SOLUCIÓN DE ESTUDIOS DE CASO BAJO EL USO DE TECNOLOGÍA CISCO

GREESS HURTADO JULIO

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Trabajo final de

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Grupo:208014_8

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TABLA DE CONTENIDO

INTRODUCCION

La presente actividad forma parte de las actividades evaluativas del Diplomado de Profundización CCNP (Prueba de Habilidades Práctica), con la que el estudiante debe identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado, poniendo en prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking.

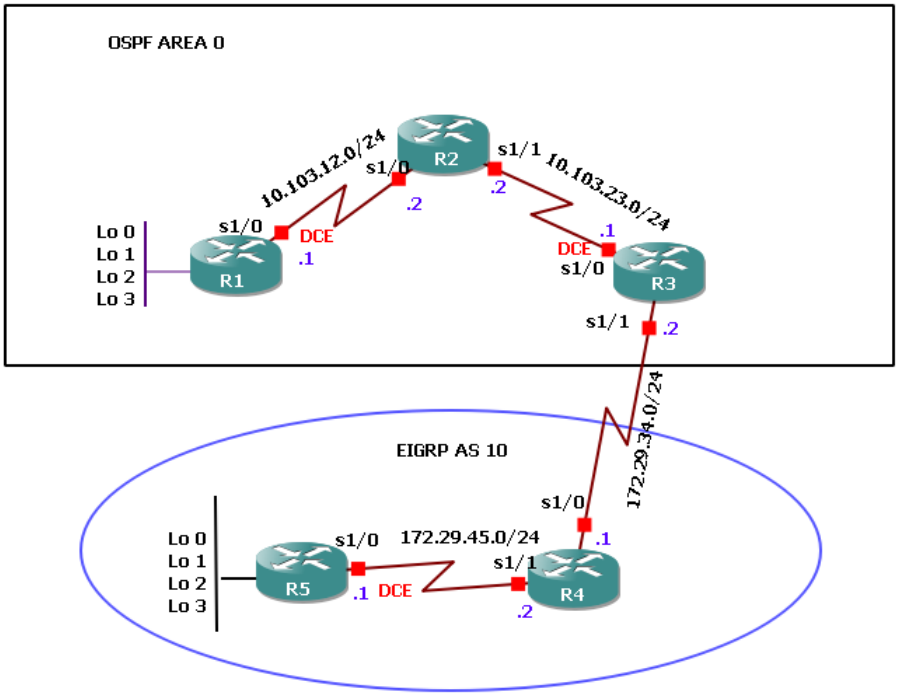
Consta de tres escenarios propuestos, los cuales en el desarrollo de este documento se informa paso a paso el proceso realizado para dar solución a actividad planteada y el registro de los procesos de verificación de conectividad mediante el uso de comandos como ***ping, traceroute, show ip route***, entre otros.

Se usaron para estas prácticas los simuladores Packet Tracer y GNS3.

DESARROLLO DE LOS TRES ESCENARIOS

ESCENARIO 1

Topología



Router	Interfaz	Dirección ip	DCE
R1	S1/0	10.103.12.1/24	X
	Lo0	10.1.1.1/22	
	Lo1	10.1.4.1/22	
	Lo2	10.1.8.1/22	
	Lo3	10.1.12.1/22	
R2	S1/0	10.103.12.2/24	
	S1/1	10.103.23.2/24	
R3	S1/0	10.103.23.1/24	X
	S1/1	172.29.34.2/24	
R4	S1/0	172.29.34.1/24	
	S1/1	172.29.45.2/24	
R5	S1/0	172.29.45.1/24	X
	Lo0	172.5.1.1/22	
	Lo1	172.5.4.1/22	
	Lo2	172.5.8.1/22	
	Lo3	172.5.12.1/22	

Desarrollo paso a paso:

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.

Se utiliza para este escenario el simulador GNS3. Se aplica comandos de configuraciones previas para los 5 Routers.

Ejemplo configuración previa en R1:

```
Router>enab
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#no ip domain lookup
R1(config)#line con 0
R1(config-line)#no exec-timeout
R1(config-line)#logging synchronous
R1(config-line)#exit
R1(config)#do wr
Building configuration...
[OK]
R1(config)#
```

Se configuran las interfaces asociadas a cada router en conexión. Se configura un clock rate de 64000 para las interfaces que están como DCE según la topología:

Interfces area de routers para **Zona A**:

```
R1(config)#int s1/0
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 s1/0
R2(config-if)#ip address 10.103.12.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#int s1/1
R2(config-if)#ip address 10.103.23.2 255.255.255.0
R2(config-if)#no shutdown

R3(config)#int s1/0
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 s1/1
R3(config-if)#ip address 172.29.34.2 255.255.255.0
R3(config-if)#no shutdown
```

Interfaces área de Routers para **Zona B**:

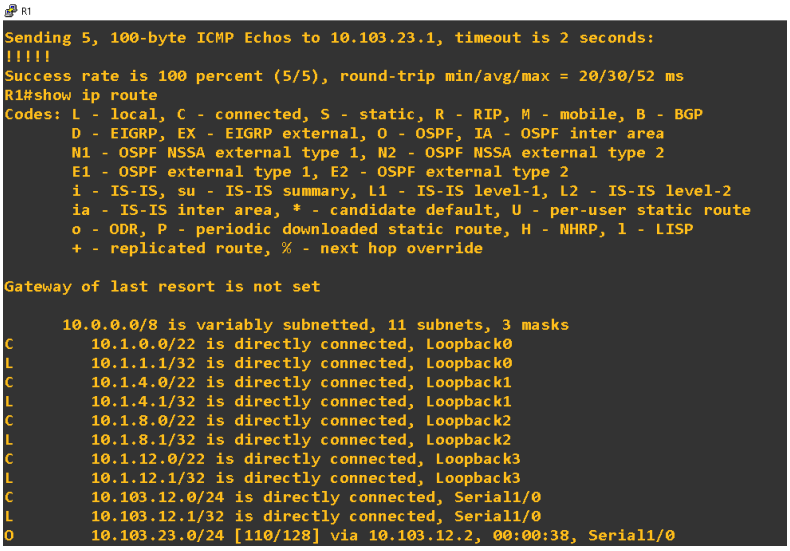
```
R4(config)#int s1/0
R4(config-if)#ip address 172.29.34.1 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#int s1/1
R4(config-if)#ip address 172.29.45.2 255.255.255.0
R4(config-if)#no shutdown
R5(config)#int s1/0
R5(config-if)#ip address 172.29.45.1 255.255.255.0
R5(config-if)#clock rate 64000
R5(config-if)#no shutdown
R5(config-if)#exit
```

Se configura OSPF as 10 área 0

```
R1(config)#router ospf 10
R1(config-router)#network 10.103.12.0 0.0.0.255 area 0

R2(config)#router ospf 10
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
R3(config)#router ospf 10
R3(config-router)#network 10.103.23.0 0.0.0.255 area 0
```

Se aplica el comando show ip route en R1 se evidencia que la red 10.103.23.0 fue aprendida por OSPF:



Configuración de EIGRP AS 10 en los router R3, R4 y R5 según la topología de la actividad:

```
R3(config)#router eigrp 10
R3(config-router)#network 172.29.34.0 0.0.0.255

R4(config)#router eigrp 10
R4(config-router)#network 172.29.34.0 0.0.0.255
R4(config-router)#network 172.29.45.0 0.0.0.255

R5(config)#router eigrp 10
R5(config-router)#network 172.29.45.0 0.0.0.255
```

Se apaga router R2: Se aplica show ip route en R3 se evidencia que la red 172.29.45.0, fue aprendida por EIGRP:

```
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
       + - replicated route, % - next hop override

Gateway of last resort is not set

      172.5.0.0/22 is subnetted, 4 subnets
D        172.5.0.0 [90/2809856] via 172.29.34.1, 00:00:08, Serial1/1
D        172.5.4.0 [90/2809856] via 172.29.34.1, 00:00:08, Serial1/1
D        172.5.8.0 [90/2809856] via 172.29.34.1, 00:00:08, Serial1/1
D        172.5.12.0 [90/2809856] via 172.29.34.1, 00:00:08, Serial1/1
      172.29.0.0/16 is variably subnetted, 3 subnets, 2 masks
C        172.29.34.0/24 is directly connected, Serial1/1
L        172.29.34.2/32 is directly connected, Serial1/1
D        172.29.45.0/24 [90/2681856] via 172.29.34.1, 00:00:08, Serial1/1
```

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.

