PRUEBA DE HABILIDADES PRACTICAS CCNA

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA
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Trabajo de grado presentado como requisito para optar al título de INGENIERO DE TELECOMUNICACIONES

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Dedicatoria

A mi familia, amigos los cuales apoyaron mi carrera y mis estudios.

AGRADECIMIENTOS

Agradezco a mi familia, mis padres que con su apoyo logran que termine mi carrera profesional, y mis amigos que creyeron en mí, en mi lucha día a día por lograr mi crecimiento personal y profesional.

TABLA DE CONTENIDO

PRUEBA DE HABILIDADES PRACTICAS CCNA

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Bogota, Colombia

Resumen

Se realiza simulación en el software paquet tracer de Cisco con el fin de llevar a práctica lo aprendido durante el diplomado, se realiza mediante los comandos, la interconexión de las redes como lo solicita la guía, obteniendo una topología de red con OSPF versión 2

Abstract

Simulation is carried out in Cisco's paquet tracer software in order to carry out what was learned during the course, it is done through the commands, the interconnection of the networks as requested by the guide, obtaining a network topology with OSPF version 2

Keywords: Traducción al ingles de las palabras clave

1. INTRODUCCION

En el siguiente documento se realiza la simulación de la topología dada para la prueba práctica del diplomado CCNA en la cual se desarrollara los diferentes requerimientos como configuración de direccionamiento, configuración de protocolo OSPF versión 2.

OSPF es un protocolo de ruteo dinámico estándar definido en la RFC 2328 para IPv4 y en la RFC 5340 para IPv6. Su función (por ser un protocolo de ruteo) es la de recolectar la información necesaria para armar las tablas de ruteo. Se lo puede clasificar como protocolo de estado de enlace y, a su vez, dentro del grupo de los IGP (Interior Gateway Protocol), dado que está pensado para ser utilizado dentro del dominio de un sistema autónomo.

Algunas de sus características básicas de OSPF:

- Estándar y de especificación abierta.
- Intra sistema autónomo.
- Converge rápidamente.
- Soporta diseño jerárquico, lo que lo hace muy escalable.
- Envía actualizaciones disparadas y sólo con la información que cambia.
- Se comunica utilizando multicast.
- Soporta autenticación.

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2. JUSTIFICACION

Se realiza este documento para documentar el proceso de la actividad práctica del diplomado CCNA de la universidad nacional abierta y a distancia, en el cual se puede ver el desarrollo, el aprendizaje y conocimientos adquiridos durante el semestre.

Se realiza la configuración en packet tracert en el cual se monta la topología, se realiza la configuración de direccionamiento IP, configuración de seguridad entre otras y los pasos solicitados en la guía.

3. OBJETIVOS

3.1 OBJETIVO GENERAL

Identificar el grado de desarrollo de competencias y habilidades adquiridas en el diplomado de profundización de CCNA.

3.2 OBJETIVOS ESPECÍFICOS

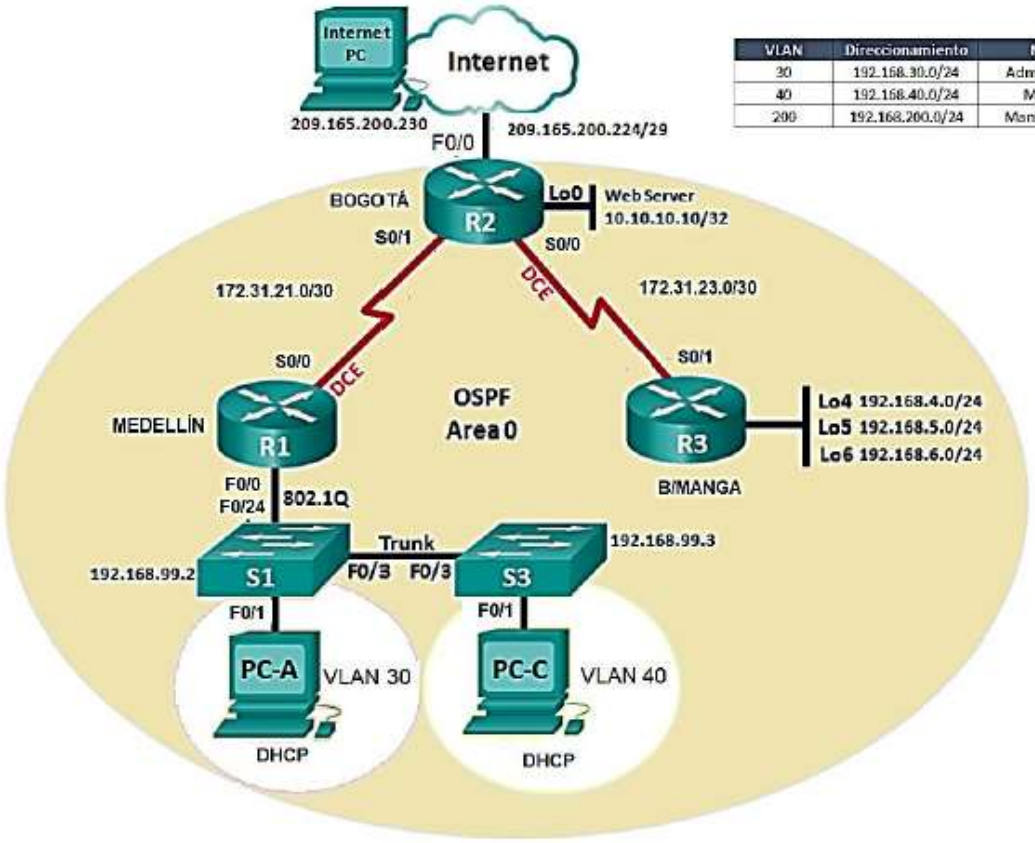
- Montaje topología
- Configuración de direccionamiento IP
- Configuración de enrutamiento OSPF versión 2
- Documentación de la configuración.

4. PRUEBA DE HABILIDADES PRACTICAS CCNA

4.1 ESCENARIO

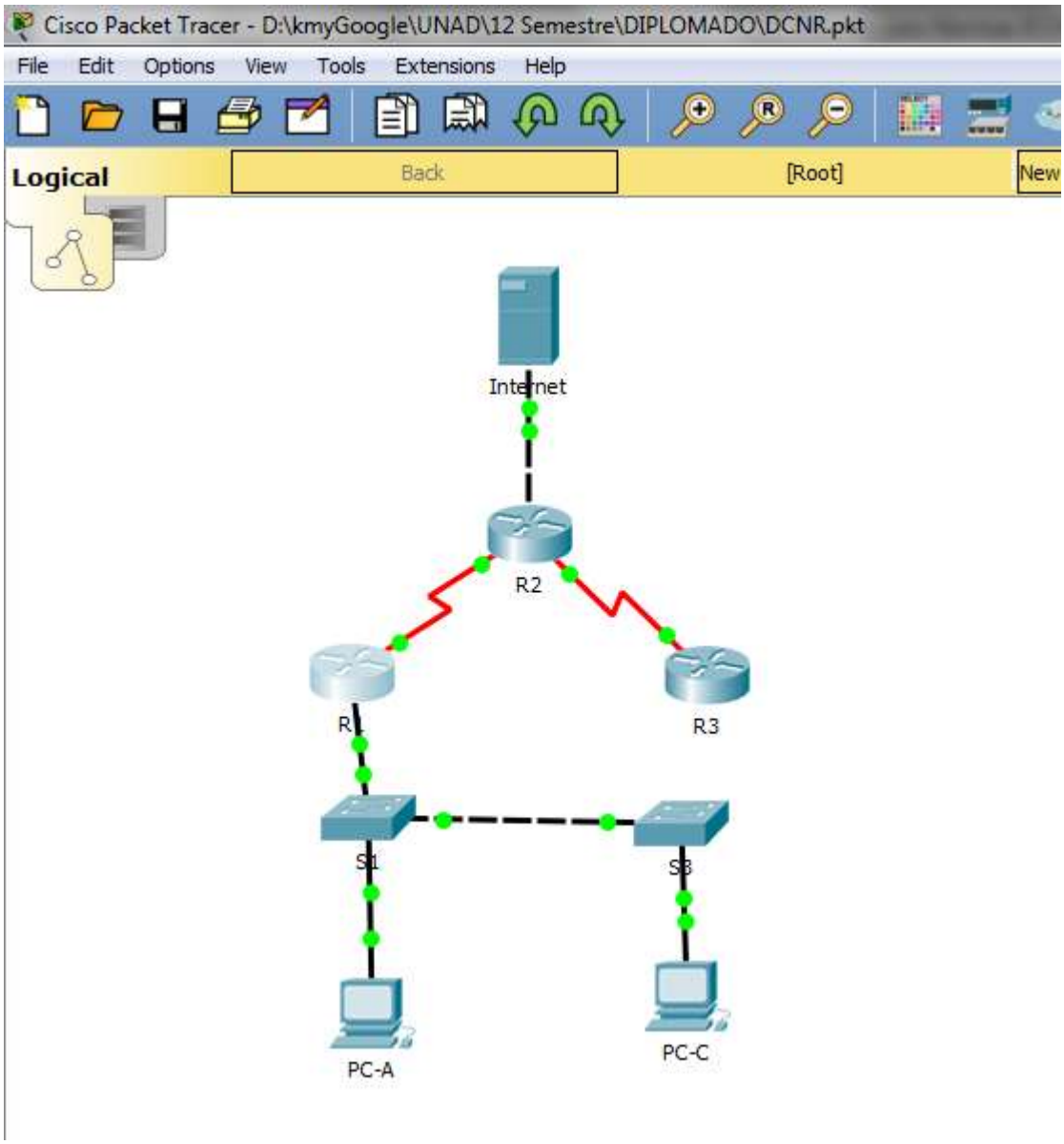
Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Bogotá, Medellín y Bucaramanga, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos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

