

EVALUACIÓN – PRUEBA DE HABILIDADES PRÁCTICAS CCNA

DIPLOMADO DE PROFUNDIZACIÓN CISCO

ESTUDIANTE

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GRUPO

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INTRODUCCION

En la realización de este trabajo se encuentra plasmado las habilidades adquiridas a lo largo del diplomado en los diferentes aspectos relacionados al Networking

Para el desarrollo de este trabajo se escogió la herramienta de Simulación Packet Tracer debido a su versatilidad y potencia en la simulación de ambientes redes.

Para cualquier empresa sin importar el tamaño el uso de las redes es un pilar fundamental en el desarrollo de las actividades propias del negocio por esto es fundamental hacer una análisis y diseño de equipos configuraciones que soporten las redes de las empresas

En este documento se encontrará la evidencia del desarrollo de la prueba de habilidades practicas donde se simula una red empresarial con sedes remotas y accesos a internet.

OBJETIVOS

Objetivo General

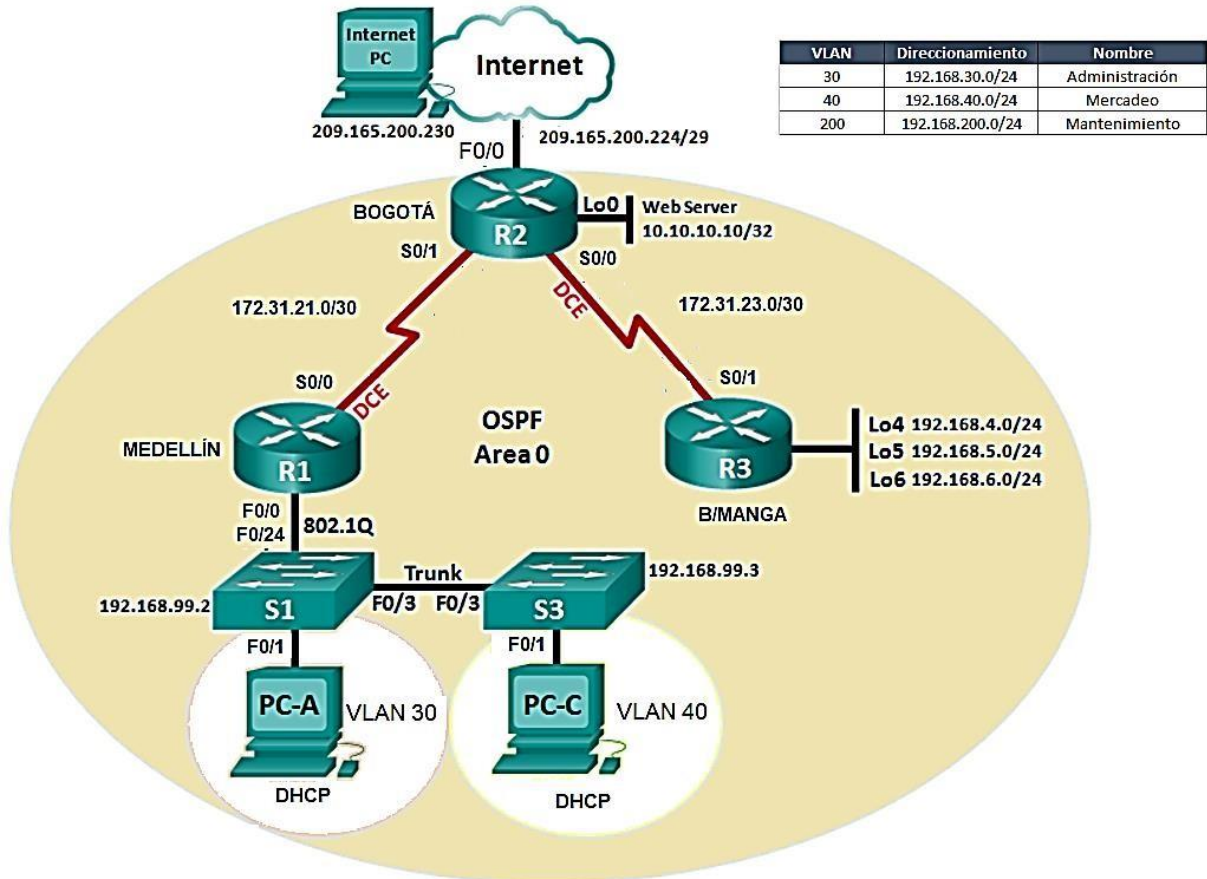
- ✓ Poner en práctica algunos de los conceptos estudiados en el diplomado en lo que tiene que ver con Routing y Switching

Objetivos Específicos

- ✓ Elaborar la topología de la red.
- ✓ Configurar y poner en funcionamiento redes virtuales (VLAN's)
- ✓ Configurar y enrutamiento OSPF
- ✓ Configurar y poner en funcionamiento NAT para compartir Internet
- ✓ Hacer las respectivas pruebas de conectividad

PLANTEAMIENTO DEL 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.



DESARROLLO DE LAS ACTIVIDADES

1. Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario
 - a. Realizar el cableado de red tal como se muestra en la topología

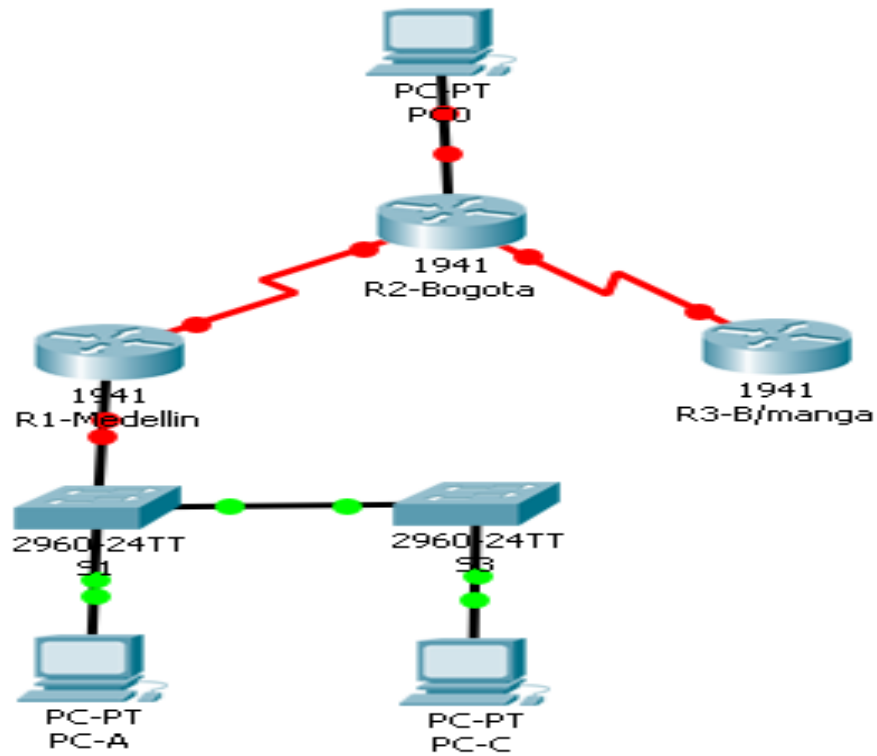


Tabla de direccionamiento

Dispositivo	Interfaz	Dirección IP	Máscara de subred	Gateway predeterminado
R1	G0/0.30	192.168.30.1	255.255.255.0	N/A
	G0/0.40	192.168.40.1	255.255.255.0	N/A
	S0/0/0 (DCE)	172.31.21.1	255.255.255.252	N/A
R2	G0/0	209.165.200.225	255.255.255.248	N/A
	S0/0/0 (DCE)	172.31.23.2	255.255.255.252	N/A
	S0/0/1 (DCE)	172.31.21.2	255.255.255.252	N/A
R3	S0/0/1 (DCE)	172.31.23.1	255.255.255.252	N/A
S1	VLAN 30	192.168.99.2	255.255.255.0	N/A
S3	VLAN 40	192.168.99.3	255.255.255.0	N/A
PC-A	NIC	DHCP		
PC-C	NIC	DHCP		
PC-INTER	NIC	209.165.200.230	255.255.255.0	

- b. Inicializar y volver a cargar los routers y los switches.
- Se accede al router mediante el puerto de consola y habilita el modo EXEC privilegiado.
 - Se escribe el comando `erase startup-config` para eliminar el archivo de configuración de inicio de la NVRAM.
 - Se emite el comando `reload` para eliminar una configuración antigua de la memoria. Cuando reciba el mensaje `Proceed with reload (Continuar con la recarga)`, presione `Enter` para confirmar. (Si presiona cualquier otra tecla, se cancela la recarga).