Se asignan las direcciones loopback según lo especificado en la siguiente tabla:

Intefaz	Dirección	mascara
Lo 0	10.1.1.1	255.255.252.0
Lo 1	10.1.4.1	255.255.252.0
Lo 2	10.1.8.1	255.255.252.0
Lo 3	10.1.12.1	255.255.252.0

Lineas de comando usados en GNS3 para configurar las direcciones lopback:

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#int Lo 0
R1(config-if)#ip address 10.1.1.1 255.255.252.0
R1(config-if)#int lo 1
R1(config-if)#ip address 10.1.4.1 255.255.252.0
R1(config-if)#int lo 2
R1(config-if)#ip address 10.1.8.1 255.255.252.0
R1(config-if)#int lo 3
R1(config-if)#ip address 10.1.12.1 255.255.252.0
```

Se configuran dichas interfaces loopback y se asociación a OSPF 10

```
R1(config)#router ospf 10
R1(config-router)#Network 10.1.1.0 0.0.3.255 area 0
R1(config-router)#Network 10.1.4.0 0.0.3.255 area 0
R1(config-router)#Network 10.1.8.0 0.0.3.255 area 0
R1(config-router)#Network 10.1.12.0 0.0.3.255 area 0
```

Comando **show ip interface brief** en **R1** para comprobar la configuración:

```
R1#show ip int brief lo 1
Interface              IP-Address      OK? Method Status                Protocol
Loopback1              10.1.4.1        YES NVRAM  up                    up
R1#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        unassigned      YES NVRAM  administratively down down
Serial1/0              10.103.12.1     YES NVRAM  up                    up
Serial1/1              unassigned      YES NVRAM  administratively down down
Serial1/2              unassigned      YES NVRAM  administratively down down
Serial1/3              unassigned      YES NVRAM  administratively down down
Loopback0              10.1.1.1        YES NVRAM  up                    up
Loopback1              10.1.4.1        YES NVRAM  up                    up
Loopback2              10.1.8.1        YES NVRAM  up                    up
Loopback3              10.1.12.1       YES NVRAM  up                    up
```

Comando **show running-config** en **R1**:

```
interface Loopback0
 ip address 10.1.1.1 255.255.252.0
!
interface Loopback1
 ip address 10.1.4.1 255.255.252.0
!
interface Loopback2
 ip address 10.1.8.1 255.255.252.0
!
interface Loopback3
 ip address 10.1.12.1 255.255.252.0
```

```
router ospf 10
 network 10.1.0.0 0.0.3.255 area 0
 network 10.1.4.0 0.0.3.255 area 0
 network 10.1.8.0 0.0.3.255 area 0
 network 10.1.12.0 0.0.3.255 area 0
 network 10.103.12.0 0.0.0.255 area 0
 network 10.103.23.0 0.0.0.255 area 0
!
```

Se aplica el comando show ip route en R2 y se evidencia que las rutas loopback fueran aprendidas por OSPF:

```
R2(config)#do 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
       + - replicated route, % - next hop override

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks
O        10.1.1.1/32 [110/65] via 10.103.12.1, 00:00:08, Serial1/0
O        10.1.4.1/32 [110/65] via 10.103.12.1, 00:00:08, Serial1/0
O        10.1.8.1/32 [110/65] via 10.103.12.1, 00:00:08, Serial1/0
O        10.1.12.1/32 [110/65] via 10.103.12.1, 00:00:08, Serial1/0
C        10.103.12.0/24 is directly connected, Serial1/0
L        10.103.12.2/32 is directly connected, Serial1/0
C        10.103.23.0/24 is directly connected, Serial1/1
L        10.103.23.2/32 is directly connected, Serial1/1
```

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.

Se determinan las direcciones Loopback para R5 de la siguiente manera:

Intefaz	Dirección	mascara
Lo 0	172.5.1.1	255.255.252.0
Lo 1	172.5.4.1	255.255.252.0
Lo 2	172.5.8.1	255.255.252.0
Lo 3	172.5.12.1	255.255.252.0

Se configuran interfaces Lo y se configuran para eigrp 10

```
R5(config)#int lo 0
R5(config-if)#ip address 172.5.1.1 255.255.252.0
R5(config-if)#int lo 1
R5(config-if)#ip address 172.5.4.1 255.255.252.0
R5(config-if)#int lo 2
R5(config-if)#ip address 172.5.8.1 255.255.252.0
R5(config-if)#int lo 3
R5(config-if)#ip address 172.5.12.1 255.255.252.0
R5(config)#router eigrp 10
R5(config-router)#network 172.5.1.1 255.255.252.0
R5(config-router)#network 172.5.4.1 255.255.252.0
R5(config-router)#network 172.5.8.1 255.255.252.0
R5(config-router)#network 172.5.12.1 255.255.252.0
```

Se valida con el comando **show running-config** en **R5**

```
interface Loopback0
 ip address 172.5.1.1 255.255.252.0
!
interface Loopback1
 ip address 172.5.4.1 255.255.252.0
!
interface Loopback2
 ip address 172.5.8.1 255.255.252.0
!
interface Loopback3
 ip address 172.5.12.1 255.255.252.0
```

```
router eigrp 10
 network 172.5.0.0 0.0.3.255
 network 172.5.4.0 0.0.3.255
 network 172.5.8.0 0.0.3.255
 network 172.5.12.0 0.0.3.255
 network 172.29.34.0 0.0.0.255
 network 172.29.45.0 0.0.0.255
```

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.

```
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
       + - replicated route, % - next hop override

