Solución de estudios de caso bajo el uso de tecnología CISCO

PRESENTADO POR:

CAROLINA CARTAGENA

TUTOR:

GERARDO GRANADOS ACUÑA

GRUPO:

208014_10

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA - UNAD

DIPLOMADO DE PROFUNDIZACIÓN CISCO CCNP

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# TABLA DE CONTENIDO

INTRODUCCIÓN

Cada día vemos como las empresas implementan redes para estar comunicadas entre sucursales, empleados y cada una de las oficinas que posean, es por esto que se evidenciado un crecimiento necesario de adquirir conocimientos avanzados sobre las redes de comunicación para implementar protocolos efectivos de enrutamiento y seguridad sobre redes WAN y LAN

Los dispositivos con los que más vamos a tener contacto en el mundo empresarial son con los dispositivos Router y Switch estos equipos sirven para enrutar el tráfico en las redes y muy a menudo vamos a tener que intervenirlos ya sea para implementar nuevas configuraciones o para ir a revisar las configuraciones y poder proponer optimizaciones o encontrar errores, adicional a esto también se obtuvo como conocimientos adquiridos el monitoreo e implementación de redes empresariales.

En este trabajo podemos encontrar de manera simulada los conocimientos adquiridos en el curso de CCNP por medio de la solución de tres escenarios propuestos y su desarrollo por medio de las diferentes configuraciones que se puede realizar a un switch Cisco.

DESARROLLO DE LA ACTIVIDAD

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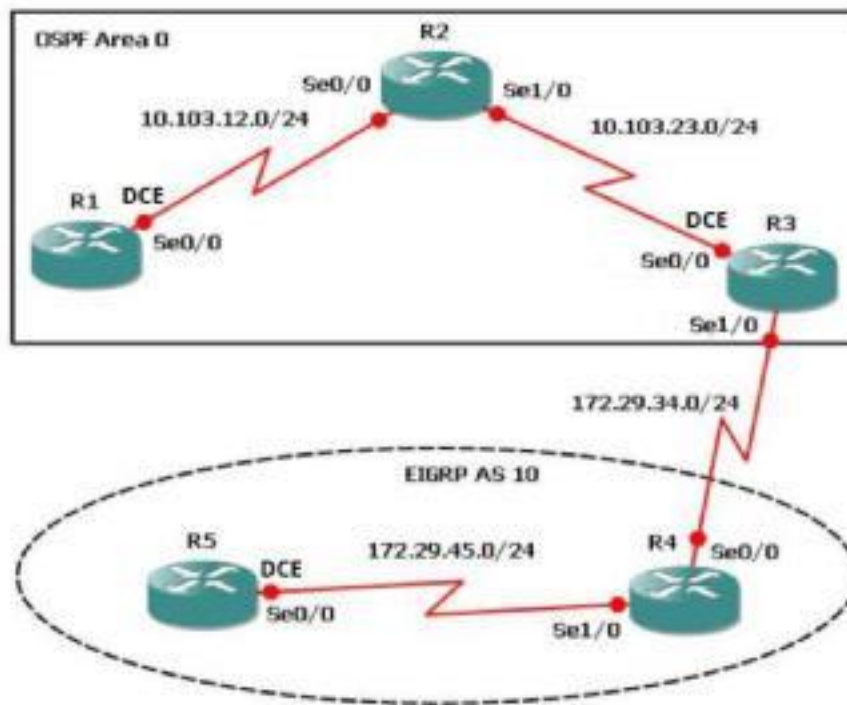
1. Aplique las configuraciones iniciales y los protocolos de enrutamiento para los routers R1, R2, R3, R4 y R5 según el diagrama. No asigne passwords en los routers. Configurar las interfaces con las direcciones que se muestran en la topología de red.

Se procede a realizar la configuración del R1.

Router>enable

Router#configure terminal

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

Router(config)#no ip domain-lookup

Router(config)#line con 0

Router(config-line)#logging synchronous

Router(config-line)#exec-timeout 0 0

Router(config-line)#exit

Router(config)#interface loopback 1

Router(config-if)#

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

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

Router(config-if)#interface serial 0/0/1

Router(config-if)#ip address 10.103.12.2 255.255.255.0

Router(config-if)#clock rate 128000

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

Router(config-if)#exit

Router(config)#exit

Router#

%SYS-5-CONFIG_I: Configured from console by console

Router#

Router(config)#router ospf 1

Router(config-router)#router-id 1.1.1.1

Router(config-router)#network 10.1.0.0 0.0.3.255 area 0

Router(config-router)#network 10.103.12.0 0.0.0.255 area 0

Router#

%SYS-5-CONFIG_I: Configured from console by console

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

Router#Router#copy ru st

Destination filename [startup-config]?

