

DIPLOMADO DE PROFUNDIZACIÓN CISCO
PRUEBA DE HABILIDADES PRACTICAS CCNP

JHEIDER QUINTERO HERNANDEZ

Universidad Nacional Abierta y a Distancia (UNAD)
ESCUELA DE CIENCIAS BASICAS, TECNOLOGIA E INGENIERIA
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JHEIDER QUINTERO HERNANDEZ

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DIRECTOR:

MSc. GERARDO GRANADOS ACUÑA

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RESUMEN

La presente actividad nos permitirá desarrollar los distintos escenarios propuestos a través de los conocimientos adquiridos a lo largo del diplomado, todo esto también como autoevaluación de nuestro aprendizaje. Se hará el uso del software Packet Tracer donde se simularán las actividades propuestas, se revisará por medio de la practica el aprovisionamiento de los dispositivos de la red, que en este caso son los routers, switch y pc, se crearán vlans y se hará uso de los protocolos de enrutamiento para luego verificar si las conexiones son exitosas o no.

Palabras claves: CISCO, CCNP, REDES, TELECOMUNICACIONES

ABSTRACT

This activity will allow us to develop the different scenarios proposed through the knowledge acquired throughout the course, all this also as a self-assessment of our learning. The Packet Tracer software will be used where the proposed activities will be simulated, the provisioning of network devices will be checked by means of practice, which in this case are the routers, switch and pc, vlans will be created and will be used of the routing protocols to then verify if the connections are successful or not.

Keywords: CISCO, CCNP, NETWORKING, TELECOMUNICATIONS

INTRODUCCIÓN

En el presente trabajo se llevarán a la práctica los conceptos y habilidades adquiridos a lo largo del diplomado de profundización Cisco CCNP. En esta actividad se evidenciará la comprensión sobre direccionamiento IP, el uso de las vlan y su configuración, así como también el uso de los protocolos de direccionamiento avanzados.

Se nos mostrarán tres escenarios en el cual se deberá desarrollar algunas configuraciones para la interconexión entre los equipos que conforman la red.

En el escenario número 1 se configurarán las interfaces de los routers para luego aplicar distintos protocolos de enrutamiento como lo son OSPF y ERGP.

En el escenario número 2 se configurará la relación vecino BGP entre los routers, se asignará el ID de cada uno de estos.

En el escenario número 3 todos los switch serán configurados para usar VTP para las actualizaciones de las Vlans, se crearán los diferentes enlaces troncales, además de eso se crearán las Vlans y se asignarán a un puerto específico en el swith.

Finalmente se realizarán las pruebas de conexión entre cada componente de red y evidenciar el funcionamiento de los mismos.

Figura 1. Escenario 1

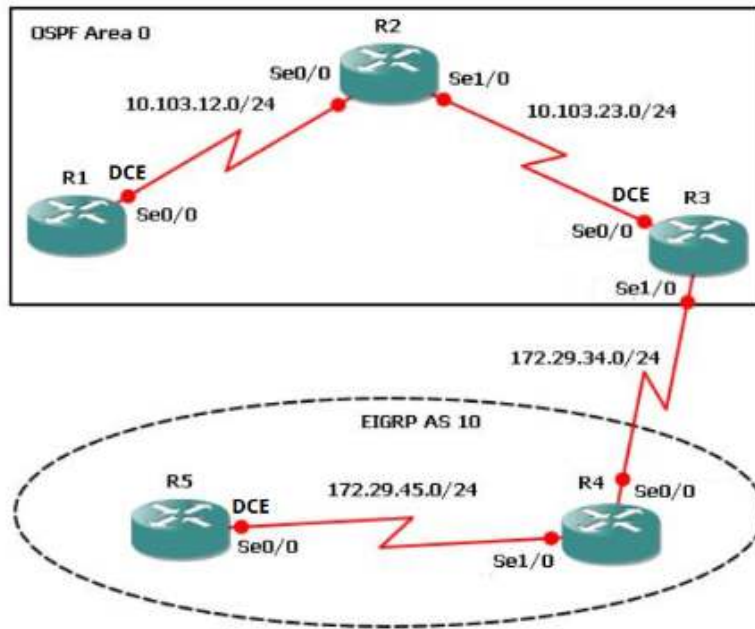
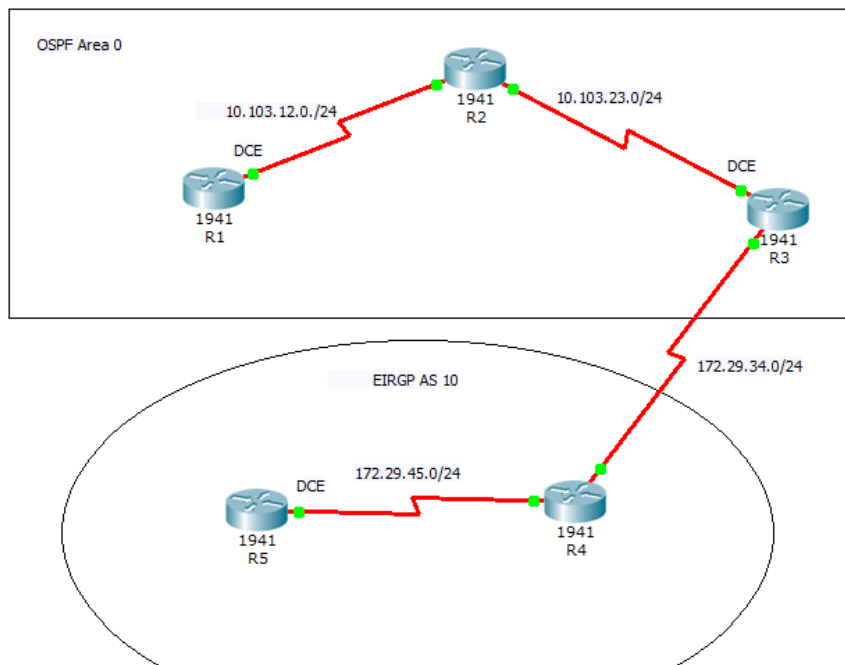


Figura 2. Simulación Packet Tracer escenario 1



1. Aplique las configuraciones iniciales y los protocolos de enrutamiento para los routers R1, R2, R3, R4 y R5 según el diagrama. No asigne passwords en los routers. Configurar las interfaces con las direcciones que se muestran en la topología de red.

ROUTER 1

```
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#int s0/0/0
R1(config-if)#ip add 10.103.12.1 255.255.255.0
R1(config-if)#clock rate 64000
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#
```

ROUTER 2

```
Router#enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#int s0/0/0
R2(config-if)#ip add 10.103.12.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
R2(config-if)#
R2(config-if)#exit
R2(config)#int s0/1/0
R2(config-if)#ip ad
R2(config-if)#ip address 10.103.23.1 255.255.255.0
R2(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
R2(config-if)#
```

ROUTER 3

```
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#int s0/0/0
R3(config-if)#ip add 10.103.23.2 255.255.255.0
R3(config-if)#clock rate 64000
R3(config-if)#no shutdown
R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
R3(config)#int s0/1/0
R3(config-if)#ip add 172.29.34.1 255.255.255.0
R3(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
R3(config-if)#
```

ROUTER 4

```
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R4
R4(config)#int s0/0/0
R4(config-if)#ip add 172.29.34.2 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
R4(config)#int s0/1/0
R4(config-if)#ip add 172.29.45.1 255.255.255.0
R4(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
R4(config-if)#
```

ROUTER 5

```
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R5
R5(config)#int s0/0/0
R5(config-if)#ip add 172.29.45.2 255.255.255.0
R5(config-if)#clock rate 64000
R5(config-if)#no shutdown
R5(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
R5(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state
to up
```

ENRUTAMIENTOS

ROUTER 1

```
R1>
R1>enable
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#network 10.103.12.0 0.0.0.255 area 0
R1(config-router)#
```

ROUTER 2

```
R2>
R2>enable
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#
R2(config)#router ospf 1
R2(config-router)#net
R2(config-router)#network 10.103.12.0 0.0.0.255 area 0
R2(config-router)#network 10.103.23.0 0.0.0.255 area 0
R2(config-router)#
```

ROUTER 3

```
R3>
R3>enable
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#net
R3(config-router)#network 10.103.23.0 0.0.0.255 area 0
```

2. Cree cuatro nuevas interfaces de Loopback en R1 utilizando la asignación de direcciones 10.1.0.0/22 y configure esas interfaces para participar en el área 0 de OSPF.

```
R1(config)#int loopback 1
```

```
R1(config-if)#  
%LINK-5-CHANGED: Interface Loopback1, changed state to up
```

```
R1(config-if)#ip address 10.1.0.1 255.255.252.0
```

```
R1(config)#int loopback 2
```

```
R1(config-if)#  
%LINK-5-CHANGED: Interface Loopback2, changed state to up
```

```
R1(config-if)#ip address 10.1.0.2 255.255.252.0  
% 10.1.0.0 overlaps with Loopback1
```

```
R1(config)#int loopback 3
```

```
R1(config-if)#  
%LINK-5-CHANGED: Interface Loopback3, changed state to up
```

```
R1(config-if)#ip address 10.1.0.3 255.255.252.0  
% 10.1.0.0 overlaps with Loopback1
```

```
R1(config)#int loopback 4
```

```
R1(config-if)#  
%LINK-5-CHANGED: Interface Loopback4, changed state to up
```

```
R1(config-if)#ip address 10.1.0.4 255.255.252.0  
% 10.1.0.0 overlaps with Loopback1
```

```
R1(config-if)#end
```

```
R1#
```

```
R1(config-router)#network 10.1.0.0 0.0.3.255 area 0
```

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

3. Cree cuatro nuevas interfaces de Loopback en R5 utilizando la asignación de direcciones 172.5.0.0/22 y configure esas interfaces para participar en el Sistema Autónomo EIGRP 10.

```
R5(config)#int loopback 1
```

```
R5(config-if)#  
%LINK-5-CHANGED: Interface Loopback1, changed state to up
```

```
R5(config-if)#ip address 172.5.0.1 255.255.252.0  
R5(config-if)#exit  
R5(config)#int loopback 2
```

```
R5(config-if)#  
%LINK-5-CHANGED: Interface Loopback2, changed state to up
```

```
R5(config-if)#ip address 172.5.0.2 255.255.252.0  
% 172.5.0.0 overlaps with Loopback1  
R5(config-if)#exit
```

```
R5(config)#int loopback 3
```

```
R5(config-if)#  
%LINK-5-CHANGED: Interface Loopback3, changed state to up
```

```
R5(config-if)#ip address 172.5.0.3 255.255.252.0  
% 172.5.0.0 overlaps with Loopback1  
R5(config-if)#exit
```

```
R5(config)#int loopback 4
```

```
R5(config-if)#  
%LINK-5-CHANGED: Interface Loopback4, changed state to up
```

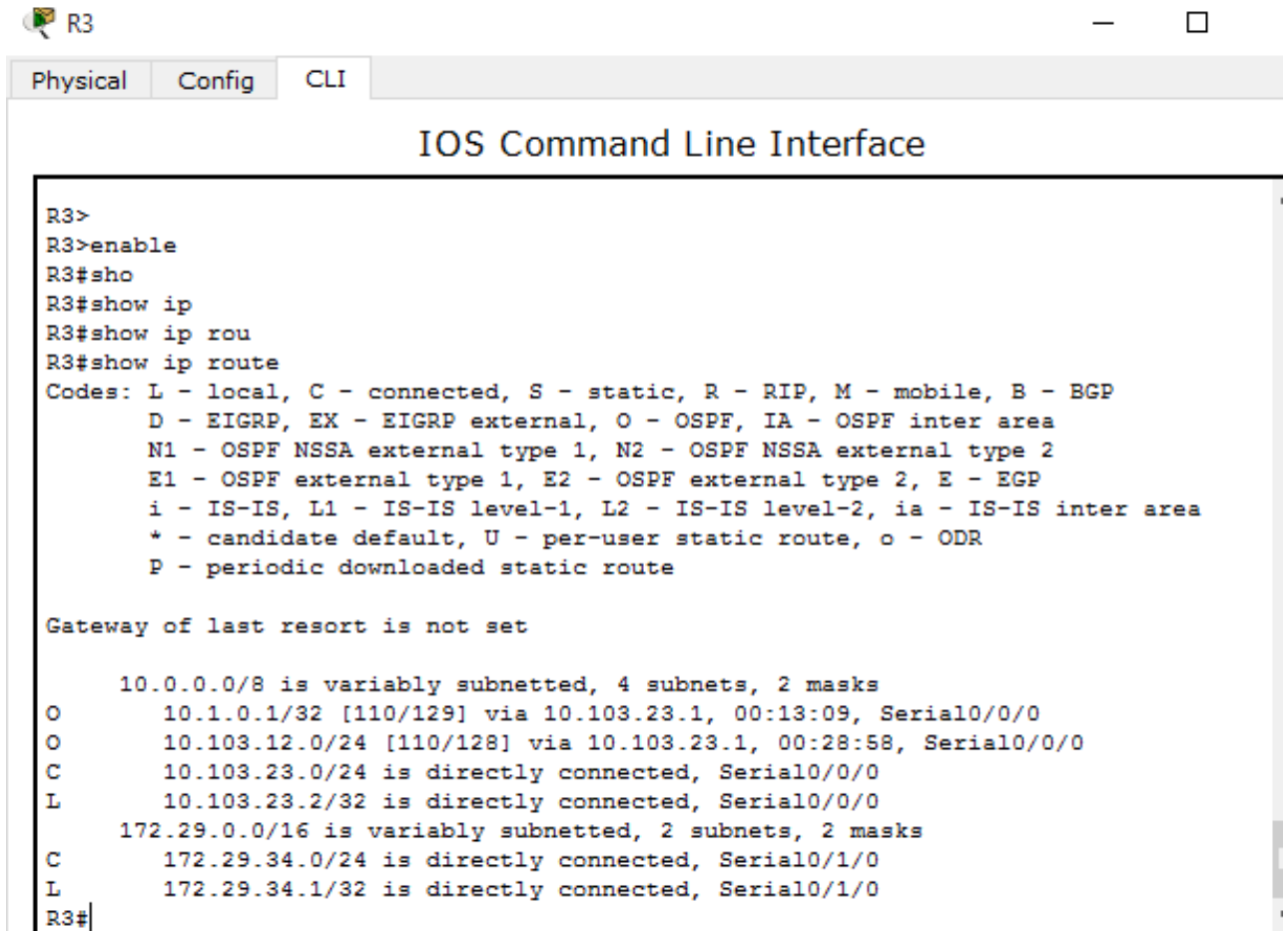
```
R5(config-if)#ip address 172.5.0.4 255.255.252.0  
% 172.5.0.0 overlaps with Loopback1  
R5(config-if)#exit
```



```
R5(config)#router eigrp 10
R5(config-router)#no auto-summary
R5(config-router)#network 172.5.0.0 0.0.3.255
R5(config-router)#
```

4. Analice la tabla de enrutamiento de R3 y verifique que R3 está aprendiendo las nuevas interfaces de Loopback mediante el comando show ip route.