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks
O        10.1.1.1/32 [110/129] via 10.103.23.2, 00:12:21, Serial1/0
O        10.1.4.1/32 [110/129] via 10.103.23.2, 00:12:21, Serial1/0
O        10.1.8.1/32 [110/129] via 10.103.23.2, 00:12:21, Serial1/0
O        10.1.12.1/32 [110/129] via 10.103.23.2, 00:12:21, Serial1/0
O        10.103.12.0/24 [110/128] via 10.103.23.2, 00:12:31, Serial1/0
C        10.103.23.0/24 is directly connected, Serial1/0
L        10.103.23.1/32 is directly connected, Serial1/0
      172.5.0.0/22 is subnetted, 4 subnets
D        172.5.0.0 [90/2809856] via 172.29.34.1, 00:04:21, Serial1/1
D        172.5.4.0 [90/2809856] via 172.29.34.1, 00:04:14, Serial1/1
D        172.5.8.0 [90/2809856] via 172.29.34.1, 00:04:10, Serial1/1
D        172.5.12.0 [90/2809856] via 172.29.34.1, 00:04:06, Serial1/1
      172.29.0.0/16 is variably subnetted, 3 subnets, 2 masks
C        172.29.34.0/24 is directly connected, Serial1/1
L        172.29.34.2/32 is directly connected, Serial1/1
D        172.29.45.0/24 [90/2681856] via 172.29.34.1, 00:12:36, Serial1/1
```

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.

EIGRP necesita cinco métricas cuando se redistribuye conotros protocolos: ancho de banda, retraso, confiabilidad, carga y MTU

Ancho de banda:

T1= 1,544 Mbps ---- 1544000 Kbps

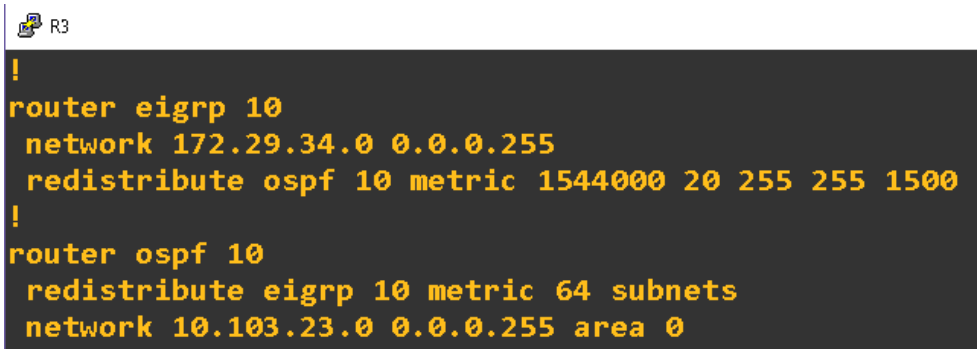
R3(config)#router eigrp 10
R3(config-router)#redistribute ospf 10 metric 1544000 20 255 255 1500

Para OSPF el costo se calcula:

$$Costo = \frac{10^8}{Ancho\ de\ BAnda} = \frac{10^8}{1544000} = 64$$

R3(config)#router ospf 10
R3(config-router)#redistribute eigrp 10 metric 64 subnets

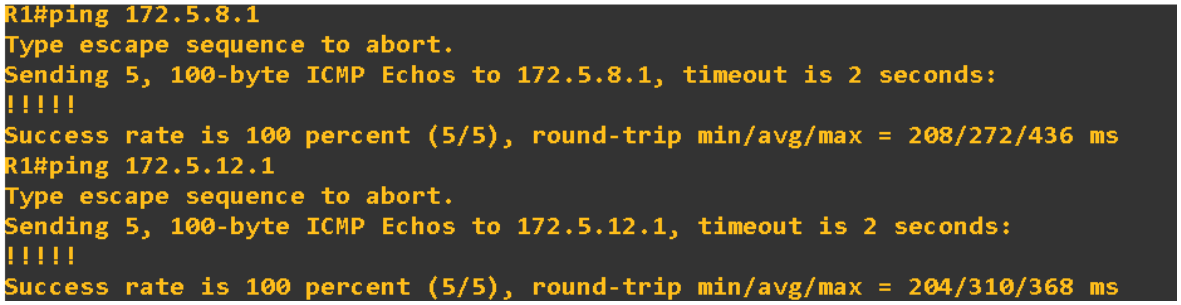
Se aplica el comando **show running-config** y se evidencia que la configuración de redistribución es exitosa para R3:



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.

Se realiza prueba de ping para confirmar la conectividad entre los enlaces de routers asociados a la red.

Ping a Loopback 2 y 3 de R5 desde R1



Ping a Loopback 2 y 3 de R1 desde R5

```
R5#ping 10.1.8.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.8.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 316/358/404 ms
R5#ping 10.1.12.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.12.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 288/336/372 ms
```

Comando Traceroute a loopback 2 del router R5

```
R1#traceroute ip 172.5.8.1
Type escape sequence to abort.
Tracing the route to 172.5.8.1
VRF info: (vrf in name/id, vrf out name/id)
  1 10.103.12.2 36 msec 68 msec 44 msec
  2 10.103.23.1 124 msec 88 msec 120 msec
  3 172.29.34.1 144 msec 148 msec 240 msec
  4 172.29.45.1 240 msec 312 msec 408 msec
```

Show ip route en R5

```
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
       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
       + - replicated route, % - next hop override

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
D EX     10.1.1.1/32 [170/2686976] via 172.29.45.2, 00:02:41, Serial1/0
D EX     10.1.4.1/32 [170/2686976] via 172.29.45.2, 00:02:41, Serial1/0
D EX     10.1.8.1/32 [170/2686976] via 172.29.45.2, 00:02:41, Serial1/0
D EX     10.1.12.1/32 [170/2686976] via 172.29.45.2, 00:02:41, Serial1/0
D EX     10.103.12.0/24 [170/2686976] via 172.29.45.2, 00:02:45, Serial1/0
D EX     10.103.23.0/24 [170/2686976] via 172.29.45.2, 00:02:45, Serial1/0
      172.5.0.0/16 is variably subnetted, 8 subnets, 2 masks
C        172.5.0.0/22 is directly connected, Loopback0
L        172.5.1.1/32 is directly connected, Loopback0
C        172.5.4.0/22 is directly connected, Loopback1
L        172.5.4.1/32 is directly connected, Loopback1
C        172.5.8.0/22 is directly connected, Loopback2
L        172.5.8.1/32 is directly connected, Loopback2
C        172.5.12.0/22 is directly connected, Loopback3
L        172.5.12.1/32 is directly connected, Loopback3
      172.29.0.0/16 is variably subnetted, 3 subnets, 2 masks
D        172.29.34.0/24 [90/2681856] via 172.29.45.2, 00:02:45, Serial1/0
C        172.29.45.0/24 is directly connected, Serial1/0
L        172.29.45.1/32 is directly connected, Serial1/0
```

Show ip route R1

```
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
       + - replicated route, % - next hop override

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 11 subnets, 3 masks
C        10.1.0.0/22 is directly connected, Loopback0
L        10.1.1.1/32 is directly connected, Loopback0
C        10.1.4.0/22 is directly connected, Loopback1
L        10.1.4.1/32 is directly connected, Loopback1
C        10.1.8.0/22 is directly connected, Loopback2
L        10.1.8.1/32 is directly connected, Loopback2
C        10.1.12.0/22 is directly connected, Loopback3
L        10.1.12.1/32 is directly connected, Loopback3
C        10.103.12.0/24 is directly connected, Serial1/0
L        10.103.12.1/32 is directly connected, Serial1/0
O        10.103.23.0/24 [110/128] via 10.103.12.2, 00:05:19, Serial1/0
      172.5.0.0/22 is subnetted, 4 subnets
O E2     172.5.0.0 [110/64] via 10.103.12.2, 00:05:13, Serial1/0
O E2     172.5.4.0 [110/64] via 10.103.12.2, 00:05:13, Serial1/0
O E2     172.5.8.0 [110/64] via 10.103.12.2, 00:05:13, Serial1/0
O E2     172.5.12.0 [110/64] via 10.103.12.2, 00:05:13, Serial1/0
      172.29.0.0/24 is subnetted, 2 subnets
O E2     172.29.34.0 [110/64] via 10.103.12.2, 00:05:19, Serial1/0
O E2     172.29.45.0 [110/64] via 10.103.12.2, 00:05:19, Serial1/0
```

Show ip route R2

R2

```
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
       + - replicated route, % - next hop override