ROUTERS

R1-Medellin

```

IOS Command Line Interface
C1800-C1801941/R9 (REVISION 1.0) WITH 491520K/32768K bytes of
memory.
Processor board ID FTX152400RS
2 Gigabit Ethernet interfaces
2 Low-speed serial(sync/async) network interface(s)
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

Router>EN
Router>enable
Router#era
Router#erase star
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#
            
```

Ctrl+F6 to exit CLI focus

R2-Bogota

```

IOS Command Line Interface
C1800-C1801941/R9 (REVISION 1.0) WITH 491520K/32768K bytes
memory.
Processor board ID FTX152400RS
2 Gigabit Ethernet interfaces
2 Low-speed serial(sync/async) network interface(s)
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

Router>en
Router>enable
Router#era
Router#erase star
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#
            
```

Ctrl+F6 to exit CLI focus

R3-B/manga

```

IOS Command Line Interface
C1800-C1801941/R9 (REVISION 1.0) WITH 491520K/32768K bytes of
memory.
Processor board ID FTX152400RS
2 Gigabit Ethernet interfaces
2 Low-speed serial(sync/async) network interface(s)
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

Router>ene
Router>ena
Router#er
Router#erase star
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#
            
```

Ctrl+F6 to exit CLI focus

SWITCHES

S1

```

IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up

Switch>en
Switch>enable
Switch#sho
Switch#show flash
Directory of flash:/

 1  -rw-   4414921      <no date>  c2960-lanbase-mz.
122-25.FX.bin

64016384 bytes total (59601463 bytes free)
Switch#e
Switch#er
Switch#erase star
Switch#erase startup-config
Erasing the nvram filesystem will remove all configuration files
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Switch#
            
```

Ctrl+F6 to exit CLI focus

S3

```

IOS Command Line Interface
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3,
changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up

Switch>en
Switch>enable
Switch#ere
Switch#era
Switch#erase st
Switch#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Switch#
            
```

Ctrl+F6 to exit CLI focus

- c. Configurar los parámetros básicos para cada switch y router
- Desactive la búsqueda del DNS.
 - Asigne class como la contraseña del modo EXEC privilegiado.
 - Asigne cisco como la contraseña de vty y la contraseña de consola, y habilite el inicio de sesión para las líneas de vty y de consola.
 - Configure logging synchronous para evitar que los mensajes de consola interrumpan la entrada de comandos.
 - Configure la interfaz DCE serial en el R1, R2 y el R3 con una frecuencia de reloj de 128000

ROUTERS



```
R1-Medellin
Physical Config CLI Attributes
IOS Command Line Interface
R1(config)#enable secret class
R1(config)#lin
R1(config)#line cons
R1(config)#line console 0
R1(config-line)#pass
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#login
R1(config-line)#exit
R1(config)#vt
R1(config)#vty
R1(config)#vt
R1(config)#vty 0 15
^
% Invalid input detected at '^' marker.
R1(config)#lin
R1(config)#line vt
R1(config)#line vty 0 15
R1(config-line)#pass
R1(config-line)#password cisco
R1(config-line)#shu
R1(config-line)#shut
R1(config-line)#shutdown
^
% Invalid input detected at '^' marker.
R1(config-line)#exit
R1(config)#line cons
R1(config)#line console 0
R1(config-line)#loggi
R1(config-line)#logging syn
R1(config-line)#logging synchronous
R1(config-line)#exit
R1(config)#int
R1(config)#interface ser
R1(config)#interface serial s0/0
^
% Invalid input detected at '^' marker.
R1(config)#interface serial 0/0
%Invalid interface type and number
R1(config)#interface serial 0/0/0
R1(config-if)#clo
R1(config-if)#clock rat
R1(config-if)#clock rate 128000
R1(config-if)#|
```

R2-Bogota

Physical Config CLI Attributes

IOS Command Line Interface

```
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hos
Router(config)#hostname R2
R2(config)#no ip domain-lookup
R2(config)#en
R2(config)#ena
R2(config)#enable secr
R2(config)#enable secret class
R2(config)#lin
R2(config)#line cons
R2(config)#line console 0
R2(config-line)#pass
R2(config-line)#password cisco
R2(config-line)#logg
R2(config-line)#logging sy
R2(config-line)#logging synchronous
R2(config-line)#exit
R2(config)#lin
R2(config)#line vt
R2(config)#line vty 0 15
R2(config-line)#pass
R2(config-line)#password cisco
R2(config-line)#exit
R2(config)#int
R2(config)#interface ser
R2(config)#interface serial 0/0/0
R2(config-if)#clo
R2(config-if)#clock ra
R2(config-if)#clock rate 128000
R2(config-if)#interface serial 0/0/1
R2(config-if)#clock rate 128000
This command applies only to DCE interfaces
R2(config-if)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

R3-B/manga

Physical Config CLI Attributes

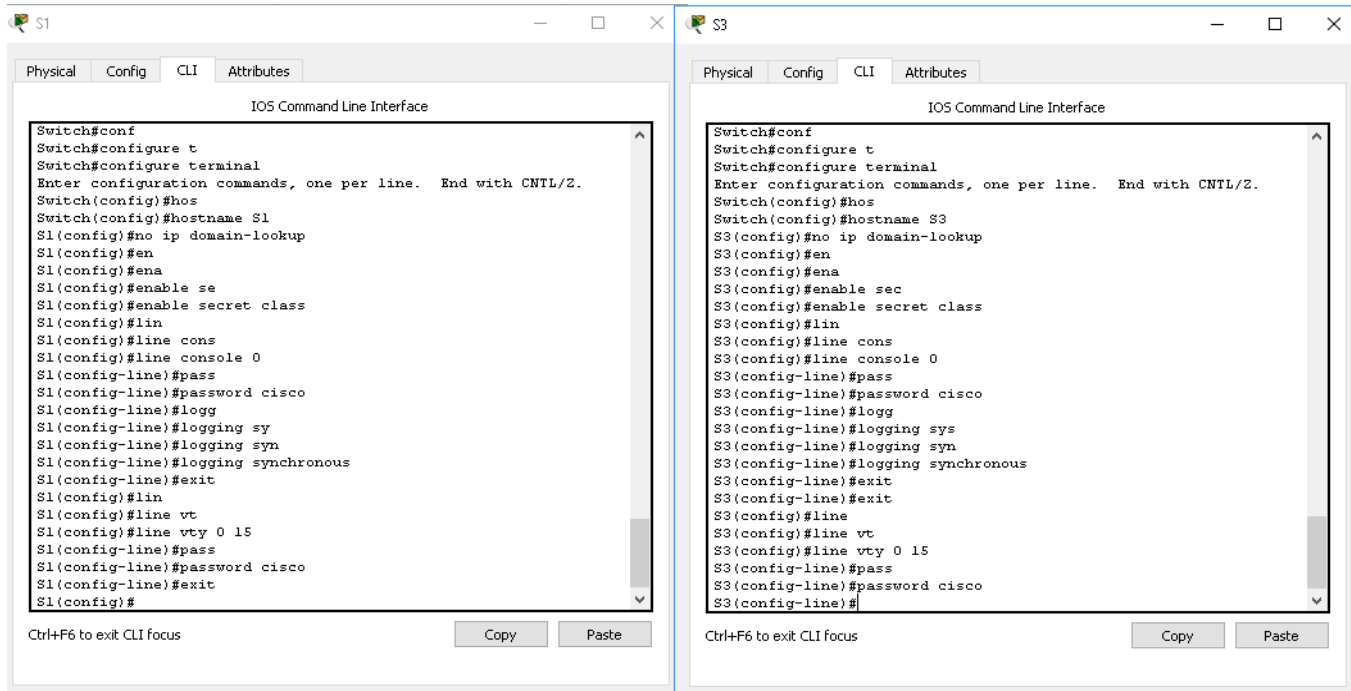
IOS Command Line Interface

```
R3(config)#no ip domain-lookup
R3(config)#ena
R3(config)#enable se
R3(config)#enable secret class
R3(config)#line
R3(config)#line cosn
R3(config)#line conso
R3(config)#line console 0
R3(config-line)#pass
R3(config-line)#password cisco
R3(config-line)#logg
R3(config-line)#logging syn
R3(config-line)#logging synchronous
R3(config-line)#exit
R3(config)#lin
R3(config)#line vt
R3(config)#line vty 0 15
R3(config-line)#pass
R3(config-line)#password cisco
R3(config-line)#exit
R3(config)#in
R3(config)#interface se
R3(config)#interface serial 0/0/1
R3(config-if)#clo
R3(config-if)#clock ra
R3(config-if)#clock rate 128000
This command applies only to DCE interfaces
R3(config-if)#
```

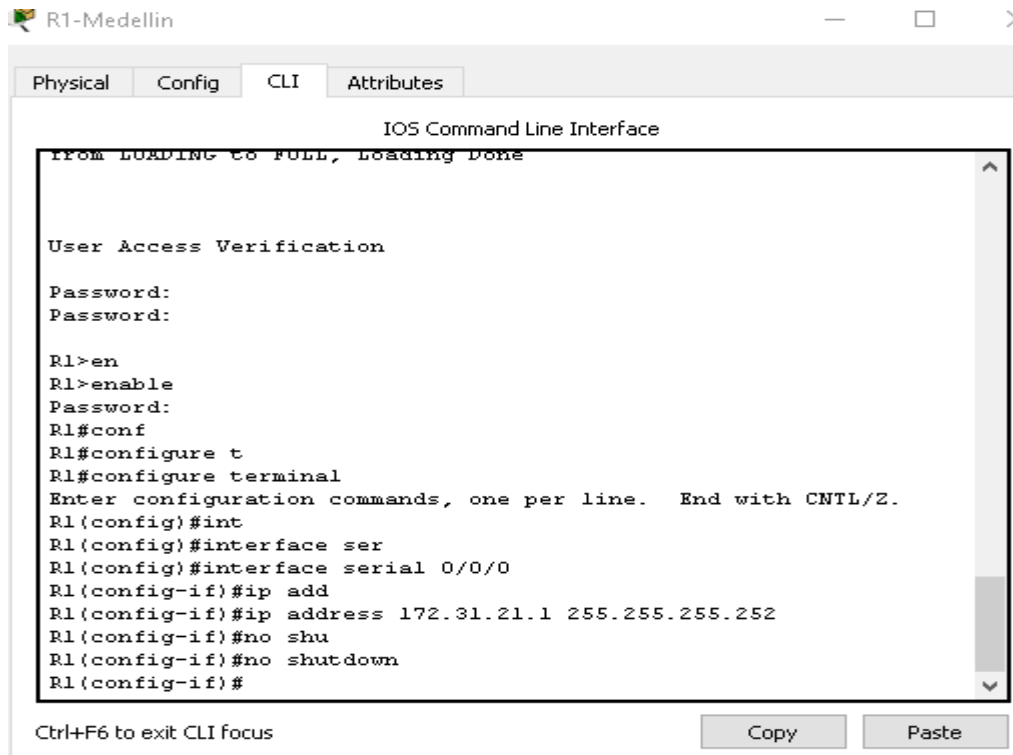
Ctrl+F6 to exit CLI focus

Copy Paste

SWITCHES



- d. Configure las direcciones IP para todas las interfaces de los ROUTERS de acuerdo con la tabla de direccionamiento.



R2-Bogota

IOS Command Line Interface