Figura 3. Router 3 comando show ip route



```
R3
R3>
R3>enable
R3#sho
R3#show ip
R3#show ip rou
R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

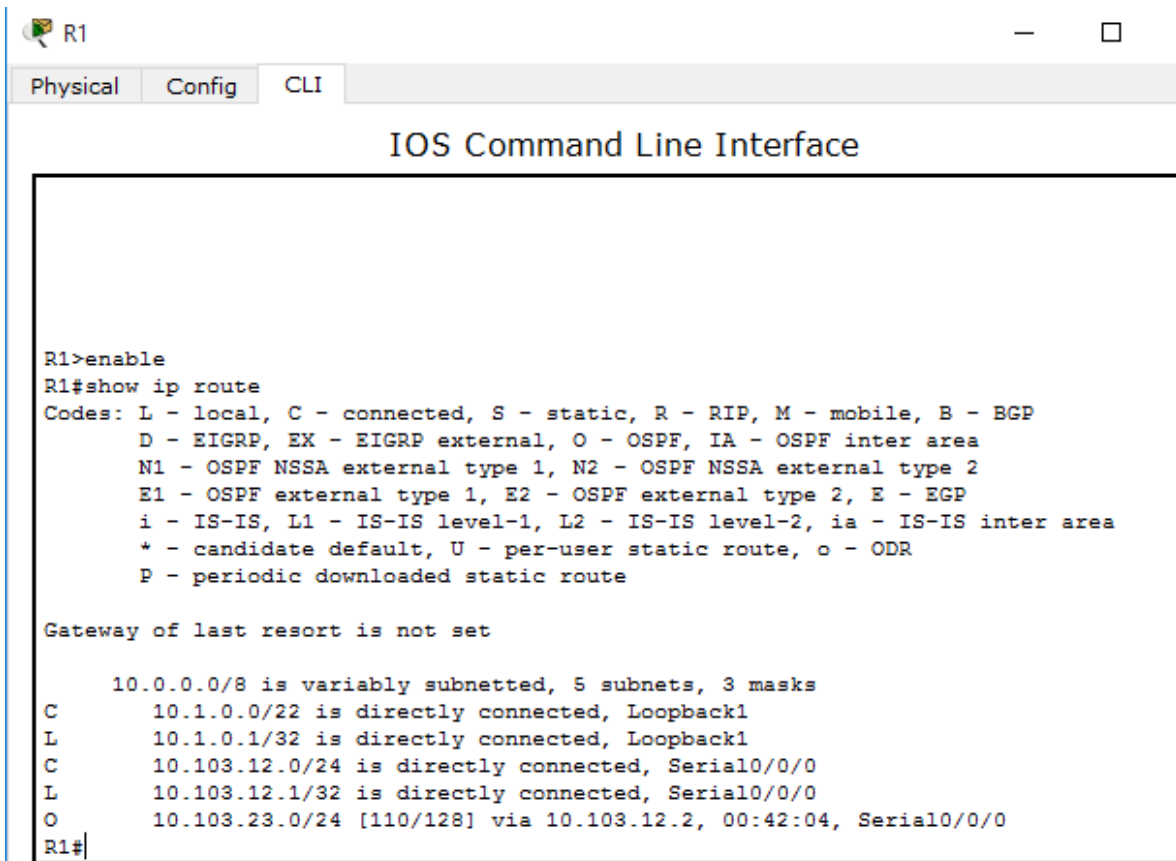
      10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
O       10.1.0.1/32 [110/129] via 10.103.23.1, 00:13:09, Serial0/0/0
O       10.103.12.0/24 [110/128] via 10.103.23.1, 00:28:58, Serial0/0/0
C       10.103.23.0/24 is directly connected, Serial0/0/0
L       10.103.23.2/32 is directly connected, Serial0/0/0
      172.29.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       172.29.34.0/24 is directly connected, Serial0/1/0
L       172.29.34.1/32 is directly connected, Serial0/1/0
R3#
```

5. Configure R3 para redistribuir las rutas EIGRP en OSPF usando el costo de 50000 y luego redistribuya las rutas OSPF en EIGRP usando un ancho de banda T1 y 20,000 microsegundos de retardo.

```
R3(config)#router eigrp 10
R3(config-router)#redistribute ospf 1 metric 50000 100 255 1 500
R3(config-router)#exit
R3(config)#router ospf 1
R3(config-router)#redistribute eigrp 10 metric 64 subnets
R3(config-router)#
```

6. Verifique en R1 y R5 que las rutas del sistema autónomo opuesto existen en su tabla de enrutamiento mediante el comando show ip route.

Figura 4. Router 1 comando show ip route



```
R1
Physical Config CLI
IOS Command Line Interface

R1>enable
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

 10.0.0.0/8 is variably subnetted, 5 subnets, 3 masks
C    10.1.0.0/22 is directly connected, Loopback1
L    10.1.0.1/32 is directly connected, Loopback1
C    10.103.12.0/24 is directly connected, Serial0/0/0
L    10.103.12.1/32 is directly connected, Serial0/0/0
O    10.103.23.0/24 [110/128] via 10.103.12.2, 00:42:04, Serial0/0/0
R1#
```

Figura 5. Rutas router 5

```

R5
Physical Config CLI
IOS Command Line Interface

R5>
R5>enable
R5#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    172.5.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       172.5.0.0/22 is directly connected, Loopback1
L       172.5.0.1/32 is directly connected, Loopback1
    172.29.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       172.29.45.0/24 is directly connected, Serial0/0/0
L       172.29.45.2/32 is directly connected, Serial0/0/0
R5#
  
```

Figura 6. Escenario 2

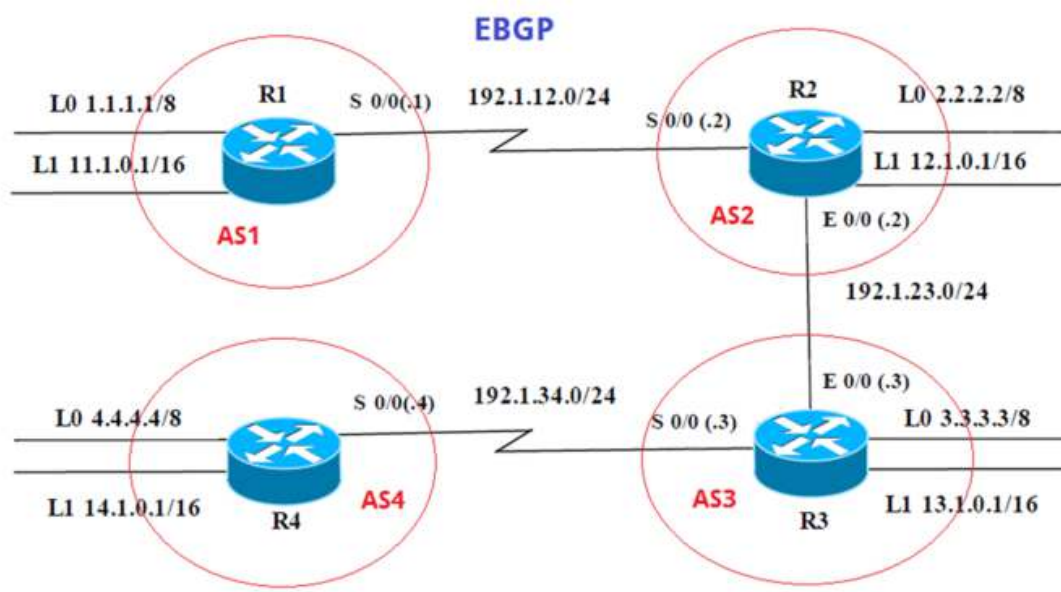


Figura 7. Simulación Packet Tracer escenario 2

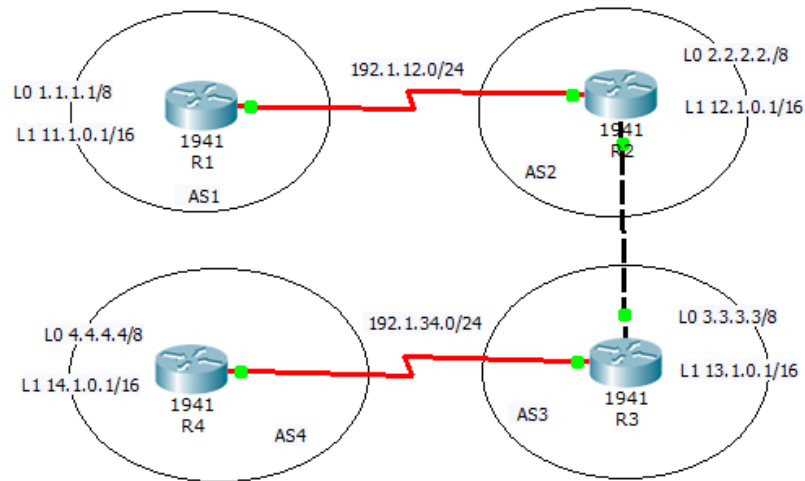


Tabla 1. Direccionamiento Routers

	Interfaz	Dirección IP	Máscara
R1	Loopback 0	1.1.1.1	255.0.0.0
	Loopback 1	11.1.0.1	255.255.0.0
	S 0/0	192.1.12.1	255.255.255.0
R2	Loopback 0	2.2.2.2	255.0.0.0
	Loopback 1	12.1.0.1	255.255.0.0
	S 0/0	192.1.12.2	255.255.255.0
	E 0/0	192.1.23.2	255.255.255.0
R3	Loopback 0	3.3.3.3	255.0.0.0
	Loopback 1	13.1.0.1	255.255.0.0
	E 0/0	192.1.23.3	255.255.255.0
	S 0/0	192.1.34.3	255.255.255.0
R4	Loopback 0	4.4.4.4	255.0.0.0
	Loopback 1	14.1.0.1	255.255.0.0
	S 0/0	192.1.34.4	255.255.255.0

1. Configure una relación de vecino BGP entre R1 y R2. R1 debe estar en AS1 y R2 debe estar en AS2. Anuncie las direcciones de Loopback en BGP. Codifique los ID para los routers BGP como 11.11.11.11 para R1 y como 22.22.22.22 para R2. Presente el paso a con los comandos utilizados y la salida del comando show ip route.

DIRECCIONAMIENTO

R1

```
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#int s0/0/0
R1(config-if)#ip add 192.1.12.1 255.255.255.0
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down

R1(config)#int loopback 0

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

R1(config-if)#ip add 1.1.1.1 255.0.0.0
R1(config-if)#exit

R1(config)#int loopback 1

%LINK-5-CHANGED: Interface Loopback1, changed state to up

R1(config-if)#ip add 11.1.0.1 255.255.0.0
R1(config-if)#
```

R2

```
Router>enable
```

```
Router#conf t
```

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

```
Router(config)#hostname R2
```

```
R2(config)#int s0/0/0
```

```
R2(config-if)#ip add 192.1.12.2 255.255.255.0
```

```
R2(config-if)#no shutdown
```

```
R2(config-if)#
```

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

```
R2(config)#int g0/0
```

```
R2(config-if)#ip add 192.1.23.2 255.255.255.0
```

```
R2(config-if)#no shutdown
```

```
R2(config-if)#
```

```
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
```

```
R2(config)#int loopback 0
```

```
R2(config-if)#ip add 2.2.2.2 255.0.0.0
```

```
R2(config)#int loopback 1
```

```
R2(config-if)#
```

```
%LINK-5-CHANGED: Interface Loopback1, changed state to up
```

```
R2(config-if)#ip add 12.1.0.1 255.255.0.0
```

```
R2(config-if)
```

R3

```
Router(config)#hostname R3
R3(config)#int s0/0/0
R3(config-if)#ip add 192.1.34.3 255.255.255.0
R3(config-if)#no shutdown
```

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

```
R3(config-if)#exit
R3(config)#int g0/0
R3(config-if)#ip add 192.1.23.3 255.255.255.0
R3(config-if)#no shutdown
```

```
R3(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
```

```
R3(config-if)#exit
R3(config)#int loopback 0
```

```
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up
```

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

```
R3(config-if)#ip add 3.3.3.3 255.0.0.0
R3(config-if)#exit
R3(config)#int loopback 1
```

```
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up
```

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up

```
R3(config-if)#ip add 13.1.0.1 255.255.0.0
R3(config-if)#
```

R4

```
Router(config)#hostname R4
R4(config)#int s0/0/0
R4(config-if)#ip add 192.1.34.4 255.255.255.0
R4(config-if)#no shutdown
```

```
R4(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
```

```
R4(config-if)#exit
R4(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state
to up
```

```
R4(config)#int loopback 0
```

```
R4(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up
```

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

```
R4(config-if)#ip add 4.4.4.4 255.0.0.0
R4(config-if)#exit
R4(config)#int loopback 1
```

```
R4(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state
to up
```

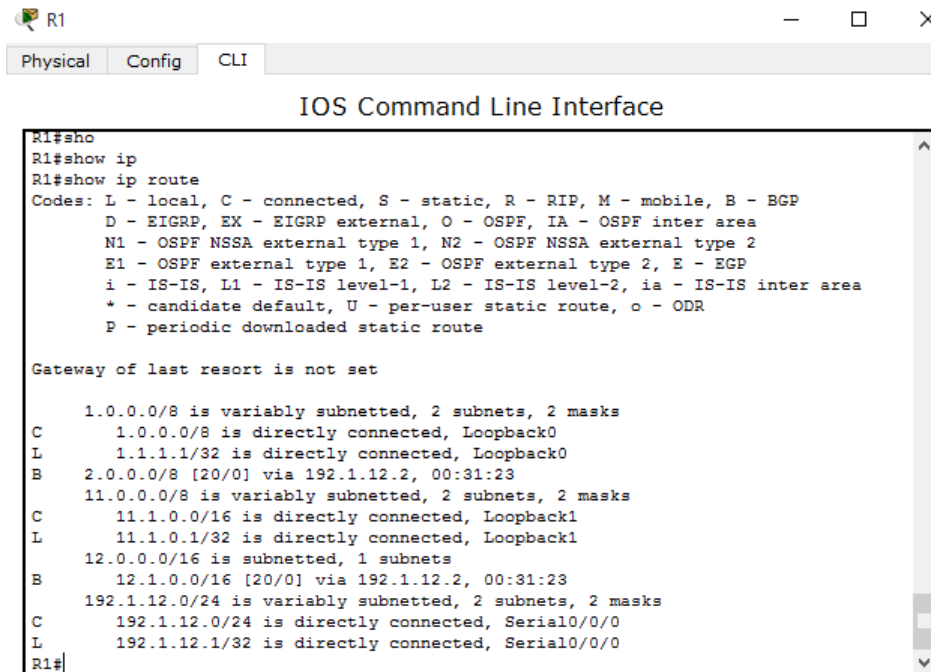
```
R4(config-if)#ip add 14.1.0.1 255.255.0.0
R4(config-if)#
```


Relación de vecino BGP entre R1 y R2

```
R1>enable
R1#conf t
R1(config)#router bgp 1
R1(config-router)#no synchronization
R1(config-router)#bgp router-id 11.11.11.11
R1(config-router)#neighbor 192.1.12.2 remote-as 2
R1(config-router)#network 1.0.0.0 mask 255.0.0.0
R1(config-router)#network 11.1.0.0 mask 255.255.0.0
R1(config-router)#
```

```
R2>enable
R2#conf t
R2(config)#router bgp 2
R2(config-router)#no synchronization
R2(config-router)#bgp router-id 22.22.22.22
R2(config-router)#neighbor 192.1.12.1 remote-as 1
R2(config-router)#%BGP-5-ADJCHANGE: neighbor 192.1.12.1 Up
R2(config-router)#network 2.0.0.0 mask 255.0.0.0
R2(config-router)#network 12.1.0.0 mask 255.255.0.0
R2(config-router)#
```