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks
O        10.1.1.1/32 [110/65] via 10.103.12.1, 00:19:02, Serial1/0
O        10.1.4.1/32 [110/65] via 10.103.12.1, 00:19:02, Serial1/0
O        10.1.8.1/32 [110/65] via 10.103.12.1, 00:19:02, Serial1/0
O        10.1.12.1/32 [110/65] via 10.103.12.1, 00:19:02, Serial1/0
C        10.103.12.0/24 is directly connected, Serial1/0
L        10.103.12.2/32 is directly connected, Serial1/0
C        10.103.23.0/24 is directly connected, Serial1/1
L        10.103.23.2/32 is directly connected, Serial1/1
      172.5.0.0/22 is subnetted, 4 subnets
O E2     172.5.0.0 [110/64] via 10.103.23.1, 00:18:34, Serial1/1
O E2     172.5.4.0 [110/64] via 10.103.23.1, 00:18:34, Serial1/1
O E2     172.5.8.0 [110/64] via 10.103.23.1, 00:18:34, Serial1/1
O E2     172.5.12.0 [110/64] via 10.103.23.1, 00:18:34, Serial1/1
      172.29.0.0/24 is subnetted, 2 subnets
O E2     172.29.34.0 [110/64] via 10.103.23.1, 00:19:02, Serial1/1
O E2     172.29.45.0 [110/64] via 10.103.23.1, 00:18:37, Serial1/1
```

Show ip route R3

R3

```
       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
       + - replicated route, % - next hop override

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks
O        10.1.1.1/32 [110/129] via 10.103.23.2, 00:20:16, Serial1/0
O        10.1.4.1/32 [110/129] via 10.103.23.2, 00:20:16, Serial1/0
O        10.1.8.1/32 [110/129] via 10.103.23.2, 00:20:16, Serial1/0
O        10.1.12.1/32 [110/129] via 10.103.23.2, 00:20:16, Serial1/0
O        10.103.12.0/24 [110/128] via 10.103.23.2, 00:20:26, Serial1/0
C        10.103.23.0/24 is directly connected, Serial1/0
L        10.103.23.1/32 is directly connected, Serial1/0
      172.5.0.0/22 is subnetted, 4 subnets
D        172.5.0.0 [90/2809856] via 172.29.34.1, 00:19:58, Serial1/1
D        172.5.4.0 [90/2809856] via 172.29.34.1, 00:19:58, Serial1/1
D        172.5.8.0 [90/2809856] via 172.29.34.1, 00:19:58, Serial1/1
D        172.5.12.0 [90/2809856] via 172.29.34.1, 00:19:58, Serial1/1
      172.29.0.0/16 is variably subnetted, 3 subnets, 2 masks
C        172.29.34.0/24 is directly connected, Serial1/1
L        172.29.34.2/32 is directly connected, Serial1/1
D        172.29.45.0/24 [90/2681856] via 172.29.34.1, 00:20:01, Serial1/1
```

Show ip route R4

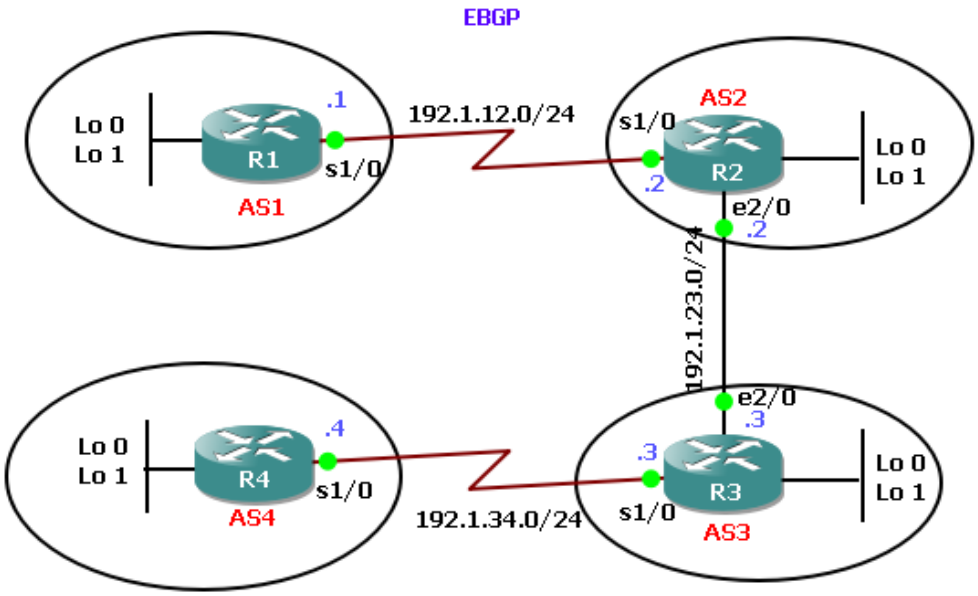
```
R4#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       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
       + - replicated route, % - next hop override

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
D EX     10.1.1.1/32 [170/2174976] via 172.29.34.2, 00:21:25, Serial1/0
D EX     10.1.4.1/32 [170/2174976] via 172.29.34.2, 00:21:25, Serial1/0
D EX     10.1.8.1/32 [170/2174976] via 172.29.34.2, 00:21:25, Serial1/0
D EX     10.1.12.1/32 [170/2174976] via 172.29.34.2, 00:21:25, Serial1/0
D EX     10.103.12.0/24 [170/2174976] via 172.29.34.2, 00:21:35, Serial1/0
D EX     10.103.23.0/24 [170/2174976] via 172.29.34.2, 00:21:39, Serial1/0
      172.5.0.0/22 is subnetted, 4 subnets
D        172.5.0.0 [90/2297856] via 172.29.45.1, 00:21:07, Serial1/1
D        172.5.4.0 [90/2297856] via 172.29.45.1, 00:21:07, Serial1/1
D        172.5.8.0 [90/2297856] via 172.29.45.1, 00:21:07, Serial1/1
D        172.5.12.0 [90/2297856] via 172.29.45.1, 00:21:07, Serial1/1
      172.29.0.0/16 is variably subnetted, 4 subnets, 2 masks
C        172.29.34.0/24 is directly connected, Serial1/0
L        172.29.34.1/32 is directly connected, Serial1/0
C        172.29.45.0/24 is directly connected, Serial1/1
L        172.29.45.2/32 is directly connected, Serial1/1
```

Escenario 2

Topología:



Información para configuración de los Routers

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 1/0	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 1/0	192.1.12.2	255.255.255.0
E 2/0	192.1.23.2	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 2/0	192.1.23.3	255.255.255.0
S 1/0	192.1.34.3	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 1/0	192.1.34.4	255.255.255.0

Desarrollo paso a paso

Se utiliza para este escenario el simulador GNS3. Se configura direccionamiento a interfaces asociadas a los cuatro Routers en la topología:

```
R1(config)#int s1/0
R1(config-if)#ip address 192.1.12.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#int lo 0
R1(config-if)#ip address 1.1.1.1 255.0.0.0
R1(config-if)#int lo 1
R1(config-if)#ip address 11.1.0.1 255.255.0.0
R1(config-if)#exit

R2(config)#int s1/0
R2(config-if)#ip address 192.1.12.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#int e2/0
R2(config-if)#ip address 192.1.23.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#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

R3(config)#int s1/0
R3(config-if)#ip address 192.1.34.3 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#int e2/0
```

```
R3(config-if)#ip address 192.1.23.3 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#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

R4(config)#int s1/0
R4(config-if)#ip address 192.1.34.4 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#int lo 0
R4(config-if)#ip address 4.4.4.4 255.0.0.0
R4(config-if)#int lo 1
R4(config-if)#ip address 14.1.0.1 255.255.0.0
R4(config-if)#exit
```

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.***

Se configura BGP en los routers R1 y R2:

```
R1(config)#router bgp 1
R1(config-router)#bgp router-id 11.11.11.11
R1(config-router)#network 192.1.12.0 mask 255.255.255.0
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)#neighbor 192.1.12.2 remote-as 2


R2(config)#router bgp 2
R2(config-router)#bgp router-id 22.22.22.22
R2(config-router)#network 192.1.12.0 mask 255.255.255.0
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)#network 192.1.23.0 mask 255.255.255.0
R2(config-router)#neighbor 192.1.12.1 remote-as 1
R2(config-router)#neighbor 192.1.23.3 remote-as 3
```

Se valida con comando show ip route en los router R1 y R2, se evidencia rutas con adyacencia:

Comando show en R1