```
R2(config)#interface gi
R2(config)#interface gigabitEthernet 0/0
R2(config-if)#ip add
R2(config-if)#ip address 209.165.200.224 255.255.255.248
Bad mask /29 for address 209.165.200.224
R2(config-if)#ip address 209.165.200.225 255.255.255.248
R2(config-if)#no shu
R2(config-if)#no shutdown

Password:
R2#conf
R2#configure t
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#inte
R2(config)#interface ser
R2(config)#interface serial 0/0/0
R2(config-if)#ip add
R2(config-if)#ip address 172.31.23.2 255.255.255.252
R2(config-if)#no shu
R2(config-if)#no shutdown
R2(config-if)#interface serial 0/0/1
R2(config-if)#ip address 172.31.21.2 255.255.255.252
R2(config-if)#no shu
R2(config-if)#no shutdown
R2(config-if)#in
R2(config-if)#exit
R2(config)#interface loo
R2(config)#interface loopback 0
R2(config-if)#ip address 10.10.10.10 255.255.255.255
R2(config-if)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

R3-B/manga

Physical Config CLI Attributes

IOS Command Line Interface

```
R3(config)#interface serial 0/0/1
R3(config-if)#ip add
R3(config-if)#ip address 172.31.23.253 255.255.255.252
R3(config-if)#no shu
R3(config-if)#no shutdown

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

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

R3(config)#in
R3(config)#interface loo
R3(config)#interface loopback 4

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

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

R3(config-if)#ip add
R3(config-if)#ip address 192.168.4.0 255.255.255.0
Bad mask /24 for address 192.168.4.0
R3(config-if)#ip address 192.168.4.1 255.255.255.0
R3(config-if)#nos
R3(config-if)#no sh
R3(config-if)#no shutdown
R3(config-if)#interface loopback 5

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

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

R3(config-if)#ip address 192.168.5.1 255.255.255.0
R3(config-if)#no sh
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#interface loopback 6

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

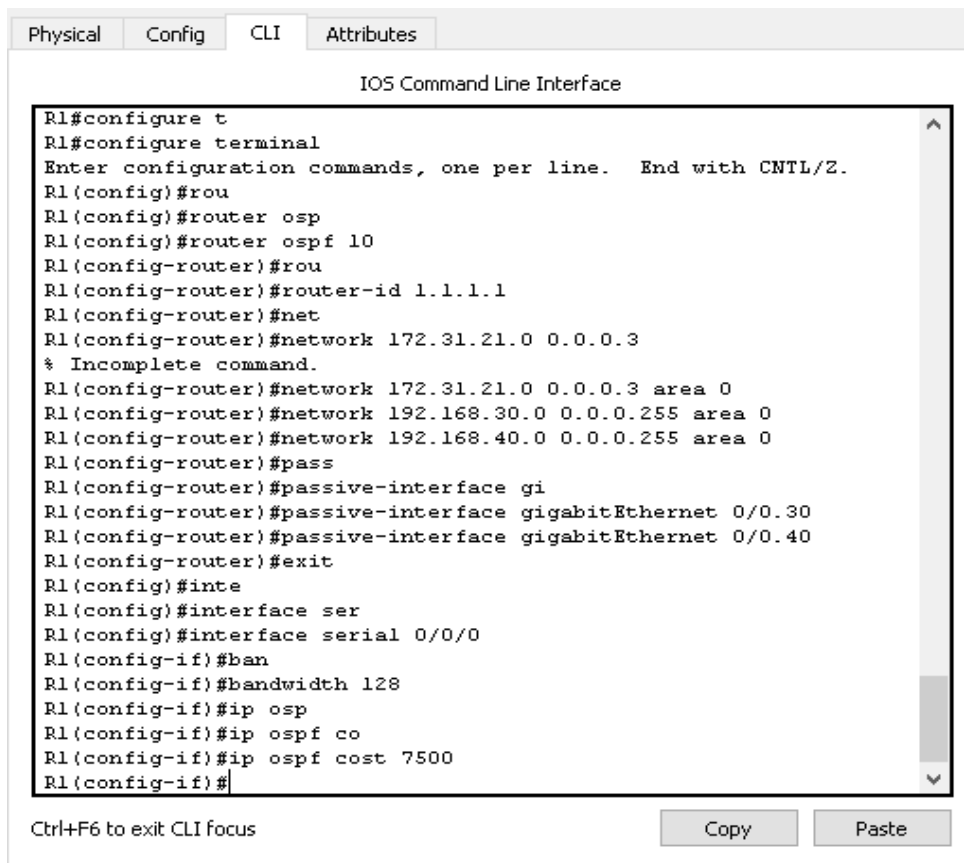
Ctrl+F6 to exit CLI focus

Copy Paste

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

OSPFv2 area 0

Configuration Item or Task	Specificatio
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



The screenshot shows a Cisco IOS CLI window titled "IOS Command Line Interface". The window has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" selected. The terminal output shows the following configuration commands:

```
R1#configure t
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#rou
R1(config)#router osp
R1(config)#router ospf 10
R1(config-router)#rou
R1(config-router)#router-id 1.1.1.1
R1(config-router)#net
R1(config-router)#network 172.31.21.0 0.0.0.3
% Incomplete command.
R1(config-router)#network 172.31.21.0 0.0.0.3 area 0
R1(config-router)#network 192.168.30.0 0.0.0.255 area 0
R1(config-router)#network 192.168.40.0 0.0.0.255 area 0
R1(config-router)#pass
R1(config-router)#passive-interface gi
R1(config-router)#passive-interface gigabitEthernet 0/0.30
R1(config-router)#passive-interface gigabitEthernet 0/0.40
R1(config-router)#exit
R1(config)#inte
R1(config)#interface ser
R1(config)#interface serial 0/0/0
R1(config-if)#ban
R1(config-if)#bandwidth 128
R1(config-if)#ip osp
R1(config-if)#ip ospf co
R1(config-if)#ip ospf cost 7500
R1(config-if)#
```

At the bottom of the window, there is a prompt "Ctrl+F6 to exit CLI focus" and two buttons: "Copy" and "Paste".

R2-Bogota

Physical Config CLI Attributes

IOS Command Line Interface

```
R2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router ospf 10
R2(config-router)#route
R2(config-router)#router-id 2.2.2.2
R2(config-router)#net
R2(config-router)#network 172.31.21.0 0.0.0.3
% Incomplete command.
R2(config-router)#network 172.31.21.0 0.0.0.3 area 0
R2(config-router)#network 172.31.21.0 0.0.0.3 area 0
02:06:34: %OSPF-5-ADJCHG: Process 10, Nbr 1.1.1.1 on Serial0/0/1
from LOADING to FULL, Loading Done
R2(config-router)#network 172.31.23.0 0.0.0.3 area 0
R2(config-router)#exit
R2(config)#int
R2(config)#interface ser
R2(config)#interface serial 0/0/0
R2(config-if)#ban
R2(config-if)#bandwidth 128
R2(config-if)#ip osp
R2(config-if)#ip ospf co
R2(config-if)#ip ospf cost 7500
R2(config-if)#bandwidth 128exit
R2(config-if)#
^
% Invalid input detected at '^' marker.

R2(config-if)#exit
R2(config)#interface serial 0/0/1
R2(config-if)#bandwidth 128
R2(config-if)#ip ospf cost 7500
R2(config-if)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

Physical Config CLI Attributes

IOS Command Line Interface

```
R3#sh
R3#show i
R3#show ip pro
R3#show ip protocols
R3#conf
R3#configure t
R3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#rou
R3(config)#router ospf 10
R3(config-router)#rout
R3(config-router)#router-id 3.3.3.3
R3(config-router)#net
R3(config-router)#network 172.31.23.0 0.0.0.3 area 0
R3(config-router)#
02:11:07: %OSPF-5-ADJCHG: Process 10, Nbr 2.2.2.2 on Serial0/0/1
from LOADING to FULL, Loading Done

R3(config-router)#exit
R3(config)#inte
R3(config)#interface ser
R3(config)#interface serial 0/0/1
R3(config-if)#ban
R3(config-if)#bandwidth 128
R3(config-if)#ip ospf
R3(config-if)#ip ospf cos
R3(config-if)#ip ospf cost 7500
R3(config-if)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

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

a. Configurar las VLAN

```

S1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#vlan 30
S1(config-vlan)#name administracion
S1(config-vlan)#vlan 40
S1(config-vlan)#name mercadeo
S1(config-vlan)#vlan 200
S1(config-vlan)#name mantenimiento
S1(config-vlan)#^Z
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#sho
S1#show vlan

VLAN Name                Status    Ports
-----
1    default                active    Fa0/1, Fa0/2,
Fa0/3, Fa0/4
Fa0/7, Fa0/8
Fa0/11, Fa0/12
Fa0/15, Fa0/16
Fa0/19, Fa0/20
Fa0/23, Fa0/24
30    administracion          active
40    mercadeo                active
200   mantenimiento          active
1002  fddi-default            act/unsup
1003  token-ring-default      act/unsup
1004  fddinet-default        act/unsup
1005  ...

S3#conf
S3#configure t
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#vlan 30
S3(config-vlan)#name administracion
S3(config-vlan)#vlan 40
S3(config-vlan)#name mercadeo
S3(config-vlan)#vlan 200
S3(config-vlan)#name mantenimiento
S3(config-vlan)#^Z
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#sh
S3#show vlan

VLAN Name                Status    Ports
-----
1    default                active    Fa0/1, Fa0/2,
Fa0/3, Fa0/4
Fa0/7, Fa0/8
Fa0/11, Fa0/12
Fa0/15, Fa0/16
Fa0/19, Fa0/20
Fa0/23, Fa0/24
30    administracion          active
40    mercadeo                active
200   mantenimiento          active
1002  fddi-default            act/unsup
1003  token-ring-default      act/unsup
1004  fddinet-default        act/unsup
1005  ...
    
