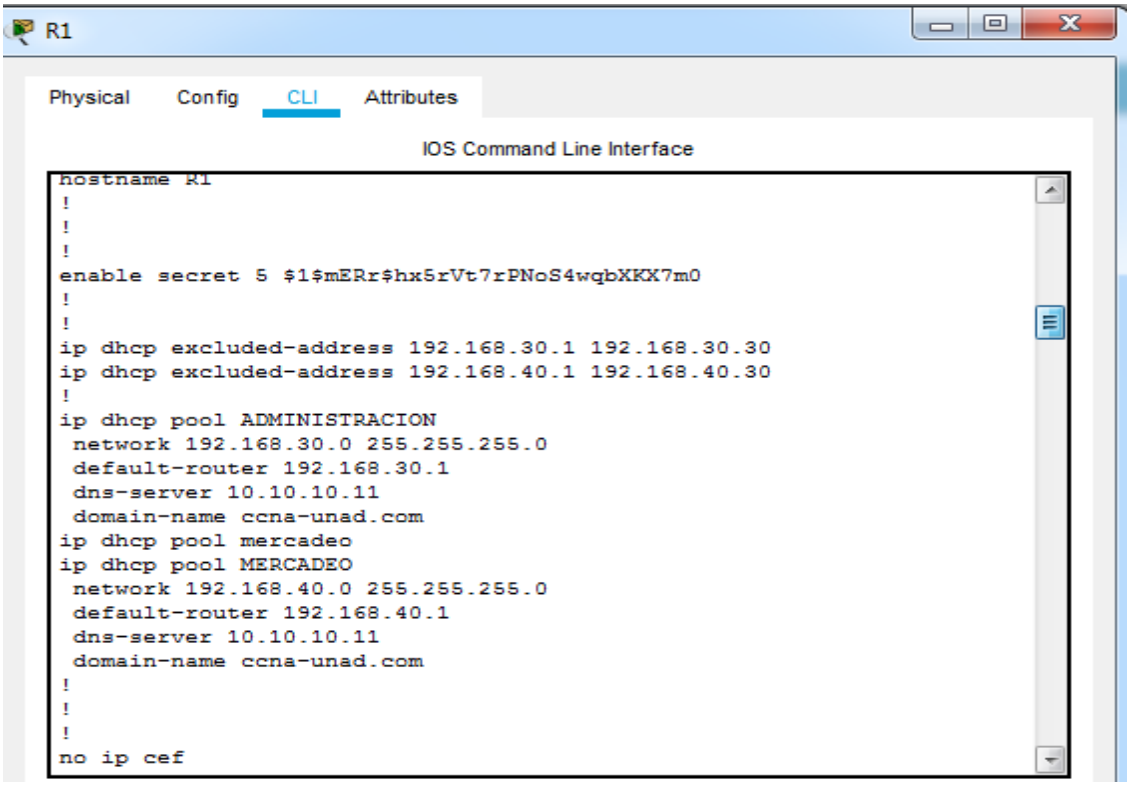
4. Desactivar todas las interfaces que no sean utilizadas en el esquema de red.