```
R1#show ip bgp
BGP table version is 7, local router ID is 11.11.11.11
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>  1.0.0.0          0.0.0.0                  0         32768 i
 *>  2.0.0.0          192.1.12.2               0             0 2 i
 *>  11.1.0.0/16      0.0.0.0                  0         32768 i
 *>  12.1.0.0/16      192.1.12.2               0             0 2 i
 *   192.1.12.0       192.1.12.2               0             0 2 i
 *>                   0.0.0.0                  0         32768 i
 *>  192.1.23.0       192.1.12.2               0             0 2 i
```

```
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
       + - 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, 00:16:24
      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, 00:16:24
      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, 00:16:24
```

Comando show en R2:

```
R2#show ip bgp
BGP table version is 7, local router ID is 12.1.0.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>  1.0.0.0          192.1.12.1               0             0 1 i
 *>  2.0.0.0          0.0.0.0                  0         32768 i
 *>  11.1.0.0/16      192.1.12.1               0             0 1 i
 *>  12.1.0.0/16      0.0.0.0                  0         32768 i
 *   192.1.12.0       192.1.12.1               0             0 1 i
 *>                   0.0.0.0                  0         32768 i
 *>  192.1.23.0       0.0.0.0                  0         32768 i
```

```
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
       + - 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, 00:19:44
      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 [20/0] via 192.1.12.1, 00:19:44
      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, 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, Ethernet2/0
L        192.1.23.2/32 is directly connected, Ethernet2/0
```

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.***

R2 se configuró previamente en el ítem anterior, por lo que se procede a configurar R3:

```
R3(config)#router bgp 3
R3(config-router)#bgp router-id 33.33.33.33
R3(config-router)#network 192.1.34.0 mask 255.255.255.0
R3(config-router)#network 192.1.23.0 mask 255.255.255.0
R3(config-router)#network 13.1.0.0 mask 255.255.0.0
R3(config-router)#network 3.0.0.0 mask 255.0.0.0
R3(config-router)#neighbor 192.1.34.4 remote-as 4
R3(config-router)#neighbor 192.1.23.2 remote-as 2
```

Se valida con comando show ip route adyacencia BGP con demás reouters:

```
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
       + - 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, 00:00:32
B     2.0.0.0/8 [20/0] via 192.1.23.2, 00:00:32
      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 [20/0] via 192.1.23.2, 00:00:32
      12.0.0.0/16 is subnetted, 1 subnets
B        12.1.0.0 [20/0] via 192.1.23.2, 00:00:32
      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, 00:00:32
      192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.1.23.0/24 is directly connected, Ethernet2/0
L        192.1.23.3/32 is directly connected, Ethernet2/0
```

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.***

R3 se configuró previamente en el ítem anterior, por lo que se procede a configurar R4:

```
R4(config)#router bgp 4
R4(config-router)#bgp router-id 44.44.44.44
R4(config-router)#network 192.1.34.0 mask 255.255.255.0
R4(config-router)#network 14.1.0.0 mask 255.255.0.0
R4(config-router)#network 4.0.0.0 mask 255.0.0.0
R4(config-router)#neighbor 192.1.34.3 remote-as 3
```

Se aplica comando show ip route para validar configuración BGP en R4:

R4

```
       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
       + - replicated route, % - next hop override

Gateway of last resort is not set

B     1.0.0.0/8 [20/0] via 192.1.34.3, 00:00:09
B     2.0.0.0/8 [20/0] via 192.1.34.3, 00:00:09
B     3.0.0.0/8 [20/0] via 192.1.34.3, 00:00:09
      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 [20/0] via 192.1.34.3, 00:00:09
      12.0.0.0/16 is subnetted, 1 subnets
B        12.1.0.0 [20/0] via 192.1.34.3, 00:00:09
      13.0.0.0/16 is subnetted, 1 subnets
B        13.1.0.0 [20/0] via 192.1.34.3, 00:00:09
      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
B     192.1.12.0/24 [20/0] via 192.1.34.3, 00:00:09
B     192.1.23.0/24 [20/0] via 192.1.34.3, 00:00:09
      192.1.34.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.1.34.0/24 is directly connected, Serial1/0
L        192.1.34.4/32 is directly connected, Serial1/0
```

Se ejecuta el comando show ip bgp en los 4 routers donde se evidencia que han aprendido las rutas loopback de los demás de manera automática:

```
R1#sho ip bgp
BGP table version is 12, local router ID is 11.11.11.11
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>  1.0.0.0          0.0.0.0                  0         32768 i
 *>  2.0.0.0          192.1.12.2               0             0 2 i
 *>  3.0.0.0          192.1.12.2                             0 2 3 i
 *>  4.0.0.0          192.1.12.2                             0 2 3 4 i
 *>  11.1.0.0/16      0.0.0.0                  0         32768 i
 *>  12.1.0.0/16      192.1.12.2               0             0 2 i
 *>  13.1.0.0/16      192.1.12.2                             0 2 3 i
 *>  14.1.0.0/16      192.1.12.2                             0 2 3 4 i
 *   192.1.12.0       192.1.12.2               0             0 2 i
 *>                   0.0.0.0                  0         32768 i
 *>  192.1.23.0       192.1.12.2               0             0 2 i
 *>  192.1.34.0       192.1.12.2                             0 2 3 i
```

```
R2#show ip bgp
BGP table version is 12, local router ID is 22.22.22.22
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>  1.0.0.0          192.1.12.1               0             0 1 i
 *>  2.0.0.0          0.0.0.0                  0         32768 i
 *>  3.0.0.0          192.1.23.3               0             0 3 i
 *>  4.0.0.0          192.1.23.3                             0 3 4 i
 *>  11.1.0.0/16      192.1.12.1               0             0 1 i
 *>  12.1.0.0/16      0.0.0.0                  0         32768 i
 *>  13.1.0.0/16      192.1.23.3               0             0 3 i
 *>  14.1.0.0/16      192.1.23.3                             0 3 4 i
 *   192.1.12.0       192.1.12.1               0             0 1 i
 *>                   0.0.0.0                  0         32768 i
 *   192.1.23.0       192.1.23.3               0             0 3 i
 *>                   0.0.0.0                  0         32768 i
 *>  192.1.34.0       192.1.23.3               0             0 3 i
```

```
R3#show bgp
BGP table version is 12, local router ID is 33.33.33.33
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>  1.0.0.0          192.1.23.2                             0 2 1 i
 *>  2.0.0.0          192.1.23.2                0            0 2 i
 *>  3.0.0.0          0.0.0.0                   0        32768 i
 *>  4.0.0.0          192.1.34.4                0            0 4 i
 *>  11.1.0.0/16      192.1.23.2                             0 2 1 i
 *>  12.1.0.0/16      192.1.23.2                0            0 2 i
 *>  13.1.0.0/16      0.0.0.0                   0        32768 i
 *>  14.1.0.0/16      192.1.34.4                0            0 4 i
 *>  192.1.12.0       192.1.23.2                0            0 2 i
 *   192.1.23.0       192.1.23.2                0            0 2 i
 *>                   0.0.0.0                   0        32768 i
 *   192.1.34.0       192.1.34.4                0            0 4 i
 *>                   0.0.0.0                   0        32768 i
```

