

PRUEBA DE HABILIDADES PRÁCTICAS CCNP

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA
INGENIERIA DE TELECOMUNICACIONES
DIPLOMADO CISCO CCNP
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PRUEBA DE HABILIDADES PRÁCTICAS

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GLOSARIO

Networking: Es la integración de dos o más redes con la finalidad de compartir o vincular dos o más dispositivos informáticos con el propósito de compartir datos. Las redes están construidas con una mezcla de hardware y software incluyendo el cableado necesario para conectar los equipos.

Conectividad: Es la capacidad de un dispositivo de poder ser conectado o establecer una conexión o comunicación con una red con el fin de enviar y recibir información, está dada por su capacidad para conectarse a una red como internet o a otros equipos y periféricos.

Router: Es un dispositivo que opera en capa tres, así mismo permite que varias redes u ordenadores se conecten entre sí. Es también conocido como enrutador y se trata de un producto de hardware que permite interconectar computadoras que funcionan en el marco de una red.

Protocolos de Enrutamiento: Son el conjunto de reglas utilizadas por el Router cuando se comunica con otro Router con el fin de compartir información y tablas de enrutamiento. Un protocolo de enrutamiento es la aplicación de un algoritmo de enrutamiento en el software o hardware.

Vlan: Es un método para crear redes lógicas independientes dentro de una misma red física, su acrónimo de virtual LAN (red de área local virtual). Varias Vlan pueden coexistir en un único conmutador físico o en una única red física.

RESUMEN

El objetivo principal del siguiente informe es el describir los pasos correspondientes a la configuración de los escenarios planteados a la prueba de habilidades prácticas del diplomado de profundización Cisco CCNP.

Adicional al realizar los ejercicios planteados nos ayuda a validar y profundizar en los conocimientos adquiridos durante el proceso de aprendizaje dentro del curso, así como el saber afrontar las situaciones que se nos presentan en la administración de las Topologías de Networking.

El objetivo principal es el enriquecimiento del estudiante en un área de profundización del área de telecomunicaciones que permita poseer una base práctica para el mejoramiento de análisis proactivo sobre la plataforma de red y de Networking.

INTRODUCCIÓN

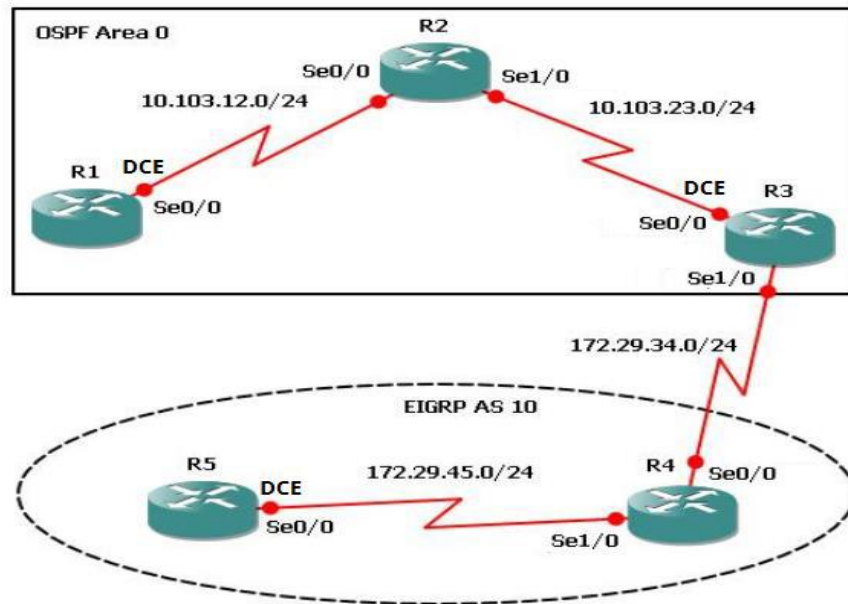
En el desarrollo de esta actividad, se realizarán las actividades propuestas en los tres (3) escenarios habilitados para tal fin, se pondrán a prueba las configuraciones básicas y se implementará la solución de cada una de ellas utilizando los comandos propuestos en la guía tales como show ip route para la verificación de la conectividad y se utilizará la herramienta GNS3 para el desarrollo de la guía.

Se realizará un paso a paso de las configuraciones realizadas las cuales corresponden a las pruebas de habilidades del diplomado Cisco CCNP, este diplomado nos ofrece una experiencia única con una gran carga de habilidades prácticas de Routing, Switching y resolución de problemas.

Adicional otro factor importante para la implementación de redes es conocer los protocolos básicos de enrutamiento ya que ellos se encargan de la comunicación entre los CPE para la generación de las tablas de enrutamiento.

ESCENARIO 1

Figura 1. Diagrama Topología Primer Escenario



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>enable
```

```
Router#configure terminal
```

```
Router(config)#hostname R1
```

```
R1(config)#no ip domain-lookup
```

```
R1(config)#line con 0
```

```
R1(config-line)#logging synchronous
```

```
R1(config-line)#exec-timeout 0 0
```

```
R1(config)#int s0/0/0
R1(config-if)#ip address 10.103.12.1 255.255.255.0
R1(config-if)#clock rate 64000
R1(config-if)#no shutdown
R2(config)#int s0/0/0
R2(config-if)#ip address 10.103.12.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#int s0/0/1
R2(config-if)#ip address 10.103.23.2 255.255.255.0
R2(config-if)#no shutdown
R3(config)#int s0/0/0
R3(config-if)#ip address 10.103.23.1 255.255.255.0
R3(config-if)#clock rate 64000
R3(config-if)#no shutdown
R3(config-if)#int s0/0/1
R3(config-if)#ip address 172.29.34.2 255.255.255.0
R3(config-if)#no shutdown
R4(config)#int s0/0/0
R4(config-if)#ip address 172.29.34.1 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#int s0/0/1
R4(config-if)#ip address 172.29.45.2 255.255.255.0
R4(config-if)#no shutdown
```

```
R5(config)#int s0/0/0
```

```
R5(config-if)#ip address 172.29.45.1 255.255.255.0
```

```
R5(config-if)#clock rate 64000
```

```
R5(config-if)#no shutdown
```

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 loopback0
```

```
R1(config-if)#ip address 10.1.0.1 255.255.255.0
```

```
R1(config-if)#ip ospf 1 area 0
```

```
R1(config-if)#ip ospf network point-to-point
```

```
R1(config-if)#int loopback1
```

```
R1(config-if)#ip address 10.1.1.1 255.255.255.0
```

```
R1(config-if)#ip ospf 1 area 0
```

```
R1(config-if)#ip ospf network point-to-point
```

```
R1(config-if)#int loopback2
```

```
R1(config-if)#ip address 10.1.2.1 255.255.255.0
```

```
R1(config-if)#ip ospf 1 area 0
```

```
R1(config-if)#ip ospf network point-to-point
```

```
R1(config-if)#int loopback3
```

```
R1(config-if)#ip address 10.1.3.1 255.255.255.0
```

```
R1(config-if)#ip ospf 1 area 0
```

```
R1(config-if)#ip ospf network point-to-point
```