```

b. Asignar las VLAN a las interfaces del switch correctas.

```

S1>enable
Password:
S1#conf
S1#configure t
S1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#inte
S1(config)#interface fa
S1(config)#interface fastEthernet 0/1
S1(config-if)#swi
S1(config-if)#switchport mode acc
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 30
S1(config-if)#exit
S1(config)#intc
S1(config)#interface vl
S1(config)#interface vlan 1
S1(config-if)#no ip add
S1(config-if)#no ip address
S1(config-if)#int
S1(config-if)#interface vlan 99
S1(config-if)#ip add
S1(config-if)#ip address 192.168.99.2 255.255.255.0
S1(config-if)#end
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#

S3>en
S3>enable
Password:
S3#conf
S3#configure t
S3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#intc
S3(config)#interface fa
S3(config)#interface fastEthernet 0/1
S3(config-if)#swt
S3(config-if)#svi
S3(config-if)#switchport mode acc
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 40
S3(config-if)#exit
S3(config)#interface vlan 1
S3(config-if)#no ip add
S3(config-if)#no ip address
S3(config-if)#interface vlan 99
S3(config-if)#ip add
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#
    
```

```

S1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#int
S1(config)#interface vlan 99
S1(config-if)#no ip add
S1(config-if)#no ip address
S1(config-if)#interface vlan 200
S1(config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up
S1(config-if)#ip address 192.168.99.2 255.255.255.0
S1(config-if)#no shut
S1(config-if)#no shutdown
S1(config-if)#

```

Ctrl+F6 to exit CLI focus

```

Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#int
S3(config)#interface vlan 99
S3(config-if)#no ip add
S3(config-if)#no ip address
S3(config-if)#interface vlan 200
S3(config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#no shu
S3(config-if)#no shutdown
S3(config-if)#

```

Ctrl+F6 to exit CLI focus

c. Configurar un enlace troncal 802.1Q entre los SWITCHES

```

IOS Command Line Interface
Fa0/13, Fa0/14
Fa0/15, Fa0/16,
Fa0/17, Fa0/18
Fa0/19, Fa0/20,
Fa0/22, Fa0/23
20 faculty active Fa0/11, Fa0/21
99 management active
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
S1#con
S1#conf
S1#configure t
S1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#int
S1(config)#interface fa
S1(config)#interface fastEthernet 0/3
S1(config-if)#swi
S1(config-if)#switchport mode tr
S1(config-if)#switchport mode trunk
S1(config-if)#no sgt
S1(config-if)#no shu
S1(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to down
S1(config-if)#

```

```

IOS Command Line Interface
S3>en
S3>enable
Password:
S3#conf
S3#configure t
S3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#int
S3(config)#interface fas
S3(config-if)#swi
S3(config-if)#switchport mode trunk
S3(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3,
changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed
state to up
S3(config-if)#no shu
S3(config-if)#no shutdown
S3(config-if)#

```

d. Verificamos troncales y conectividad

```

IOS Command Line Interface
%SYS-5-CONFIG_I: Configured from console by console
S1#show interfaces trunk
Port Mode Encapsulation Status Native vlan
Fa0/3 on 802.1q trunking 1
Port Vlans allowed on trunk
Fa0/3 1-1005
Port Vlans allowed and active in management domain
Fa0/3 1,30,40,200
Port Vlans in spanning tree forwarding state and not
pruned
Fa0/3 none
S1#ping 192.168.99.3
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.99.3, timeout is 2
seconds:
...!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 0/0/0
ms
S1#ping 192.168.99.3
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.99.3, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1
ms
S1#

```

Ctrl+F6 to exit CLI focus

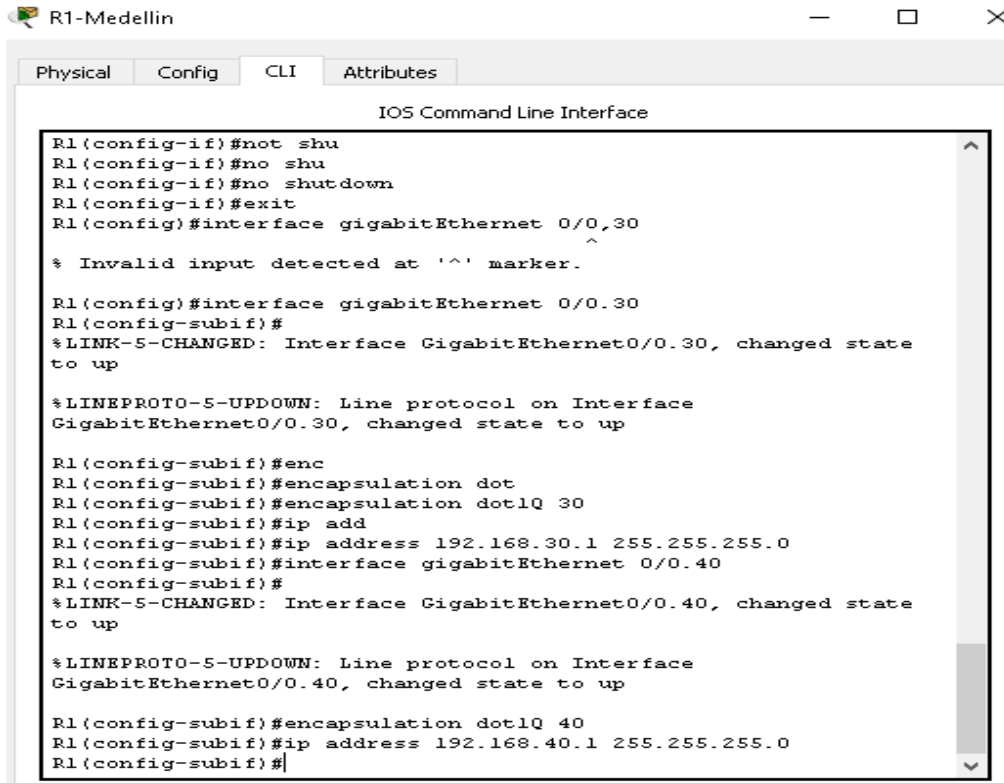
```

IOS Command Line Interface
pruned
Fa0/3 1,30,40,200
S3#show interfaces trunk
Port Mode Encapsulation Status Native vlan
Fa0/3 on 802.1q trunking 1
Port Vlans allowed on trunk
Fa0/3 1-1005
Port Vlans allowed and active in management domain
Fa0/3 1,30,40,200
Port Vlans in spanning tree forwarding state and not
pruned
Fa0/3 1,30,40,200
S3#ping 192.168.99.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.99.2, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0
ms
S3#ping 192.168.99.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.99.2, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1
ms
S3#

```

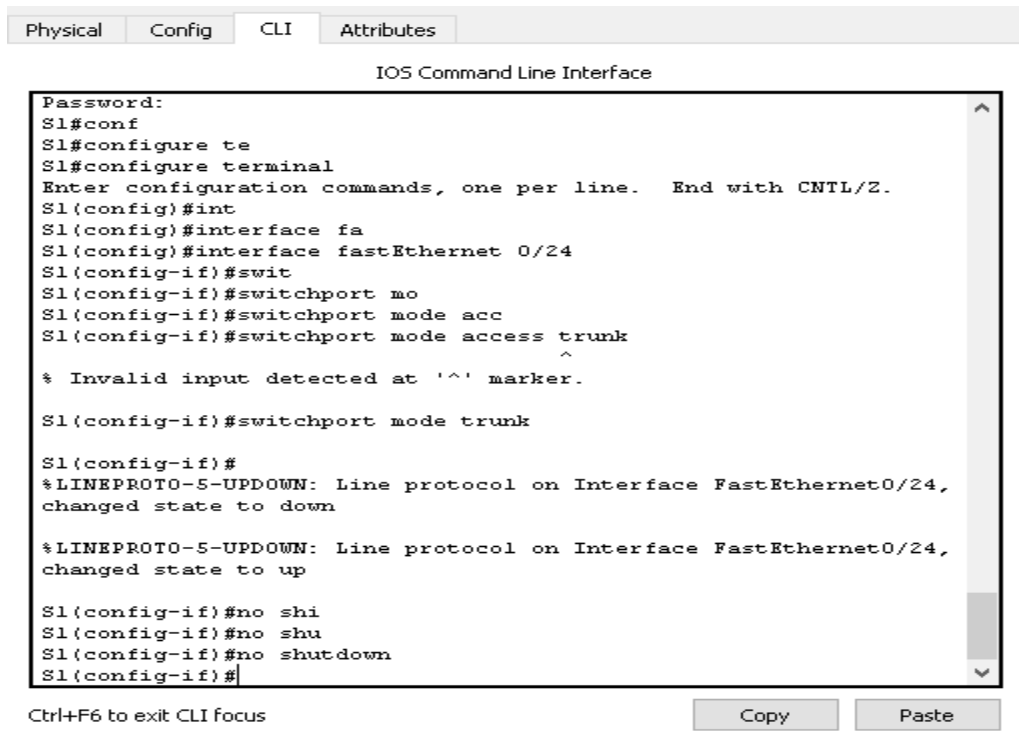
Ctrl+F6 to exit CLI focus

e. Encapsulacion IEEE 802.1Q en el R1



```
R1-Medellin
Physical Config CLI Attributes
IOS Command Line Interface
R1(config-if)#not shu
R1(config-if)#no shu
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#interface gigabitEthernet 0/0.30
^
% Invalid input detected at '^' marker.
R1(config)#interface gigabitEthernet 0/0.30
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.30, changed state
to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/0.30, changed state to up
R1(config-subif)#enc
R1(config-subif)#encapsulation dot
R1(config-subif)#encapsulation dot1Q 30
R1(config-subif)#ip add
R1(config-subif)#ip address 192.168.30.1 255.255.255.0
R1(config-subif)#interface gigabitEthernet 0/0.40
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.40, changed state
to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/0.40, changed state to up
R1(config-subif)#encapsulation dot1Q 40
R1(config-subif)#ip address 192.168.40.1 255.255.255.0
R1(config-subif)#
```

f. Configurar un enlace troncal 802.1Q entre los switch y el router