Figura 8. Router 1 relación routers vecinos

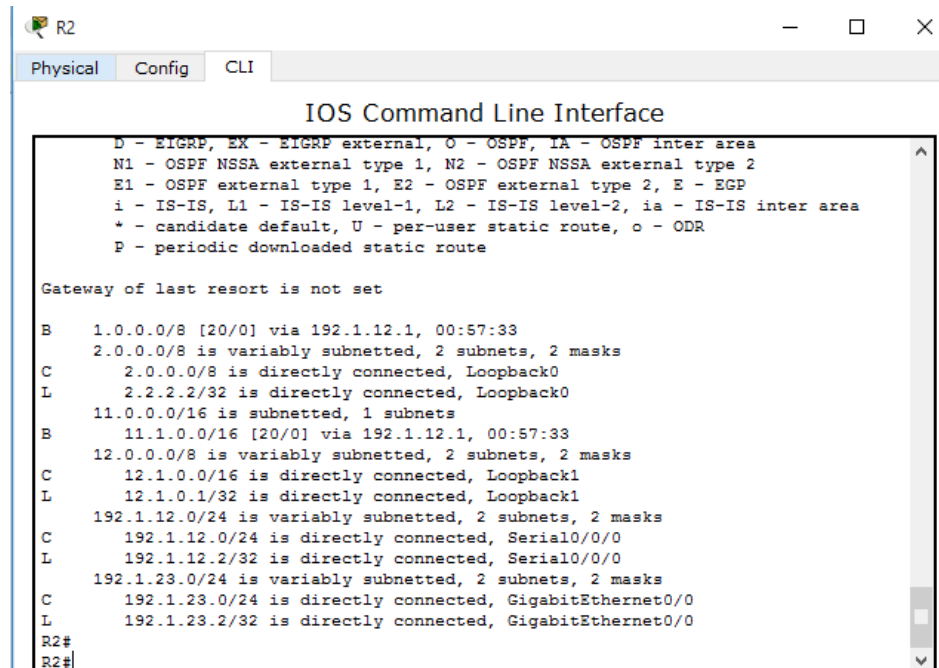


```
R1
Physical Config CLI
IOS Command Line Interface
R1#sho
R1#show ip
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

Gateway of last resort is not set

  1.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       1.0.0.0/8 is directly connected, Loopback0
L       1.1.1.1/32 is directly connected, Loopback0
B       2.0.0.0/8 [20/0] via 192.1.12.2, 00:31:23
        11.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       11.1.0.0/16 is directly connected, Loopback1
L       11.1.0.1/32 is directly connected, Loopback1
        12.0.0.0/16 is subnetted, 1 subnets
B       12.1.0.0/16 [20/0] via 192.1.12.2, 00:31:23
        192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.1.12.0/24 is directly connected, Serial0/0/0
L       192.1.12.1/32 is directly connected, Serial0/0/0
R1#
```

Figura 9. Router 2 relación routers vecinos



```
R2
Physical Config CLI
IOS Command Line Interface
        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

B       1.0.0.0/8 [20/0] via 192.1.12.1, 00:57:33
        2.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       2.0.0.0/8 is directly connected, Loopback0
L       2.2.2.2/32 is directly connected, Loopback0
        11.0.0.0/16 is subnetted, 1 subnets
B       11.1.0.0/16 [20/0] via 192.1.12.1, 00:57:33
        12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       12.1.0.0/16 is directly connected, Loopback1
L       12.1.0.1/32 is directly connected, Loopback1
        192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.1.12.0/24 is directly connected, Serial0/0/0
L       192.1.12.2/32 is directly connected, Serial0/0/0
        192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.1.23.0/24 is directly connected, GigabitEthernet0/0
L       192.1.23.2/32 is directly connected, GigabitEthernet0/0
R2#
R2#
```

2. Configure una relación de vecino BGP entre R2 y R3. R2 ya debería estar configurado en AS2 y R3 debería estar en AS3. Anuncie las direcciones de Loopback de R3 en BGP. Codifique el ID del router R3 como 33.33.33.33. Presente el paso a con los comandos utilizados y la salida del comando show ip route.

Relación de vecino BGP entre R2 y R3

```
R2(config)#router bgp
R2(config)#router bgp 2
R2(config-router)#neighbor 192.1.23.3 remote-as 3
R2(config-router)#
```

```
R3>enable
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router b
R3(config)#router bgp 3
R3(config-router)#bgp router-id 33.33.33.33
R3(config-router)#no synchronization
R3(config-router)#neighbor 192.1.23.2 remote-as 2
R3(config-router)#%BGP-5-ADJCHANGE: neighbor 192.1.23.2 Up
```

```
R3(config-router)#neighbor 192.1.34.4 remote-as 4
R3(config-router)#network 3.0.0.0 mask 255.0.0.0
R3(config-router)#network 13.1.0.0 mask 255.255.0.0
R3(config-router)#
```

Figura 10. Router 2 relación routers vecinos

The screenshot shows the CLI of Router 2. The window title is 'R2' and the active tab is 'CLI'. The main title is 'IOS Command Line Interface'. The output shows the following neighbor relationships:

```

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

B   1.0.0.0/8 [20/0] via 192.1.12.1, 01:06:33
    2.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C   2.0.0.0/8 is directly connected, Loopback0
L   2.2.2.2/32 is directly connected, Loopback0
    11.0.0.0/16 is subnetted, 1 subnets
B   11.1.0.0/16 [20/0] via 192.1.12.1, 01:06:33
    12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C   12.1.0.0/16 is directly connected, Loopback1
L   12.1.0.1/32 is directly connected, Loopback1
    192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.1.12.0/24 is directly connected, Serial0/0/0
L   192.1.12.2/32 is directly connected, Serial0/0/0
    192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.1.23.0/24 is directly connected, GigabitEthernet0/0
L   192.1.23.2/32 is directly connected, GigabitEthernet0/0
  
```

Figura 11. Router 3 relación routers vecinos

The screenshot shows the CLI of Router 3. The window title is 'R3' and the active tab is 'CLI'. The main title is 'IOS Command Line Interface'. The output shows the following neighbor relationships:

```

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

B   1.0.0.0/8 [20/0] via 192.1.23.2, 01:07:25
B   2.0.0.0/8 [20/0] via 192.1.23.2, 01:07:25
    3.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C   3.0.0.0/8 is directly connected, Loopback0
L   3.3.3.3/32 is directly connected, Loopback0
    11.0.0.0/16 is subnetted, 1 subnets
B   11.1.0.0/16 [20/0] via 192.1.23.2, 01:07:25
    12.0.0.0/16 is subnetted, 1 subnets
B   12.1.0.0/16 [20/0] via 192.1.23.2, 01:07:25
    13.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C   13.1.0.0/16 is directly connected, Loopback1
L   13.1.0.1/32 is directly connected, Loopback1
    192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.1.23.0/24 is directly connected, GigabitEthernet0/0
L   192.1.23.3/32 is directly connected, GigabitEthernet0/0
    192.1.34.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.1.34.0/24 is directly connected, Serial0/0/0
L   192.1.34.3/32 is directly connected, Serial0/0/0
  
```

3. Configure una relación de vecino BGP entre R3 y R4. R3 ya debería estar configurado en AS3 y R4 debería estar en AS4. Anuncie las direcciones de Loopback de R4 en BGP. Codifique el ID del router R4 como 44.44.44.44. Establezca las relaciones de vecino con base en las direcciones de Loopback 0. Cree rutas estáticas para alcanzar la Loopback 0 del otro router. No anuncie la Loopback 0 en BGP. Anuncie la red Loopback de R4 en BGP. Presente el paso a con los comandos utilizados y la salida del comando show ip route.

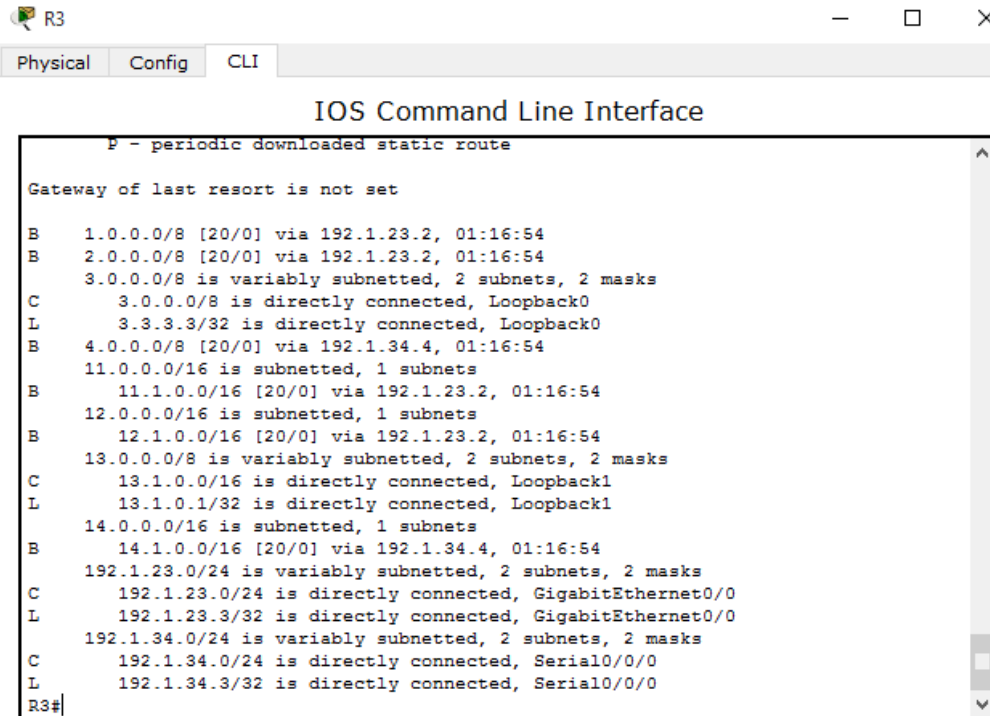
Relación de vecino BGP entre R3 y R4

```
R3(config)#router bgp 3
R3(config-router)#neighbor 192.1.34.4 remote-as 4
R3(config-router)#
```

```
R4>enable
R4#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#router bgp 4
R4(config-router)#bgp router-id 44.44.44.44
R4(config-router)#no synchronization
R4(config-router)#neighbor 192.1.34.3 remote-as 3
R4(config-router)#%BGP-5-ADJCHANGE: neighbor 192.1.34.3 Up

R4(config-router)#network 4.0.0.0 mask 255.0.0.0
R4(config-router)#network 14.1.0.0 mask 255.255.0.0
R4(config-router)#
```

Figura 12. Router 3 relación routers vecinos



The screenshot shows the CLI of Router 3. At the top, there are tabs for 'Physical', 'Config', and 'CLI'. The main window title is 'IOS Command Line Interface'. The output of the 'show ip route' command is displayed, listing various routes with their status (B for BGP, C for Connected, L for Local) and next-hop information. The routes include 1.0.0.0/8, 2.0.0.0/8, 3.0.0.0/8, 4.0.0.0/8, 11.0.0.0/16, 12.0.0.0/16, 13.0.0.0/8, 13.1.0.0/16, 14.0.0.0/16, 14.1.0.0/16, 192.1.23.0/24, 192.1.23.3/32, 192.1.34.0/24, and 192.1.34.3/32. The prompt 'R3#' is visible at the bottom left.

```
P - periodic downloaded static route

Gateway of last resort is not set

B 1.0.0.0/8 [20/0] via 192.1.23.2, 01:16:54
B 2.0.0.0/8 [20/0] via 192.1.23.2, 01:16:54
  3.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 3.0.0.0/8 is directly connected, Loopback0
L 3.3.3.3/32 is directly connected, Loopback0
B 4.0.0.0/8 [20/0] via 192.1.34.4, 01:16:54
  11.0.0.0/16 is subnetted, 1 subnets
B 11.1.0.0/16 [20/0] via 192.1.23.2, 01:16:54
  12.0.0.0/16 is subnetted, 1 subnets
B 12.1.0.0/16 [20/0] via 192.1.23.2, 01:16:54
  13.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 13.1.0.0/16 is directly connected, Loopback1
L 13.1.0.1/32 is directly connected, Loopback1
  14.0.0.0/16 is subnetted, 1 subnets
B 14.1.0.0/16 [20/0] via 192.1.34.4, 01:16:54
  192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.1.23.0/24 is directly connected, GigabitEthernet0/0
L 192.1.23.3/32 is directly connected, GigabitEthernet0/0
  192.1.34.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.1.34.0/24 is directly connected, Serial0/0/0
L 192.1.34.3/32 is directly connected, Serial0/0/0
R3#
```

Figura 13. Router 4 relación routers vecinos



The screenshot shows the CLI of Router 4. At the top, there are tabs for 'Physical', 'Config', and 'CLI'. The main window title is 'IOS Command Line Interface'. The output of the 'show ip route' command is displayed, listing various routes with their status (B for BGP, C for Connected, L for Local) and next-hop information. The routes include 1.0.0.0/8, 2.0.0.0/8, 3.0.0.0/8, 4.0.0.0/8, 11.0.0.0/16, 12.0.0.0/16, 13.0.0.0/16, 13.1.0.0/16, 14.0.0.0/8, 14.1.0.0/16, 192.1.34.0/24, 192.1.34.4/32, and 192.1.34.4/32. The prompt 'R4#' is visible at the bottom left.

```
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

B 1.0.0.0/8 [20/0] via 192.1.34.3, 01:17:30
B 2.0.0.0/8 [20/0] via 192.1.34.3, 01:17:30
B 3.0.0.0/8 [20/0] via 192.1.34.3, 01:17:30
  4.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 4.0.0.0/8 is directly connected, Loopback0
L 4.4.4.4/32 is directly connected, Loopback0
  11.0.0.0/16 is subnetted, 1 subnets
B 11.1.0.0/16 [20/0] via 192.1.34.3, 01:17:30
  12.0.0.0/16 is subnetted, 1 subnets
B 12.1.0.0/16 [20/0] via 192.1.34.3, 01:17:30
  13.0.0.0/16 is subnetted, 1 subnets
B 13.1.0.0/16 [20/0] via 192.1.34.3, 01:17:30
  14.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 14.1.0.0/16 is directly connected, Loopback1
L 14.1.0.1/32 is directly connected, Loopback1
  192.1.34.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.1.34.0/24 is directly connected, Serial0/0/0
L 192.1.34.4/32 is directly connected, Serial0/0/0
R4#
```