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

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 lo0
```

```
R5(config-if)#ip address 172.5.0.1 255.255.255.0
```

```
R5(config-if)#int lo1
```

```
R5(config-if)#ip address 172.5.1.1 255.255.255.0
```

```
R5(config-if)#int lo2
```

```
R5(config-if)#ip address 172.5.2.1 255.255.255.0
```

```
R5(config-if)#int lo3
```

```
R5(config-if)#ip address 172.5.3.1 255.255.255.0
```

```
R5(config-if)#exit
```

```
R5(config)#router eigrp 10
```

```
R5(config-router)#network 172.5.0.0 0.0.3.255
```

```
R5(config-router)#end
```

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

Se toma la imagen en donde se puede evidenciar el aprendizaje de rutas a través de los protocolos de enrutamiento dinámicos (OSPF, EIGRP)

Figura 2. Validación de aprendizaje de rutas

```
R3#show ip route
Codes: 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
       i - IS-IS, su - IS-IS summary, 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

172.5.0.0/32 is subnetted, 4 subnets
D   172.5.0.1 [90/2809856] via 172.29.34.1, 00:02:05, Serial1/1
D   172.5.0.3 [90/2809856] via 172.29.34.1, 00:02:05, Serial1/1
D   172.5.0.2 [90/2809856] via 172.29.34.1, 00:02:05, Serial1/1
D   172.5.0.4 [90/2809856] via 172.29.34.1, 00:02:05, Serial1/1
172.29.0.0/24 is subnetted, 2 subnets
C   172.29.34.0 is directly connected, Serial1/1
D   172.29.45.0 [90/2681856] via 172.29.34.1, 00:02:05, Serial1/1
10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
O   10.1.0.3/32 [110/129] via 10.103.23.2, 00:11:20, Serial1/0
O   10.1.0.2/32 [110/129] via 10.103.23.2, 00:11:20, Serial1/0
O   10.1.0.1/32 [110/129] via 10.103.23.2, 00:11:20, Serial1/0
O   10.1.0.4/32 [110/129] via 10.103.23.2, 00:11:20, Serial1/0
O   10.103.12.0/24 [110/128] via 10.103.23.2, 00:11:26, Serial1/0
C   10.103.23.0/24 is directly connected, Serial1/0
```

Figura 3. Rutas aprendidas por EIGRP y OSPF

```
R3#show ip route
Codes: 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
       i - IS-IS, su - IS-IS summary, 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

172.5.0.0/32 is subnetted, 4 subnets
D   172.5.0.1 [90/2809856] via 172.29.34.1, 00:02:05, Serial1/1
D   172.5.0.3 [90/2809856] via 172.29.34.1, 00:02:05, Serial1/1
D   172.5.0.2 [90/2809856] via 172.29.34.1, 00:02:05, Serial1/1
D   172.5.0.4 [90/2809856] via 172.29.34.1, 00:02:05, Serial1/1
172.29.0.0/24 is subnetted, 2 subnets
C   172.29.34.0 is directly connected, Serial1/1
D   172.29.45.0 [90/2681856] via 172.29.34.1, 00:02:05, Serial1/1
10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
D   10.1.0.3/32 [110/129] via 10.103.23.2, 00:11:20, Serial1/0
D   10.1.0.2/32 [110/129] via 10.103.23.2, 00:11:20, Serial1/0
D   10.1.0.1/32 [110/129] via 10.103.23.2, 00:11:20, Serial1/0
D   10.1.0.4/32 [110/129] via 10.103.23.2, 00:11:20, Serial1/0
D   10.103.12.0/24 [110/128] via 10.103.23.2, 00:11:26, Serial1/0
C   10.103.23.0/24 is directly connected, Serial1/0
```

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 ospf 1
```

```
R3(config-router)#redistribute eigrp 10 metric 50000 subnets
```

```
R3(config-router)#exit
```

```
R3(config)#router eigrp 10
```

```
R3(config-router)#redistribute ospf 1 metric 1544 2000 255 1 1500
```

```
R3(config-router)#end
```

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. Validación rutas aprendidas en Router 1

```
R1#show ip route
Codes: 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
       i - IS-IS, su - IS-IS summary, 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

      172.5.0.0/32 is subnetted, 4 subnets
O E2   172.5.0.1 [110/20] via 10.103.12.2, 00:05:10, Serial1/0
O E2   172.5.0.3 [110/20] via 10.103.12.2, 00:05:10, Serial1/0
O E2   172.5.0.2 [110/20] via 10.103.12.2, 00:05:10, Serial1/0
O E2   172.5.0.4 [110/20] via 10.103.12.2, 00:05:10, Serial1/0
      172.29.0.0/24 is subnetted, 2 subnets
O E2   172.29.34.0 [110/20] via 10.103.12.2, 00:05:10, Serial1/0
O E2   172.29.45.0 [110/20] via 10.103.12.2, 00:05:10, Serial1/0
      10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C       10.1.0.3/32 is directly connected, Loopback3
C       10.1.0.2/32 is directly connected, Loopback2
C       10.1.0.1/32 is directly connected, Loopback1
C       10.1.0.4/32 is directly connected, Loopback4
C       10.103.12.0/24 is directly connected, Serial1/0
O       10.103.23.0/24 [110/128] via 10.103.12.2, 01:52:30, Serial1/0
```


Figura 5. Validación rutas aprendidas en Router 5

```
R5#show ip route
Codes: 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
       i - IS-IS, su - IS-IS summary, 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

    172.5.0.0/32 is subnetted, 4 subnets
C       172.5.0.1 is directly connected, Loopback1
C       172.5.0.3 is directly connected, Loopback3
C       172.5.0.2 is directly connected, Loopback2
C       172.5.0.4 is directly connected, Loopback4
    172.29.0.0/24 is subnetted, 2 subnets
D       172.29.34.0 [90/2681856] via 172.29.45.1, 00:00:44, Serial1/0
C       172.29.45.0 is directly connected, Serial1/0
    10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
D EX   10.1.0.3/32 [170/7801856] via 172.29.45.1, 00:00:46, Serial1/0
D EX   10.1.0.2/32 [170/7801856] via 172.29.45.1, 00:00:46, Serial1/0
D EX   10.1.0.1/32 [170/7801856] via 172.29.45.1, 00:00:46, Serial1/0
D EX   10.1.0.4/32 [170/7801856] via 172.29.45.1, 00:00:46, Serial1/0
D EX   10.103.12.0/24 [170/7801856] via 172.29.45.1, 00:00:47, Serial1/0
D EX   10.103.23.0/24 [170/7801856] via 172.29.45.1, 00:00:48, Serial1/0
```

ESCENARIO 2

Figura 6. Diagrama Topología Segundo Escenario

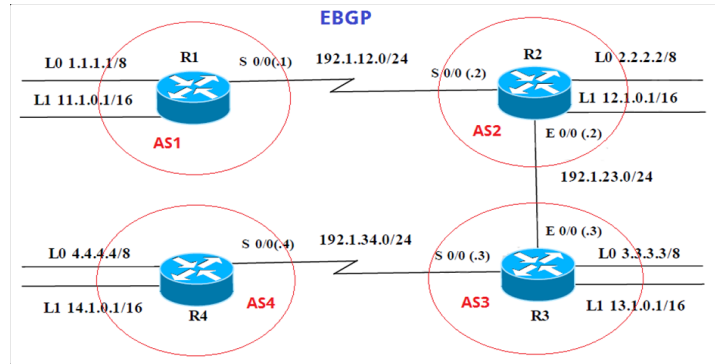


Tabla 1. Direcccionamiento Router R1, R2, R3, R4

INFORMACIÓN PARA CONFIGURACIÓN DE LOS RUTERS			
R1	Interfaz	Dirección IP	Máscara
	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	Interfaz	Dirección IP	Máscara
	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
R3	Interfaz	Dirección IP	Máscara
	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
R4	Interfaz	Dirección IP	Máscara
	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