```
Physical Config CLI Attributes
IOS Command Line Interface
Password:
S1#conf
S1#configure te
S1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#int
S1(config)#interface fa
S1(config)#interface fastEthernet 0/24
S1(config-if)#swit
S1(config-if)#switchport mo
S1(config-if)#switchport mode acc
S1(config-if)#switchport mode access trunk
^
% Invalid input detected at '^' marker.
S1(config-if)#switchport mode trunk
S1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/24,
changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/24,
changed state to up
S1(config-if)#no shi
S1(config-if)#no shu
S1(config-if)#no shutdown
S1(config-if)#
```

Ctrl+F6 to exit CLI focus

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

```
IOS Command Line Interface
Password:
Password:
S1#conf
S1#configure t
S1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S1(config)#in
S1(config)#interface f
S1(config)#interface fastEthernet 0/2
S1(config-if)#shut
S1(config-if)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to
administratively down
S1(config-if)#exit
S1(config)#interface range fastEthernet 0/4-23
S1(config-if-range)#shutdown

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

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

Ctrl+F6 to exit CLI focus

Copy Paste

S3

Physical Config CLI Attributes

```
IOS Command Line Interface
S3>en
S3>enable
Password:
S3#conf
S3#configure
Configuring from terminal, memory, or network [terminal]? t
Enter configuration commands, one per line.  End with CNTL/Z.
S3(config)#int
S3(config)#interface fas
S3(config)#interface fastEthernet 0/2
S3(config-if)#shu
S3(config-if)#shutdown

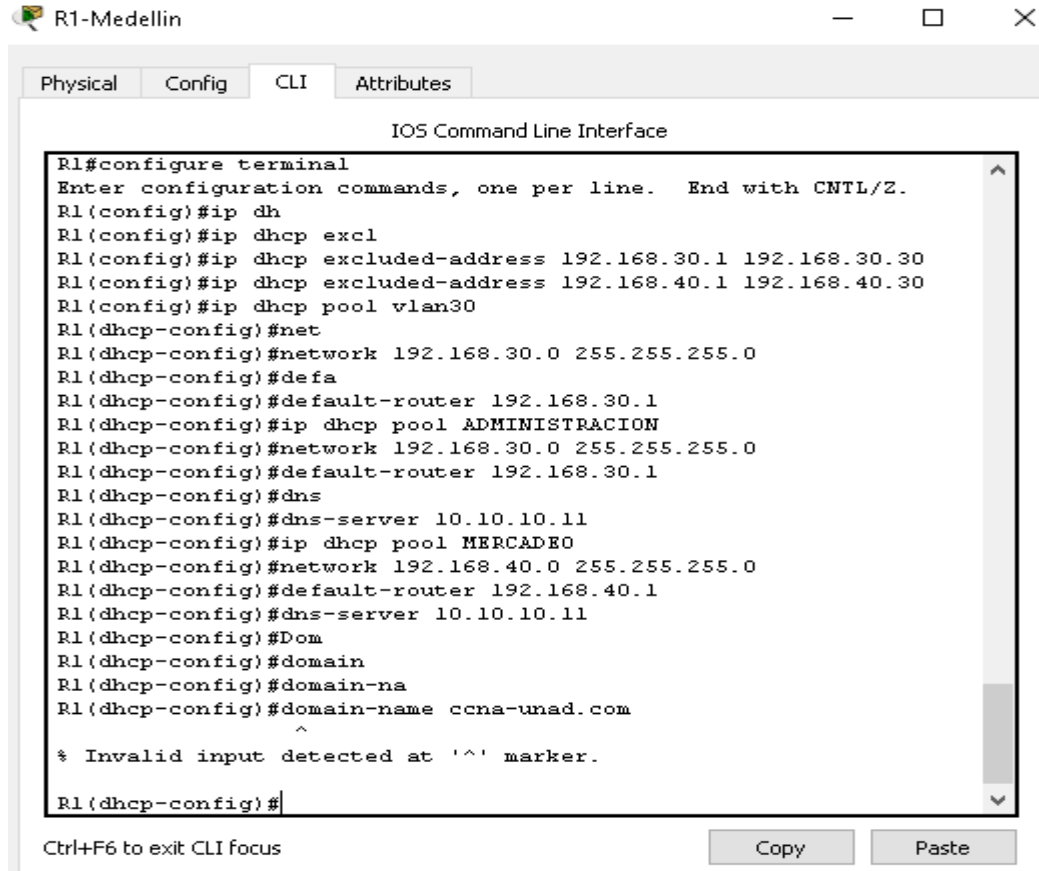
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to
administratively down
S3(config-if)#interface range fastEthernet 0/4-24
S3(config-if-range)#shutdown

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

Ctrl+F6 to exit CLI focus

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5. Configurar R1 como servidor DHCP para las VLANs 30 y 40 y reservar las primeras 30 direcciones IP para configuraciones estáticas

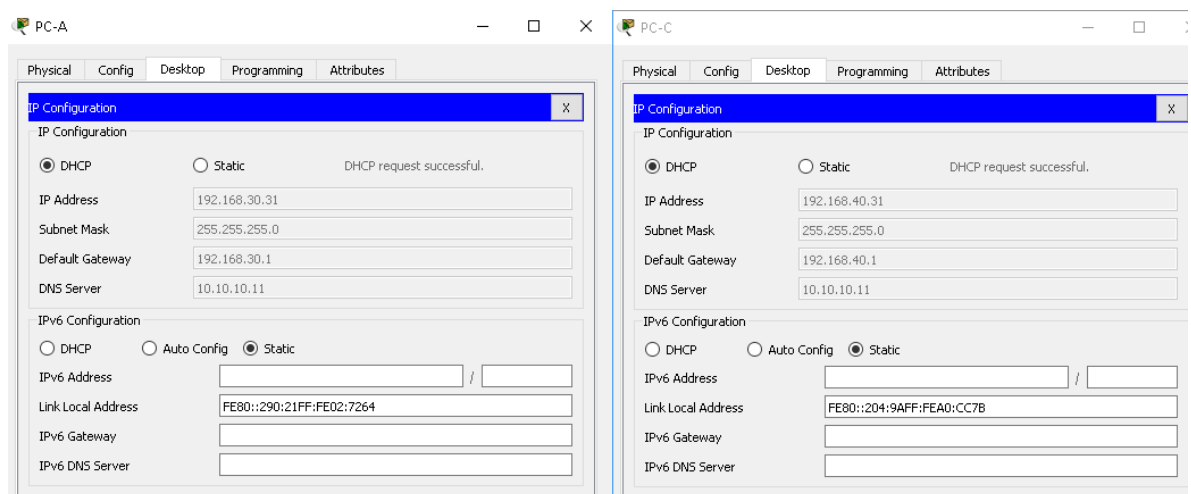


```
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp
R1(config)#ip dhcp excl
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#ip dhcp pool vlan30
R1(dhcp-config)#net
R1(dhcp-config)#network 192.168.30.0 255.255.255.0
R1(dhcp-config)#defa
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#ip dhcp pool ADMINISTRACION
R1(dhcp-config)#network 192.168.30.0 255.255.255.0
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#dns
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#ip dhcp pool MERCADERO
R1(dhcp-config)#network 192.168.40.0 255.255.255.0
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#Dom
R1(dhcp-config)#domain
R1(dhcp-config)#domain-na
R1(dhcp-config)#domain-name ccna-unad.com
^
% Invalid input detected at '^' marker.
R1(dhcp-config)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

Configurar Dhcp PC-A y PC-B



PC-A Configuration:

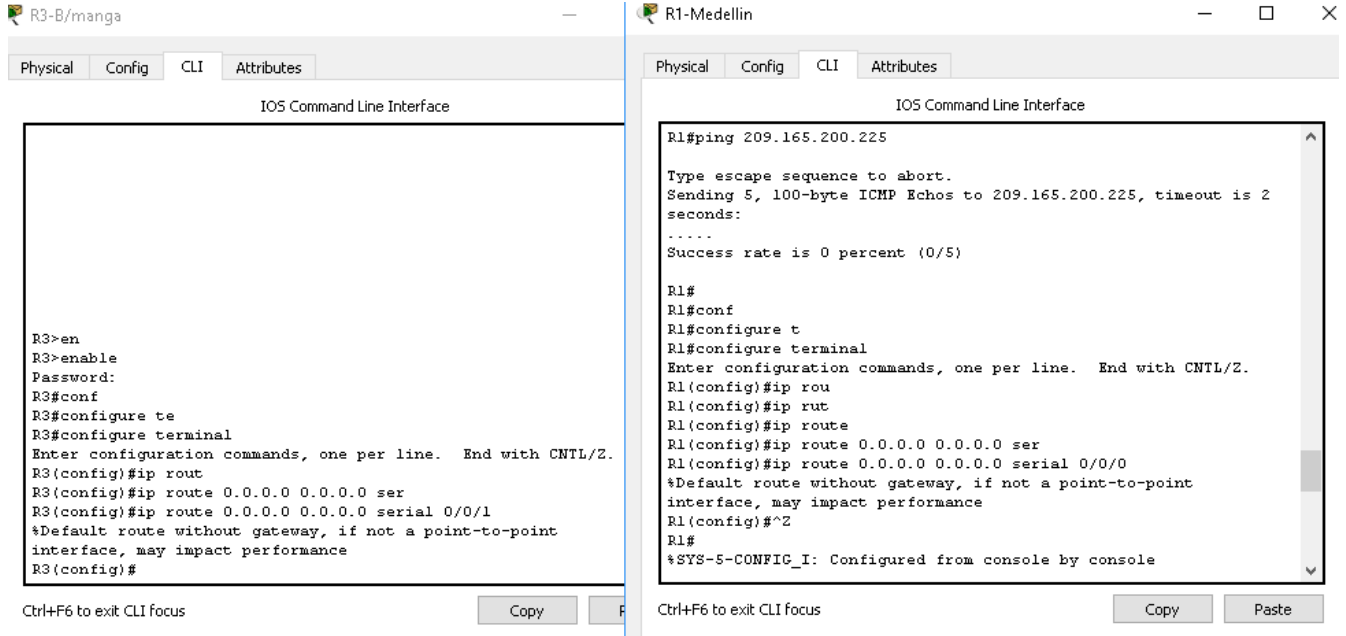
- IP Configuration: DHCP (selected), Static, DHCP request successful.
- IP Address: 192.168.30.31
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.30.1
- DNS Server: 10.10.10.11
- IPv6 Configuration: DHCP (selected), Auto Config, Static.
- IPv6 Address: [Empty]
- Link Local Address: FE80::290:21FF:FE02:7264
- IPv6 Gateway: [Empty]
- IPv6 DNS Server: [Empty]