Figura 14. Escenario 3

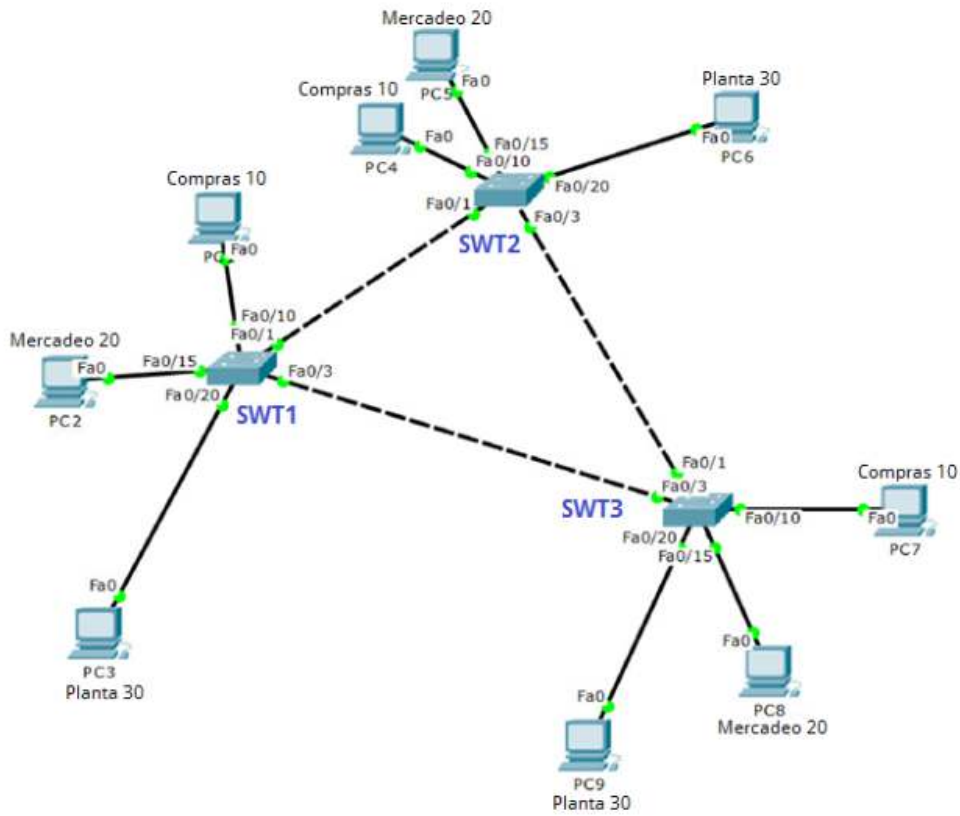
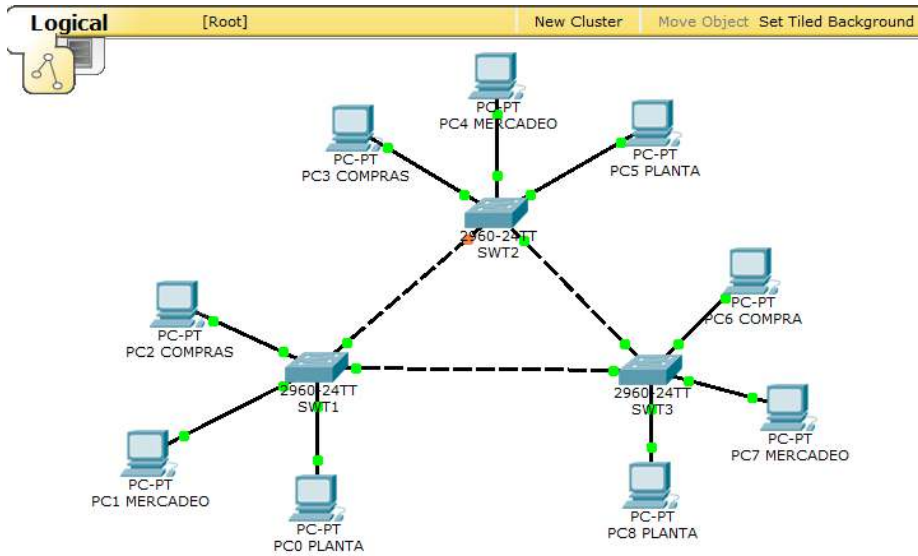


Figura 15. Simulación Packet Tracer escenario 3



A. Configurar VTP

1. Todos los switches se configurarán para usar VTP para las actualizaciones de LAN. El switch SWT2 se configurará como el servidor. Los switches SWT1 y SWT3 se configurarán como clientes. Los switches estarán en el dominio VPT llamado CCNP y usando la contraseña cisco.

NOMBRES Y VTP

SWT1

```
Switch>enable
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SWT1
SWT1(config)#vtp domain CCNP
Changing VTP domain name from NULL to CCNP

SWT1(config)#vtp mode client
Setting device to VTP CLIENT mode.
SWT1(config)#vtp pass cisco
Setting device VLAN database password to cisco
```

SWT2

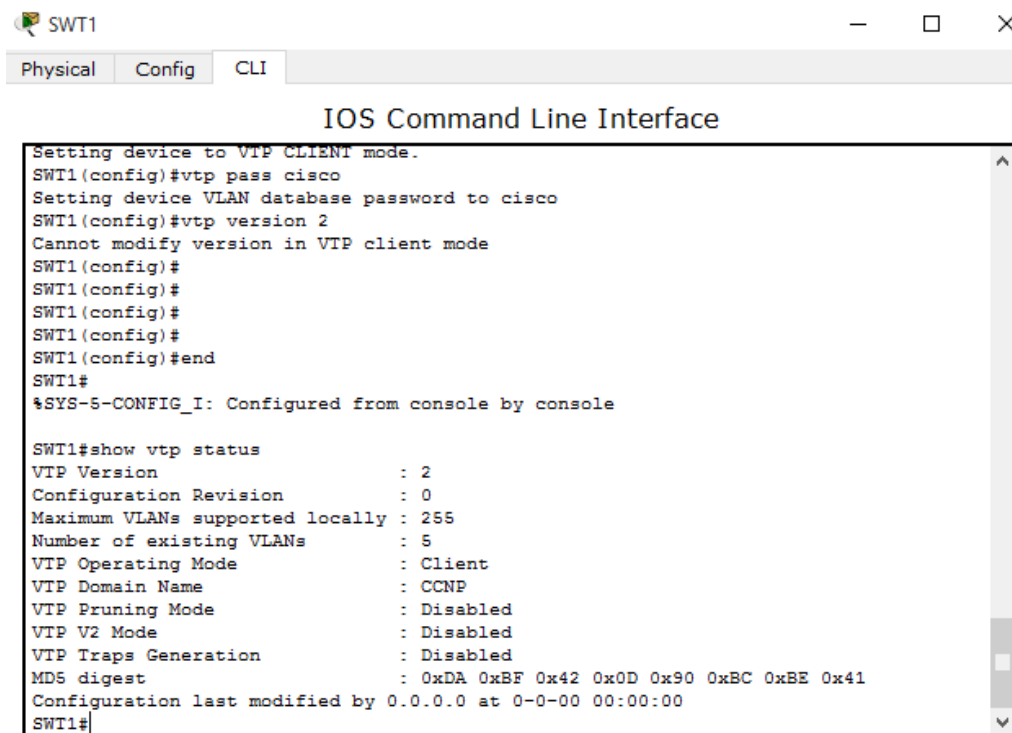
```
Switch>enable
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SWT2
SWT2(config)#vtp domain CCNP
Changing VTP domain name from NULL to CCNP
SWT2(config)#vtp mode server
Device mode already VTP SERVER.
SWT2(config)#vtp pass cisco
Setting device VLAN database password to cisco
SWT2(config)#vtp version 2
SWT2(config)#
```


SWT3

```
Switch>enable
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SWT3
SWT3(config)#vtp domain CCNP
Changing VTP domain name from NULL to CCNP
SWT3(config)#vtp mode client
Setting device to VTP CLIENT mode.
SWT3(config)#vtp pass cisco
Setting device VLAN database password to cisco
SWT3(config)#
```

2. Verifique las configuraciones mediante el comando show vtp status.

Figura 16. Switch 1 vtp status

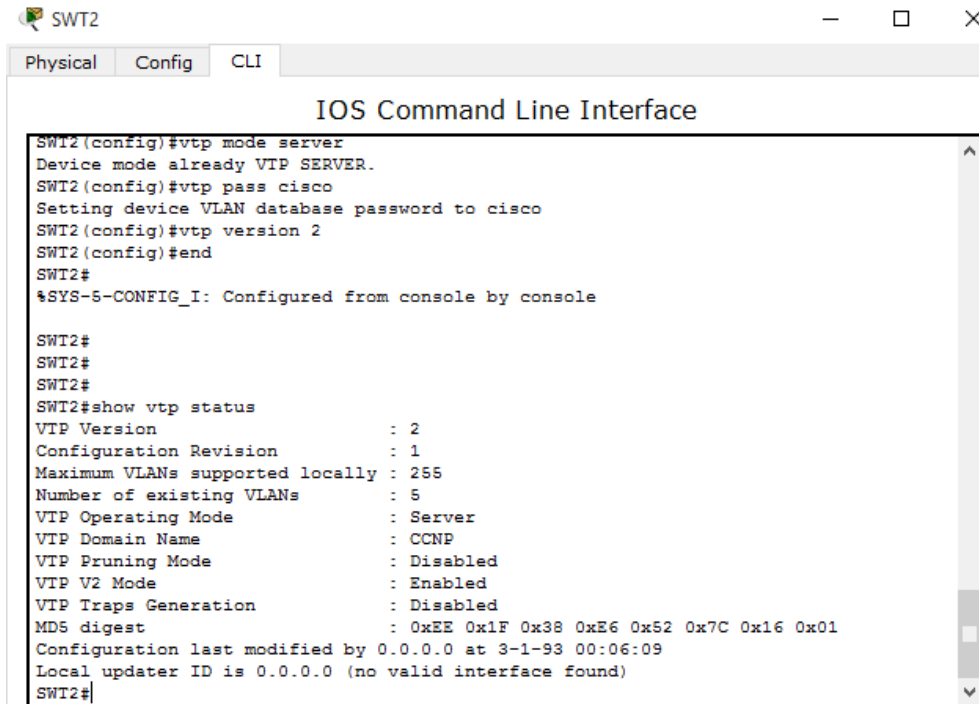


The screenshot shows a terminal window titled "SWT1" with tabs for "Physical", "Config", and "CLI". The main content is the "IOS Command Line Interface" showing the following commands and output:

```
Setting device to VTP CLIENT mode.
SWT1(config)#vtp pass cisco
Setting device VLAN database password to cisco
SWT1(config)#vtp version 2
Cannot modify version in VTP client mode
SWT1(config)#
SWT1(config)#
SWT1(config)#
SWT1(config)#
SWT1(config)#end
SWT1#
%SYS-5-CONFIG_I: Configured from console by console

SWT1#show vtp status
VTP Version                : 2
Configuration Revision     : 0
Maximum VLANs supported locally : 255
Number of existing VLANs   : 5
VTP Operating Mode         : Client
VTP Domain Name            : CCNP
VTP Pruning Mode           : Disabled
VTP V2 Mode                : Disabled
VTP Traps Generation       : Disabled
MDS digest                  : 0xDA 0xBF 0x42 0x0D 0x90 0xBC 0xBE 0x41
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
SWT1#
```

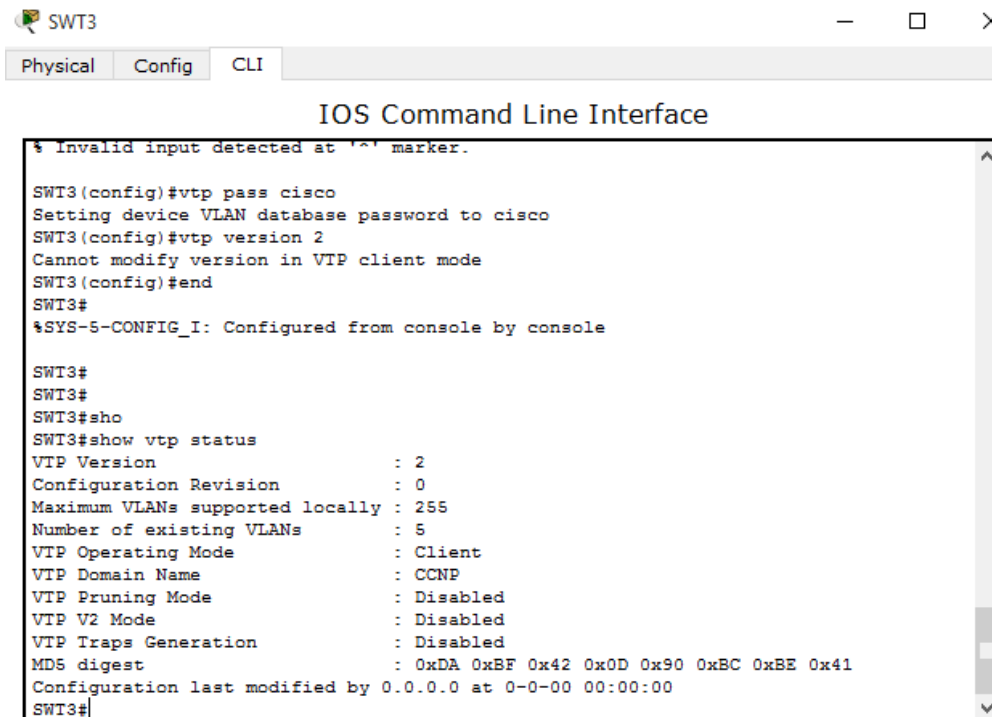
Figura 17. Switch 2 vtp status



```
SWT2
Physical Config CLI
IOS Command Line Interface
SWT2(config)#vtp mode server
Device mode already VTP SERVER.
SWT2(config)#vtp pass cisco
Setting device VLAN database password to cisco
SWT2(config)#vtp version 2
SWT2(config)#end
SWT2#
%SYS-5-CONFIG_I: Configured from console by console

SWT2#
SWT2#
SWT2#
SWT2#show vtp status
VTP Version           : 2
Configuration Revision : 1
Maximum VLANs supported locally : 255
Number of existing VLANs : 5
VTP Operating Mode    : Server
VTP Domain Name       : CCNP
VTP Pruning Mode      : Disabled
VTP V2 Mode           : Enabled
VTP Traps Generation  : Disabled
MDS digest            : 0xEE 0x1F 0x38 0xE6 0x52 0x7C 0x16 0x01
Configuration last modified by 0.0.0.0 at 3-1-93 00:06:09
Local updater ID is 0.0.0.0 (no valid interface found)
SWT2#
```

Figura 18. Switch 3 vtp status



```
SWT3
Physical Config CLI
IOS Command Line Interface
% Invalid input detected at '^' marker.
SWT3(config)#vtp pass cisco
Setting device VLAN database password to cisco
SWT3(config)#vtp version 2
Cannot modify version in VTP client mode
SWT3(config)#end
SWT3#
%SYS-5-CONFIG_I: Configured from console by console

SWT3#
SWT3#
SWT3#sho
SWT3#show vtp status
VTP Version           : 2
Configuration Revision : 0
Maximum VLANs supported locally : 255
Number of existing VLANs : 5
VTP Operating Mode    : Client
VTP Domain Name       : CCNP
VTP Pruning Mode      : Disabled
VTP V2 Mode           : Disabled
VTP Traps Generation  : Disabled
MDS digest            : 0xDA 0xBF 0x42 0x0D 0x90 0xBC 0xBE 0x41
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
SWT3#
```

B. Configurar DTP (Dynamic Trunking Protocol)

1. Configure un enlace troncal ("trunk") dinámico entre SWT1 y SWT2. Debido a que el modo por defecto es dynamic auto, solo un lado del enlace debe configurarse como dynamic desirable.