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.

```
R1(config)#int lo0
```

```
R1(config-if)#ip address 1.1.1.1 255.0.0.0
```

```
R1(config-if)#int lo1
```

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

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

```
R1(config)#int s0/0/0
```

```
R1(config-if)#ip address 192.1.12.1 255.255.255.0
```

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

```
R1(config)#router bgp 1
```

```
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 1.1.1.0 mask 255.0.0.0
```

```
R1(config-router)#network 11.1.0.0 mask 255.255.0.0
```

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

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

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

```
R2(config-if)#int lo 1
```

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

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

```

R2(config)#int S0/0/0

R2(config-if)#ip address 192.1.12.2 255.255.255.0

R2(config-if)#no shutdown

R2(config)#router bgp 2

R2(config-router)#bgp router-id 22.22.22.22

R2(config-router)#neighbor 192.1.12.1 remote-as 1

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

R2(config-router)#network 2.2.2.0 mask 255.0.0.0

R2(config-router)#network 12.1.0.0 mask 255.255.0.0

R2(config-router)#exit

```

Figura 7. Validación rutas aprendidas Protocolo BGP

```

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
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

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, 00:05:45
 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 [20/0] via 192.1.12.2, 00:05:45
 192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.12.0/24 is directly connected, Serial1/0
L    192.1.12.1/32 is directly connected, Serial1/0
B    192.1.23.0/24 [20/0] via 192.1.12.2, 00:05:45

```

Figura 8. Rutas Aprendidas Protocolo BGP

```
R2#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
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

Gateway of last resort is not set

B    1.0.0.0/8 [20/0] via 192.1.12.1, 00:07:38
     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
L    11.0.0.0/16 is subnetted, 1 subnets
B    11.1.0.0 [20/0] via 192.1.12.1, 00:07:38
     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
L    192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.12.0/24 is directly connected, Serial1/0
L    192.1.12.2/32 is directly connected, Serial1/0
L    192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.23.0/24 is directly connected, FastEthernet0/0
L    192.1.23.2/32 is directly connected, FastEthernet0/0
```

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.

```
Router#configure terminal
```

```
Router(config)#hostname R3
```

```
R3(config)#int lo 0
```

```
R3(config-if)#ip address 3.3.3.3 255.0.0.0
```

```
R3(config-if)#int lo 1
```

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

```
R3(config-if)#exit
```

```
R3(config)#int s0/0/0
```

```
R3(config-if)#ip address 192.1.34.3 255.255.255.0
```

```
R3(config-if)#no shut
```

```

R3(config-if)#exit

R3(config)#router bgp 3

R3(config-router)#bgp router-id 33.33.33.33

R3(config-router)#neighbor 192.1.23.2 remote-as 2

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

R3(config-router)#network 3.3.3.0 mask 255.0.0.0

R3(config-router)#network 13.1.0.0 mask 255.255.0.0

R3(config-router)#exit

R3(config)#exit

```

Figura 9. Comando show ip route validación rutas por BGP R3.

```

R2#show int
R2#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
        I - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
        a - application route
        + - replicated route, % - next hop override

Gateway of last resort is not set

B    1.0.0.0/8 [20/0] via 192.1.12.1, 00:30:46
     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
B    3.0.0.0/8 [20/0] via 192.1.23.3, 00:01:01
     11.0.0.0/16 is subnetted, 1 subnets
B    11.1.0.0 [20/0] via 192.1.12.1, 00:30:46
     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
     13.0.0.0/16 is subnetted, 1 subnets
B    13.1.0.0 [20/0] via 192.1.23.3, 00:01:01
     192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.12.0/24 is directly connected, Serial1/0
L    192.1.12.2/32 is directly connected, Serial1/0
     192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.23.0/24 is directly connected, FastEthernet0/0
L    192.1.23.2/32 is directly connected, FastEthernet0/0
B    192.1.34.0/24 [20/0] via 192.1.23.3, 00:01:00

```

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 Loopback0. 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.

```

R3#conf t
R3(config)#router bgp 65532
R3(config-router)#bgp router-id 33.33.33.33
R3(config-router)#neighbor 192.1.23.2 remote-as 65531
R3(config-router)#network 3.0.0.0 mask 255.0.0.0
R3(config-router)#netw 13.1.0.0 mask 255.255.0.0
R3(config-router)#network 192.1.23.0 mask 255.255.255.0
R3(config-router)#network 192.1.34.0 mask 255.255.255.0
R3(config-router)#exit
R3(config)#router bgp 65531
R2(config)#router bgp 65531
R2(config-router)#neighbor 192.1.23.3 remote-as 65532
R2(config-router)#exit
R2(config)#

```

Figura 10. Redes compartidas por BGP

```

R2#show int
R2#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
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

Gateway of last resort is not set

B    1.0.0.0/8 [20/0] via 192.1.12.1, 00:30:46
     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
B    3.0.0.0/8 [20/0] via 192.1.23.3, 00:01:01
     11.0.0.0/16 is subnetted, 1 subnets
B    11.1.0.0 [20/0] via 192.1.12.1, 00:30:46
     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
     13.0.0.0/16 is subnetted, 1 subnets
B    13.1.0.0 [20/0] via 192.1.23.3, 00:01:01
     192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.12.0/24 is directly connected, Serial1/0
L    192.1.12.2/32 is directly connected, Serial1/0
     192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.23.0/24 is directly connected, FastEthernet0/0
L    192.1.23.2/32 is directly connected, FastEthernet0/0
B    192.1.34.0/24 [20/0] via 192.1.23.3, 00:01:00

```


Figura 11. Redes aprendidas por BGP

```
R3#show ip ro
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
i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
a - application route
+ - replicated route, % - next hop override

Gateway of last resort is not set

B    1.0.0.0/8 [20/0] via 192.1.23.2, 00:02:20
B    2.0.0.0/8 [20/0] via 192.1.23.2, 00:02:20
B    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
L    11.0.0.0/16 is subnetted, 1 subnets
B    11.1.0.0 [20/0] via 192.1.23.2, 00:02:19
L    12.0.0.0/16 is subnetted, 1 subnets
B    12.1.0.0 [20/0] via 192.1.23.2, 00:02:19
L    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
B    192.1.12.0/24 [20/0] via 192.1.23.2, 00:02:19
L    192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.23.0/24 is directly connected, FastEthernet0/0
L    192.1.23.3/32 is directly connected, FastEthernet0/0
C    192.1.34.0/24 is variably subnetted, 2 subnets, 2 masks
L    192.1.34.0/24 is directly connected, Serial1/0
L    192.1.34.3/32 is directly connected, Serial1/0
```

```
R4(config)#router bgp 65533
```

```
R4(config-router)#bgp router-id 44.44.44.44
```

```
R4(config-router)#net 4.0.0.0 mask 255.0.0.0
```

```
R4(config-router)#net 14.1.0.0 mask 255.255.0.0
```

```
R4(config-router)#neig 192.1.34.3 remote-as 65532
```

```
R4(config-router)#exit
```

```
R3(config)#router bgp 65532
```

```
R3(config-router)#neighbor 192.1.34.4 remote-as 65533
```

```
R3(config-router)#exit
```