Building configuration...

[OK]

Router#

Ahora se procede a configurar R2.

Router>enable

Router#configure terminal

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

Router(config)#no ip domain-lookup

Router(config)#line con 0

Router(config-line)#logging synchronous

Router(config-line)#exec-timeout 0 0

Router(config-line)#exit

Router(config)#interface loopback 2

Router(config-if)#

%LINK-5-CHANGED: Interface Loopback2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback2, changed state to up

Router(config-if)#interface serial 0/0/0

Router(config-if)#ip address 10.103.12.1 255.255.255.0

Router(config-if)#no shut

Router(config-if)#

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

Router(config-if)#interface serial 0/0/1

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

Router(config-if)#interface serial 0/0/1

Router(config-if)#ip address 10.103.23.2 255.255.255.0

Router(config-if)#no shut

Router(config-if)#

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

Router(config-if)#exit

Router(config)#exit

Router#

Router(config)#router ospf 1

Router(config-router)#router-id 2.2.2.2

Router(config-router)#network 10.103.12.0 0.0.0.255 area 0

Router(config-router)#network 10.103.23.0 0.0.0.255 area 0

Router#

%SYS-5-CONFIG_I: Configured from console by console

Router#copy

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

Router#copy ru st

Destination filename [startup-config]?

Building configuration...

[OK]

Router#

Luego, se realiza la configuración R3.

Router>enable

Router#configure terminal

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

Router(config)#no ip domain-lookup

Router(config)#line con 0

Router(config-line)#logging synchronous

Router(config-line)#exec-timeout 0 0

Router(config-line)#exit

Router(config)#interface lookback 3

^

% Invalid input detected at '^' marker.

Router(config)#interface loopback 3

Router(config-if)#

%LINK-5-CHANGED: Interface Loopback3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback3, changed state to up

Router(config-if)#interface serial 0/0/0

Router(config-if)#ip address 10.103.23.1 255.255.255.0

Router(config-if)#clock rate 128000

Router(config-if)#no shutdown

Router(config-if)#

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

Router(config-if)#exit

Router(config)#int

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

Router(config)#interface loopback 3

Router(config-if)#interface serial 0/0/1

Router(config-if)#ip address 172.29.34.2 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

Router(config-if)#exit

Router(config)#exit

Router#

Router#

Router(config)#router ospf 1

Router(config-router)#router-id 3.3.3.3

Router(config-router)#network 10.103.23.0 0.0.0.255 area 0

Router#

%SYS-5-CONFIG_I: Configured from console by console

Router#copy ru

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

Router#copy ru st

Destination filename [startup-config]?

Building configuration...

[OK]

Router#

Seguido de la configuración R4.

Router>enable

Router#configure terminal

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

Router(config)#no ip domain-lookup

Router(config)#line con 0

Router(config-line)#logging synchronous

Router(config-line)#exec-timeout 0 0

Router(config-line)#exit

Router(config)#interface loopback 4

Router(config-if)#

%LINK-5-CHANGED: Interface Loopback4, changed state to up

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

Router(config-if)#interface serial 0/0/0

Router(config-if)#ip address 172.29.34.1 255.255.255.0

Router(config-if)#no shut

Router(config-if)#

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

Router(config-if)#interface serial 0/0/

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

1

Router(config-if)#interface serial 0/0/1

Router(config-if)#ip address 172.29.45.2 255.255.255.0

Router(config-if)#no shut

Router(config-if)#

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

Router(config-if)#exit

Router(config)#exit

Router#

%SYS-5-CONFIG_I: Configured from console by console

Router#copy ru st

Destination filename [startup-config]?

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

Destination filename [startup-config]?

Building configuration...

[OK]

Router#

Finalmente, se realiza la configuración de R5.

Router>enable

Router#configure terminal

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

Router(config)#no ip domain-lookup

Router(config)#line con 0

Router(config-line)#logging synchronous

Router(config-line)#exec-timeout 0 0

Router(config-line)#exit

Router(config)#interface loopback 5

Router(config-if)#

%LINK-5-CHANGED: Interface Loopback5, changed state to up

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

Router(config-if)#interface serial 0/0/0

Router(config-if)#ip address 172.29.45.1 255.255.255.0

Router(config-if)#clock rate 128000

Router(config-if)#no shut

Router(config-if)#

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

Router(config-if)#exit

Router(config)#exit

Router#

%SYS-5-CONFIG_I: Configured from console by console

Router#copy ru st

Destination filename [startup-config]?