4.1.1 Topología



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

4.1.2 Topología packet tracert



4.1.2.1 Configuración inicial Routers

Con el comando hostname configuramos el nombre a todos los dispositivos

ROUTERS:

- R1
- R2
- R3

SWITCH:

- S1
- S2

Configuración de seguridad

Asignación de contraseñas

```
R1>
R1>ena
R1#conf termin
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#enable secret cisco
R1(config)#
```

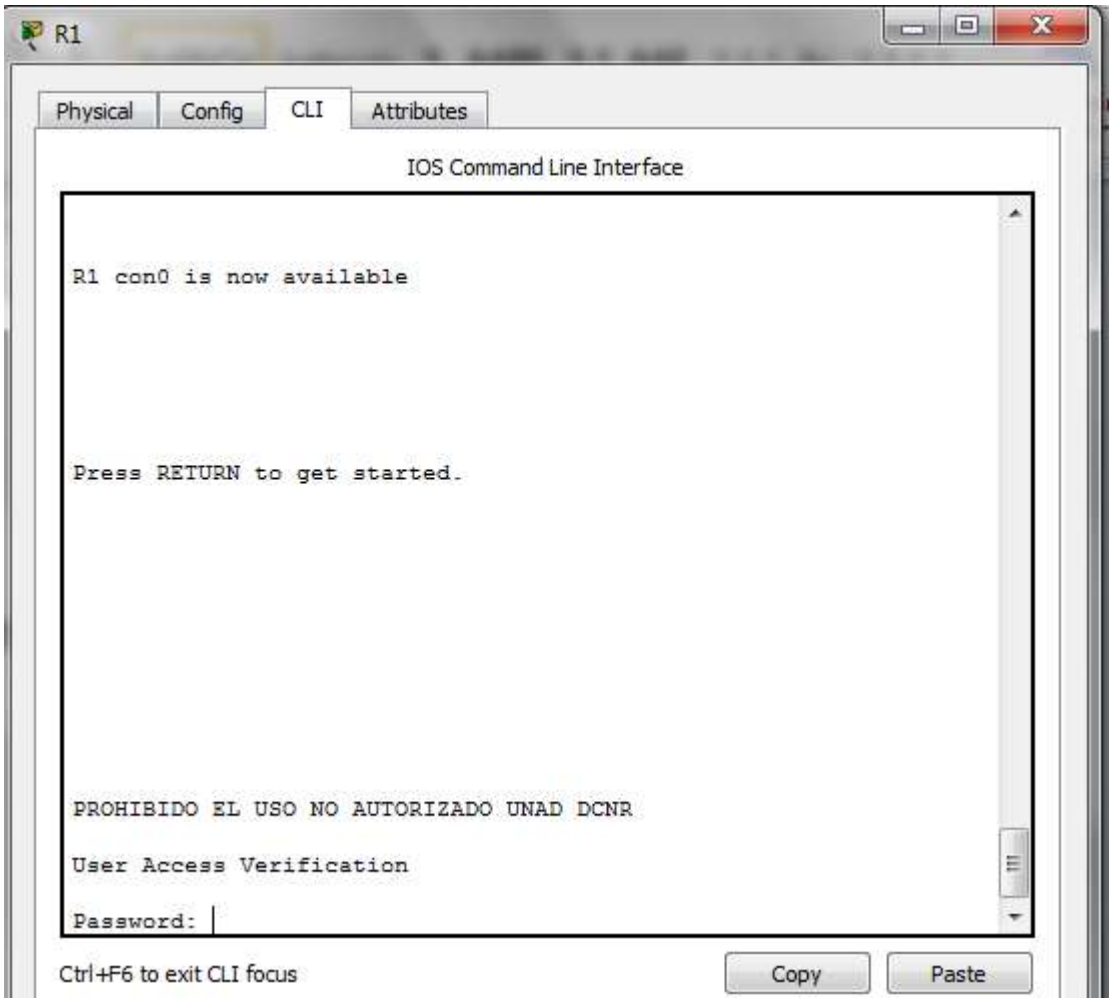
```
R1(config)#enable secret class
R1(config)#
```

```
R1(config)#enable secret class
R1(config)#line aux 0
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#line console 0
R1(config-line)#password class
R1(config-line)#login
R1(config-line)#exit
R1(config)#line vty 0
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#
```

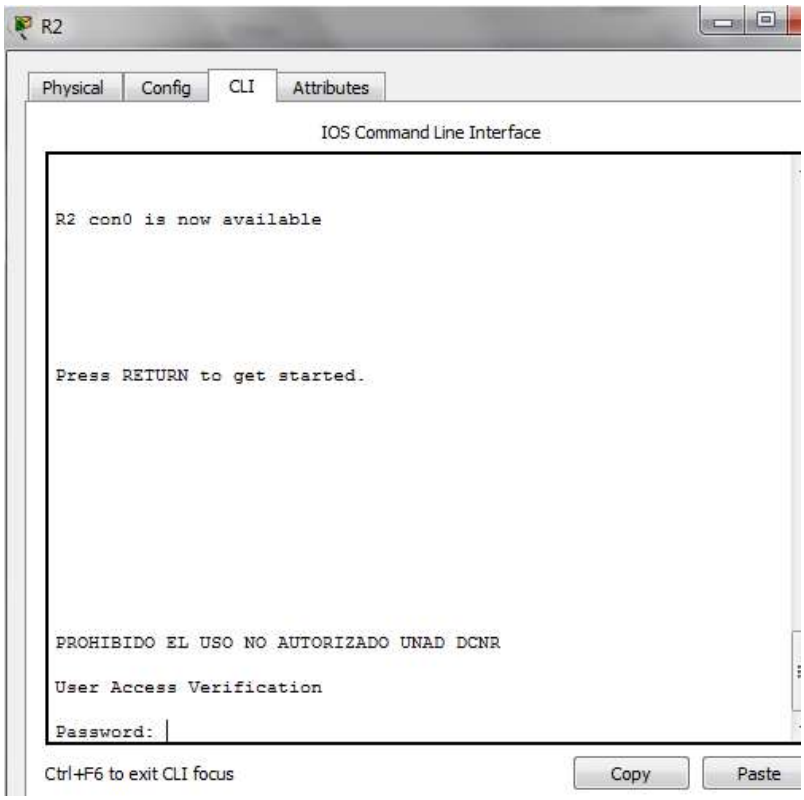
Encriptar contraseñas:

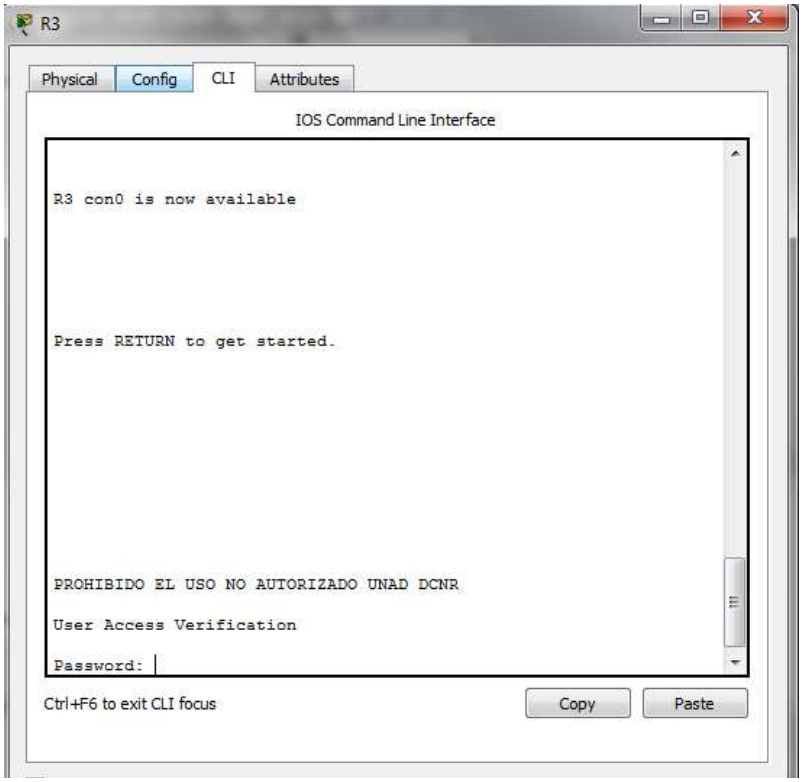
```
R1(config)#service pass
R1(config)#service password-encryption
```