```
R4#show ip bgp
BGP table version is 12, local router ID is 44.44.44.44
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>  1.0.0.0          192.1.34.3                             0 3 2 1 i
 *>  2.0.0.0          192.1.34.3                             0 3 2 i
 *>  3.0.0.0          192.1.34.3                0            0 3 i
 *>  4.0.0.0          0.0.0.0                   0        32768 i
 *>  11.1.0.0/16      192.1.34.3                             0 3 2 1 i
 *>  12.1.0.0/16      192.1.34.3                             0 3 2 i
 *>  13.1.0.0/16      192.1.34.3                0            0 3 i
 *>  14.1.0.0/16      0.0.0.0                   0        32768 i
 *>  192.1.12.0       192.1.34.3                             0 3 2 i
 *>  192.1.23.0       192.1.34.3                0            0 3 i
 *   192.1.34.0       192.1.34.3                0            0 3 i
 *>                   0.0.0.0                   0        32768 i
```

Para pruebas, se hace ping desde R1 a las Lo 0 de los demás routers y a la interfaz s1/0 de R4

```
R1#ping 4.4.4.4
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 4.4.4.4, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 64/90/128 ms
R1#ping 3.3.3.3
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 3.3.3.3, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/52/68 ms
R1#ping 2.2.2.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/23/28 ms
R1#ping 192.1.34.4
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.1.34.4, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 84/96/108 ms
```

Desde R4 se realiza prueba con el comando Traceroute a las loopback 1 de R1, R2 y R3

```
R4#traceroute 11.1.0.1
Type escape sequence to abort.
Tracing the route to 11.1.0.1
VRF info: (vrf in name/id, vrf out name/id)
  1 192.1.34.3 76 msec 68 msec 60 msec
  2 192.1.23.2 [AS 3] 128 msec 64 msec 64 msec
  3 192.1.12.1 [AS 2] 100 msec 92 msec 84 msec
R4#traceroute 12.1.0.1
Type escape sequence to abort.
Tracing the route to 12.1.0.1
VRF info: (vrf in name/id, vrf out name/id)
  1 192.1.34.3 44 msec 32 msec 4 msec
  2 192.1.23.2 [AS 3] 32 msec 32 msec 28 msec
R4#traceroute 13.1.0.1
Type escape sequence to abort.
Tracing the route to 13.1.0.1
VRF info: (vrf in name/id, vrf out name/id)
  1 192.1.34.3 40 msec 56 msec 64 msec
```

Se valida comando show ip route de los 4 activos nuevamente, evidenciando las rutas aprendidas:

R1

```
       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
       + - 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, 00:10:50
B     3.0.0.0/8 [20/0] via 192.1.12.2, 00:10:19
B     4.0.0.0/8 [20/0] via 192.1.12.2, 00:09:49
      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, 00:10:50
      13.0.0.0/16 is subnetted, 1 subnets
B        13.1.0.0 [20/0] via 192.1.12.2, 00:10:19
      14.0.0.0/16 is subnetted, 1 subnets
B        14.1.0.0 [20/0] via 192.1.12.2, 00:09:49
      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, 00:10:50
B     192.1.34.0/24 [20/0] via 192.1.12.2, 00:10:19
R1#
```

R2

```
       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
       + - 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, 00:13:00
      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, 00:12:55
B     4.0.0.0/8 [20/0] via 192.1.23.3, 00:12:24
      11.0.0.0/16 is subnetted, 1 subnets
B        11.1.0.0 [20/0] via 192.1.12.1, 00:13:00
      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, 00:12:55
      14.0.0.0/16 is subnetted, 1 subnets
B        14.1.0.0 [20/0] via 192.1.23.3, 00:12:24
      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, Ethernet2/0
L        192.1.23.2/32 is directly connected, Ethernet2/0
B     192.1.34.0/24 [20/0] via 192.1.23.3, 00:12:55
```

R3

```
       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
       + - 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, 00:13:26
B     2.0.0.0/8 [20/0] via 192.1.23.2, 00:13:52
      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, 00:13:51
      11.0.0.0/16 is subnetted, 1 subnets
B        11.1.0.0 [20/0] via 192.1.23.2, 00:13:26
      12.0.0.0/16 is subnetted, 1 subnets
B        12.1.0.0 [20/0] via 192.1.23.2, 00:13:52
      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 [20/0] via 192.1.34.4, 00:13:51
B     192.1.12.0/24 [20/0] via 192.1.23.2, 00:13:52
      192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.1.23.0/24 is directly connected, Ethernet2/0
L        192.1.23.3/32 is directly connected, Ethernet2/0
      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
```

R4

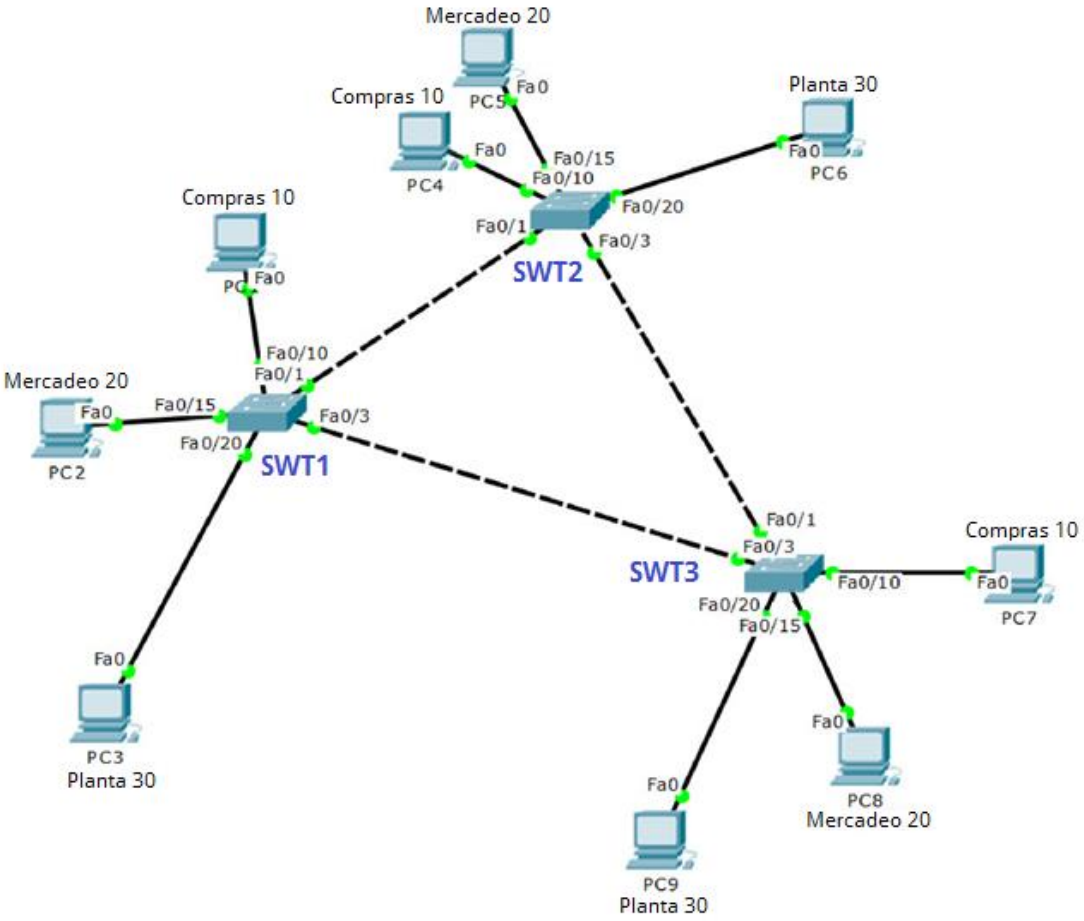
```
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