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 paso con los comandos utilizados y la salida del comando show ip route.


```
R1(config)#ip route 2.0.0.0 255.0.0.0 192.1.12.2
R1(config)#router bgp 65530
R1(config-router)#no net 1.0.0.0 mask 255.0.0.0
R1(config-router)#neighbor 2.2.2.2 remote-as 65531
R1(config-router)#neighbor 2.2.2.2 ebgp-multihop 2
R1(config-router)#neighbor 2.2.2.2 update-source Loopback0
R1(config-router)#
R1#
R2(config)#ip route 1.0.0.0 255.0.0.0 192.1.12.1
R2(config)#ip route 3.0.0.0 255.0.0.0 192.1.23.3
R2(config)#router bgp 65531
R2(config-router)#neighbor 1.1.1.1 remote-as 65530
R2(config-router)#neighbor 1.1.1.1 ebgp-multihop 2
R2(config-router)#
R2(config-router)#neighbor 1.1.1.1 update-source Loopback0
R2(config-router)#neighbor 3.3.3.3 remote-as 65532
R2(config-router)#neighbor 3.3.3.3 ebgp-multihop 2
R2(config-router)#neighbor 3.3.3.3 update-source Loopback0
R2(config-router)#no network 2.0.0.0 mask 255.0.0.0
R3(config)#ip route 2.0.0.0 255.0.0.0 192.1.23.2
R3(config)#ip route 4.0.0.0 255.0.0.0 192.1.34.4
R3(config)#router bgp 65532
R3(config-router)#no network 3.0.0.0 mask 255.0.0.0
```

```

R3(config-router)#neighbor 2.2.2.2 remote-as 65531

R3(config-router)#$2.2.2 ebgp-multihop 2neighbor 2.2.2.2 ebgp-multihop 2

R3(config-router)#neighbor 2.2.2.2 ebgp-multihop 2

R3(config-router)#

R3(config-router)#neighbor 2.2.2.2 update-source Loopback0

R3(config-router)#neighbor 4.4.4.4 remote-as 65533

R3(config-router)#neighbor 4.4.4.4 ebgp-multihop 2

R3(config-router)#neighbor 4.4.4.4 update-source Loopback0

R3(config-router)#no neighbor 192.1.34.4 remote-as 65533

R3(config-router)#

R3(config-router)#no neighbor 192.1.23.2 remote-as 65531

R3(config-router)#

```

Figura 12. Rutas estáticas configuradas.

```

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
i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
a - application route
+ - replicated route, % - next hop override

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
S    2.0.0.0/8 [1/0] via 192.1.12.2
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 [20/0] via 2.2.2.2, 00:09:36
13.0.0.0/16 is subnetted, 1 subnets
B    13.1.0.0 [20/0] via 2.2.2.2, 00:09:36
192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.12.0/24 is directly connected, Serial1/0
L    192.1.12.1/32 is directly connected, Serial1/0

```

Figura 13. Validación Rutas Router 2

```
R2#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
i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
a - application route
+ - replicated route, % - next hop override

Gateway of last resort is not set

S    1.0.0.0/8 [1/0] via 192.1.12.1
    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
S    3.0.0.0/8 [1/0] via 192.1.23.3
    11.0.0.0/16 is subnetted, 1 subnets
B    11.1.0.0 [20/0] via 1.1.1.1, 00:10:45
    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
    13.0.0.0/16 is subnetted, 1 subnets
B    13.1.0.0 [20/0] via 3.3.3.3, 00:07:41
    192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.12.0/24 is directly connected, Serial1/0
L    192.1.12.2/32 is directly connected, Serial1/0
    192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.23.0/24 is directly connected, FastEthernet0/0
L    192.1.23.2/32 is directly connected, FastEthernet0/0
```

Figura 14. Validación Rutas Router 3

```
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
i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
a - application route
+ - replicated route, % - next hop override

Gateway of last resort is not set

S    2.0.0.0/8 [1/0] via 192.1.23.2
    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
S    4.0.0.0/8 [1/0] via 192.1.34.4
    11.0.0.0/16 is subnetted, 1 subnets
B    11.1.0.0 [20/0] via 2.2.2.2, 00:08:40
    12.0.0.0/16 is subnetted, 1 subnets
B    12.1.0.0 [20/0] via 2.2.2.2, 00:08:40
    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
B    192.1.12.0/24 [20/0] via 2.2.2.2, 00:08:40
    192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.23.0/24 is directly connected, FastEthernet0/0
L    192.1.23.3/32 is directly connected, FastEthernet0/0
    192.1.34.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.34.0/24 is directly connected, Serial1/0
L    192.1.34.3/32 is directly connected, Serial1/0
```

Figura 15. Validación Rutas Router 4

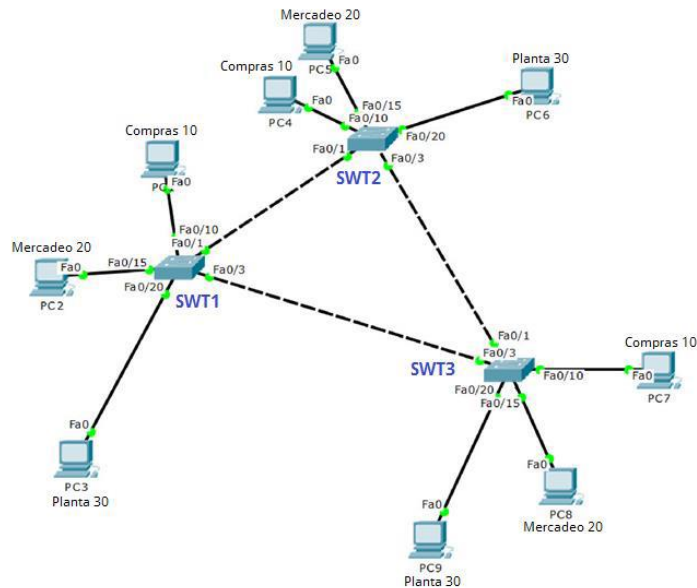
```
R4#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, 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    192.1.12.0/24 [20/0] via 3.3.3.3, 00:14:33
S    3.0.0.0/8 [1/0] via 192.1.34.3
C    4.0.0.0/8 is directly connected, Loopback0
B    192.1.23.0/24 [20/0] via 3.3.3.3, 00:14:33
     11.0.0.0/16 is subnetted, 1 subnets
B    11.1.0.0 [20/0] via 3.3.3.3, 00:14:33
C    192.1.34.0/24 is directly connected, Serial1/0
     12.0.0.0/16 is subnetted, 1 subnets
B    12.1.0.0 [20/0] via 3.3.3.3, 00:14:33
     13.0.0.0/16 is subnetted, 1 subnets
B    13.1.0.0 [20/0] via 3.3.3.3, 00:14:33
     14.0.0.0/16 is subnetted, 1 subnets
C    14.1.0.0 is directly connected, Loopback1
R4#
```

ESCENARIO 3

Figura 16. Topología Escenario Tres.