PC-C Configuration:

- IP Configuration: DHCP (selected), Static, DHCP request successful.
- IP Address: 192.168.40.31
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.40.1
- DNS Server: 10.10.10.11
- IPv6 Configuration: DHCP (selected), Auto Config, Static.
- IPv6 Address: [Empty]
- Link Local Address: FE80::204:9AFF:FEA0:CC7B
- IPv6 Gateway: [Empty]
- IPv6 DNS Server: [Empty]

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

Configuramos rutas estaticas

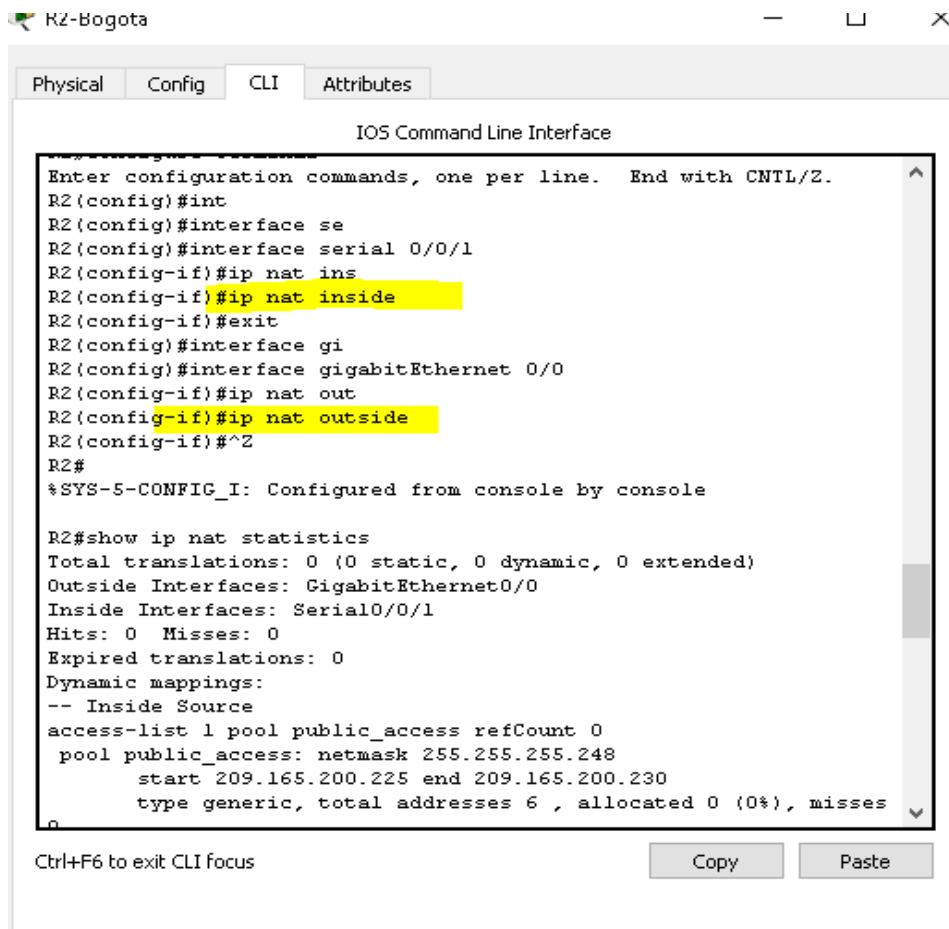


The image shows two terminal windows side-by-side. The left window is titled 'R3-B/manga' and shows the configuration of static routes on R3. The right window is titled 'R1-Medellin' and shows a successful ping test from R1 to 209.165.200.225, followed by the configuration of terminal emulation on R1.

```
R3>en
R3>enable
Password:
R3#conf
R3#configure te
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ip route
R3(config)#ip route 0.0.0.0 0.0.0.0 ser
R3(config)#ip route 0.0.0.0 0.0.0.0 serial 0/0/1
%Default route without gateway, if not a point-to-point
interface, may impact performance
R3(config)#
```

```
R1#ping 209.165.200.225
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.225, timeout is 2
seconds:
.....
Success rate is 0 percent (0/5)

R1#
R1#conf
R1#configure t
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip rou
R1(config)#ip rut
R1(config)#ip route
R1(config)#ip route 0.0.0.0 0.0.0.0 ser
R1(config)#ip route 0.0.0.0 0.0.0.0 serial 0/0/0
%Default route without gateway, if not a point-to-point
interface, may impact performance
R1(config)#^Z
R1#
%SYS-5-CONFIG_I: Configured from console by console
```



The image shows a terminal window titled 'R2-Bogota' showing the configuration of NAT on R2. The configuration includes setting up the 'inside' interface (serial 0/0/1) and the 'outside' interface (gigabitEthernet 0/0). The NAT configuration is highlighted in yellow. Below the configuration, the 'show ip nat statistics' command is executed, displaying the current NAT statistics.

```
R2(config)#int
R2(config)#interface se
R2(config)#interface serial 0/0/1
R2(config-if)#ip nat ins
R2(config-if)#ip nat inside
R2(config-if)#exit
R2(config)#interface gi
R2(config)#interface gigabitEthernet 0/0
R2(config-if)#ip nat out
R2(config-if)#ip nat outside
R2(config-if)#^Z
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#show ip nat statistics
Total translations: 0 (0 static, 0 dynamic, 0 extended)
Outside Interfaces: GigabitEthernet0/0
Inside Interfaces: Serial0/0/1
Hits: 0 Misses: 0
Expired translations: 0
Dynamic mappings:
-- Inside Source
access-list 1 pool public_access refCount 0
 pool public_access: netmask 255.255.255.248
   start 209.165.200.225 end 209.165.200.230
   type generic, total addresses 6 , allocated 0 (0%), misses
```

R2-Bogota



physical Config CLI Attributes

IOS Command Line Interface

```
R2>enable
Password:
R2#conf
R2#configure te
R2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#acc
R2(config)#access-list 1 permit 192.168.30.0 0.0.0.255
R2(config)#access-list 2 permit 192.168.40.0 0.0.0.255
R2(config)#ip nat
R2(config)#ip nat pool
R2(config)#ip nat pool publ
R2(config)#ip nat pool public
R2(config)#ip nat pool public_access 209.165.200.225
209.165.200.230 255.255.255.248

^
% Invalid input detected at '^' marker.

R2(config)#ip nat pool public_access 209.165.200.225
209.165.200.230 netmask 255.255.255.248
R2(config)#ip nat ins
R2(config)#ip nat inside so
R2(config)#ip nat inside source list
R2(config)#ip nat inside source list 1 pool publ
R2(config)#ip nat inside source list 1 pool public_access
R2(config)#ip nat inside source list 2 pool public_access
R2(config)#
```

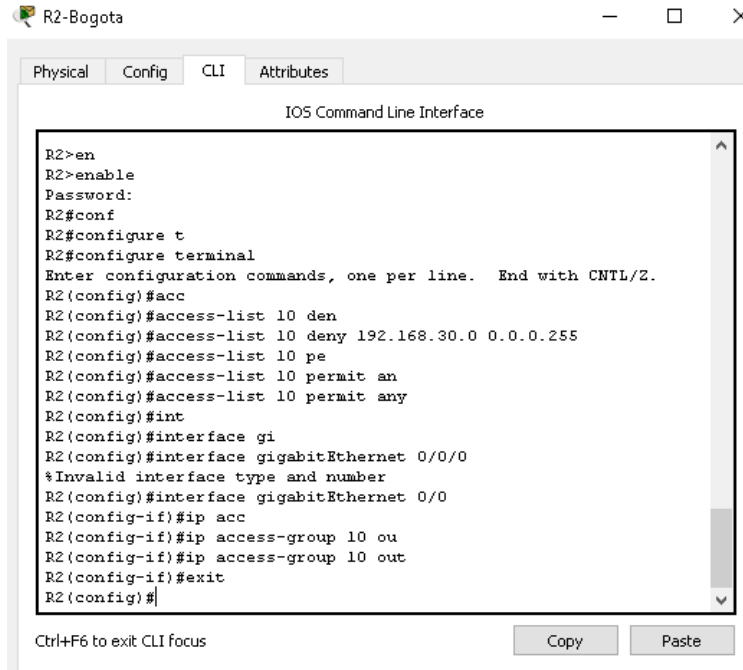
Ctrl+F6 to exit CLI focus

Copy

Paste

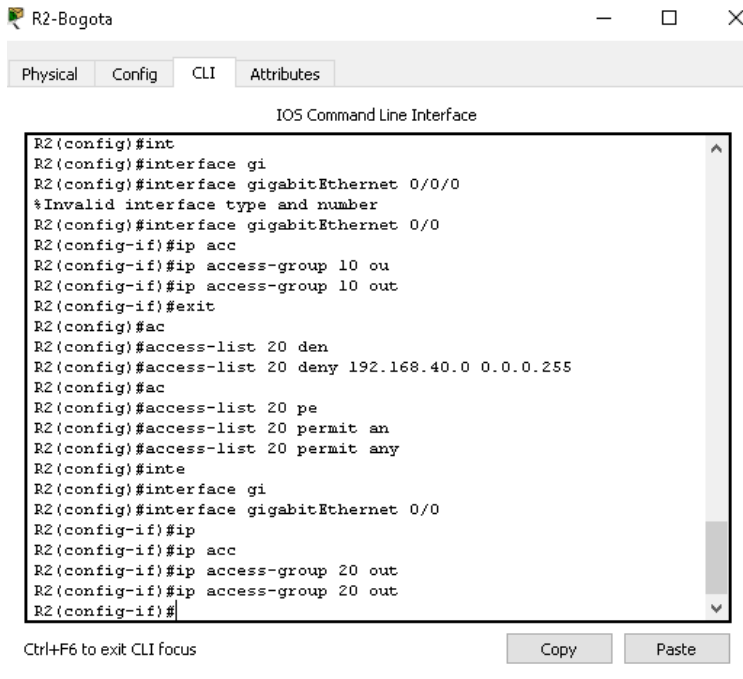
7. Configurar al menos dos listas de acceso de tipo estándar a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