Building configuration...

[OK]

Router#

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

Router#

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.

Cuatro Interfaces Loopback en R1	
Loopback11	10.1.0.1/22
Loopback12	10.1.4.1/22
Loopback13	10.1.8.1/22
Loopback14	10.1.12.1/22

Se realiza la configuración Router 1

Router>enable

Router#configure terminal

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

Router(config)#interface loopback11

Router(config-if)#

%LINK-5-CHANGED: Interface Loopback11, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback11, changed state to up

Router(config-if)#ip address 10.1.0.1 255.255.252.0

Router(config-if)#exit

Router(config)#interface loopback12

Router(config-if)#

%LINK-5-CHANGED: Interface Loopback12, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback12, changed state to up

Router(config-if)#ip address 10.1.4.1 255.255.252.0

Router(config-if)#exit

Router(config)#interface loopback13

Router(config-if)#

%LINK-5-CHANGED: Interface Loopback13, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback13, changed state to up

Router(config-if)#ip address 10.1.8.1 255.255.252.0

Router(config-if)#exit

Router(config)#interface loopback14

Router(config-if)#

%LINK-5-CHANGED: Interface Loopback14, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback14, changed state to up

Router(config-if)#ip address 10.1.12.1 255.255.252.0

Router(config-if)#exit

Router(config)#router ospf 1

Router(config-router)#router-id 1.1.1.1

Router(config-router)#network 10.1.0.0 0.0.3.255 area

0 Router(config-router)#network 10.103.12.0 Router#

%SYS-5-CONFIG_I: Configured from console by console

Router#configure terminal

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

Router(config)#router ospf 1

Router(config-router)#network 10.103.12.0 0.0.0.255 area 0

Router(config-router)#exit

Router(config)#exit

Router#

%SYS-5-CONFIG_I: Configured from console by console

Router#copy ru st

Destination filename [startup-config]?

Building configuration...

[OK]

Router#

Router#

Router#configure terminal

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

Router(config)#interface loopback11

Router(config-if)#ip ospf network point-to-point

Router(config-if)#exit

Router(config)#interface loopback12

Router(config-if)#ip ospf network point-to-point

Router(config-if)#exit

Router(config)#interface loopback13

Router(config-if)#ip ospf network point-to-point

Router(config-if)#exit

Router(config)#interface loopback14

Router(config-if)#ip ospf network point-to-point

Router(config-if)#exit

Router(config)#exit

Router#

%SYS-5-CONFIG_I: Configured from console by console

Router#copy ru st

Destination filename [startup-config]?

Building configuration...

[OK]

Router#

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

Cuatro Interfaces Loopback en R5	
Loopback51	172.5.0.1
Loopback52	172.5.4.1
Loopback53	172.5.8.1
Loopback54	172.5.12.1

Configuración Router 5.

Router>enable

Router#configure terminal

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

Router(config)#interface loopback51

Router(config-if)#

%LINK-5-CHANGED: Interface Loopback51, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback51, changed state to up

Router(config-if)#ip address 172.5.0.1 255.255.252.0

Router(config-if)#exit

Router(config)#interface loopback52

Router(config-if)#

%LINK-5-CHANGED: Interface Loopback52, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback52, changed state to up

Router(config-if)#ip address 172.5.4.1 255.255.252.0

Router(config-if)#exit

Router(config)#interface loopback53

Router(config-if)#

%LINK-5-CHANGED: Interface Loopback53, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback53, changed state to up

Router(config-if)#ip address 172.5.8.1 255.255.252.0

Router(config-if)#exit

Router(config)#interface loopback54

Router(config-if)#

%LINK-5-CHANGED: Interface Loopback54, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback54, changed state to up