A. CONFIGURAR VTP

1. Todos los switches se configurarán para usar VTP para las actualizaciones de VLAN. 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.

```
Switch>enable
```

```
Switch#configure terminal
```

```
Switch(config)#vtp domain CCNP
```

```
Switch(config)#vtp mode server
```

```
Switch(config)#vtp password cisco
```

```
Switch(config)#hostname SWT2
```

```

SWT2(config)#exit

Switch>enable

Switch#configure terminal

Switch(config)#hostname SWT1

SWT1(config)#vtp domain CCNP

SWT1(config)#vtp mode client

SWT1(config)#vtp password cisco

SWT1(config)#exit

Switch# configure terminal

Switch(config)#hostname SWT3

SWT3(config)#vtp domain CCNP

SWT3(config)#vtp mode client

SWT3(config)#vtp password cisco

SWT3(config)#exit

```

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

Figura 17. Verificación comando show VTP status.

```

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
MD5 digest                  : 0xDA 0xBF 0x42 0x0D 0x90 0xBC 0xBE
0x41
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00

```

Figura 18. Verificación show VTP status SW2.

```
SWT2>enable
SWT2#show vtp status
VTP Version                : 2
Configuration Revision      : 0
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                : Disabled
VTP Traps Generation       : Disabled
MD5 digest                 : 0xDA 0xBF 0x42 0x0D 0x90 0xBC 0xBE
0x41
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
Local updater ID is 0.0.0.0 (no valid interface found)
SWT2#copy running-config startup-config
Destination filename [startup-config]?
```

Figura 19. Verificación show VTP status SW3.

```
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
MD5 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#copy running-config startup-config
Destination filename [startup-config]?
```

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(config)#int
```

```
SWT1(config)#interface fa
```

```
SWT1(config)#interface fastEthernet 0/1
```

SWT1(config-if)#switchport mode dynamic desirable

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

Figura 20. Verificación interfaces modo trunk SW1.

```
SWT1#show interfaces 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
```

Figura 21. Verificación interfaces modo trunk SW2.

```
SWT2>enable
SWT2#show interfaces trunk
Port      Mode           Encapsulation  Status        Native vlan
Fa0/1     auto           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
```

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

SWT1#conf terminal

SWT1(config)#inter

SWT1(config)#interface fas


```
SWT1(config)#interface fastEthernet 0/3
```

```
SWT1(config-if)#sw mode Trunk
```

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

Figura 22. Validación interfaces modo trunk SW1.

```
SWT1#show interfaces 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
```

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

```
SWT2(config)#inter
```

```
SWT2(config)#interface f
```

```
SWT2(config)#interface fastEthernet 0/3
```

```
SWT2(config-if)#sw mode Trunk
```

```
SWT3(config)#inter
```

```
SWT3(config)#interface f
```

```
SWT3(config)#interface fastEthernet 0/1
```

```
SWT3(config-if)#sw mode Trunk
```

C. AGREGAR VLANS Y ASIGNAR PUERTOS

En STW1 agregue la VLAN 10. En STW2 agregue las VLANS Compras (10), Mercadeo (20), Planta (30) y Admon (99). En la Vlan 10 no permite la configuración debido a que está en modo cliente

```
SWT1#conf t
```

```
SWT1(config)#vlan 10
```

VTP VLAN configuration not allowed when device is in CLIENT mode.

```
SWT1(config)#
```

```
SWT2#conf t
```

```
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)#
```

Verifique que las VLANs han sido agregadas correctamente.

Figura 23. Verificación comando show Vlan brief

```

SWT2#show vlan brief

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,
Gig0/1, Gig0/2
10   Compras                 active
20   Mercado                 active
30   Planta                  active
99   Admon                   active
1002 fddi-default            active
1003 token-ring-default    active
1004 fddinet-default       active
1005 trnet-default         active

```

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

Tabla 2. Información configuración de dispositivos.

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		

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

```
SWT1(config)#int f0/10
```

```
SWT1(config-if)#switchport mode access
```

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

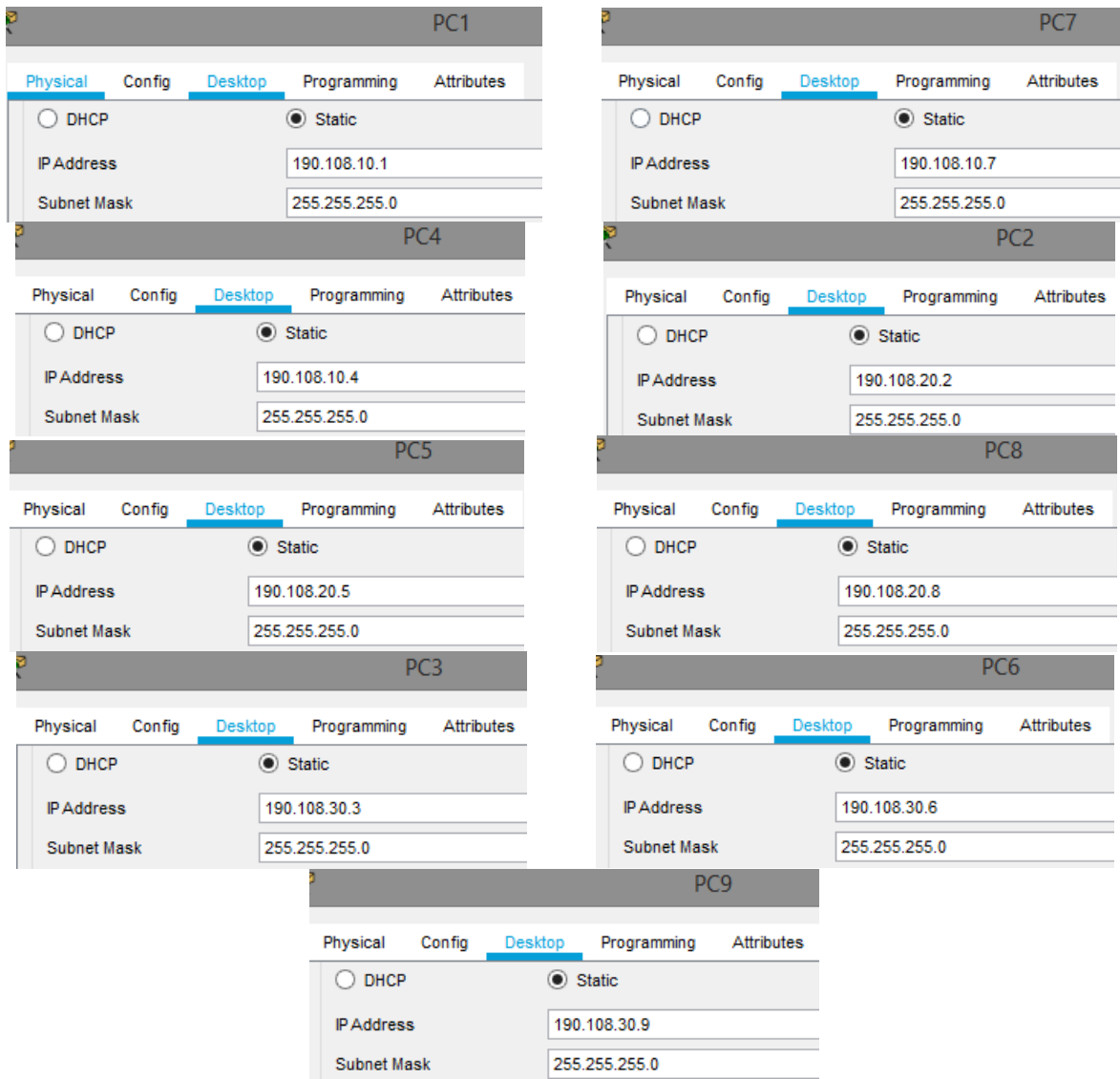
```
SWT2(config)#int f0/10
```

```
SWT2(config-if)#switchport mode access
SWT2(config-if)#switchport access vlan 10
SWT3(config)#int f0/10
SWT3(config-if)#switchport mode access
SWT3(config-if)#switchport access vlan 10
```

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.