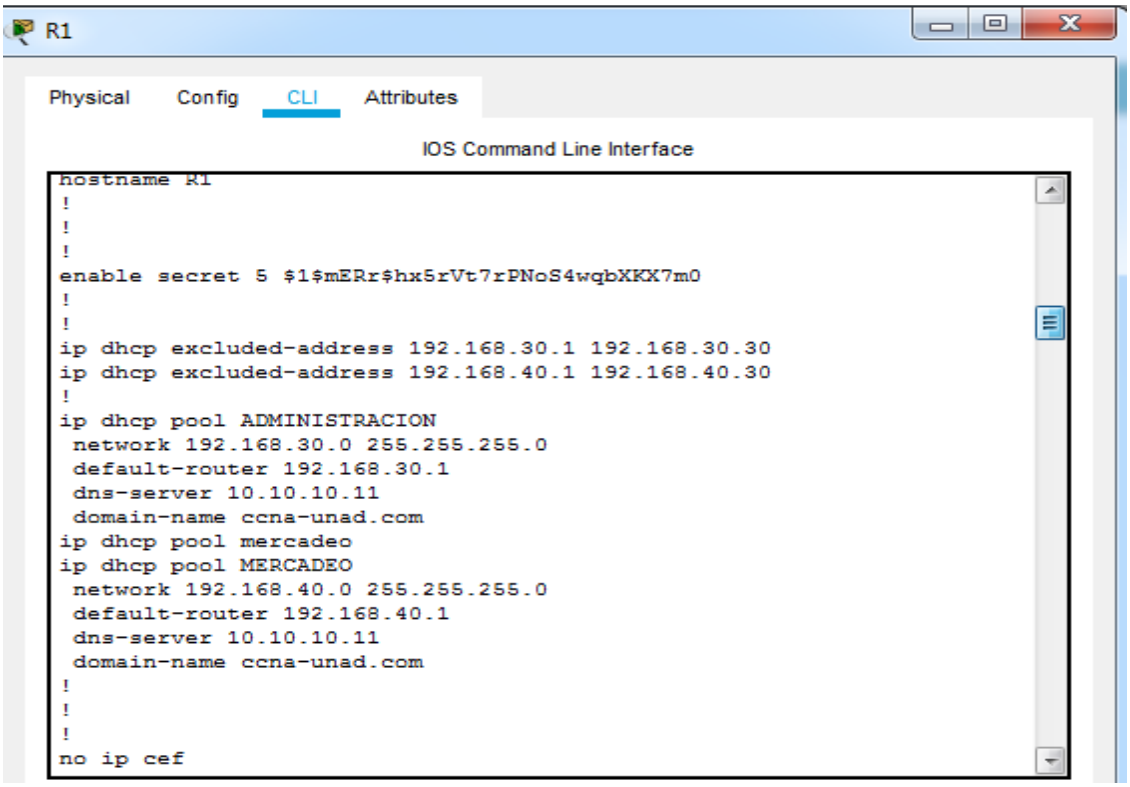
```
Port                Link   VLAN   IP Address          MAC Address
FastEthernet0/1     Up     1      --                  00D0.5872.1601
FastEthernet0/2     Down   1      --                  00D0.5872.1602
FastEthernet0/3     Up     --     --                  00D0.5872.1603
FastEthernet0/4     Down   1      --                  00D0.5872.1604
FastEthernet0/5     Down   1      --                  00D0.5872.1605
FastEthernet0/6     Down   30     --                  00D0.5872.1606
FastEthernet0/7     Down   1      --                  00D0.5872.1607
FastEthernet0/8     Down   1      --                  00D0.5872.1608
FastEthernet0/9     Down   1      --                  00D0.5872.1609
FastEthernet0/10    Down   1      --                  00D0.5872.160A
FastEthernet0/11    Down   1      --                  00D0.5872.160B
FastEthernet0/12    Down   1      --                  00D0.5872.160C
FastEthernet0/13    Down   1      --                  00D0.5872.160D
FastEthernet0/14    Down   1      --                  00D0.5872.160E
FastEthernet0/15    Down   1      --                  00D0.5872.160F
FastEthernet0/16    Down   1      --                  00D0.5872.1610
FastEthernet0/17    Down   1      --                  00D0.5872.1611
FastEthernet0/18    Down   1      --                  00D0.5872.1612
FastEthernet0/19    Down   1      --                  00D0.5872.1613
FastEthernet0/20    Down   1      --                  00D0.5872.1614
FastEthernet0/21    Down   1      --                  00D0.5872.1615
FastEthernet0/22    Down   1      --                  00D0.5872.1616
FastEthernet0/23    Down   1      --                  00D0.5872.1617
FastEthernet0/24    Up     --     --                  00D0.5872.1618
GigabitEthernet0/1  Down   1      --                  00D0.5872.1619
GigabitEthernet0/2  Down   1      --                  00D0.5872.161A
Vlan1               Down   1      <not set>           0004.9A0B.88AA
Vlan200             Up     200    192.168.200.2/24    0004.9A0B.8801
Hostname: S1

Physical Location: Intercity, Home City, Corporate Office, Main Wiring Closet
```