Configurar banner y verificación de seguridad



Este procedimiento se replica en los routes R2 y R3


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
R2 con0 is now available
Press RETURN to get started.
PROHIBIDO EL USO NO AUTORIZADO UNAD DCNR
User Access Verification
Password:
Ctrl+F6 to exit CLI focus
Copy
Paste

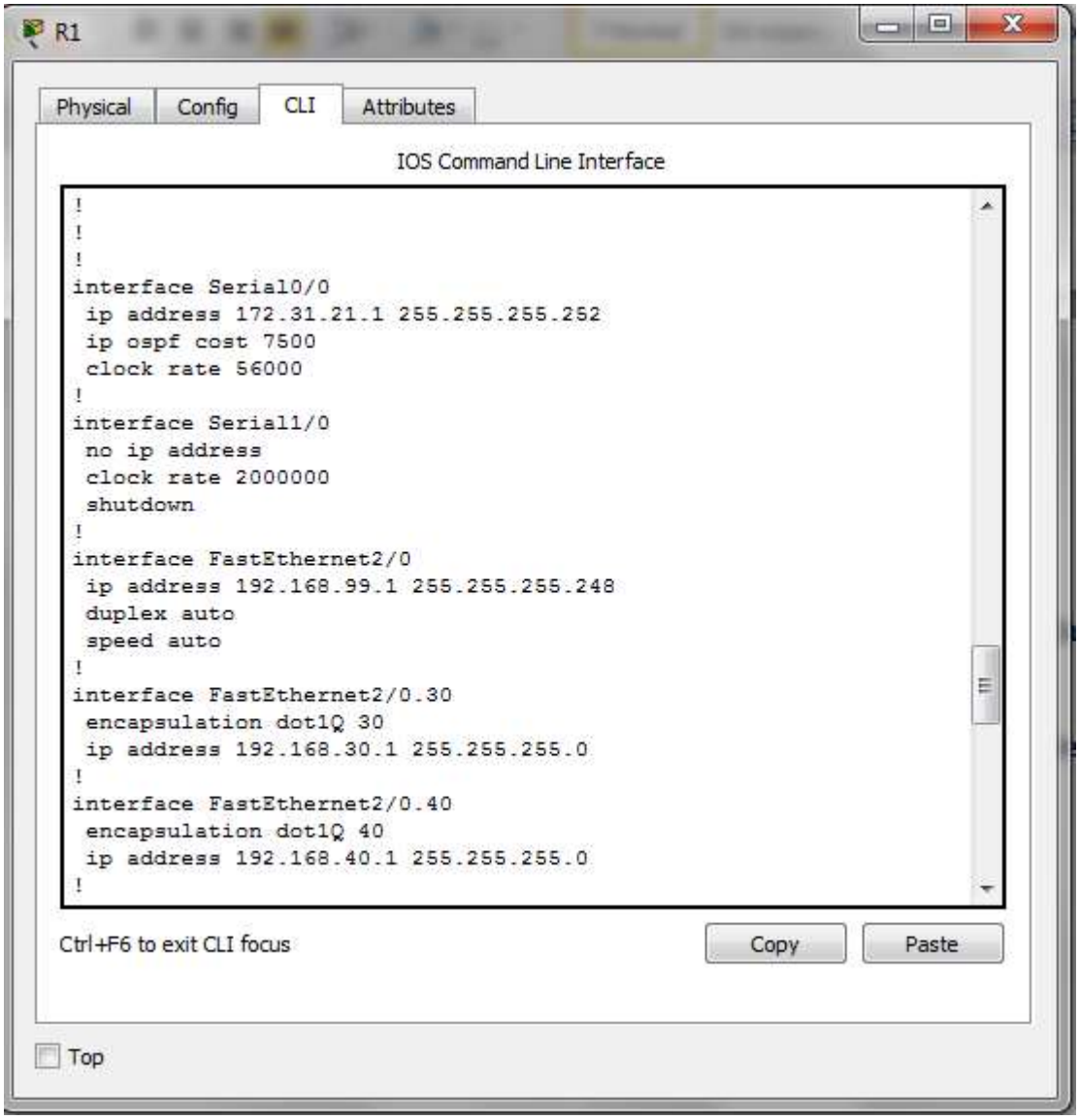

R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
R3 con0 is now available
Press RETURN to get started.
PROHIBIDO EL USO NO AUTORIZADO UNAD DCNR
User Access Verification
Password:
Ctrl+F6 to exit CLI focus
Copy
Paste

4.1.2.2 Configuración direccionamiento

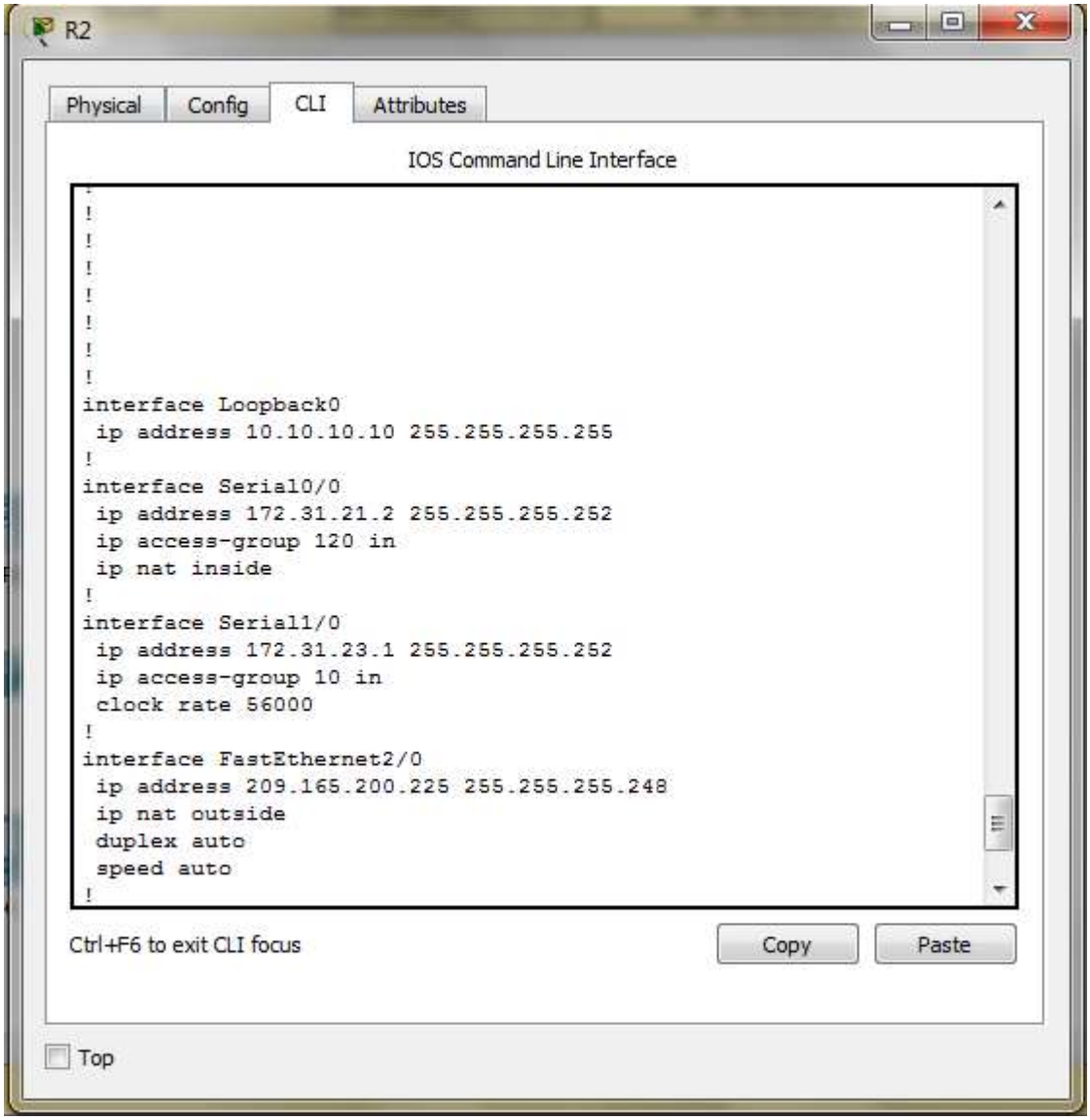
Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario

Con el comando `R1(config)#ip address` asignamos a cada interfaz el direccionamiento de acuerdo a la topología dada.