- a. Denegar servicio a internet a la red 192.168.30.0



```
R2-Bogota
Physical Config CLI Attributes
IOS Command Line Interface
R2>en
R2>enable
Password:
R2#conf
R2#configure t
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#acc
R2(config)#access-list 10 den
R2(config)#access-list 10 deny 192.168.30.0 0.0.0.255
R2(config)#access-list 10 pe
R2(config)#access-list 10 permit an
R2(config)#access-list 10 permit any
R2(config)#int
R2(config)#interface gi
R2(config)#interface gigabitEthernet 0/0/0
%Invalid interface type and number
R2(config)#interface gigabitEthernet 0/0
R2(config-if)#ip acc
R2(config-if)#ip access-group 10 ou
R2(config-if)#ip access-group 10 out
R2(config-if)#exit
R2(config)#
```

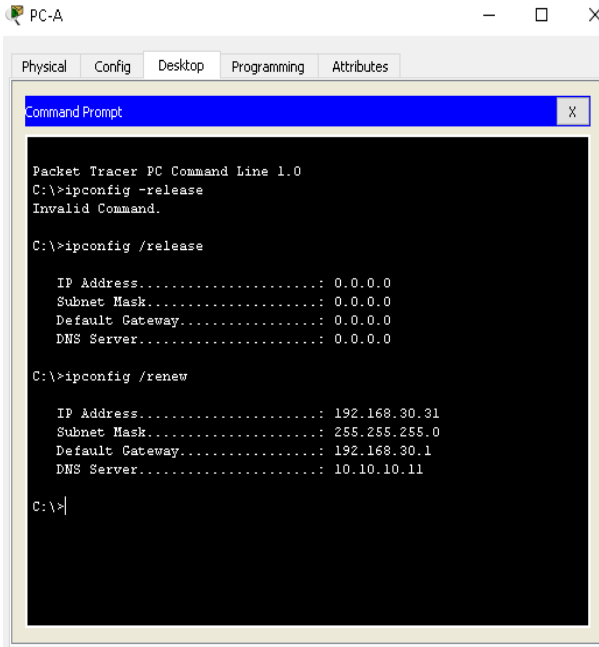
- b. Denegar servicio a internet a la red 192.168.40.0



```
R2-Bogota
Physical Config CLI Attributes
IOS Command Line Interface
R2(config)#int
R2(config)#interface gi
R2(config)#interface gigabitEthernet 0/0/0
%Invalid interface type and number
R2(config)#interface gigabitEthernet 0/0
R2(config-if)#ip acc
R2(config-if)#ip access-group 10 ou
R2(config-if)#ip access-group 10 out
R2(config-if)#exit
R2(config)#ac
R2(config)#access-list 20 den
R2(config)#access-list 20 deny 192.168.40.0 0.0.0.255
R2(config)#ac
R2(config)#access-list 20 pe
R2(config)#access-list 20 permit an
R2(config)#access-list 20 permit any
R2(config)#inte
R2(config)#interface gi
R2(config)#interface gigabitEthernet 0/0
R2(config-if)#ip
R2(config-if)#ip acc
R2(config-if)#ip access-group 20 out
R2(config-if)#ip access-group 20 out
R2(config-if)#
```

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

a. PRUEBAS DE DHCP



PC-A

```
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ipconfig -release
Invalid Command.

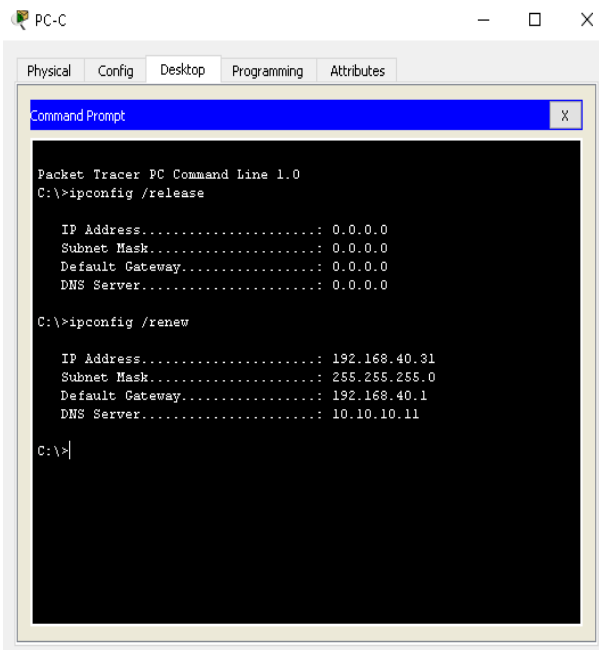
C:\>ipconfig /release

IP Address. . . . . : 0.0.0.0
Subnet Mask. . . . . : 0.0.0.0
Default Gateway. . . . . : 0.0.0.0
DNS Server. . . . . : 0.0.0.0

C:\>ipconfig /renew

IP Address. . . . . : 192.168.30.31
Subnet Mask. . . . . : 255.255.255.0
Default Gateway. . . . . : 192.168.30.1
DNS Server. . . . . : 10.10.10.11

C:\>
```



PC-C

```
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ipconfig /release

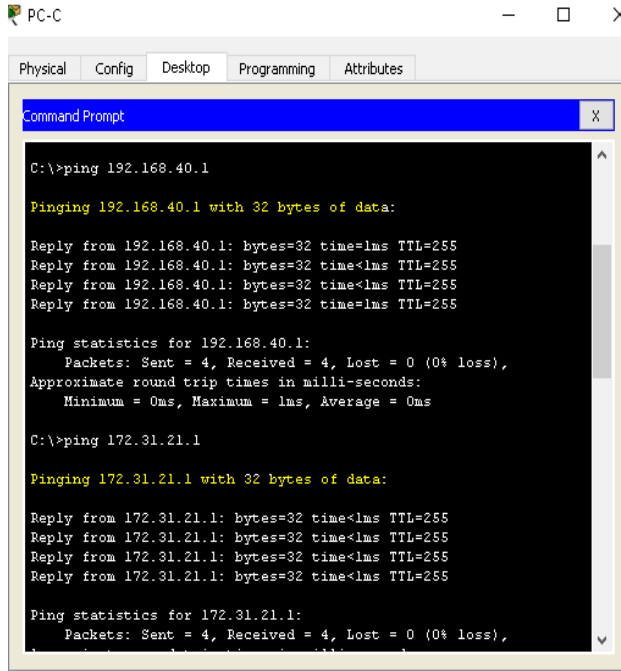
IP Address. . . . . : 0.0.0.0
Subnet Mask. . . . . : 0.0.0.0
Default Gateway. . . . . : 0.0.0.0
DNS Server. . . . . : 0.0.0.0

C:\>ipconfig /renew

IP Address. . . . . : 192.168.40.31
Subnet Mask. . . . . : 255.255.255.0
Default Gateway. . . . . : 192.168.40.1
DNS Server. . . . . : 10.10.10.11

C:\>
```