5. Implement DHCP and NAT for IPv4




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

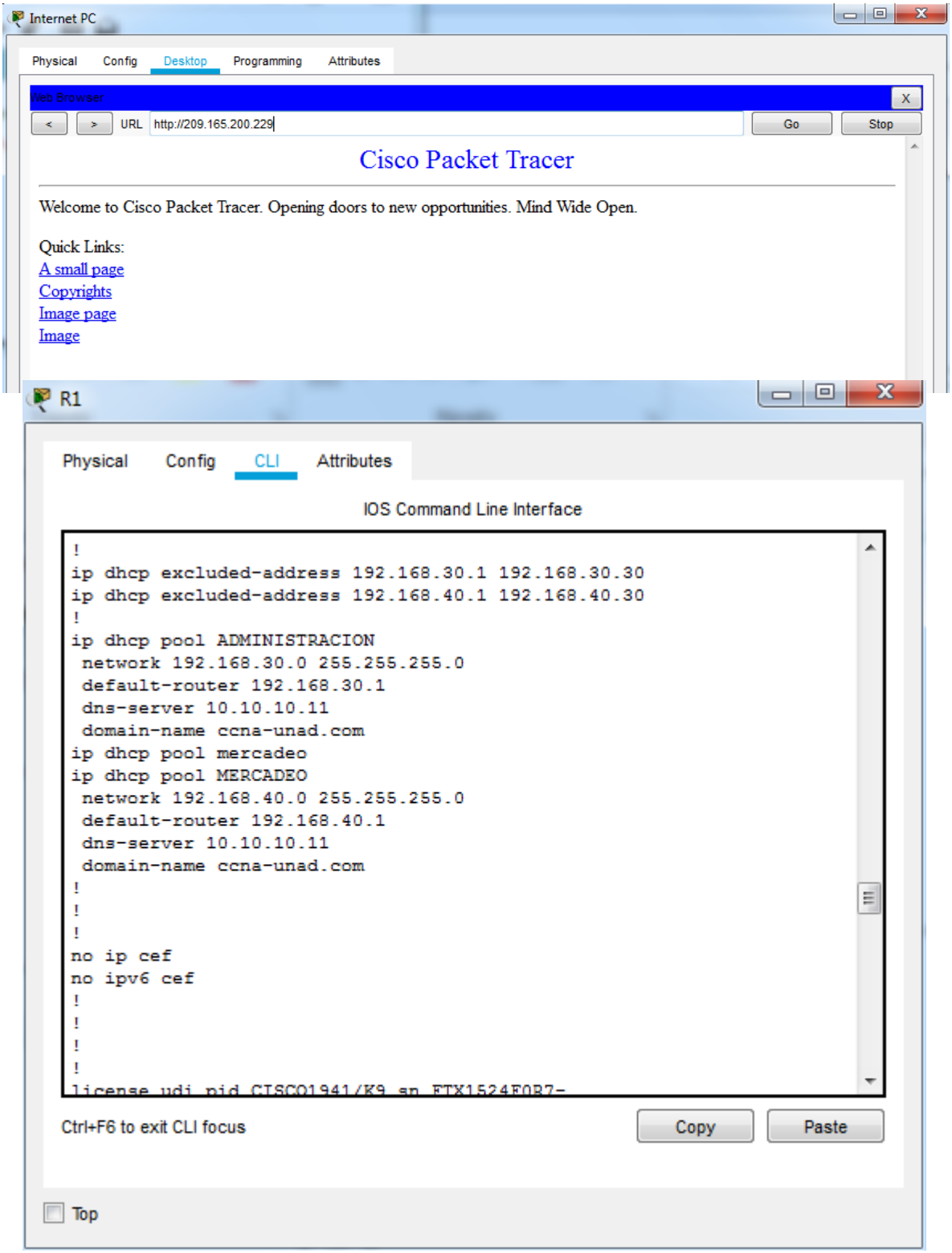




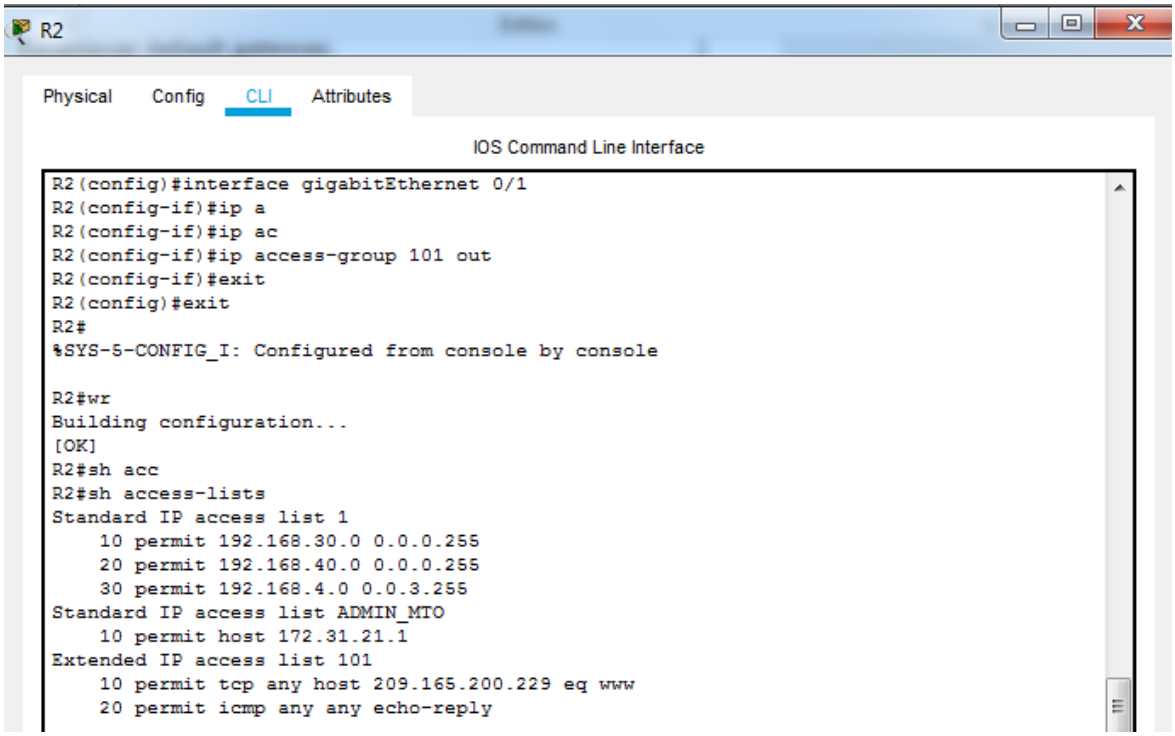

7. Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.