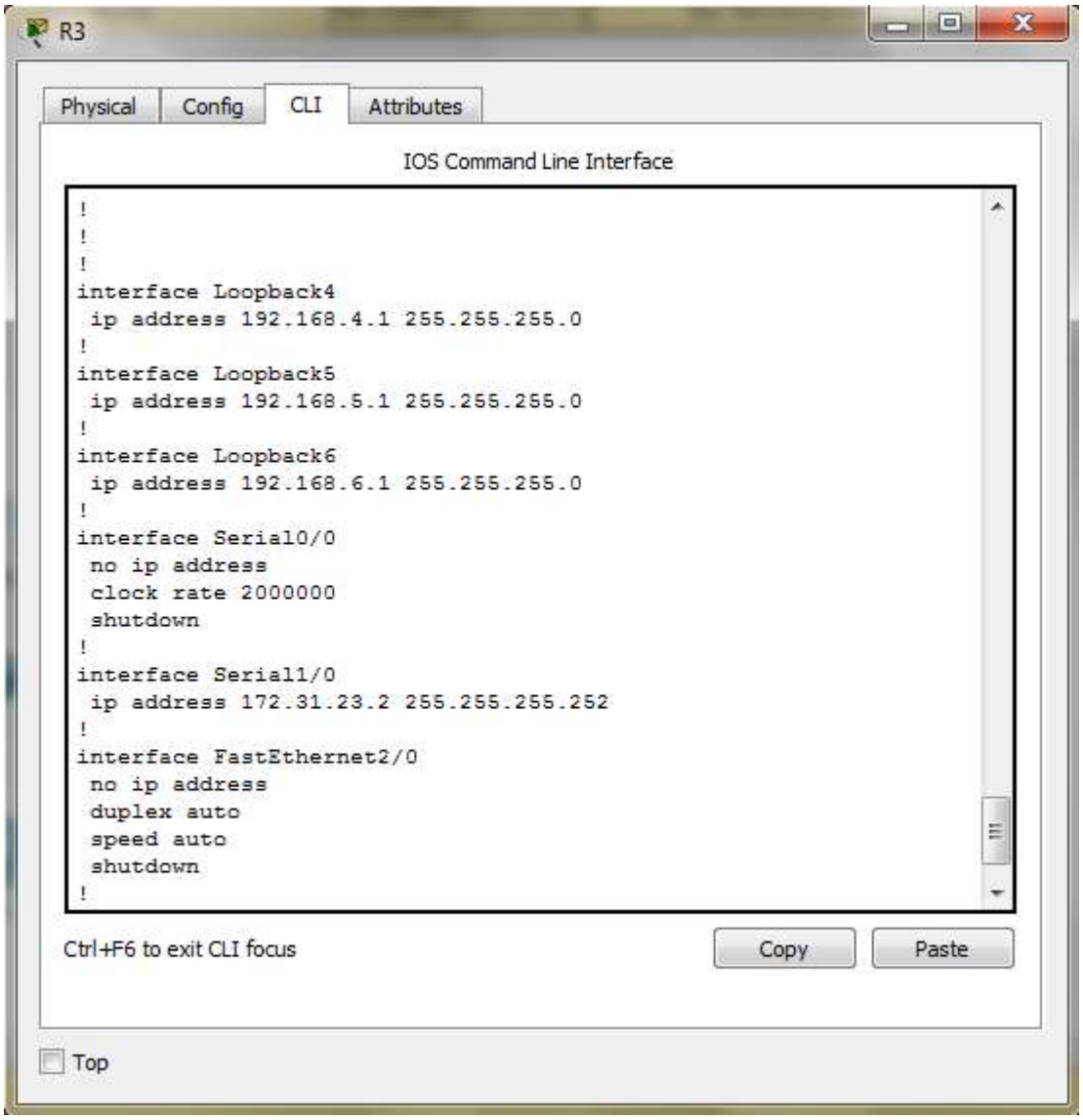
ROUTER R1



ROUTER R2


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
!
!
!
!
!
!
!
interface Loopback0
 ip address 10.10.10.10 255.255.255.255
!
interface Serial0/0
 ip address 172.31.21.2 255.255.255.252
 ip access-group 120 in
 ip nat inside
!
interface Serial1/0
 ip address 172.31.23.1 255.255.255.252
 ip access-group 10 in
 clock rate 56000
!
interface FastEthernet2/0
 ip address 209.165.200.225 255.255.255.248
 ip nat outside
 duplex auto
 speed auto
!
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

ROUTER R3


R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
!
!
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 Serial0/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial1/0
 ip address 172.31.23.2 255.255.255.252
!
interface FastEthernet2/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

4.1.2.3 Enrutamiento OSPFv2

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	2.2.2.2
Router ID R3	3.3.3.3
Configurar todas las interfaces LAN como pasivas	
Establecer el ancho de banda para enlaces seriales en	128 Kb/s
Ajustar el costo en la métrica de S0/0 a	7500

R1

Se configura OSPF y las redes de acuerdo a la topología

```
R1(config)#router ospf 10
R1(config-router)#
```

```
network 192.168.99.0 0.0.0.7 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 172.31.21.0 0.0.0.3 area 0
```

R2

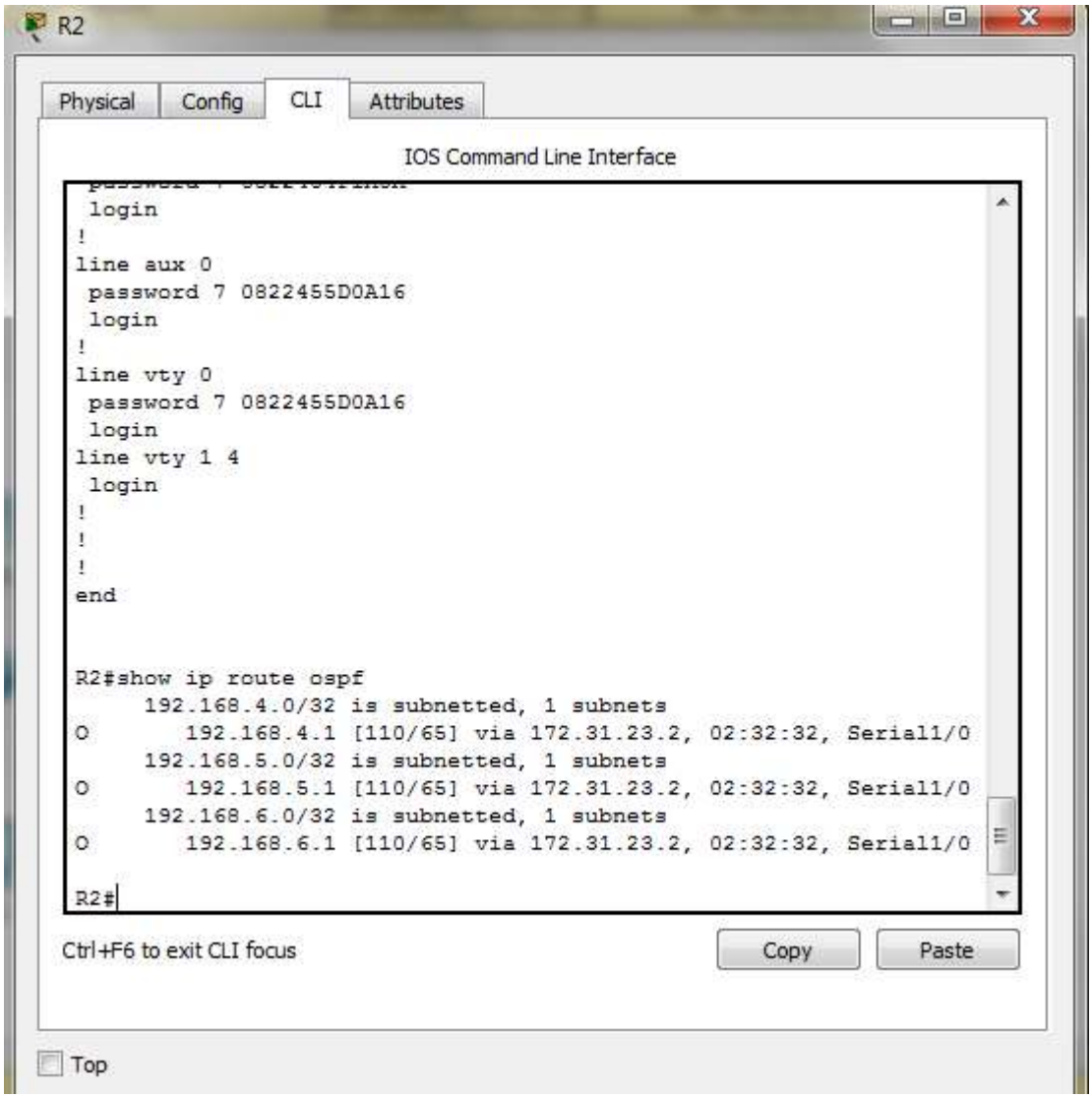
```
router ospf 10
 router-id 2.2.2.2
 log-adjacency-changes
 passive-interface FastEthernet2/0
 passive-interface Loopback0
 network 10.10.10.10 0.0.0.0 area 0
 network 209.165.200.224 0.0.0.7 area 0
 network 172.31.21.0 0.0.0.3 area 0
 network 172.31.23.0 0.0.0.3 area 0
```