SWT1

```
SWT1(config)#int f0/1  
SWT1(config-if)#switchport mode trunk
```

```
SWT1(config-if)#  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed  
state to down
```

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

```
SWT1(config-if)#switchport mode dynamic desirable
```

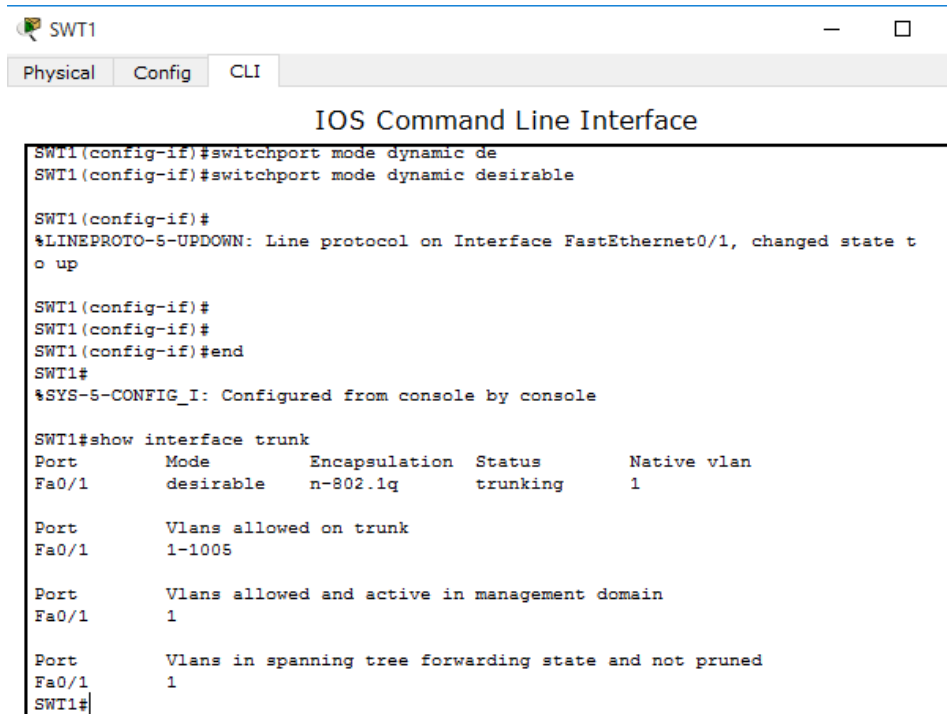
```
SWT1(config-if)#  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed  
state to up
```

SWT2

```
SWT2(config)#int f0/1  
SWT2(config-if)#switchport mode trunk  
SWT2(config-if)#
```

2. Verifique el enlace "trunk" entre SWT1 y SWT2 usando el comando show interfaces trunk.

Figura 19. Trunk switch 1



```
SWT1(config-if)#switchport mode dynamic de
SWT1(config-if)#switchport mode dynamic desirable

SWT1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state t
o up

SWT1(config-if)#
SWT1(config-if)#
SWT1(config-if)#end
SWT1#
%SYS-5-CONFIG_I: Configured from console by console

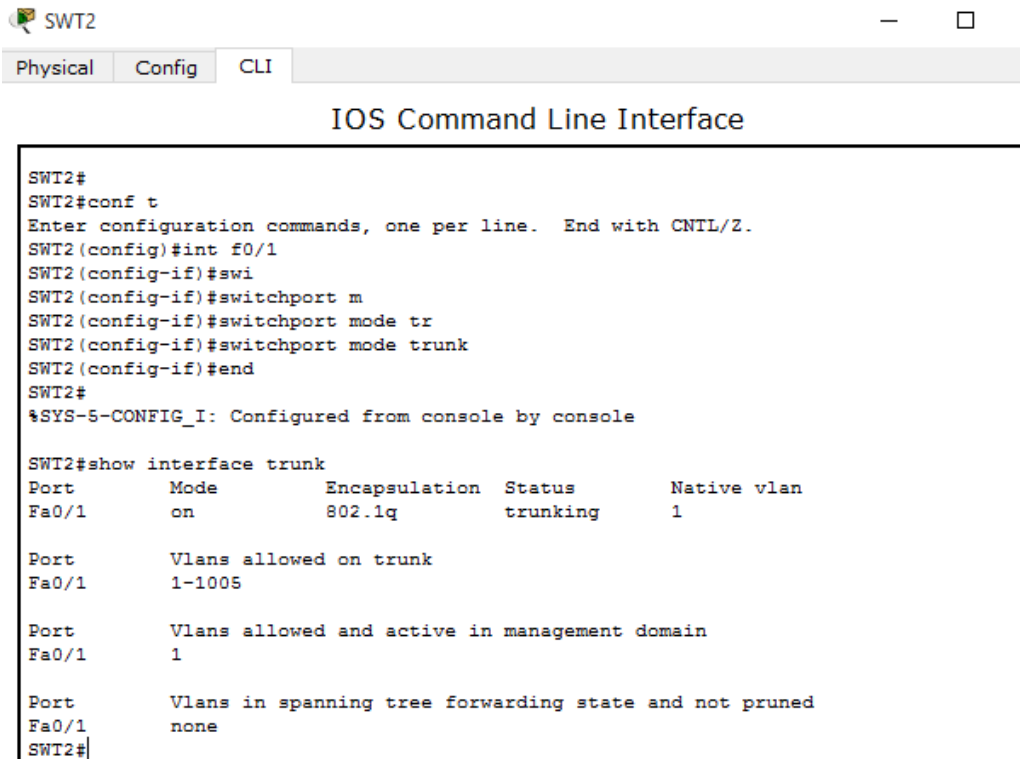
SWT1#show interface trunk
Port      Mode      Encapsulation  Status      Native vlan
Fa0/1     desirable n-802.1q       trunking    1

Port      Vlans allowed on trunk
Fa0/1     1-1005

Port      Vlans allowed and active in management domain
Fa0/1     1

Port      Vlans in spanning tree forwarding state and not pruned
Fa0/1     1
SWT1#
```

Figura 20. Trunk switch 2



```
SWT2#
SWT2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SWT2(config)#int f0/1
SWT2(config-if)#swi
SWT2(config-if)#switchport m
SWT2(config-if)#switchport mode tr
SWT2(config-if)#switchport mode trunk
SWT2(config-if)#end
SWT2#
%SYS-5-CONFIG_I: Configured from console by console

SWT2#show interface trunk
Port      Mode      Encapsulation  Status      Native vlan
Fa0/1     on        802.1q         trunking    1

Port      Vlans allowed on trunk
Fa0/1     1-1005

Port      Vlans allowed and active in management domain
Fa0/1     1

Port      Vlans in spanning tree forwarding state and not pruned
Fa0/1     none
SWT2#
```

3. Entre SWT1 y SWT3 configure un enlace "trunk" estático utilizando el comando switchport mode trunk en la interfaz F0/3 de SWT1.

SWT1

```
SWT1(config)#int f0/3
SWT1(config-if)#switchport mode trunk
```

```
SWT1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down
```

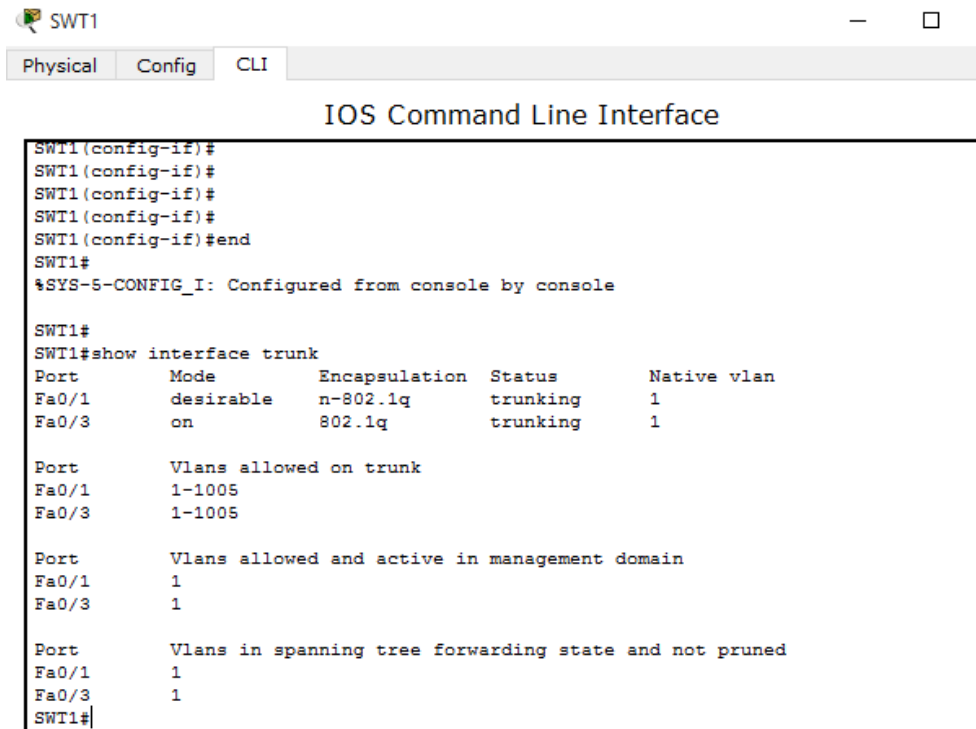
```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
```

SWT3

```
SWT3(config)#int f0/3
SWT3(config-if)#switchport mode trunk
SWT3(config-if)#
```

4. Verifique el enlace "trunk" el comando show interfaces trunk en SWT1.

Figura 21. Verificación enlace troncal switch 1



```
SWT1
Physical Config CLI
IOS Command Line Interface
SWT1(config-if)#
SWT1(config-if)#
SWT1(config-if)#
SWT1(config-if)#
SWT1(config-if)#end
SWT1#
%SYS-5-CONFIG_I: Configured from console by console

SWT1#
SWT1#show interface trunk
Port      Mode      Encapsulation  Status      Native vlan
Fa0/1     desirable n-802.1q       trunking    1
Fa0/3     on        802.1q         trunking    1

Port      Vlans allowed on trunk
Fa0/1     1-1005
Fa0/3     1-1005

Port      Vlans allowed and active in management domain
Fa0/1     1
Fa0/3     1

Port      Vlans in spanning tree forwarding state and not pruned
Fa0/1     1
Fa0/3     1
SWT1#
```

5. Configure un enlace "trunk" permanente entre SWT2 y SWT3.

SWT2

```
SWT2(config)#int f0/3  
SWT2(config-if)#switchport mode trunk
```

```
SWT2(config-if)#  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed  
state to down
```

SWT3

```
SWT3(config)#int f0/1  
SWT3(config-if)#switchport mode trunk  
SWT3(config-if)#
```

C. Agregar VLANs y asignar puertos.

1. En STW1 agregue la VLAN 10. En STW2 agregue las VLANS Compras (10), Mercadeo (20), Planta (30) y Admon (99)

SWT1

```
SWT1(config)#vlan 10  
VTP VLAN configuration not allowed when device is in CLIENT mode.  
SWT1(config)#
```

SWT2

```
SWT2(config)#vlan 10  
SWT2(config-vlan)#name compras  
SWT2(config-vlan)#exit  
SWT2(config)#vlan 20  
SWT2(config-vlan)#name mercadeo  
SWT2(config-vlan)#exit  
SWT2(config)#vlan 30  
SWT2(config-vlan)#name planta  
SWT2(config-vlan)#exit  
SWT2(config)#vlan 99  
SWT2(config-vlan)#name admon  
SWT2(config-vlan)#
```

2. Verifique que las VLANs han sido agregadas correctamente.

Figura 22. Creación Vlan switch 2

```

SWT2#
SWT2#show vlan

VLAN Name                Status    Ports
-----
1    default                 active    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, Fa0/18
                                           Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                           Fa0/23, Fa0/24, Gig1/1, Gig1/2

10   compras                 active
20   mercadeo                active
30   planta                  active
99   admon                   active
1002 fddi-default            act/unsup
1003 token-ring-default   act/unsup
1004 fddinet-default      act/unsup
1005 trnet-default        act/unsup

VLAN Type  SAID      MTU   Parent  RingNo BridgeNo Stp    BrdgMode Trans1 Trans2
-----
1    enet    100001    1500  -       -       -     -     -         0      0
10   enet    100010    1500  -       -       -     -     -         0      0
--More--

```

3. Asocie los puertos a las VLAN y configure las direcciones IP de acuerdo con la siguiente tabla.

Tabla 2. Direccionamiento Vlan


Interfaz	VLAN	Direcciones IP de los PCs
F0/10	VLAN 10	190.108.10.X / 24
F0/15	VLAN 20	190.108.20.X / 24
F0/20	VLAN 30	190.108.30.X / 24

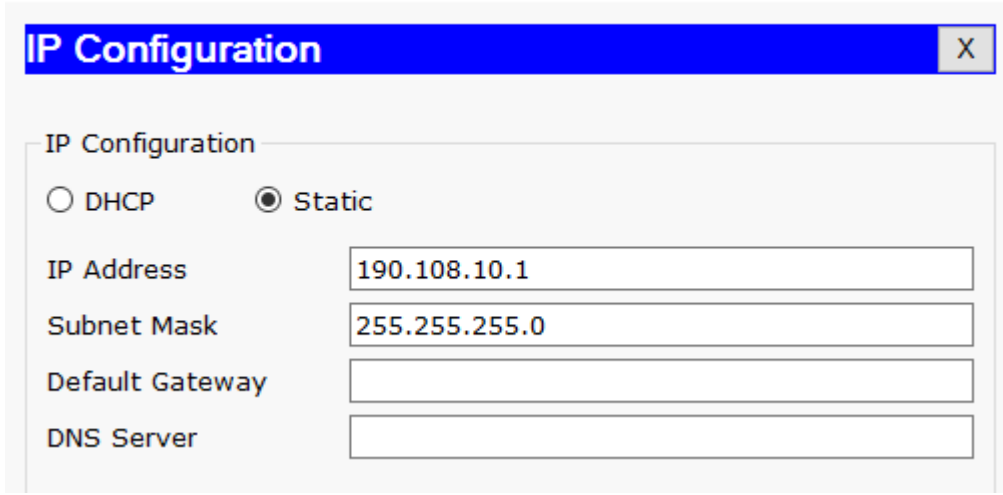
X = número de cada PC particular

SWT1

```
SWT1(config)#int f0/10
SWT1(config-if)#switchport mode access
SWT1(config-if)#switchport access vlan 10
SWT1(config-if)#exit
SWT1(config)#int f0/15
SWT1(config-if)#switchport mode access
SWT1(config-if)#switchport access vlan 20
SWT1(config-if)#exit
SWT1(config)#int f0/20
SWT1(config-if)#switchport mode access
SWT1(config-if)#switchport access vlan 30
SWT1(config-if)#
```

Figura 23. Pc 2 asignación de IP

 PC2 COMPRAS



The image shows a screenshot of a network configuration window titled "IP Configuration". The window has a blue header bar with the title and a close button (X). Below the header, the "IP Configuration" section is visible. It contains two radio buttons: "DHCP" (unselected) and "Static" (selected). Below the radio buttons, there are four input fields: "IP Address" with the value "190.108.10.1", "Subnet Mask" with the value "255.255.255.0", "Default Gateway" (empty), and "DNS Server" (empty).