```
SWT2(config-if)#int f0/15
SWT2(config-if)#switchport mode access
SWT2(config-if)#switchport access vlan 20
SWT2(config-if)#int f0/20
SWT2(config-if)#switchport mode access
SWT2(config-if)#switchport access vlan 30
SWT3(config-if)#int f0/15
SWT3(config-if)#switchport mode access
SWT3(config-if)#switchport access vlan 20
SWT3(config-if)#int f0/20
SWT3(config-if)#switchport mode access
SWT3(config-if)#switchport access vlan 30
```

Figura 24. Ordenadores conectados al SW1 – SW2 – SW3



D. 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. Direccionamiento SW1, SW2, SW3.

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(config)#int vlan 99
```

```
SWT1(config-if)#ip address 190.108.99.1 255.255.255.0
```

```
SWT1(config-if)#no shutdown
```

```
SWT2(config)#int vlan 99
```

```
SWT2(config-if)#ip address 190.108.99.2 255.255.255.0
```

```
SWT2(config-if)#no shutdown
```

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

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

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

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.

El Ping no es exitoso porque no se encuentran en la misma Vlan y no están en la misma red.

Figura 25. Prueba de ping Vlan 10

```
Physical Config Desktop Programming Attributes
Command Prompt
C:\>ping 190.108.10.20

Pinging 190.108.10.20 with 32 bytes of data:

Reply from 190.108.10.20: bytes=32 time=1ms TTL=128
Reply from 190.108.10.20: bytes=32 time<1ms TTL=128
Reply from 190.108.10.20: bytes=32 time<1ms TTL=128
Reply from 190.108.10.20: bytes=32 time<1ms TTL=128

Ping statistics for 190.108.10.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 190.108.10.2

Pinging 190.108.10.2 with 32 bytes of data:

Reply from 190.108.10.2: bytes=32 time=1ms TTL=128
Reply from 190.108.10.2: bytes=32 time<1ms TTL=128
Reply from 190.108.10.2: bytes=32 time<1ms TTL=128
Reply from 190.108.10.2: bytes=32 time=1ms TTL=128

Ping statistics for 190.108.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Figura 26. Prueba de ping Vlan 20 y 30

```
Physical Config Desktop Programming Attributes
Command Prompt

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

C:\>ping 190.108.20.2

Pinging 190.108.20.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 190.108.20.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 190.108.30.2

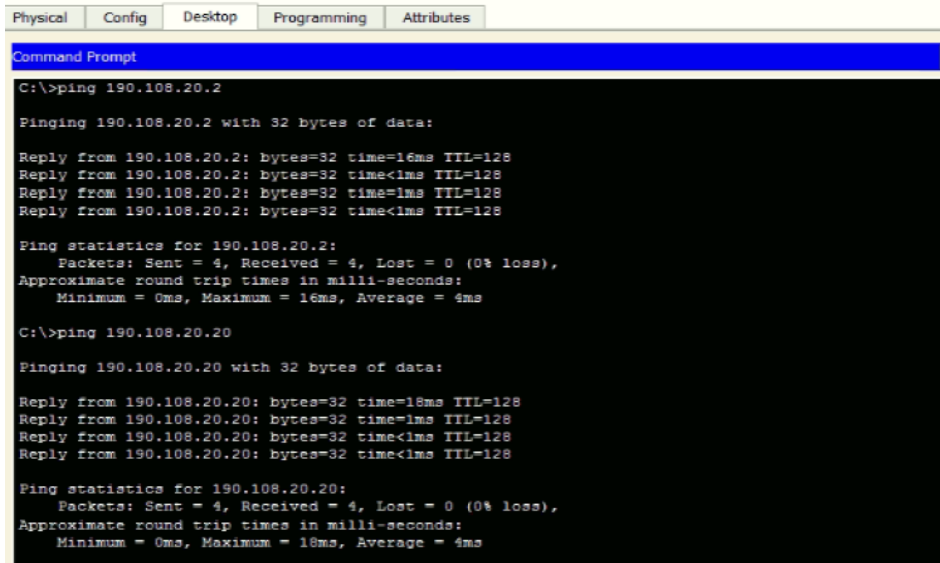
Pinging 190.108.30.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 190.108.30.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

Figura 27. Pruebas de Conectividad Vlan 20.



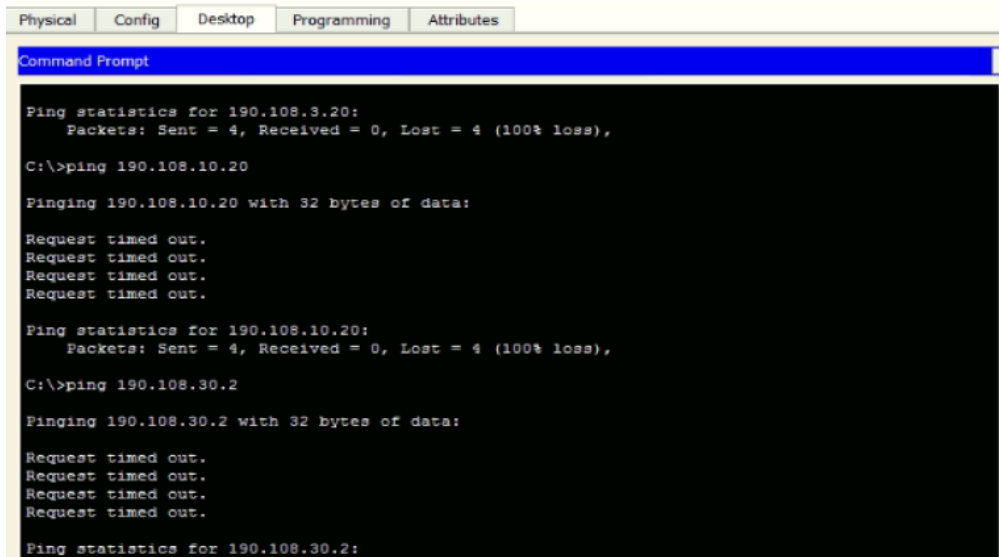
```
Physical Config Desktop Programming Attributes
Command Prompt
C:\>ping 190.108.20.2
Pinging 190.108.20.2 with 32 bytes of data:
Reply from 190.108.20.2: bytes=32 time=16ms TTL=128
Reply from 190.108.20.2: bytes=32 time<1ms TTL=128
Reply from 190.108.20.2: bytes=32 time=1ms TTL=128
Reply from 190.108.20.2: bytes=32 time<1ms TTL=128

Ping statistics for 190.108.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 16ms, Average = 4ms

C:\>ping 190.108.20.20
Pinging 190.108.20.20 with 32 bytes of data:
Reply from 190.108.20.20: bytes=32 time=18ms TTL=128
Reply from 190.108.20.20: bytes=32 time<1ms TTL=128
Reply from 190.108.20.20: bytes=32 time<1ms TTL=128
Reply from 190.108.20.20: bytes=32 time<1ms TTL=128

Ping statistics for 190.108.20.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 18ms, Average = 4ms
```