B     1.0.0.0/8 [20/0] via 192.1.34.3, 00:14:18
B     2.0.0.0/8 [20/0] via 192.1.34.3, 00:14:48
B     3.0.0.0/8 [20/0] via 192.1.34.3, 00:14:48
      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 [20/0] via 192.1.34.3, 00:14:18
      12.0.0.0/16 is subnetted, 1 subnets
B        12.1.0.0 [20/0] via 192.1.34.3, 00:14:48
      13.0.0.0/16 is subnetted, 1 subnets
B        13.1.0.0 [20/0] via 192.1.34.3, 00:14:48
      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
B     192.1.12.0/24 [20/0] via 192.1.34.3, 00:14:48
B     192.1.23.0/24 [20/0] via 192.1.34.3, 00:14:48
      192.1.34.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.1.34.0/24 is directly connected, Serial1/0
L        192.1.34.4/32 is directly connected, Serial1/0
```

Escenario 3

Topología



Desarrollo paso a paso

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.

Se utiliza para este escenario el simulador Packet Tracer. Se configuran para los 3 switches las especificaciones antes enunciadas:

```
SWT1(config)#vtp mode client
Device mode already VTP CLIENT.
```

SWT2(config)#vtp mode server
Device mode already VTP SERVER.

SWT3(config)#vtp mode client
Device mode already VTP CLIENT.

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

```
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

SWT2(config)#do 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)

SWT1(config)#do 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
```

B. Configurar DTP (Dynamic Trunking Protocol)

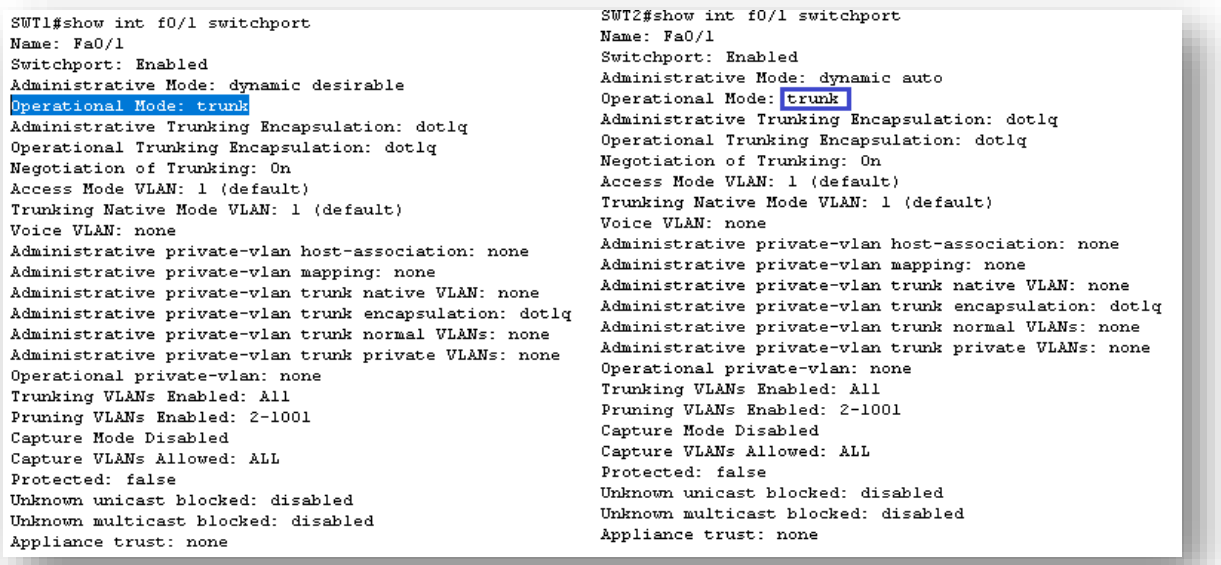
1. Configure un enlace troncal ("trunk") dinámico entre SWT1 y SWT2. Debido a que el modo por defecto es ***dynamic auto***, solo un lado del enlace debe configurarse como ***dynamic desirable***.

Puero f0/1 de SWT 1 se deja en modo desirable para cumplir el requisito:

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

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

Se valida en los dos switches y ya está en modo trunk



```
SWT1#show int f0/1 switchport
Name: Fa0/1
Switchport: Enabled
Administrative Mode: dynamic desirable
Operational Mode: trunk
Administrative Trunking Encapsulation: dotlq
Operational Trunking Encapsulation: dotlq
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Administrative private-vlan trunk native VLAN: none
Administrative private-vlan trunk encapsulation: dotlq
Administrative private-vlan trunk normal VLANs: none
Administrative private-vlan trunk private VLANs: none
Operational private-vlan: none
Trunking VLANs Enabled: All
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL
Protected: false
Unknown unicast blocked: disabled
Unknown multicast blocked: disabled
Appliance trust: none
```

```
SWT2#show int f0/1 switchport
Name: Fa0/1
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: trunk
Administrative Trunking Encapsulation: dotlq
Operational Trunking Encapsulation: dotlq
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Administrative private-vlan trunk native VLAN: none
Administrative private-vlan trunk encapsulation: dotlq
Administrative private-vlan trunk normal VLANs: none
Administrative private-vlan trunk private VLANs: none
Operational private-vlan: none
Trunking VLANs Enabled: All
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL
Protected: false
Unknown unicast blocked: disabled
Unknown multicast blocked: disabled
Appliance trust: none
```

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

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

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

```
SWT1#show int 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
```

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

SWT3(config-if)#switchport mode trunk

```
SWT3(config-if)#switchport mode trunk
SWT3(config-if)#do wr
Building configuration...
[OK]
SWT3(config-if)#end
SWT3#
%SYS-5-CONFIG_I: Configured from console by console

SWT3#show int f0/1 switchport
Name: Fa0/1
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Administrative private-vlan trunk native VLAN: none
Administrative private-vlan trunk encapsulation: dot1q
Administrative private-vlan trunk normal VLANs: none
Administrative private-vlan trunk private VLANs: none
Operational private-vlan: none
Trunking VLANs Enabled: All
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL
Protected: false
Unknown unicast blocked: disabled
Unknown multicast blocked: disabled
Appliance trust: none
```

```
SWT2#show int f0/3 switchport
Name: Fa0/3
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Administrative private-vlan trunk native VLAN: none
Administrative private-vlan trunk encapsulation: dot1q
Administrative private-vlan trunk normal VLANs: none
Administrative private-vlan trunk private VLANs: none
Operational private-vlan: none
Trunking VLANs Enabled: All
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL
Protected: false
Unknown unicast blocked: disabled
Unknown multicast blocked: disabled
Appliance trust: none
```

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)

Se nombran las vlan en SWT2 y se habilita VLAN 10 en SWT1

```
SWT1(config)#int vlan 10

SWT2(config)#vlan 10
SWT2(config-vlan)#name Compras
SWT2(config-vlan)#vlan 20
SWT2(config-vlan)#name Mercadeo
SWT2(config-vlan)#vlan 30
SWT2(config-vlan)#name Planta
```

2. Verifique que las VLANs han sido agregadas correctamente.

En SWT1 se verifica name debido a que es cliente VTP, aparece con renombrada como **Compras**

```
SWT1#show vlan name Compras

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
10   Compras                          active

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

Se valida en VLANS en SWT2 se evidencian configuradas con sus respectivos nombres:

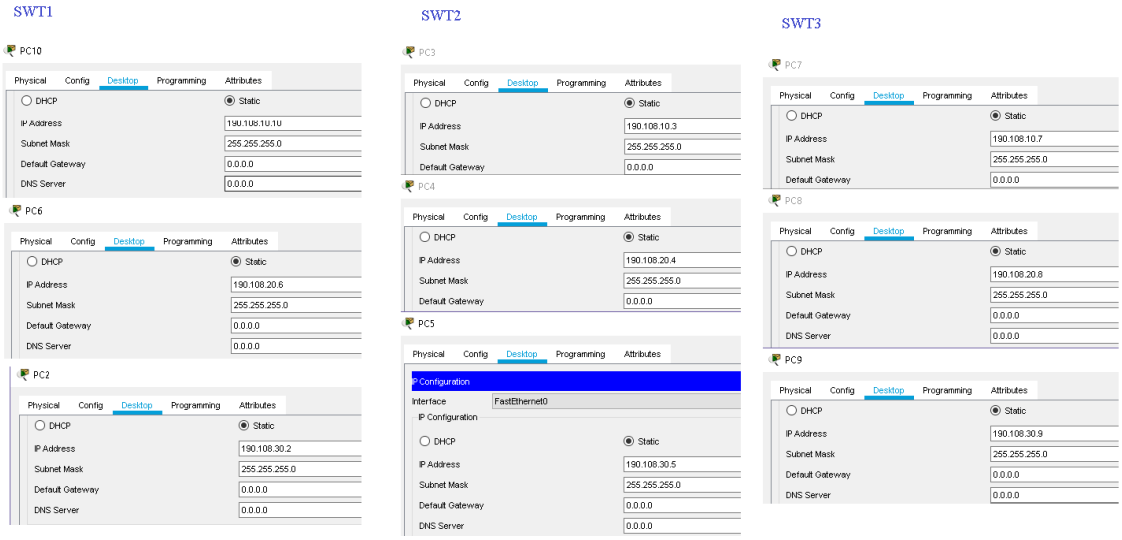
```
SWT2#
SWT2#show vlan ?
  brief  VTP all VLAN status in brief
  id     VTP VLAN status by VLAN id
  name   VTP VLAN status by VLAN name
  <cr>
SWT2#show vlan brief

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   Mercadeo                         active
30   Planta                           active
99   Admon                            active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
```

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

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



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

Configuración en SWT1, SWT2 y SWT3

```
SWT1(config)#int f0/10
SWT1(config-if)#switchport access vlan 10
SWT1(config-if)#no shutdown
SWT1(config)#int f0/15
SWT1(config-if)#switchport access vlan 20
SWT1(config-if)#no shutdown
SWT1(config)#int f0/20
SWT1(config-if)#switchport access vlan 30
SWT1(config-if)#no shutdown
SWT1(config-if)#exit


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

```
SWT2(config-if)#no shutdown
SWT2(config)#int f0/15
SWT2(config-if)#switchport access vlan 20
SWT2(config-if)#no shutdown
SWT2(config)#int f0/20
SWT2(config-if)#switchport access vlan 30
SWT2(config-if)#no shutdown
SWT2(config-if)#exit
```

```
SWT3(config)#int f0/10
SWT3(config-if)#switchport access vlan 10
SWT3(config-if)#no shutdown
SWT3(config)#int f0/15
SWT3(config-if)#switchport access vlan 20
SWT3(config-if)#no shutdown
SWT3(config)#int f0/20
SWT3(config-if)#switchport access vlan 30
SWT3(config-if)#no shutdown
SWT3(config-if)#exit
```

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.

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

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.

Teniendo en cuenta que el SWT2 está configurado con direccionamiento ip para la interfaz VLAN 99 debido a que está en modo VTP server, se pudo completar la conexión

Se hace pings respectivos y de manera exitosa únicamente entre switch de la misma VLAN:

PC10

Physical Config Desktop Programming Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ping 190.108.10.3

Pinging 190.108.10.3 with 32 bytes of data:

Reply from 190.108.10.3: bytes=32 time=1ms TTL=128
Reply from 190.108.10.3: bytes=32 time<1ms TTL=128
Reply from 190.108.10.3: bytes=32 time<1ms TTL=128
Reply from 190.108.10.3: bytes=32 time=10ms TTL=128

Ping statistics for 190.108.10.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 10ms, Average = 2ms

C:\>ping 190.108.10.7

Pinging 190.108.10.7 with 32 bytes of data:

Reply from 190.108.10.7: bytes=32 time=1ms TTL=128
Reply from 190.108.10.7: bytes=32 time=1ms TTL=128
Reply from 190.108.10.7: bytes=32 time<1ms TTL=128
Reply from 190.108.10.7: bytes=32 time<1ms TTL=128

Ping statistics for 190.108.10.7:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

PC4

Physical Config Desktop Programming Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ping 190.108.20.6

Pinging 190.108.20.6 with 32 bytes of data:

Reply from 190.108.20.6: bytes=32 time=1ms TTL=128
Reply from 190.108.20.6: bytes=32 time<1ms TTL=128
Reply from 190.108.20.6: bytes=32 time=10ms TTL=128
Reply from 190.108.20.6: bytes=32 time<1ms TTL=128

Ping statistics for 190.108.20.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 10ms, Average = 2ms

C:\>ping 190.108.20.8

Pinging 190.108.20.8 with 32 bytes of data:

Reply from 190.108.20.8: bytes=32 time=1ms TTL=128
Reply from 190.108.20.8: bytes=32 time<1ms TTL=128
Reply from 190.108.20.8: bytes=32 time<1ms TTL=128
Reply from 190.108.20.8: bytes=32 time=1ms TTL=128

Ping statistics for 190.108.20.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

PC9

Physical Config Desktop Programming Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
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=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
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 = 1ms, Average = 0ms

C:\>ping 190.108.30.5

Pinging 190.108.30.5 with 32 bytes of data:

Reply from 190.108.30.5: bytes=32 time=1ms TTL=128
Reply from 190.108.30.5: bytes=32 time<1ms TTL=128
Reply from 190.108.30.5: bytes=32 time<1ms TTL=128
Reply from 190.108.30.5: bytes=32 time<1ms TTL=128

Ping statistics for 190.108.30.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Se aclara que solo está haciendo ping para los PC que pertenezcan a la misma VLAN.

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

Se realiza ping a las direcciones ip de las VLAN 99 de los switches de la topología y todas dieron exitosas entre estos:

```
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 = 0/1/3 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 = 0/0/0 ms


 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 = 0/0/3 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
```

```
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 = 0/1/5 ms

SWT3#
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 = 0/0/0 ms
```

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

Hasta el momento el único que permite ping a todos los demás PC's es SWT2 debido a que se le configuró previamente lasinterfaces, los demas switch no pueden hacer pings, funcionan como puentes:

```
SWT2#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 80 percent (4/5), round-trip min/avg/max = 0/1/3 ms

SWT2#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 80 percent (4/5), round-trip min/avg/max = 0/0/3 ms

SWT2#ping 190.108.20.4

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 190.108.20.4, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/3 ms
```

Todo el enrutamiento es controlado por SWT2 en el que por medio de la VLAN 99 administra la red.

CONCLUSIONES

- Se aplica el uso de la redistribución de protocolos de enrutamiento con el fin anunciar rutas que se aprenden por otros medios, como otro protocolo de enrutamiento, rutas estáticas o rutas directamente conectadas.
- Al redistribuir a otro protocolo de enrutamiento, hay que tener presente las métricas de cada uno ya que juegan un papel importante en la redistribución. Cada protocolo utiliza diferentes métricas.
- Es importante tener en cuenta la sintaxis a la hora de configurar los comandos en los activos de la topología
- EIGRP usa cinco variables diferentes para calcular la métrica
- Al aplicar VLAN Trunking Protocol, se determina que es un protocolo usado para configurar y administrar VLANs en equipos Cisco. Los switches pueden operar en tres modos VTP diferentes Servidor–Cliente–Transparente.
- Cuando se configura VTP es importante elegir el modo adecuado, ya que VTP es una herramienta muy potente y puede crear problemas en la red. En un mismo dominio VTP la información de VLAN configurada en el servidor se transmite a todos los clientes.

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