Figura 24. Pc 1 asignación de IP

PC1 MERCADEO

IP Configuration

IP Configuration

DHCP Static

IP Address: 190.108.20.2

Subnet Mask: 255.255.0.0

Default Gateway:

DNS Server:

Figura 25. Pc 0 asignación de IP

PC0 PLANTA

IP Configuration

IP Configuration

DHCP Static

IP Address: 190.108.30.3

Subnet Mask: 255.255.0.0

Default Gateway:

DNS Server:

SWT2

SWT2>

SWT2>enable

SWT2#conf t

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

SWT2(config)#int f0/10

SWT2(config-if)#switchport mode access

SWT2(config-if)#switchport access vlan 10

SWT2(config-if)#exit

SWT2(config)#int f0/15

SWT2(config-if)#swi

SWT2(config-if)#switchport mode access

SWT2(config-if)#switchport access vlan 20

SWT2(config-if)#exit

SWT2(config)#int f0/20

SWT2(config-if)#swi

SWT2(config-if)#switchport mode access

SWT2(config-if)#switchport access vlan 30

SWT2(config-if)#

Figura 26. Pc 3 asignación de IP

PC3 COMPRAS

IP Configuration

DHCP Static

IP Address: 190.108.10.4

Subnet Mask: 255.255.0.0

Default Gateway:

DNS Server:

Figura 27. Pc 4 asignación de IP

PC4 MERCADEO

IP Configuration

DHCP Static

IP Address: 190.108.20.5

Subnet Mask: 255.255.0.0

Default Gateway:

DNS Server:

Figura 28. Pc 5 asignación de IP

PC5 PLANTA

IP Configuration

DHCP Static

IP Address: 190.108.30.6

Subnet Mask: 255.255.0.0

Default Gateway:

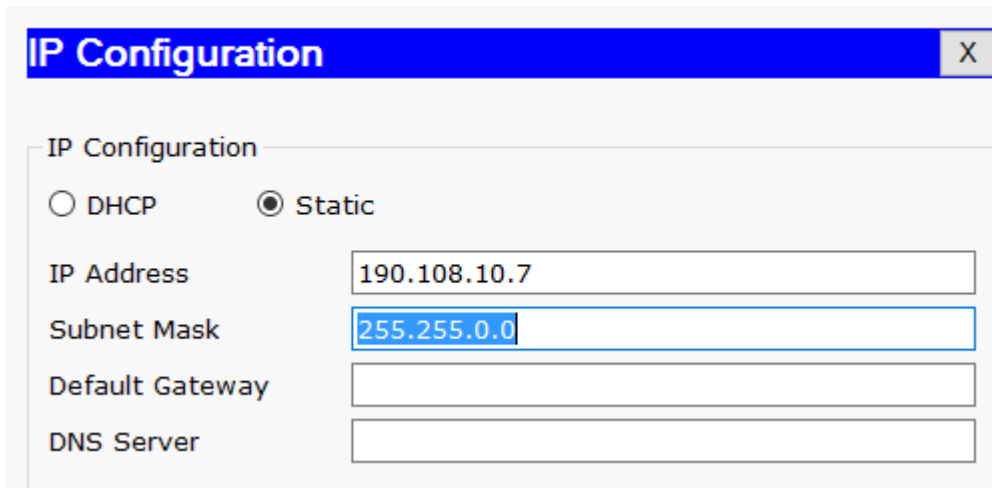
DNS Server:

SWT3

```
SWT3(config)#int f0/10
SWT3(config-if)#switchport mode access
SWT3(config-if)#switchport access vlan 10
SWT3(config-if)#exit
SWT3(config)#int f0/15
SWT3(config-if)#swi
SWT3(config-if)#switchport mode access
SWT3(config-if)#switchport access vlan 20
SWT3(config-if)#exit
SWT3(config)#int f0/20
SWT3(config-if)#swi
SWT3(config-if)#switchport mode access
SWT3(config-if)#swi
SWT3(config-if)#switchport access vlan 30
SWT3(config-if)#
```

Figura 29. Pc 6 asignación de IP

 PC6 COMPRA



The image shows a screenshot of a network configuration window titled "IP Configuration". The window has a blue header bar with the title and a close button (X). Below the header, there are radio buttons for "DHCP" and "Static". The "Static" option is selected. Below the radio buttons, there are four input fields: "IP Address" with the value "190.108.10.7", "Subnet Mask" with the value "255.255.0.0", "Default Gateway", and "DNS Server".

Field	Value
IP Address	190.108.10.7
Subnet Mask	255.255.0.0
Default Gateway	
DNS Server	

Figura 30. Pc 7 asignación de IP

PC7 MERCADEO

IP Configuration

IP Configuration

DHCP Static

IP Address: 190.108.20.8

Subnet Mask: 255.255.0.0

Default Gateway:

DNS Server:

Figura 31. Pc 8 asignación de IP

PC8 PLANTA

IP Configuration

IP Configuration

DHCP Static

IP Address: 190.108.30.9

Subnet Mask: 255.255.0.0

Default Gateway:

DNS Server:

4. Configure el puerto F0/10 en modo de acceso para SWT1, SWT2 y SWT3 y asígnelo a la VLAN 10.

SWT1

```
SWT1(config)#int f0/10
SWT1(config-if)#switchport access vlan 10
SWT1(config-if)#
```

SWT2

```
SWT2(config)#int f0/10
SWT2(config-if)#switchport access vlan 10
SWT2(config-if)#
```

SWT3

```
SWT3(config)#int f0/10
SWT3(config-if)#switchport access vlan 10
SWT3(config-if)#
```

5. Repita el procedimiento para los puertos F0/15 y F0/20 en SWT1, SWT2 y SWT3. Asigne las VLANs y las direcciones IP de los PCs de acuerdo con la tabla de arriba.

SWT1

```
SWT1(config)#int f0/15
SWT1(config-if)#switchport mode access
SWT1(config-if)#switchport access vlan 20
SWT1(config-if)#exit
SWT1(config)#int f0/20
SWT1(config-if)#switchport mode access
SWT1(config-if)#switchport access vlan 30
SWT1(config-if)#
```

SWT2

```
SWT2(config)#int f0/15
SWT2(config-if)#switchport mode access
SWT2(config-if)#switchport access vlan 20
SWT2(config-if)#
SWT2(config)#int f0/20
SWT2(config-if)#switchport mode access
SWT2(config-if)#switchport access vlan 30
SWT2(config-if)#
```

SWT3

```
SWT3(config)#int f0/15
SWT3(config-if)#switchport mode access
SWT3(config-if)#switchport access vlan 20
SWT3(config-if)#exit
SWT3(config)#int f0/20
SWT3(config-if)#switchport mode access
SWT3(config-if)#switchport access vlan 30
SWT3(config-if)#
```


C. Configurar las direcciones IP en los Switches.

1. En cada uno de los Switches asigne una dirección IP al SVI (Switch Virtual Interface) para VLAN 99 de acuerdo con la siguiente tabla de direccionamiento y active la interfaz.

Tabla 3. Tabla IP Switch

Equipo	Interfaz	Dirección IP	Máscara
SWT1	VLAN 99	190.108.99.1	255.255.255.0
SWT2	VLAN 99	190.108.99.2	255.255.255.0
SWT3	VLAN 99	190.108.99.3	255.255.255.0

SWT1

```
SWT1(config)#int vlan 99
SWT1(config-if)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to up

SWT1(config-if)#ip add 190.108.99.1 255.255.255.0
SWT1(config-if)#no shutdown
SWT1(config-if)#
```

SWT2

```
SWT2(config)#int vlan 99
SWT2(config-if)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to up

SWT2(config-if)#ip add 190.108.99.2 255.255.255.0
SWT2(config-if)#no shutdown
SWT2(config-if)#
```

SWT3

```
SWT3(config)#int vlan 99
```

```
SWT3(config-if)#
```

```
%LINK-5-CHANGED: Interface Vlan99, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to up
```

```
SWT3(config-if)#ip add 190.108.99.3 255.255.255.0
```

```
SWT3(config-if)#no shutdown
```

```
SWT3(config-if)#
```