Figura 28. Pruebas de Conectividad



```
Physical Config Desktop Programming Attributes
Command Prompt

Ping statistics for 190.108.3.20:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

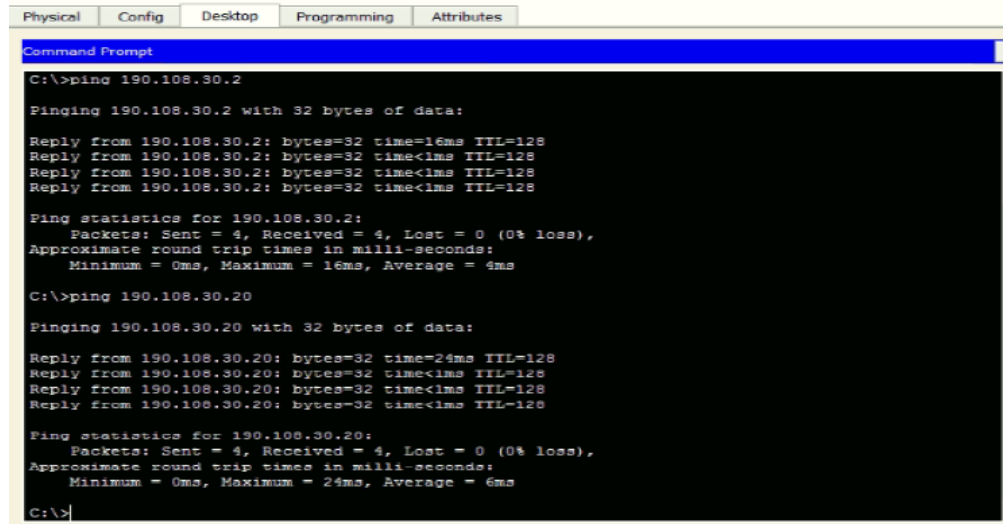
C:\>ping 190.108.10.20
Pinging 190.108.10.20 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 190.108.10.20:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 190.108.30.2
Pinging 190.108.30.2 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

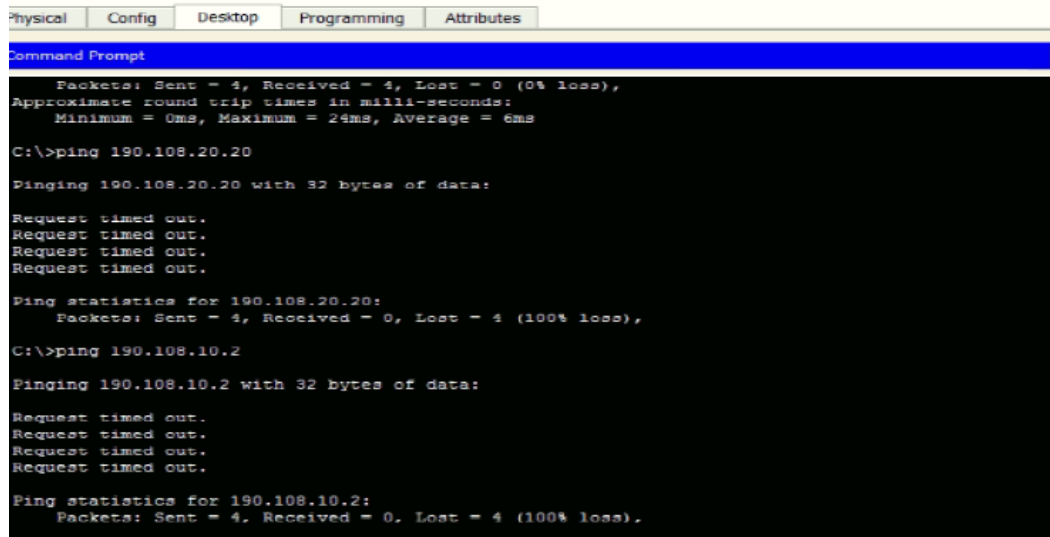
Ping statistics for 190.108.30.2:
```


Figura 29. Pruebas de conectividad Vlan 30.



```
Physical Config Desktop Programming Attributes
Command Prompt
C:\>ping 190.108.30.2
Pinging 190.108.30.2 with 32 bytes of data:
Reply from 190.108.30.2: bytes=32 time=16ms TTL=128
Reply from 190.108.30.2: bytes=32 time<1ms TTL=128
Reply from 190.108.30.2: bytes=32 time<1ms TTL=128
Reply from 190.108.30.2: bytes=32 time<1ms TTL=128
Ping statistics for 190.108.30.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 16ms, Average = 4ms
C:\>ping 190.108.30.20
Pinging 190.108.30.20 with 32 bytes of data:
Reply from 190.108.30.20: bytes=32 time=24ms TTL=128
Reply from 190.108.30.20: bytes=32 time<1ms TTL=128
Reply from 190.108.30.20: bytes=32 time<1ms TTL=128
Reply from 190.108.30.20: bytes=32 time<1ms TTL=128
Ping statistics for 190.108.30.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 24ms, Average = 6ms
C:\>
```

Figura 30. Pruebas de conectividad Vlan 10 y 20



```
Physical Config Desktop Programming Attributes
Command Prompt
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 24ms, Average = 6ms
C:\>ping 190.108.20.20
Pinging 190.108.20.20 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 190.108.20.20:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 190.108.10.2
Pinging 190.108.10.2 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 190.108.10.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss).
```

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

El Ping es exitoso porque tienen la misma Vlan y la misma red.

Figura 31. Pruebas de ping SW2

```
Physical Config CLI Attributes
IOS Command Line Interface
seconds:
..!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 0/0/1
ms

SWI2#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 = 0/1/3
ms

SWI2#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 = 0/0/1
ms

SWI2#
```

Figura 32. Pruebas de ping SW1

```
Physical Config CLI Attributes
IOS Command Line Interface
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

SWI1#ping 190.108.99.3

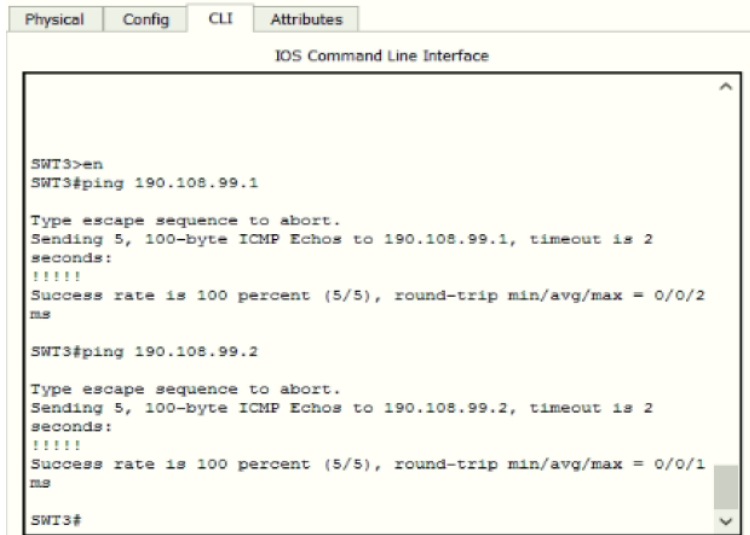
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.99.3, timeout is 2
seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/1/4
ms

SWI1#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 = 0/1/6
ms

SWI1#
```