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

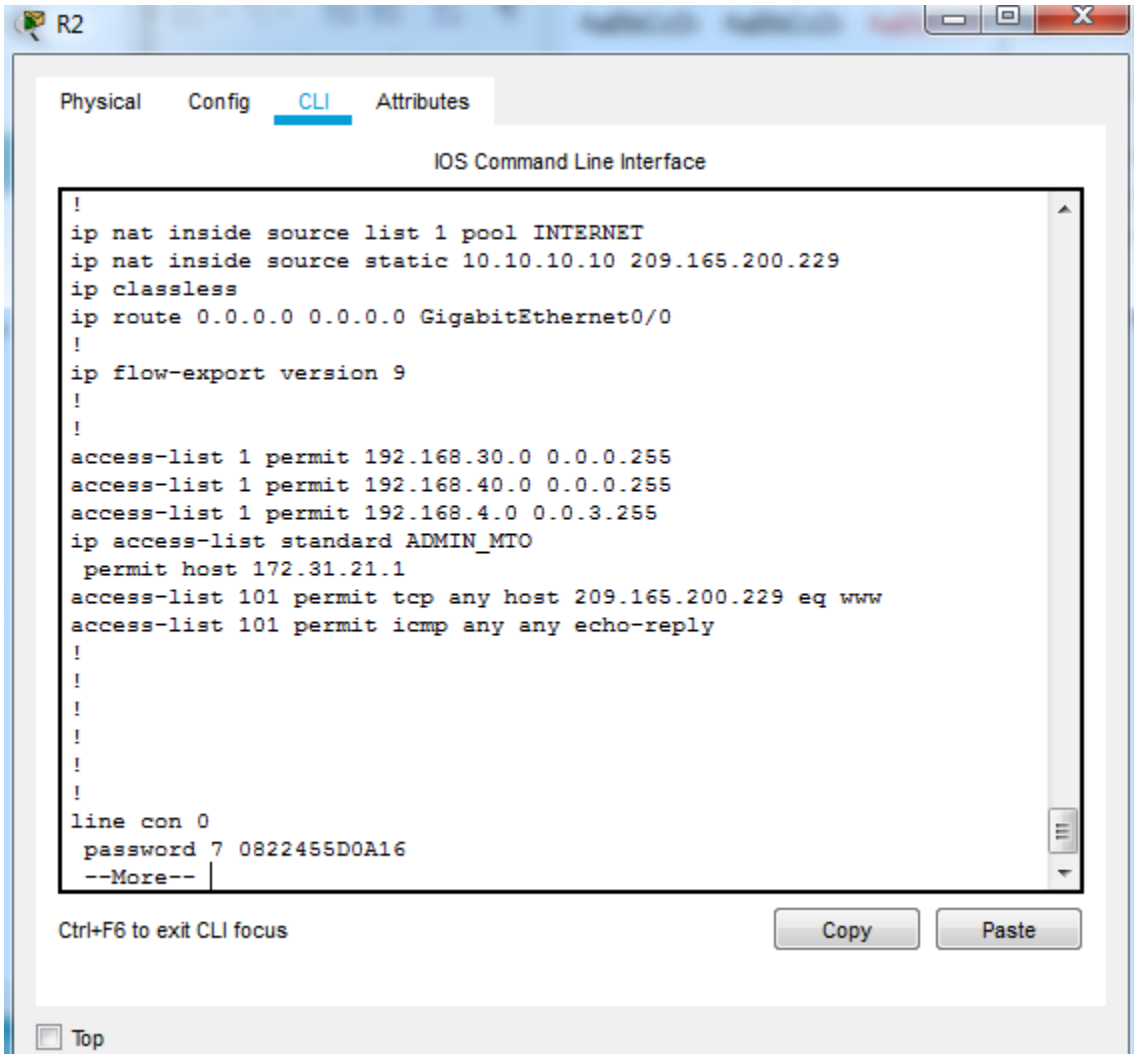
8. Configurar NAT en R2 para permitir que los host puedan salir a internet