E. Verificar la conectividad Extremo a Extremo

1. Ejecute un Ping desde cada PC a los demás. Explique por qué el ping tuvo o no tuvo éxito.

Figura 32. Ping desde pc2 compras vlan 20

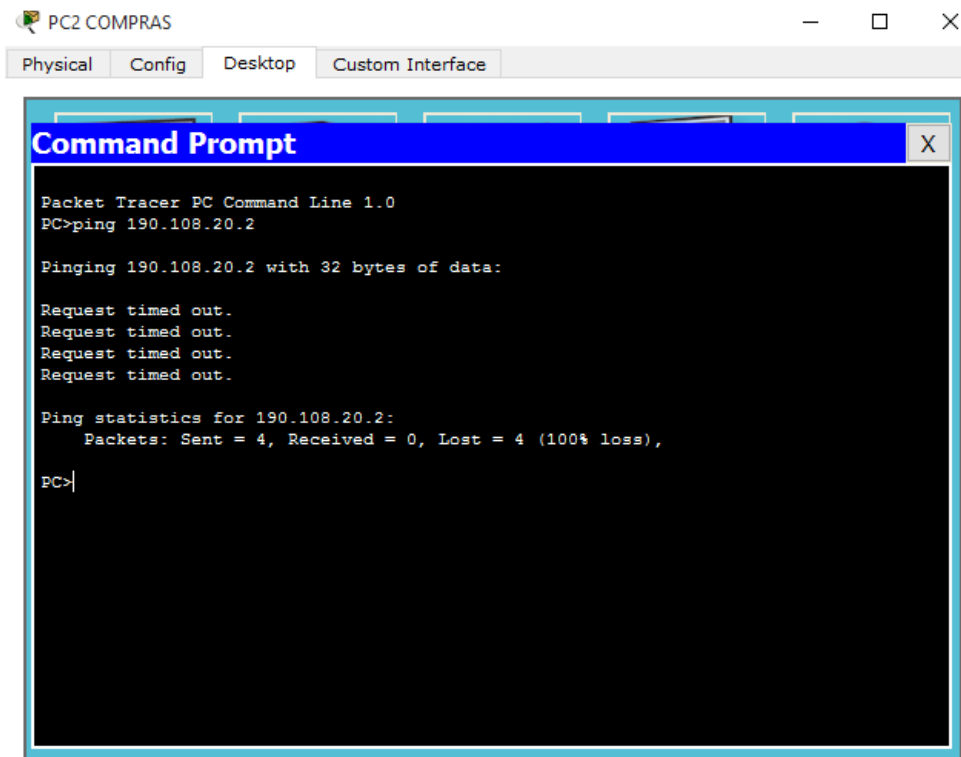


Figura 33. Ping desde pc1 mercadeo vlan 10

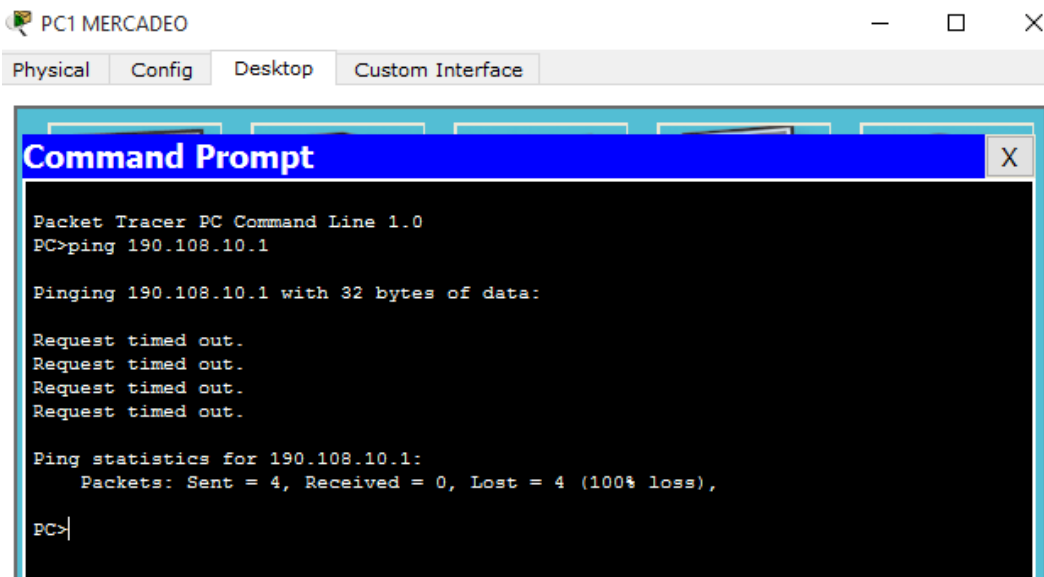


Figura 34. Ping desde pc2 compras vlan 20

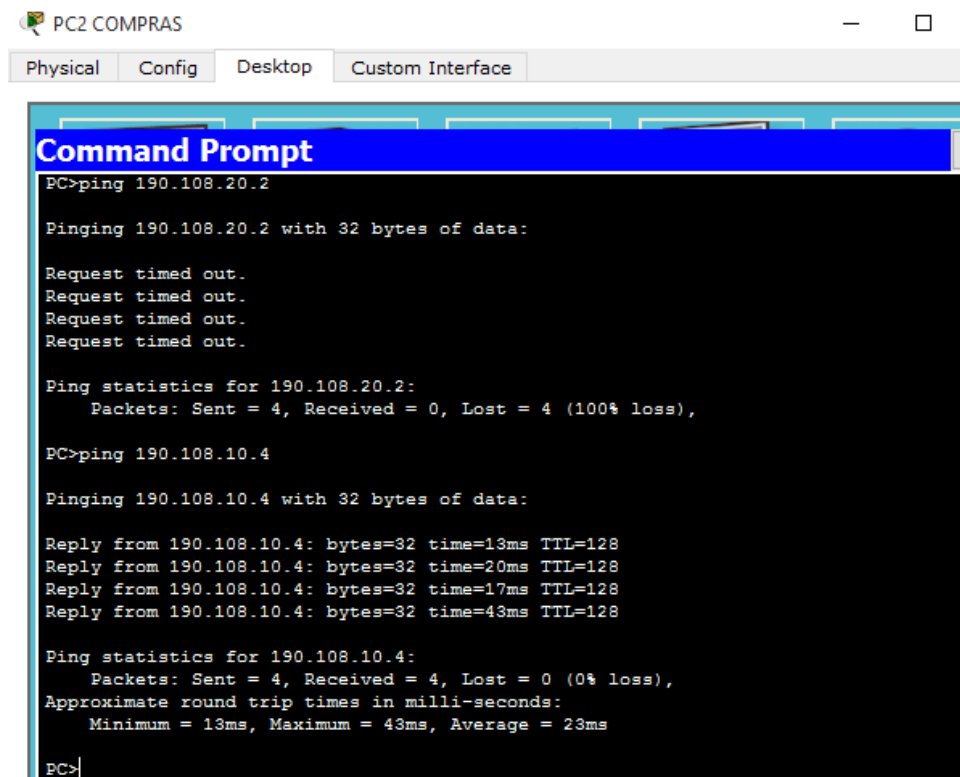


Figura 35. Ping desde pc3 compras vlan 10

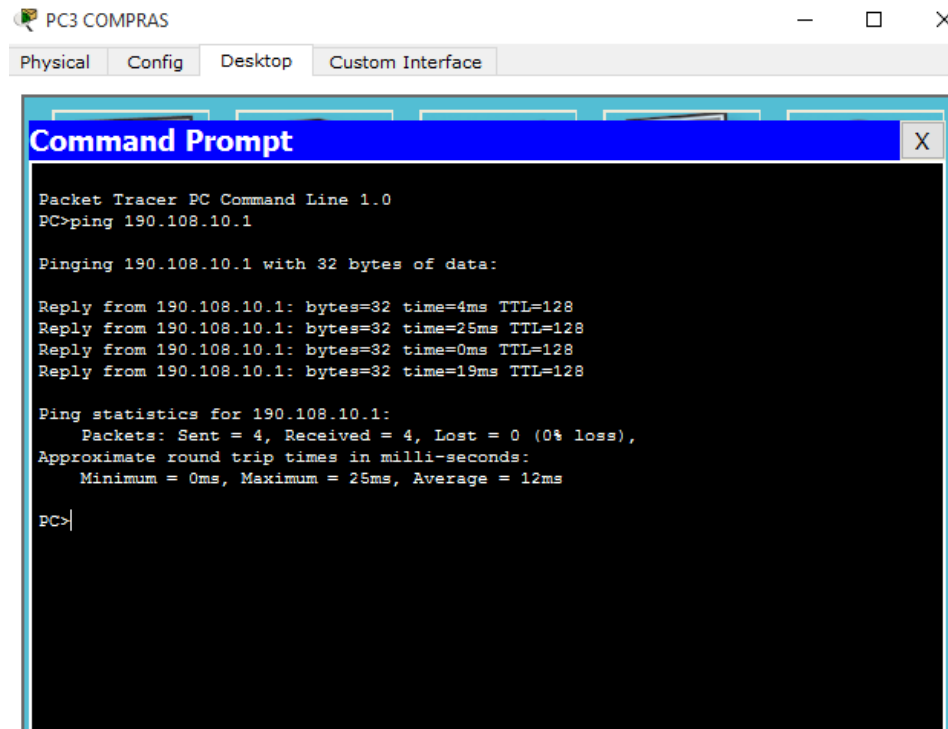


Figura 36. Ping desde pc4 mercadeo vlan 20

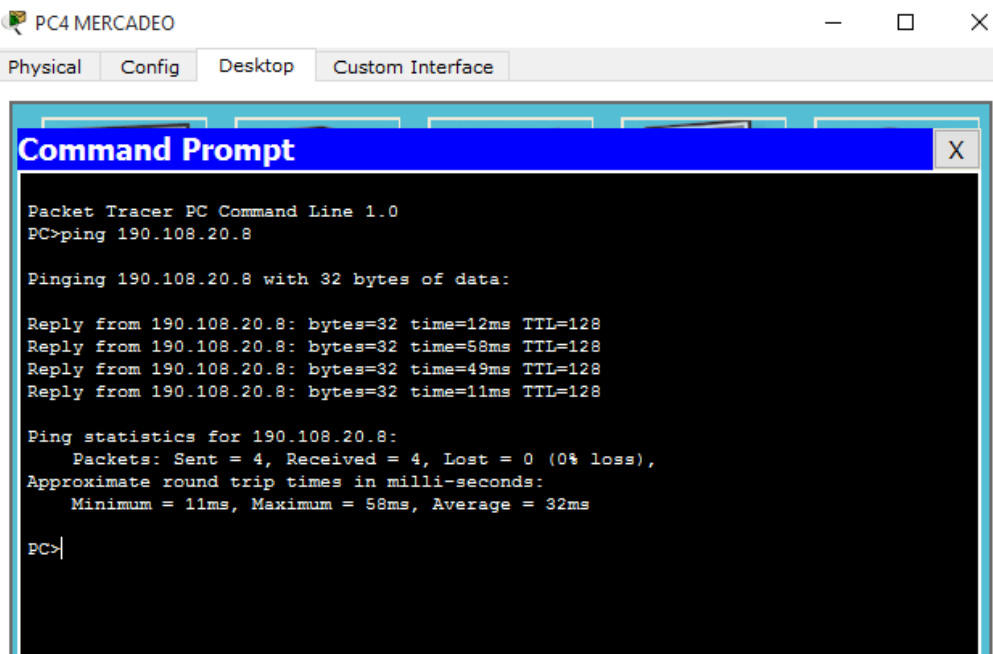
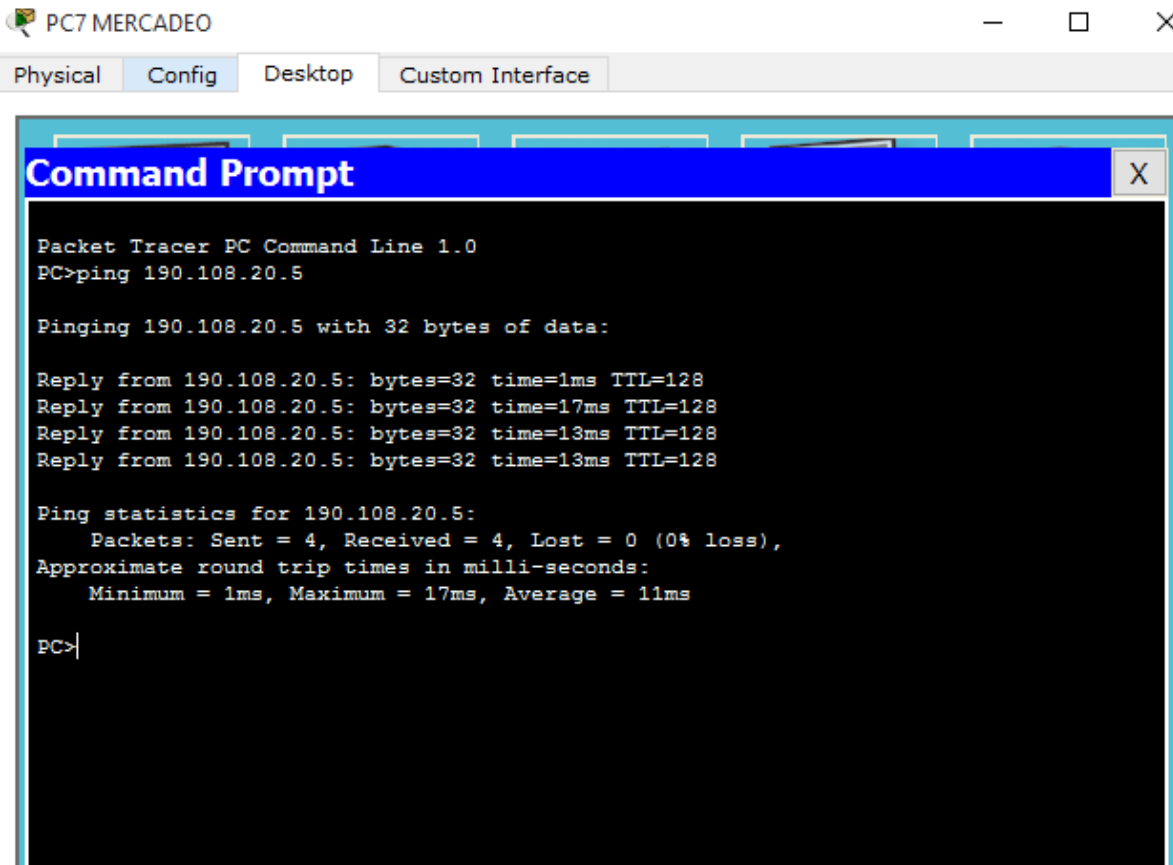


Figura 37. Ping desde pc7 mercadeo vlan 20



The screenshot shows a Packet Tracer PC Command Line window for PC7 MERCADERO. The window has tabs for Physical, Config, Desktop, and Custom Interface. The Command Prompt displays the following text:

```
Packet Tracer PC Command Line 1.0
PC>ping 190.108.20.5

Pinging 190.108.20.5 with 32 bytes of data:

Reply from 190.108.20.5: bytes=32 time=1ms TTL=128
Reply from 190.108.20.5: bytes=32 time=17ms TTL=128
Reply from 190.108.20.5: bytes=32 time=13ms TTL=128
Reply from 190.108.20.5: bytes=32 time=13ms TTL=128

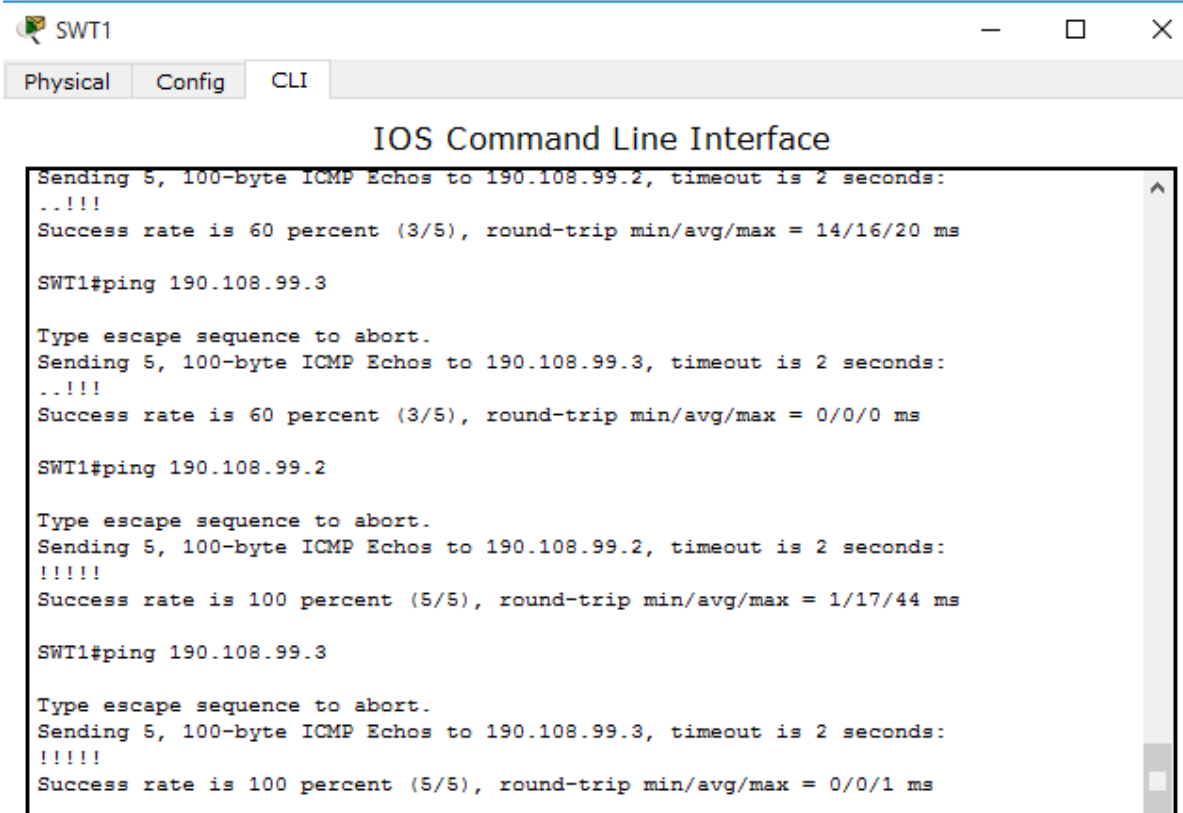
Ping statistics for 190.108.20.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 17ms, Average = 11ms

PC>|
```

- El ping es exitoso cuando son equipos que están en la misma vlan. El ping no tuvo éxito entre equipos de vlans diferentes puesto que no existe un enrutamiento para que se puedan ver entre ellas.

2. Ejecute un Ping desde cada Switch a los demás. Explique por qué el ping tuvo o no tuvo éxito.

Figura 38. Ping desde switch 1



The screenshot shows a Cisco IOS Command Line Interface window titled "SWT1". The window has three tabs: "Physical", "Config", and "CLI", with "CLI" selected. The main content area displays the following text:

```
IOS Command Line Interface

Sending 5, 100-byte ICMP Echos to 190.108.99.2, timeout is 2 seconds:
..!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 14/16/20 ms

SWT1#ping 190.108.99.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.99.3, timeout is 2 seconds:
..!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 0/0/0 ms

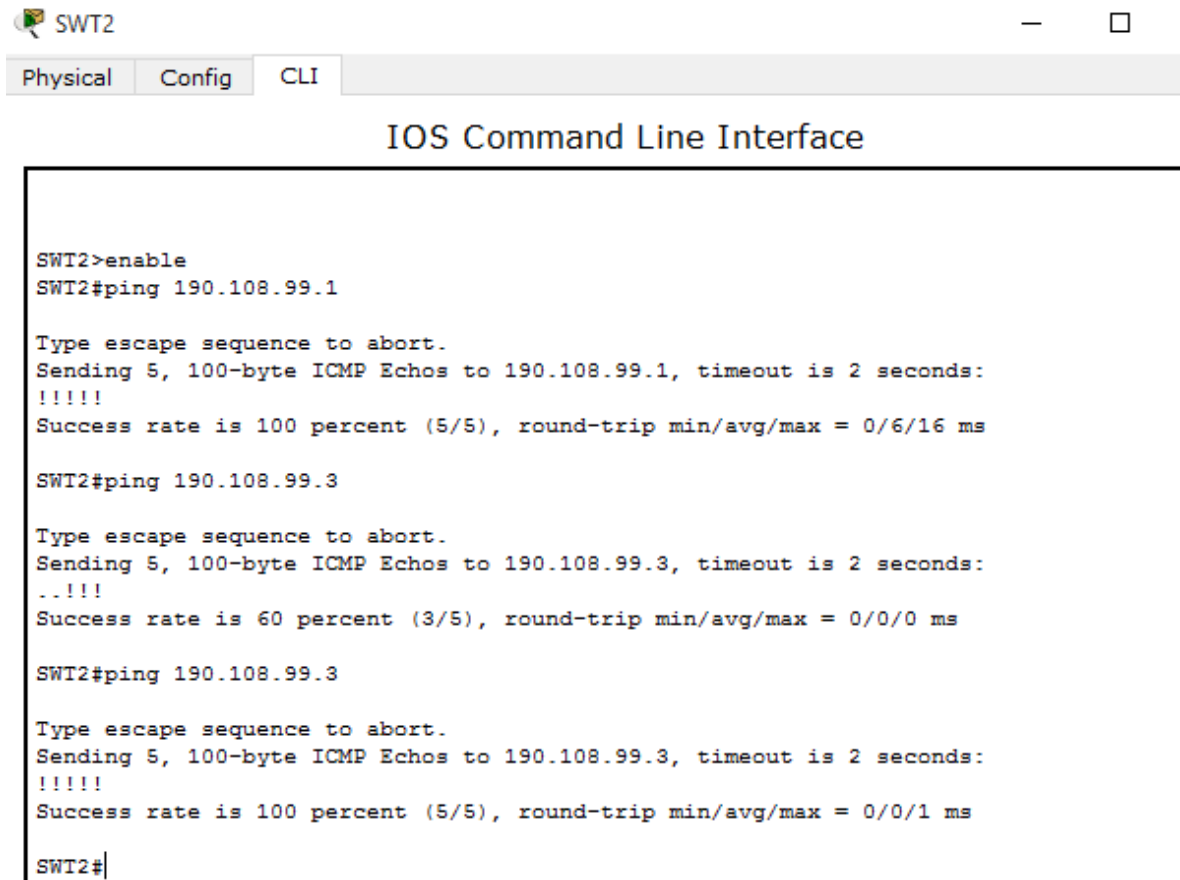
SWT1#ping 190.108.99.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.99.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/17/44 ms

SWT1#ping 190.108.99.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.99.3, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
```