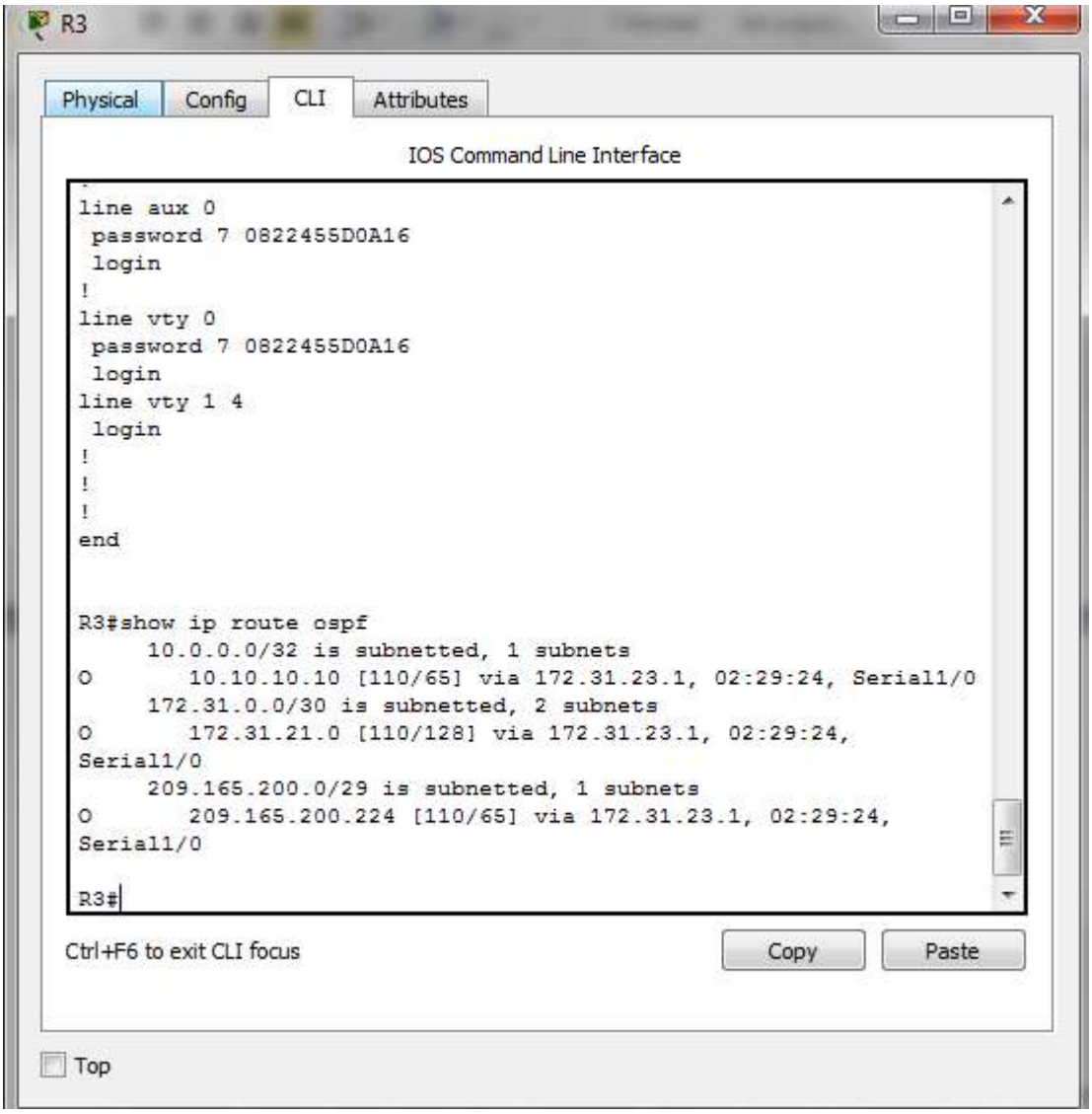
R3

```
router ospf 10
 router-id 3.3.3.3
 log-adjacency-changes
 passive-interface Loopback4
 passive-interface Loopback5
 passive-interface Loopback6
 network 192.168.4.0 0.0.0.255 area 0
 network 192.168.5.0 0.0.0.255 area 0
 network 192.168.6.0 0.0.0.255 area 0
 network 172.31.23.0 0.0.0.3 area 0
```

4.1.2.4 Verificar información OSPF

- Visualizar tablas de enrutamiento y routers conectados por OSPFv2 **show ip route ospf**




R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
line aux 0
password 7 0822455D0A16
login
!
line vty 0
password 7 0822455D0A16
login
line vty 1 4
login
!
!
!
end
R3#show ip route ospf
10.0.0.0/32 is subnetted, 1 subnets
O 10.10.10.10 [110/65] via 172.31.23.1, 02:29:24, Serial1/0
172.31.0.0/30 is subnetted, 2 subnets
O 172.31.21.0 [110/128] via 172.31.23.1, 02:29:24,
Serial1/0
209.165.200.0/29 is subnetted, 1 subnets
O 209.165.200.224 [110/65] via 172.31.23.1, 02:29:24,
Serial1/0
R3#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

- 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#show ip ospf database
            OSPF Router with ID (1.1.1.1) (Process ID 10)

                Router Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum Link count
```

```
R2#show ip ospf data
            OSPF Router with ID (2.2.2.2) (Process ID 10)

                Router Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum Link
count
2.2.2.2         2.2.2.2         974         0x80000011 0x00f053 5
3.3.3.3         3.3.3.3         972         0x8000000f 0x00a9a8 5
```

```
R3#show ip ospf data
            OSPF Router with ID (3.3.3.3) (Process ID 10)

                Router Link States (Area 0)

Link ID         ADV Router      Age         Seq#       Checksum
Link count
3.3.3.3         3.3.3.3         1090        0x8000000f 0x00a9a8 5
2.2.2.2         2.2.2.2         1093        0x80000011 0x00f053 5
```

- **R1**

R1#show ip ospf interface

FastEthernet2/0 is up, line protocol is up
Internet address is 192.168.99.1/29, Area 0
Process ID 10, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 1.1.1.1, Interface address 192.168.99.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
No Hellos (Passive interface)
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
FastEthernet2/0.30 is up, line protocol is up

Internet address is 192.168.30.1/24, Area 0
Process ID 10, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 1.1.1.1, Interface address 192.168.30.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
No Hellos (Passive interface)
Index 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)
FastEthernet2/0.40 is up, line protocol is up
Internet address is 192.168.40.1/24, Area 0
Process ID 10, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 1.1.1.1, Interface address 192.168.40.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
No Hellos (Passive interface)
Index 3/3, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
Serial0/0 is up, line protocol is up
Internet address is 172.31.21.1/30, Area 0
Process ID 10, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 7500
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 4/4, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 2.2.2.2
Suppress hello for 0 neighbor(s)

R2
R2#show ip ospf inter

Loopback0 is up, line protocol is up
Internet address is 10.10.10.10/32, Area 0
Process ID 10, Router ID 2.2.2.2, Network Type LOOPBACK, Cost: 1
Loopback interface is treated as a stub Host
FastEthernet2/0 is up, line protocol is up
Internet address is 209.165.200.225/29, Area 0
Process ID 10, Router ID 2.2.2.2, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 2.2.2.2, Interface address 209.165.200.225
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)
Serial1/0 is up, line protocol is up
Internet address is 172.31.23.1/30, Area 0
Process ID 10, Router ID 2.2.2.2, 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 3/3, 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 3.3.3.3
Suppress hello for 0 neighbor(s)
Serial0/0 is up, line protocol is up
Internet address is 172.31.21.2/30, Area 0
Process ID 10, Router ID 2.2.2.2, 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 00:00:08
Index 4/4, flood queue length 0

Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Suppress hello for 0 neighbor(s)

R3
R3#show ip ospf inter

Loopback4 is up, line protocol is up
Internet address is 192.168.4.1/24, Area 0
Process ID 10, Router ID 3.3.3.3, 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 10, Router ID 3.3.3.3, 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 10, Router ID 3.3.3.3, Network Type LOOPBACK, Cost: 1
Loopback interface is treated as a stub Host
Serial1/0 is up, line protocol is up
Internet address is 172.31.23.2/30, Area 0
Process ID 10, Router ID 3.3.3.3, 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 4/4, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 2.2.2.2
Suppress hello for 0 neighbor(s)

4.1.2.5 Configuración VLANs

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

Configuracion S1

```
S1#show run
Building configuration...