Figura 33. Pruebas de ping SW3



```
Physical Config CLI Attributes
IOS Command Line Interface

SWI3>en
SWI3#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 = 0/0/2
ms

SWI3#ping 190.108.99.2

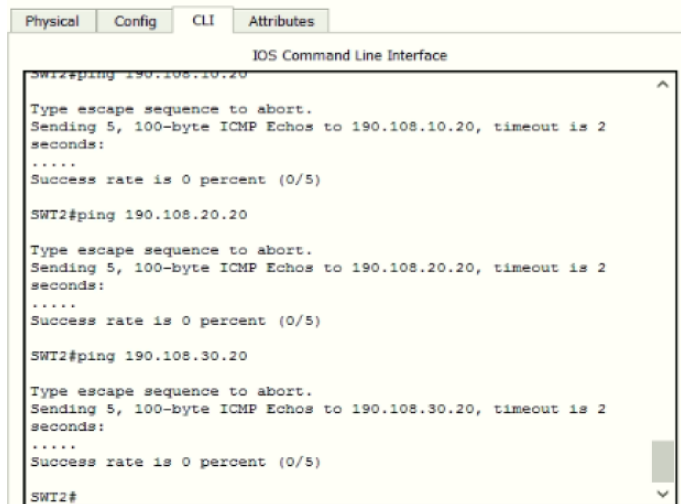
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.99.2, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1
ms

SWI3#
```

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

El ping no es exitoso desde cada SW porque no están en la misma Vlan ni en la misma red.

Figura 34. Pruebas de ping a cada PC



```
Physical Config CLI Attributes
IOS Command Line Interface

SWI2#ping 190.108.10.20

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.10.20, timeout is 2
seconds:
.....
Success rate is 0 percent (0/5)

SWI2#ping 190.108.20.20

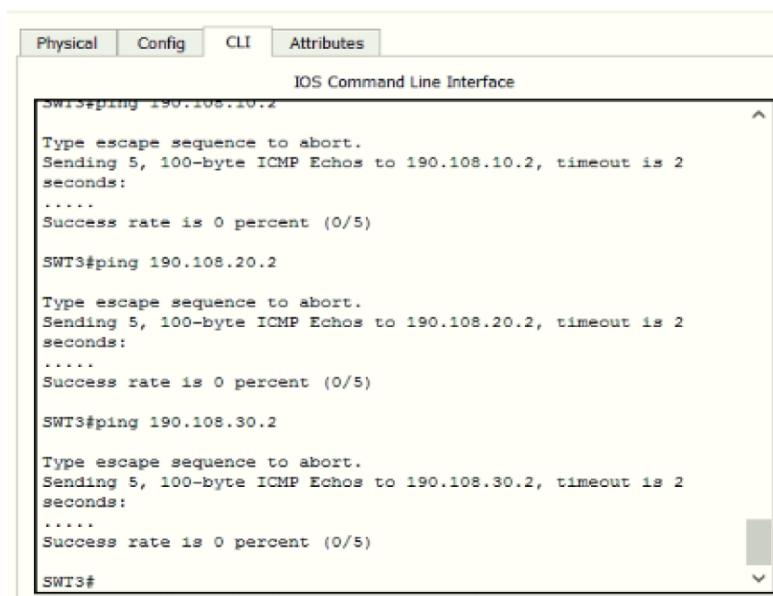
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.20.20, timeout is 2
seconds:
.....
Success rate is 0 percent (0/5)

SWI2#ping 190.108.30.20

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.30.20, timeout is 2
seconds:
.....
Success rate is 0 percent (0/5)

SWI2#
```

Figura 35. Pruebas de ping a cada PC



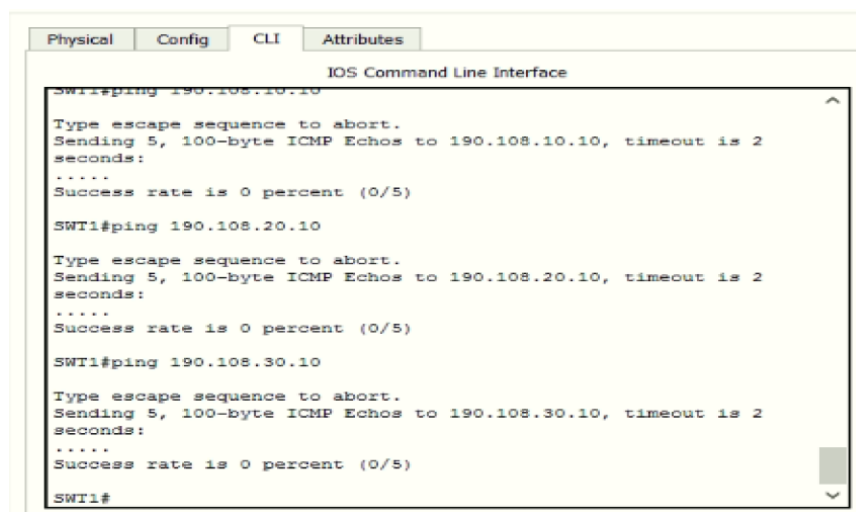
```
Physical Config CLI Attributes
IOS Command Line Interface
SWI3#ping 190.108.10.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.10.2, timeout is 2
seconds:
.....
Success rate is 0 percent (0/5)

SWI3#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)

SWI3#ping 190.108.30.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.30.2, timeout is 2
seconds:
.....
Success rate is 0 percent (0/5)

SWI3#
```

Figura 36. Pruebas de ping a cada PC



```
Physical Config CLI Attributes
IOS Command Line Interface
SWI1#ping 190.108.10.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.10.10, timeout is 2
seconds:
.....
Success rate is 0 percent (0/5)

SWI1#ping 190.108.20.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.20.10, timeout is 2
seconds:
.....
Success rate is 0 percent (0/5)

SWI1#ping 190.108.30.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.30.10, timeout is 2
seconds:
.....
Success rate is 0 percent (0/5)

SWI1#
```

CONCLUSIONES

Se tienen varios protocolos de enrutamiento para la configuración de redes libres uno de ellos el EIGRP como protocolo de enrutamiento, además de soportar varios dispositivos de configuración sencilla.

En la creación de redes independientes se utilizan las Vlan (Red de área local virtual) las cuáles nos permiten crear secciones pequeñas para enviar información y éstas no son físicas y no involucran un ajuste de cableado y permitiendo disminuir el tamaño del dominio.

En la administración de la red se utiliza el protocolo VTP, el cuál es utilizado para la distribución de una Vlan a toda la red y evitando la configuración de la misma por cada uno de los dispositivos.

BIBLIOGRAFIA

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

Teare, D., Vachon B., Graziani, R. (2015). CISCO Press (Ed). Basic Network and Routing Concepts. 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>.