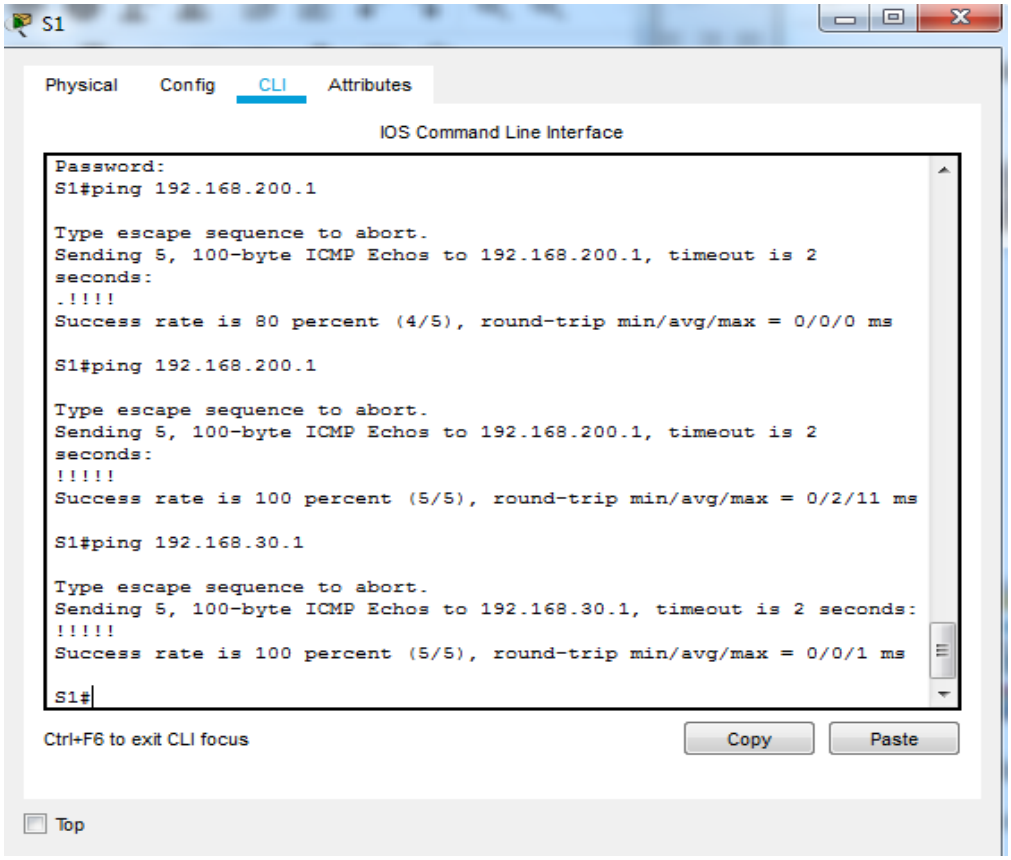
9. Configurar al menos dos listas de acceso de tipo estándar a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