Figura 39. Ping desde switch 2



The screenshot shows a terminal window titled "SWT2" with three tabs: "Physical", "Config", and "CLI". The main content is the "IOS Command Line Interface". The user enters the command "enable" to enter privileged mode. Then, they enter "ping 190.108.99.1", which results in a 100% success rate. Next, they enter "ping 190.108.99.3", resulting in a 60% success rate. Finally, they enter "ping 190.108.99.3" again, resulting in a 100% success rate. The prompt "SWT2#" is visible at the end of the last command.

```
SWT2>enable
SWT2#ping 190.108.99.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.99.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/6/16 ms

SWT2#ping 190.108.99.3

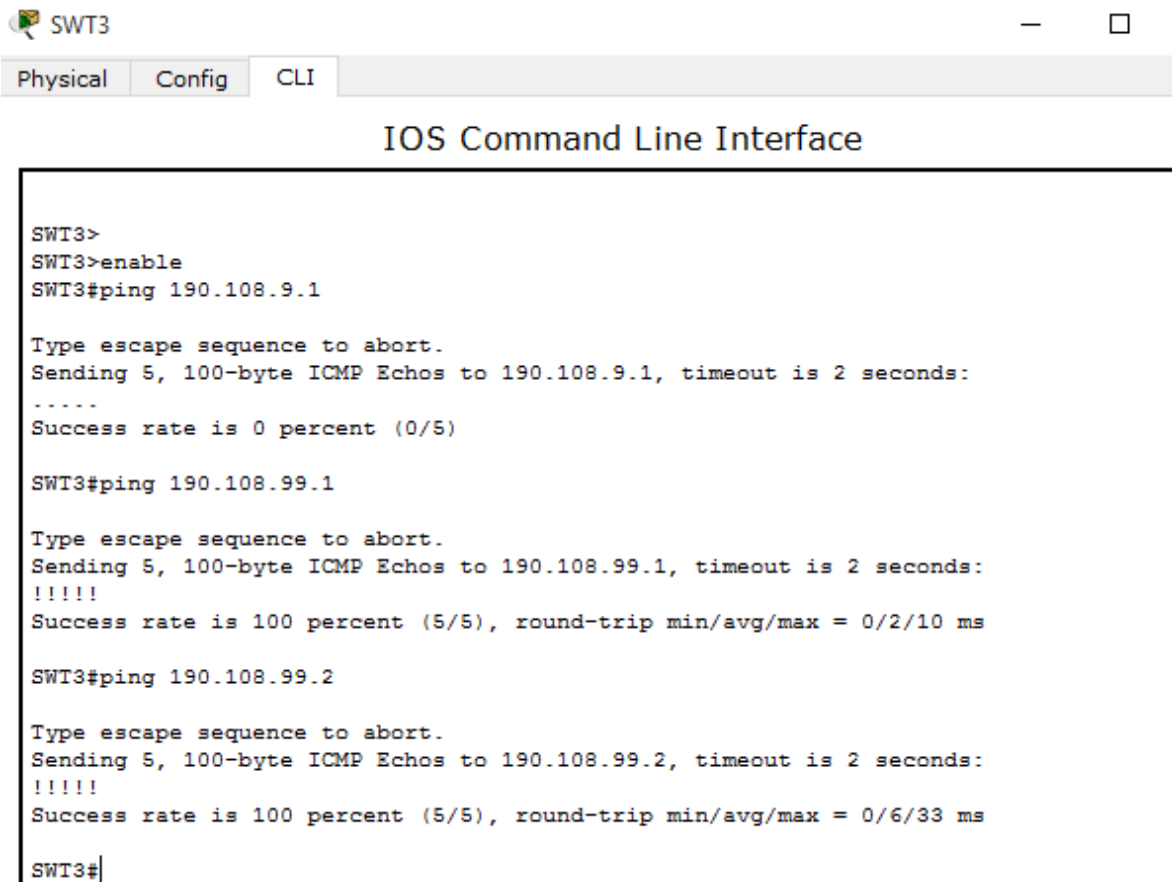
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.99.3, timeout is 2 seconds:
..!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 0/0/0 ms

SWT2#ping 190.108.99.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.99.3, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

SWT2#
```

Figura 40. Ping desde switch 3



```
SWT3
Physical Config CLI
IOS Command Line Interface

SWT3>
SWT3>enable
SWT3#ping 190.108.9.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.9.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

SWT3#ping 190.108.99.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.99.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/2/10 ms

SWT3#ping 190.108.99.2

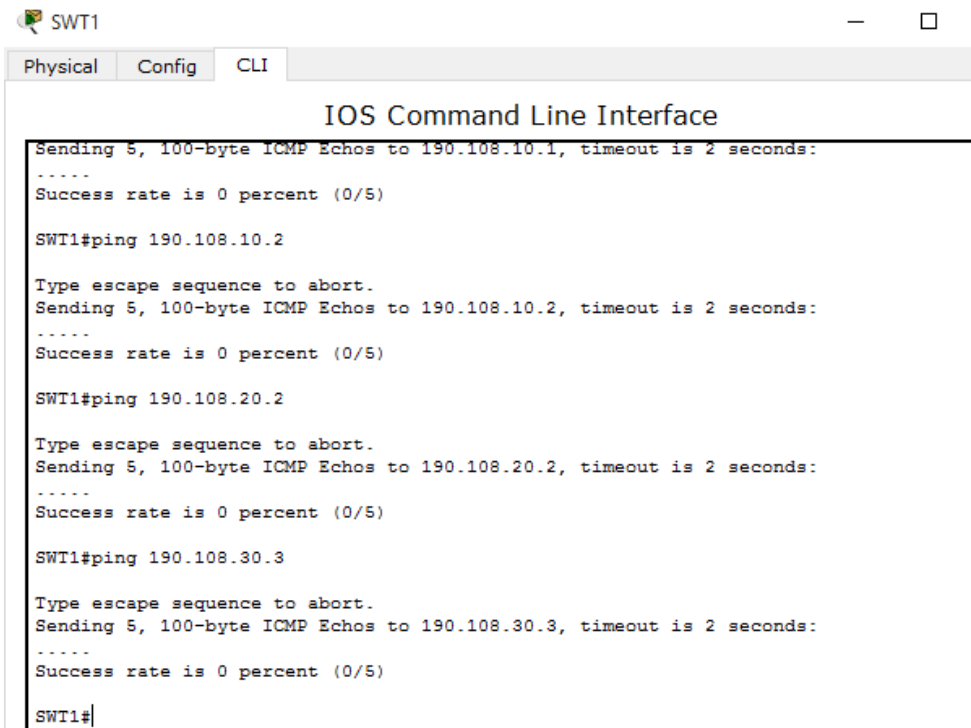
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.99.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/6/33 ms

SWT3#|
```

- El ping entre los tres switch es exitoso pues las direcciones ip que se configuraron están en una misma vlan y los puertos en modo trunk para la comunicación entre estos.

2. Ejecute un Ping desde cada Switch a cada PC. Explique por qué el ping tuvo o no tuvo éxito.

Figura 41. Ping de switch 1 a pc



```
SWT1
Physical Config CLI
IOS Command Line Interface
Sending 5, 100-byte ICMP Echos to 190.108.10.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

SWT1#ping 190.108.10.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.10.2, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

SWT1#ping 190.108.20.2

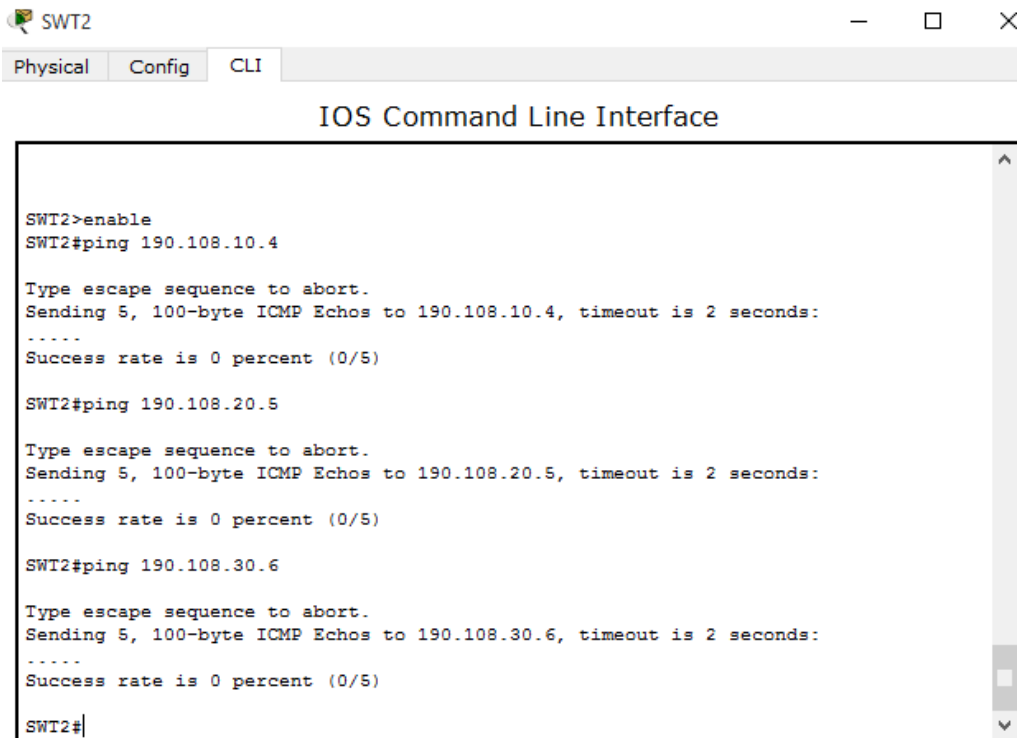
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.20.2, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

SWT1#ping 190.108.30.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.30.3, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

SWT1#
```

Figura 42. Ping de switch 2 a pc



The image shows a screenshot of a network switch's Command Line Interface (CLI) window. The window title is "SWT2" and it has three tabs: "Physical", "Config", and "CLI". The main content area is titled "IOS Command Line Interface" and displays the following text:

```
SWT2>enable
SWT2#ping 190.108.10.4

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.10.4, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

SWT2#ping 190.108.20.5

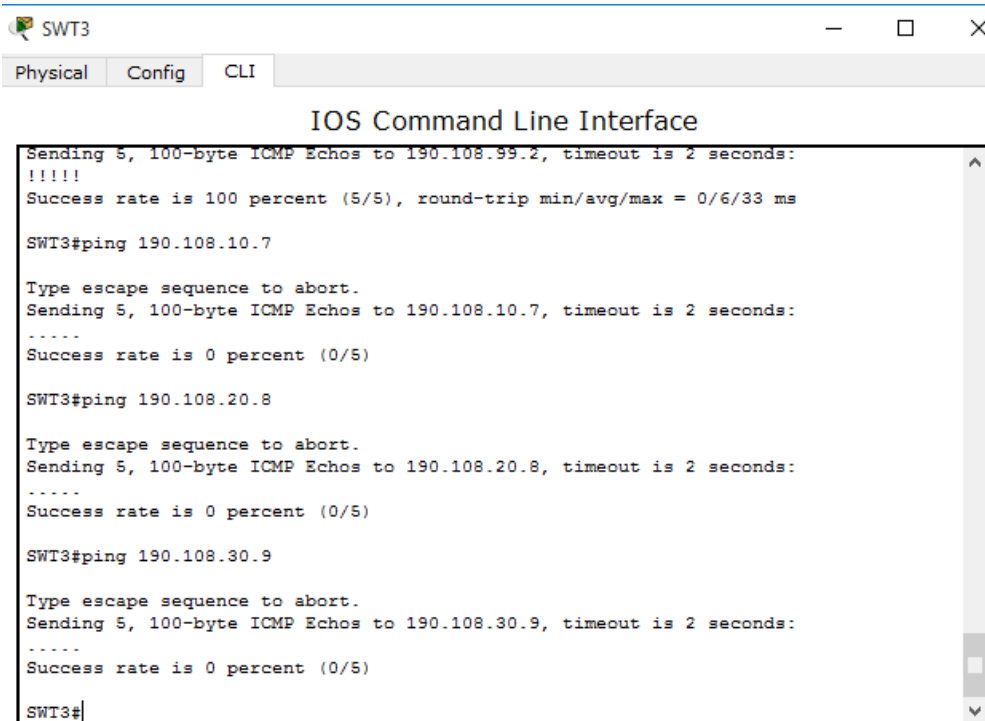
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.20.5, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

SWT2#ping 190.108.30.6

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.30.6, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

SWT2#|
```

Figura 43. Ping de switch 3 a pc



```
SWT3
Physical Config CLI
IOS Command Line Interface
Sending 5, 100-byte ICMP Echos to 190.108.99.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/6/33 ms
SWT3#ping 190.108.10.7
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.10.7, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
SWT3#ping 190.108.20.8
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.20.8, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
SWT3#ping 190.108.30.9
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.30.9, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
SWT3#
```

- El ping no tuvo éxito debido a que en ningún switch se configuró una dirección ip a una vlan.

CONCLUSIONES

- ✓ Por medio de los ejercicios prácticos logramos identificar el grado de desarrollo de competencias y habilidades que se adquirieron a lo largo del diplomado.
- ✓ Se aplicaron las configuraciones, como lo fueron los protocolos de enrutamiento básicos y avanzados, se asignó el direccionamiento indicado, así como la activación de las interfaces de cada dispositivo.
- ✓ Se realizó la configuración de Vlans, se implementó la configuración de vecinos BGP, se realizó el anuncio de direcciones e identificación. Se configura OSPF y EIGPR y redistribución de rutas para la interconexión de redes según lo solicitado en la guía.
- ✓ Se configuró VTP modo servidor y cliente para las VLAN en cada switch, se estableció un dominio y contraseña.

BIBLIOGRAFIA

Teare, D., Vachon B., Graziani, R. (2015). CISCO Press (Ed). EIGRP Implementation. Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide CCNP ROUTE 300-101. Recuperado de <https://1drv.ms/b/s!AmIJYei-NT1InMfy2rhPZHwEoWx>

Teare, D., Vachon B., Graziani, R. (2015). CISCO Press (Ed). OSPF Implementation. Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide CCNP ROUTE 300-101. Recuperado de <https://1drv.ms/b/s!AmIJYei-NT1InMfy2rhPZHwEoWx>

UNAD (2015). Introducción a la configuración de Switches y Routers [OVA]. Recuperado de <https://1drv.ms/u/s!AmIJYei-NT1IhgL9QChD1m9EuGqC>

Teare, D., Vachon B., Graziani, R. (2015). CISCO Press (Ed). Path Control Implementation. Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide CCNP ROUTE 300-101. Recuperado de <https://1drv.ms/b/s!AmIJYei-NT1InMfy2rhPZHwEoWx>

Teare, D., Vachon B., Graziani, R. (2015). CISCO Press (Ed). Implementing a Border Gateway Protocol (BGP). Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide CCNP ROUTE 300-101. Recuperado de <https://1drv.ms/b/s!AmIJYei-NT1InMfy2rhPZHwEoWx>

UNAD (2015). Principios de Enrutamiento [OVA]. Recuperado de https://1drv.ms/u/s!AmIJYei-NT1IhgOyjWeh6timi_Tm

Froom, R., Frahim, E. (2015). CISCO Press (Ed). InterVLAN Routing. Implementing Cisco IP Switched Networks (SWITCH) Foundation Learning Guide CCNP SWITCH 300-115. Recuperado de <https://1drv.ms/b/s!AmIJYei-NT1InWR0hoMxgBNv1CJ>

Froom, R., Frahim, E. (2015). CISCO Press (Ed). Network Management. Implementing Cisco IP Switched Networks (SWITCH) Foundation Learning Guide CCNP SWITCH 300-115. Recuperado de <https://1drv.ms/b/s!AmIJYei-NT1InWR0hoMxgBNv1CJ>