Current configuration : 1601 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname S1
!
enable password 7 0822455D0A16
!
!
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
switchport access vlan 30
switchport mode access
!
interface FastEthernet0/2
shutdown
!
interface FastEthernet0/3
switchport mode trunk
!
interface FastEthernet0/4
shutdown
!
interface FastEthernet0/5
shutdown
!
```

```
interface FastEthernet0/6
shutdown
!
interface FastEthernet0/7
shutdown
!
interface FastEthernet0/8
shutdown
!
interface FastEthernet0/9
shutdown
!
interface FastEthernet0/10
shutdown
!
interface FastEthernet0/11
shutdown
!
interface FastEthernet0/12
shutdown
!
interface FastEthernet0/13
shutdown
!
interface FastEthernet0/14
shutdown
!
interface FastEthernet0/15
shutdown
!
interface FastEthernet0/16
shutdown
!
interface FastEthernet0/17
shutdown
!
interface FastEthernet0/18
shutdown
!
interface FastEthernet0/19
shutdown
!
interface FastEthernet0/20
shutdown
!
```

```
interface FastEthernet0/21
shutdown
!
interface FastEthernet0/22
shutdown
!
interface FastEthernet0/23
shutdown
!
interface FastEthernet0/24
switchport mode trunk
!
interface GigabitEthernet0/1
shutdown
!
interface GigabitEthernet0/2
shutdown
!
interface Vlan1
description IP S1
ip address 192.168.99.2 255.255.255.248
!
banner motd ^CPROHIBIDO EL USO NO AUTORIZADO UNAD DCNR^C
!
!
!
line con 0
password 7 0822455D0A16
login
!
line vty 0 4
password 7 0822455D0A16
login
line vty 5 15
password 7 0822455D0A16
login
!
!
!
end
```

Configuracion S3

```
S3#sho run
Building configuration...

Current configuration : 1598 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname S3
!
enable password 7 0822455D0A16
!
!
!
no ip domain-lookup
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
switchport access vlan 40
switchport mode access
!
interface FastEthernet0/2
!
interface FastEthernet0/3
switchport mode trunk
!
interface FastEthernet0/4
shutdown
!
interface FastEthernet0/5
shutdown
!
interface FastEthernet0/6
shutdown
!
interface FastEthernet0/7
shutdown
!
```

```
interface FastEthernet0/8
shutdown
!
interface FastEthernet0/9
shutdown
!
interface FastEthernet0/10
shutdown
!
interface FastEthernet0/11
shutdown
!
interface FastEthernet0/12
shutdown
!
interface FastEthernet0/13
shutdown
!
interface FastEthernet0/14
shutdown
!
interface FastEthernet0/15
shutdown
!
interface FastEthernet0/16
shutdown
!
interface FastEthernet0/17
shutdown
!
interface FastEthernet0/18
shutdown
!
interface FastEthernet0/19
shutdown
!
interface FastEthernet0/20
shutdown
!
interface FastEthernet0/21
shutdown
!
interface FastEthernet0/22
shutdown
!
```

```
interface FastEthernet0/23
shutdown
!
interface FastEthernet0/24
shutdown
!
interface GigabitEthernet0/1
shutdown
!
interface GigabitEthernet0/2
shutdown
!
interface Vlan1
description IP S3
ip address 192.168.99.3 255.255.255.248
!
banner motd ^CPROHIBIDO EL USO NO AUTORIZADO UNAD DCNR^C
!
!
!
line con 0
password 7 0822455D0A16
login
!
line vty 0 4
password 7 0822455D0A16
login
line vty 5 15
password 7 0822455D0A16
login
!
!
!
End
```

4 .En el Switch 3 deshabilitar DNS lookup

```
S3(config)#no ip domain-lookup
```

```
S3#show run
Building configuration...

Current configuration : 1598 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname S3
!
enable password 7 0822455D0A16
!
!
!
no ip domain-lookup
!
```

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

S1

```
!
interface Vlan1
 description IP S1
 ip address 192.168.99.2 255.255.255.248
!
```

S3

```
interface Vlan1
 description IP S3
 ip address 192.168.99.3 255.255.255.248
```

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

S1

interface FastEthernet0/2
shutdown
!
interface FastEthernet0/3
switchport mode trunk
!

```
interface FastEthernet0/4
shutdown
!
interface FastEthernet0/5
shutdown
!
interface FastEthernet0/6
shutdown
!
interface FastEthernet0/7
shutdown
!
interface FastEthernet0/8
shutdown
!
interface FastEthernet0/9
shutdown
!
interface FastEthernet0/10
shutdown
!
interface FastEthernet0/11
shutdown
!
interface FastEthernet0/12
shutdown
!
interface FastEthernet0/13
shutdown
!
interface FastEthernet0/14
shutdown
!
interface FastEthernet0/15
shutdown
!
interface FastEthernet0/16
shutdown
!
interface FastEthernet0/17
shutdown
!
interface FastEthernet0/18
shutdown
!
```

```
interface FastEthernet0/19
shutdown
!
interface FastEthernet0/20
shutdown
!
interface FastEthernet0/21
shutdown
!
interface FastEthernet0/22
shutdown
!
interface FastEthernet0/23
shutdown
!
interface FastEthernet0/24
switchport mode trunk
!
interface GigabitEthernet0/1
shutdown
!
interface GigabitEthernet0/2
shutdown
```

S3

```
interface FastEthernet0/2
!
interface FastEthernet0/3
switchport mode trunk
!
interface FastEthernet0/4
shutdown
!
interface FastEthernet0/5
shutdown
!
interface FastEthernet0/6
shutdown
!
interface FastEthernet0/7
shutdown
!
interface FastEthernet0/8
shutdown
```

```
!
interface FastEthernet0/9
shutdown
!
interface FastEthernet0/10
shutdown
!
interface FastEthernet0/11
shutdown
!
interface FastEthernet0/12
shutdown
!
interface FastEthernet0/13
shutdown
!
interface FastEthernet0/14
shutdown
!
interface FastEthernet0/15
shutdown
!
interface FastEthernet0/16
shutdown
!
interface FastEthernet0/17
shutdown
!
interface FastEthernet0/18
shutdown
!
interface FastEthernet0/19
shutdown
!
interface FastEthernet0/20
shutdown
!
interface FastEthernet0/21
shutdown
!
interface FastEthernet0/22
shutdown
!
interface FastEthernet0/23
shutdown
```

```
!
interface FastEthernet0/24
shutdown
!
interface GigabitEthernet0/1
shutdown
!
interface GigabitEthernet0/2
shutdown
```

7. Implement DHCP and NAT for IPv4

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

```
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
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
```

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

```
ip dhcp excluded-address 192.168.30.1 192.168.30.30
ip dhcp excluded-address 192.168.40.1 192.168.40.30
```

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

```
ip nat pool UNAD 209.165.200.225 209.165.200.230 netmask 255.255.255.248
ip nat inside source list 1 pool UNAD
ip classless
```

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

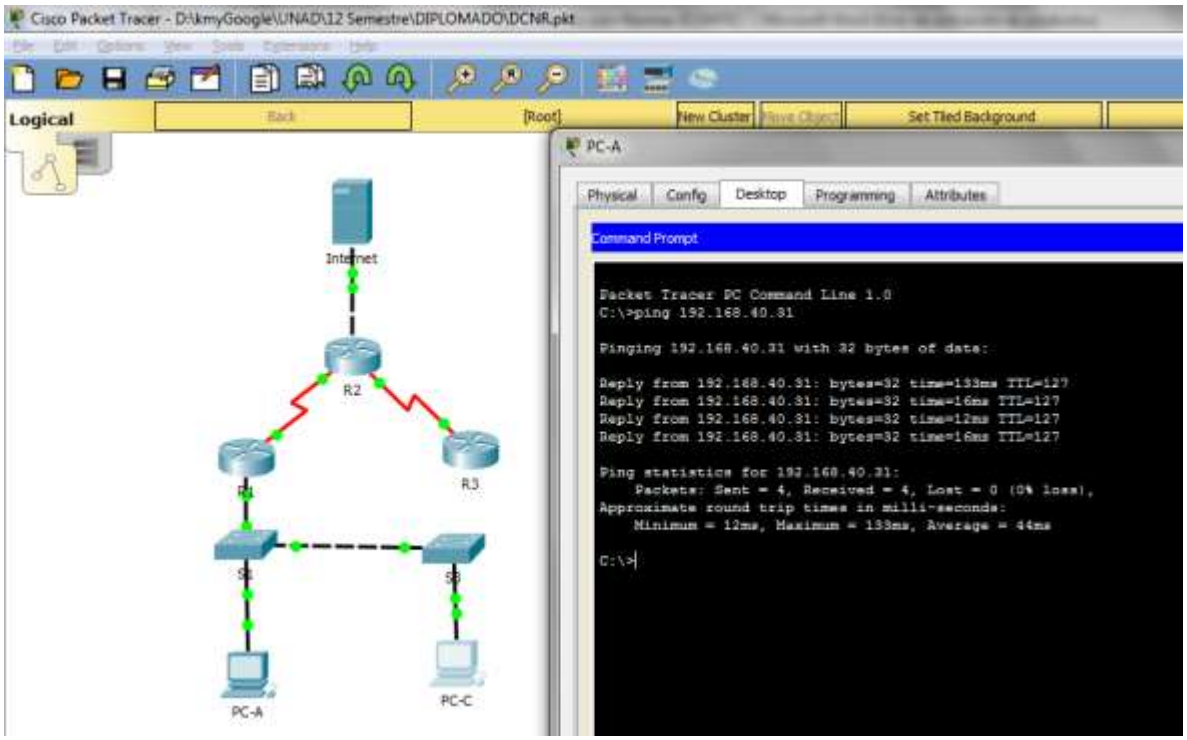
12. Configurar al menos dos listas de acceso de tipo extendido o nombradas a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