b. Ping a R1 y R2

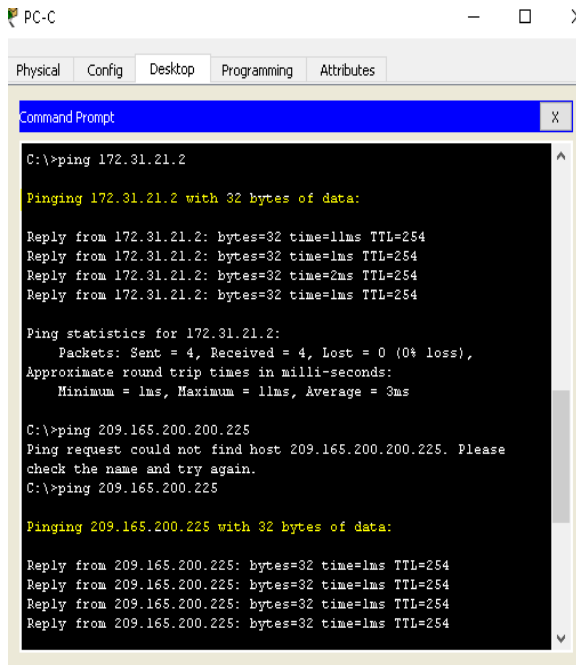


```
PC-C
Physical Config Desktop Programming Attributes
Command Prompt
C:\>ping 192.168.40.1
Pinging 192.168.40.1 with 32 bytes of data:
Reply from 192.168.40.1: bytes=32 time<1ms TTL=255
Reply from 192.168.40.1: bytes=32 time<1ms TTL=255
Reply from 192.168.40.1: bytes=32 time<1ms TTL=255
Reply from 192.168.40.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.40.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 172.31.21.1
Pinging 172.31.21.1 with 32 bytes of data:
Reply from 172.31.21.1: bytes=32 time<1ms TTL=255
Reply from 172.31.21.1: bytes=32 time<1ms TTL=255
Reply from 172.31.21.1: bytes=32 time<1ms TTL=255
Reply from 172.31.21.1: bytes=32 time<1ms TTL=255

Ping statistics for 172.31.21.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

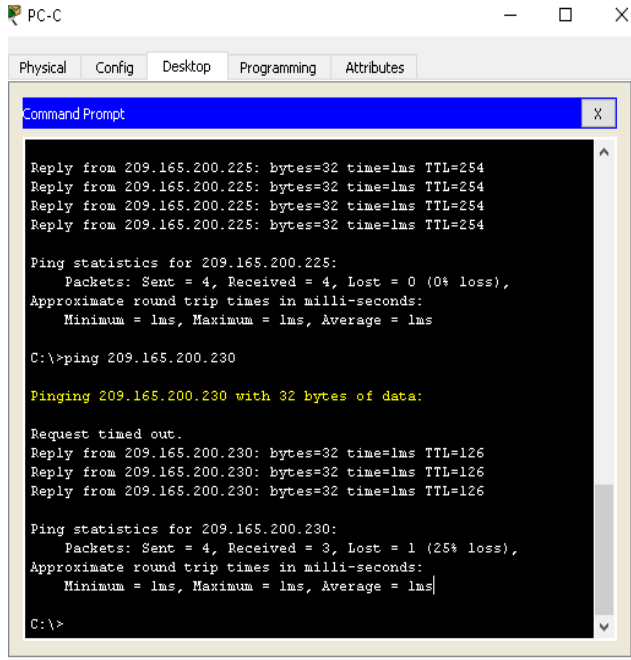


```
PC-C
Physical Config Desktop Programming Attributes
Command Prompt
C:\>ping 172.31.21.2
Pinging 172.31.21.2 with 32 bytes of data:
Reply from 172.31.21.2: bytes=32 time=11ms TTL=254
Reply from 172.31.21.2: bytes=32 time=1ms TTL=254
Reply from 172.31.21.2: bytes=32 time=2ms TTL=254
Reply from 172.31.21.2: bytes=32 time=1ms TTL=254

Ping statistics for 172.31.21.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 11ms, Average = 3ms

C:\>ping 209.165.200.225
Ping request could not find host 209.165.200.225. Please
check the name and try again.
C:\>ping 209.165.200.225
Pinging 209.165.200.225 with 32 bytes of data:
Reply from 209.165.200.225: bytes=32 time=1ms TTL=254
Reply from 209.165.200.225: bytes=32 time=1ms TTL=254
Reply from 209.165.200.225: bytes=32 time=1ms TTL=254
Reply from 209.165.200.225: bytes=32 time=1ms TTL=254
```


c. Ping hacia INTERNET



```
PC-C
Physical Config Desktop Programming Attributes
Command Prompt
Reply from 209.165.200.225: bytes=32 time=1ms TTL=254
Reply from 209.165.200.225: bytes=32 time=1ms TTL=254
Reply from 209.165.200.225: bytes=32 time=1ms TTL=254
Reply from 209.165.200.225: bytes=32 time=1ms TTL=254

Ping statistics for 209.165.200.225:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

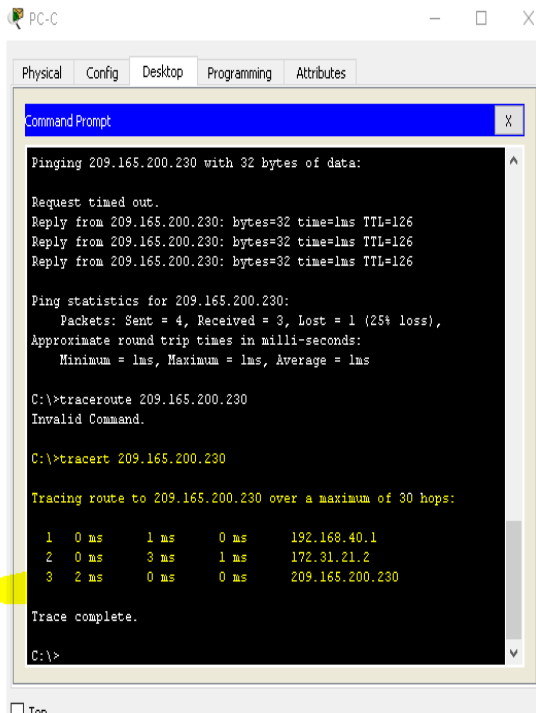
C:\>ping 209.165.200.230

Pinging 209.165.200.230 with 32 bytes of data:

Request timed out.
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126

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

C:\>
```



```
PC-C
Physical Config Desktop Programming Attributes
Command Prompt
Pinging 209.165.200.230 with 32 bytes of data:

Request timed out.
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126

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

C:\>tracert 209.165.200.230
Invalid Command.

C:\>tracert 209.165.200.230

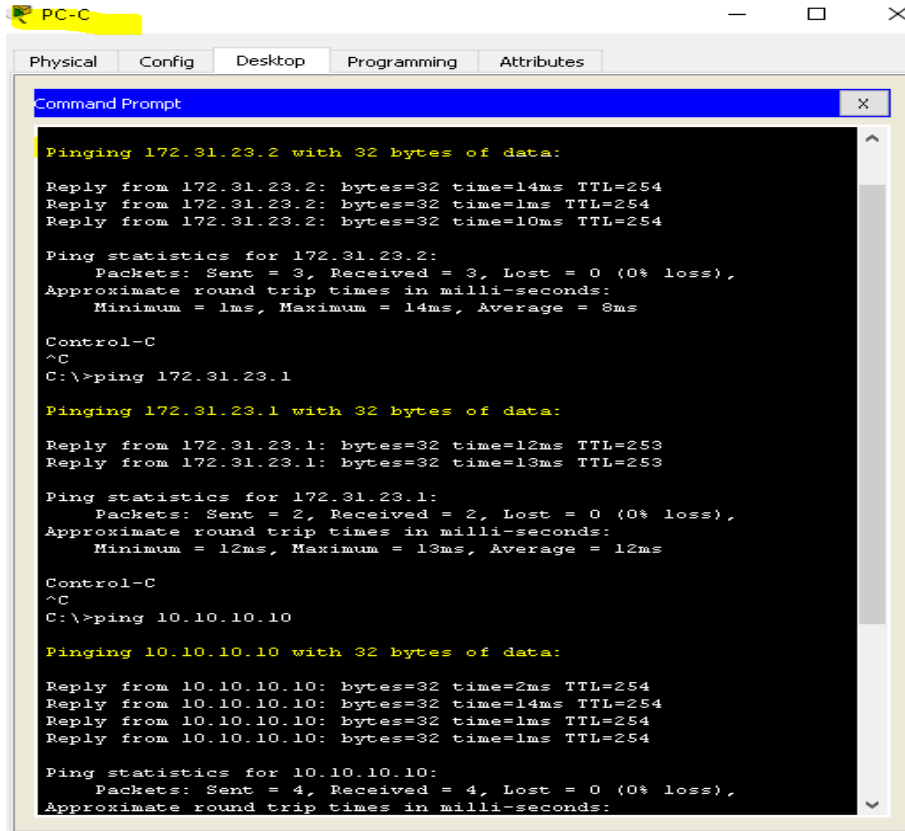
Tracing route to 209.165.200.230 over a maximum of 30 hops:

  0  0 ms  1 ms  0 ms  192.168.40.1
  1  0 ms  0 ms  1 ms  172.31.21.2
  2  2 ms  0 ms  0 ms  209.165.200.230

Trace complete.

C:\>
```

d. Ping a webserver y router 3



```
PC-C
Physical Config Desktop Programming Attributes
Command Prompt
Pinging 172.31.23.2 with 32 bytes of data:
Reply from 172.31.23.2: bytes=32 time=14ms TTL=254
Reply from 172.31.23.2: bytes=32 time=1ms TTL=254
Reply from 172.31.23.2: bytes=32 time=10ms TTL=254
Ping statistics for 172.31.23.2:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 14ms, Average = 8ms
Control-C
^C
C:\>ping 172.31.23.1
Pinging 172.31.23.1 with 32 bytes of data:
Reply from 172.31.23.1: bytes=32 time=12ms TTL=253
Reply from 172.31.23.1: bytes=32 time=13ms TTL=253
Ping statistics for 172.31.23.1:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 12ms, Maximum = 13ms, Average = 12ms
Control-C
^C
C:\>ping 10.10.10.10
Pinging 10.10.10.10 with 32 bytes of data:
Reply from 10.10.10.10: bytes=32 time=2ms TTL=254
Reply from 10.10.10.10: bytes=32 time=14ms TTL=254
Reply from 10.10.10.10: bytes=32 time=1ms TTL=254
Reply from 10.10.10.10: bytes=32 time=1ms TTL=254
Ping statistics for 10.10.10.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
```

CONCLUSIONES

Este trabajo se realizó con el propósito de dar solución a un escenario propuesto de una red empresarial que tenía 3 sucursales en ciudades distintas escenario que puede llegar a ser muy similar al que nos podemos encontrar en un ambiente real de cualquier empresa en Colombia.

Esta actividad fue muy enriquecedora debido a que pude poner en práctica los temas más importantes que se vieron en el diplomado y que muy seguramente me van a permitir como profesional enriqueciendo los campos en los que me voy a poder desempeñar ahora como profesional de ingeniería de sistemas de la UNAD.

Cisco es una de las plataformas más usadas a nivel mundial en el ámbito de las redes empresariales por lo cual este diplomado fue de suma importancia para mí como persona y que muy seguramente lo pondré en práctica muy pronto.

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