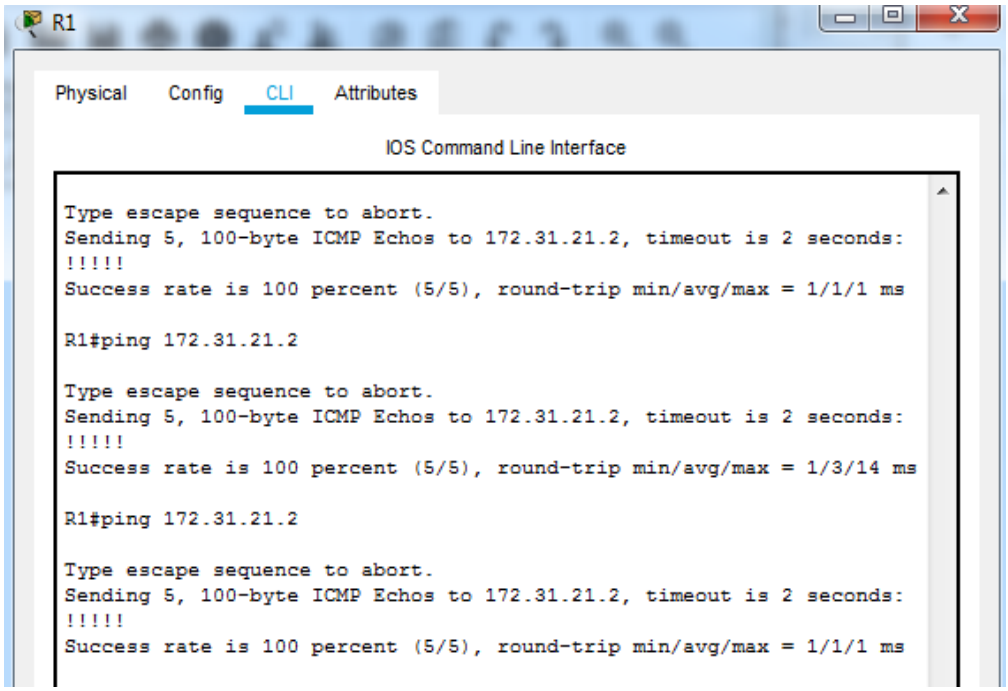


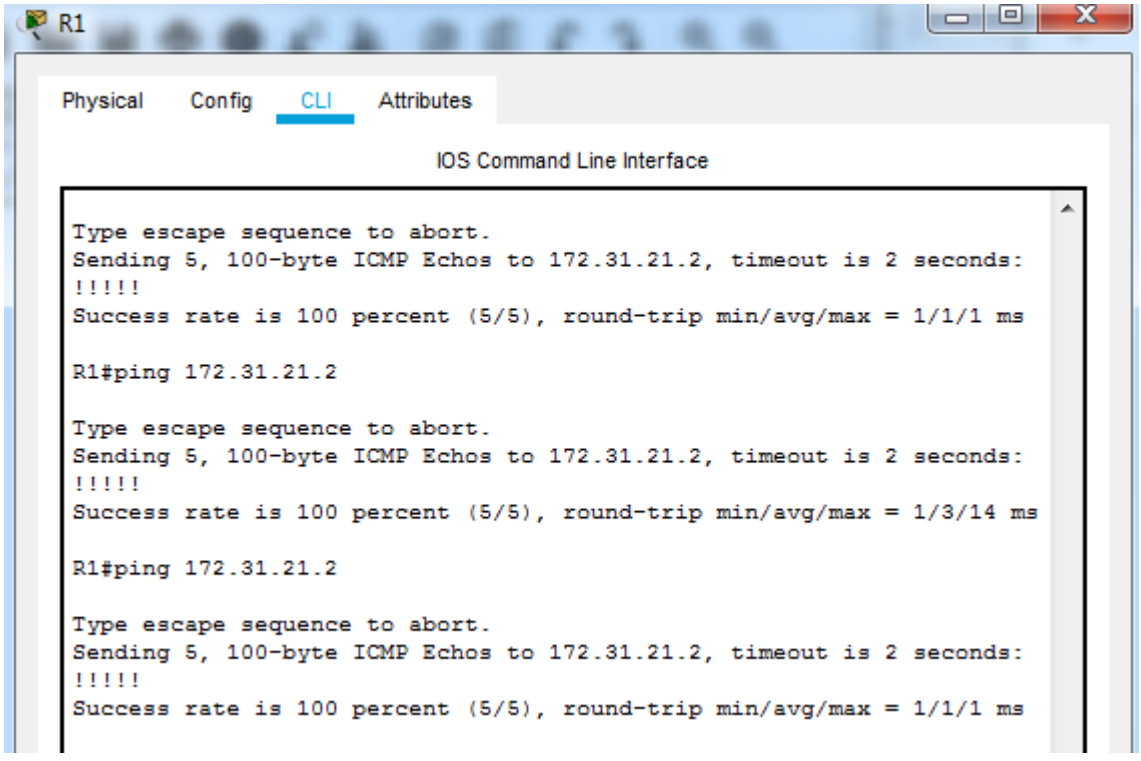
10. Configurar al menos dos listas de acceso de tipo extendido o nombradas a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.



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




R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
R1#ping 172.31.21.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/14 ms
R1#ping 172.31.21.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms


R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
R1#ping 172.31.21.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/14 ms
R1#ping 172.31.21.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms

## CONCLUSIONES

- Por medio de los contenidos propuestos en la plataforma de cisco para los módulos de CCNA 1 y CCNA 2, obtuvimos los conceptos básicos que nos permiten poner realizar escenarios que permiten la emulación de entornos o topologías que se presentan en la vida real.
- Durante el desarrollo pudimos configurar diferentes dispositivos que integran una red, dentro de los cuales tenemos SW, Routers, PC, Servidores, y diferentes conectores para siempre establecer la mejor topología.
- Es importante la implementación del enrutamiento y manejos de direccionamiento IP a cada uno de los equipos de la red, implementar de vlan, listas de acceso, seguridad, conexión DHCP y demás requerimientos propuestos en las topologías.
- Al realizar el proceso de aprendizaje de los módulos 1 y 2 del CCNA me brindo gran conocimiento y deseo de continuar con las capacitaciones en la plataforma cisco, ya que es de vital importancia y de gran utilidad para nuestro desempeño en el campo profesional como ingenieros de sistemas.

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  CISCO. (2014). Enrutamiento Dinámico. Principios de Enrutamiento y Conmutación. Recuperado de https://static-course-assets.s3.amazonaws.com/RSE50ES/module7/index.html#7.0.1.1

- **Temática: OSPF de una sola área**

  CISCO. (2014). OSPF de una sola área. Principios de Enrutamiento y Conmutación. Recuperado de https://static-course-assets.s3.amazonaws.com/RSE50ES/module8/index.html#8.0.1.1

- **Temática: Listas de control de acceso**

  CISCO. (2014). Listas de control de acceso. Principios de Enrutamiento y Conmutación. Recuperado de https://static-course-assets.s3.amazonaws.com/RSE50ES/module9/index.html#9.0.1.1