```
access-list 10 deny 192.168.4.0 0.0.0.255
access-list 10 permit any
access-list 20 deny 192.168.99.0 0.0.0.255
access-list 20 permit any
access-list 1 permit 192.168.30.0 0.0.0.255
access-list 120 permit tcp host 192.168.30.0 any eq www
access-list 120 deny ip any any
```

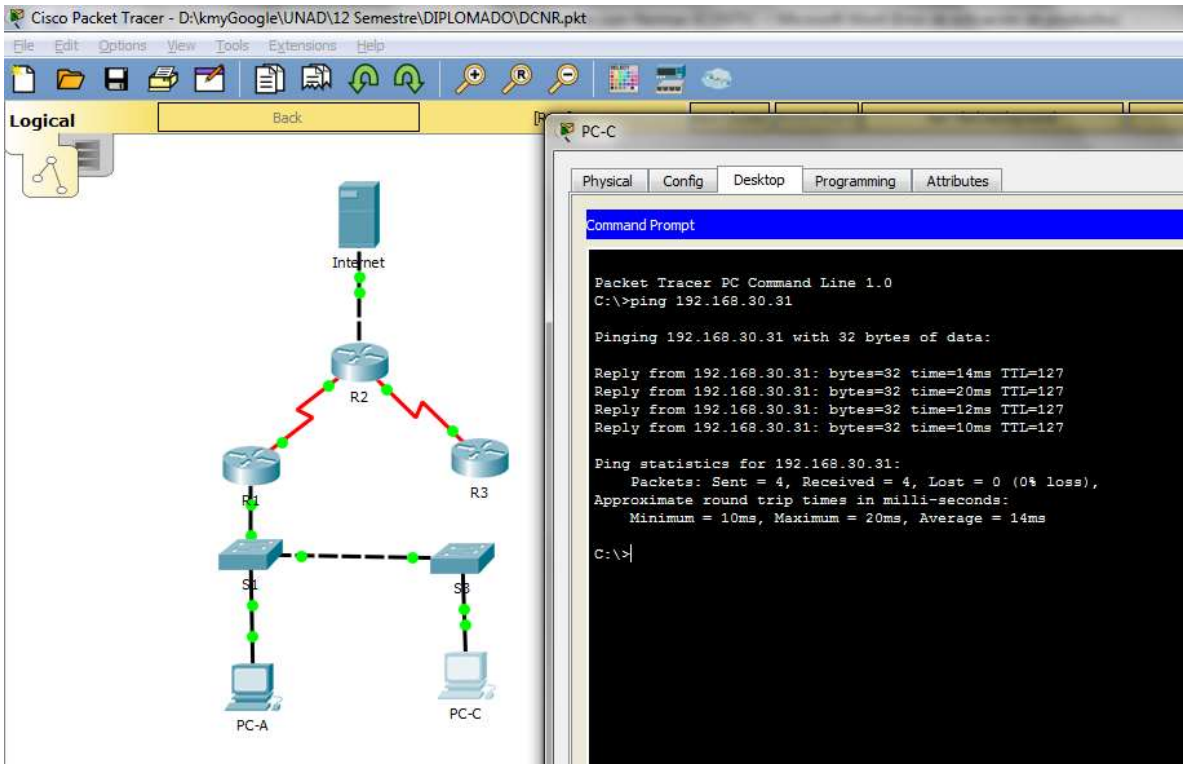
5. RESULTADOS

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

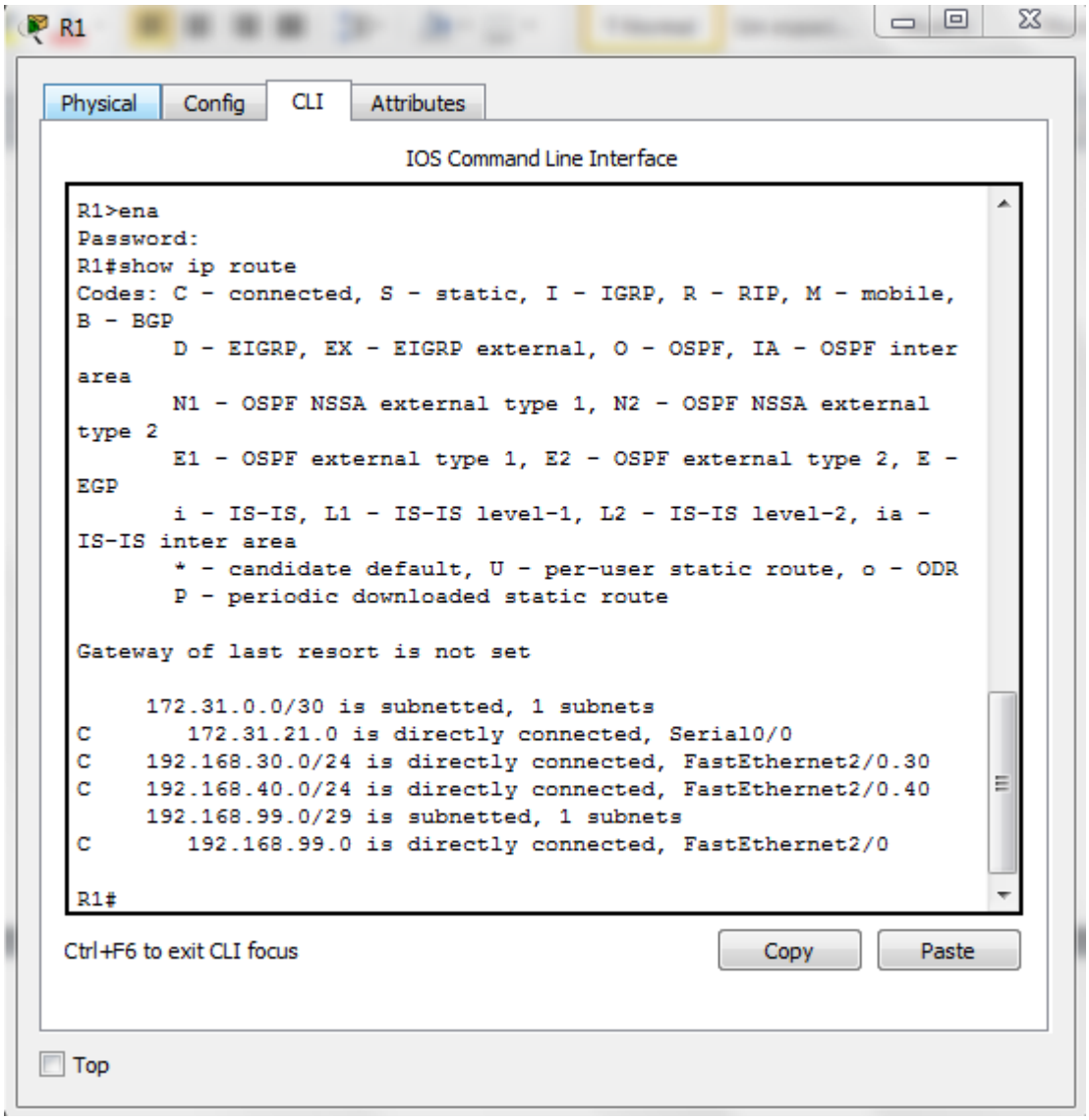
Ping PC-A a PC-C

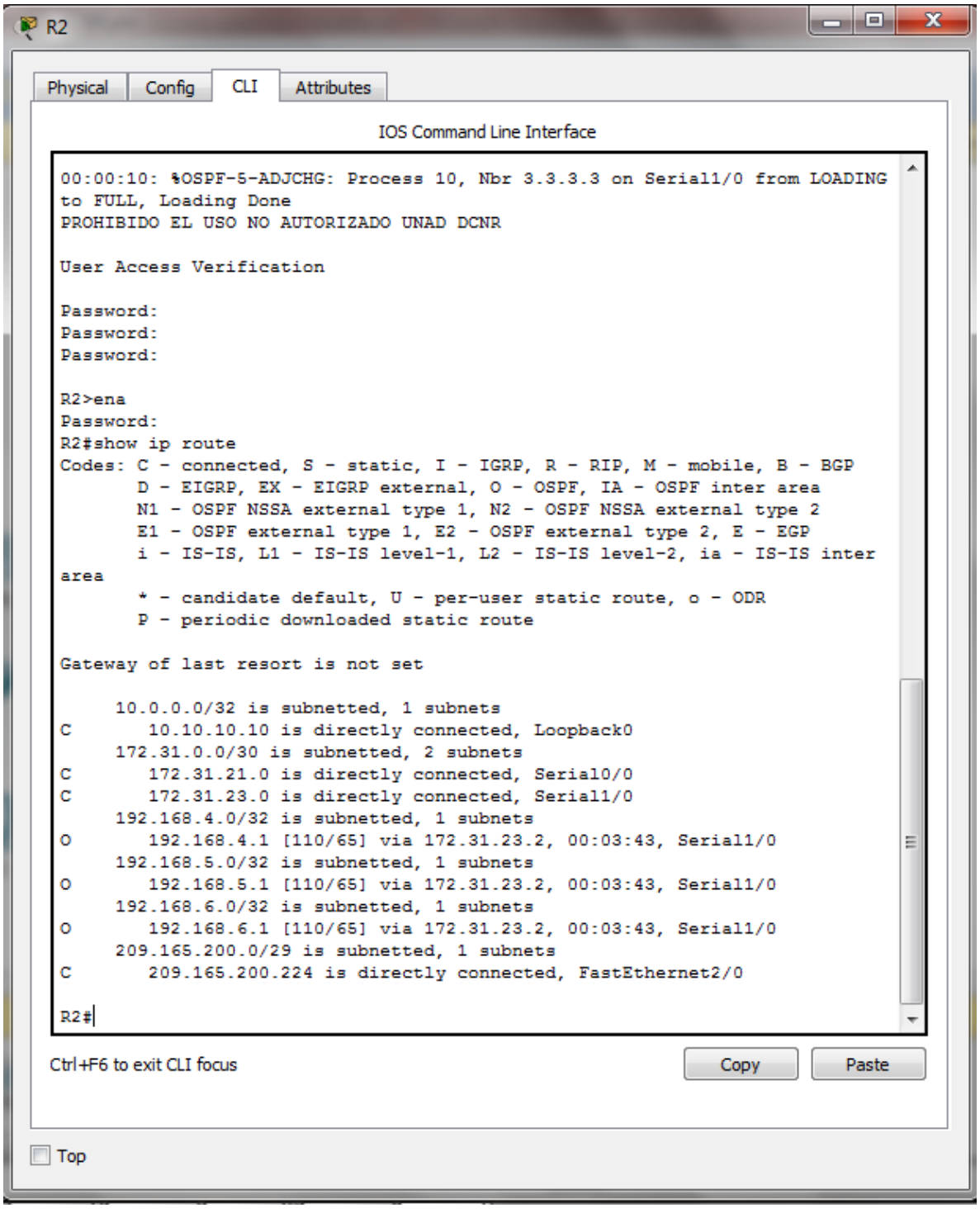


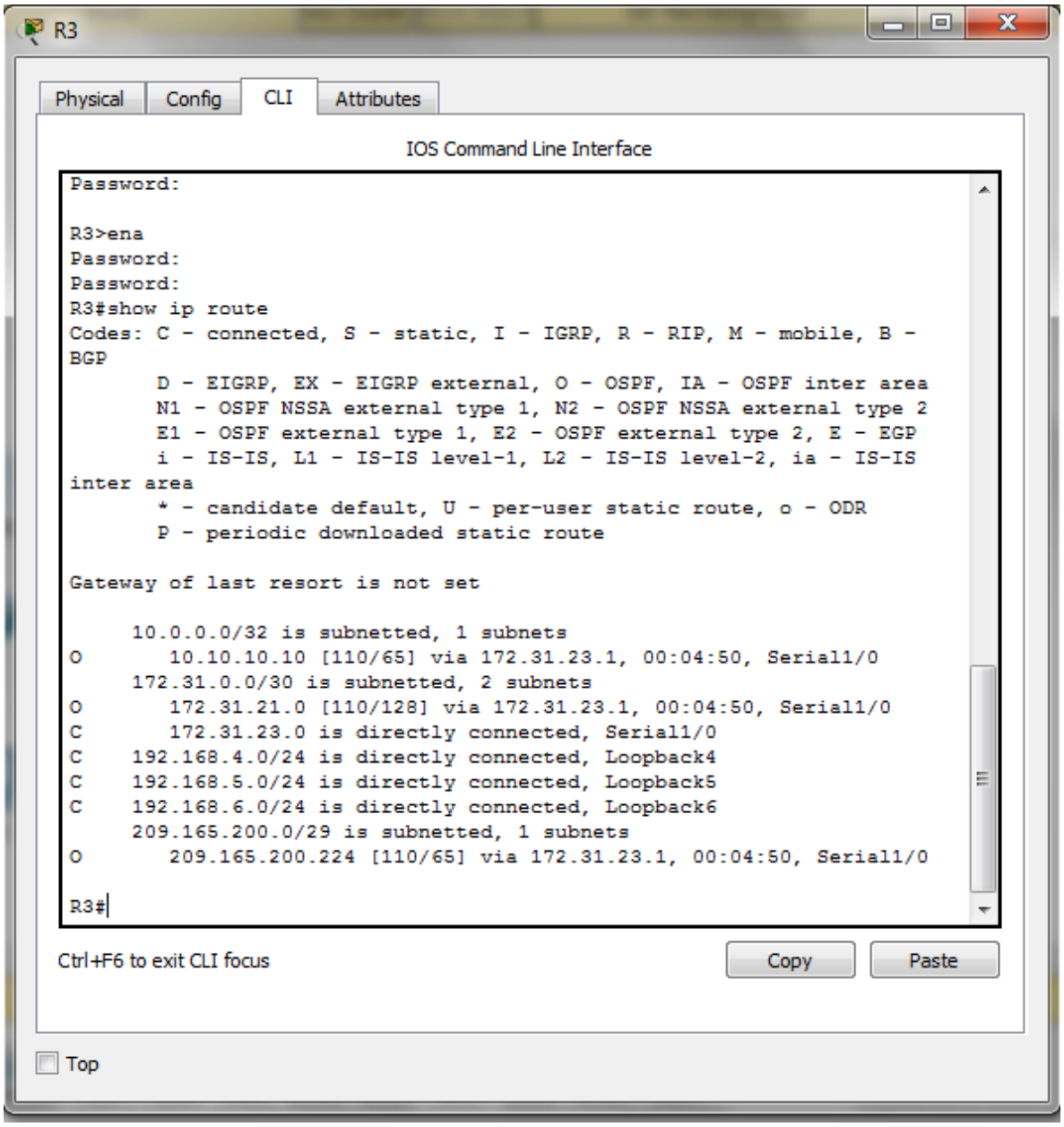
Ping PC-C a PC-A



SHOW IP ROUTE


R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
R1>ena
Password:
R1#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile,
B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter
area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external
type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E -
EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia -
IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is not set
172.31.0.0/30 is subnetted, 1 subnets
C 172.31.21.0 is directly connected, Serial0/0
C 192.168.30.0/24 is directly connected, FastEthernet2/0.30
C 192.168.40.0/24 is directly connected, FastEthernet2/0.40
192.168.99.0/29 is subnetted, 1 subnets
C 192.168.99.0 is directly connected, FastEthernet2/0
R1#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
00:00:10: %OSPF-5-ADJCHG: Process 10, Nbr 3.3.3.3 on Serial1/0 from LOADING to FULL, Loading Done
PROHIBIDO EL USO NO AUTORIZADO UNAD DCNR
User Access Verification
Password:
Password:
Password:
R2>ena
Password:
R2#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is not set
10.0.0.0/32 is subnetted, 1 subnets
C 10.10.10.10 is directly connected, Loopback0
172.31.0.0/30 is subnetted, 2 subnets
C 172.31.21.0 is directly connected, Serial0/0
C 172.31.23.0 is directly connected, Serial1/0
192.168.4.0/32 is subnetted, 1 subnets
O 192.168.4.1 [110/65] via 172.31.23.2, 00:03:43, Serial1/0
192.168.5.0/32 is subnetted, 1 subnets
O 192.168.5.1 [110/65] via 172.31.23.2, 00:03:43, Serial1/0
192.168.6.0/32 is subnetted, 1 subnets
O 192.168.6.1 [110/65] via 172.31.23.2, 00:03:43, Serial1/0
209.165.200.0/29 is subnetted, 1 subnets
C 209.165.200.224 is directly connected, FastEthernet2/0
R2#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
Password:
R3>ena
Password:
Password:
R3#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is not set
10.0.0.0/32 is subnetted, 1 subnets
O 10.10.10.10 [110/65] via 172.31.23.1, 00:04:50, Serial1/0
172.31.0.0/30 is subnetted, 2 subnets
O 172.31.21.0 [110/128] via 172.31.23.1, 00:04:50, Serial1/0
C 172.31.23.0 is directly connected, Serial1/0
C 192.168.4.0/24 is directly connected, Loopback4
C 192.168.5.0/24 is directly connected, Loopback5
C 192.168.6.0/24 is directly connected, Loopback6
209.165.200.0/29 is subnetted, 1 subnets
O 209.165.200.224 [110/65] via 172.31.23.1, 00:04:50, Serial1/0
R3#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

6. CONCLUSIONES

- Se realiza configuración de enrutamiento
- Se lleva a practica los conocimiento adquiridos acerca de OSPF adquiridos en el semestre
- Se verifica conectividad entre los dispositivos
- Se realiza configuración de seguridad sabiendo que siempre se debe implementar ya que estos dispositivos en una red son muy importantes ya que interconectan las redes y son fuente de ataques.

7. REFERENCIAS BIBLIOGRÁFICAS

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CISCO. (2014). Enrutamiento entre VLANs. Principios de Enrutamiento y Conmutación. Recuperado de: https://static-course-assets.s3.amazonaws.com/RSE50ES/module5/index.html#5.0.1.1

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8. ANEXOS

8.1 ANEXO 1

Configuración de routers y switchs.