Router(config-if)#ip address 172.5.12.1 255.255.252.0

Router(config-if)#exit

Router(config)#

Router(config)#route eigrp 10
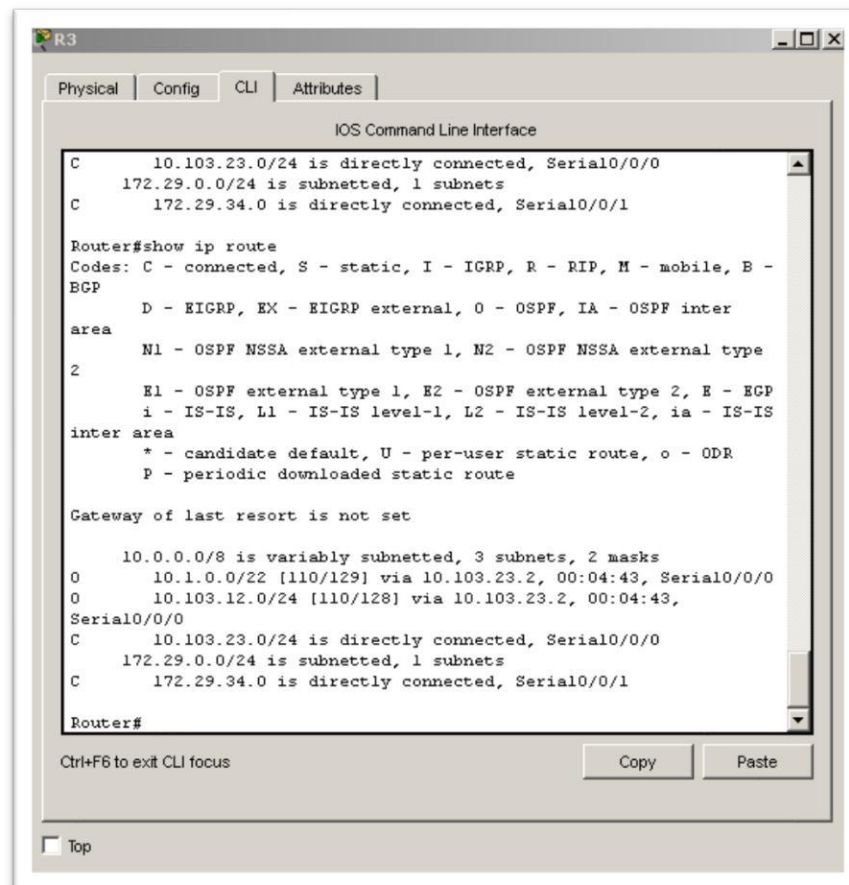
Router(config-router)#auto-summary

Router(config-router)#network 172.5.0.0 0.0.3.255

Router(config-router)#network 172.29.45.0 0.0.0.255

Router#

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

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.

Router>enable

Router#configure terminal

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

Router(config)#router ospf 10

Router(config-router)#redistribute eigrp 10 subnets

Router(config-router)#exit

Router(config)#router ospf 1

Router(config-router)#redistribute eigrp 10

% Only classful networks will be redistributed

Router(config-router)#redistribute eigrp 10 subnets

Router(config-router)#exit Router(config)#router

eigrp 10

Router(config-router)#redistribute ospf 1 metric 1544 100 255 1

1500 Router(config-router)#exit

Router(config)#exit

Router#

%SYS-5-CONFIG_I: Configured from console by console

Router#show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B -

BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks

O 10.1.0.0/22 [110/129] via 10.103.23.2, 00:08:56, Serial0/0/0

O 10.103.12.0/24 [110/128] via 10.103.23.2, 00:08:56,

Serial0/0/0 C 10.103.23.0/24 is directly connected, Serial0/0/0

172.29.0.0/24 is subnetted, 1 subnets

C 172.29.34.0 is directly connected, Serial0/0/1

Router#configure terminal

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

Router(config)#router ospf 1

Router(config-router)#network 172.29.34.0 0.0.0.255 area 0

Router(config-router)#exit

Router(config)#exit

Router#

%SYS-5-CONFIG_I: Configured from console by console

Router#show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B -

BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks

O 10.1.0.0/22 [110/129] via 10.103.23.2, 00:10:57, Serial0/0/0

O 10.103.12.0/24 [110/128] via 10.103.23.2, 00:10:57,

Serial0/0/0 C 10.103.23.0/24 is directly connected, Serial0/0/0

172.29.0.0/24 is subnetted, 1 subnets

C 172.29.34.0 is directly connected, Serial0/0/1

Router#configure terminal

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

Router(config)#router ospf 1

Router(config-router)#redistribute eigrp 10 subnets

Router(config-router)#log-adjacency-changes

Router(config-router)#redistribute eigrp 7 subnets

Router(config-router)#network 172.29.45.0 area 0

^

% Invalid input detected at '^' marker.

Router(config-router)#network 172.29.45.0 0.0.0.255 area 0

Router(config-router)#exit

Router(config)#router eigrp 10
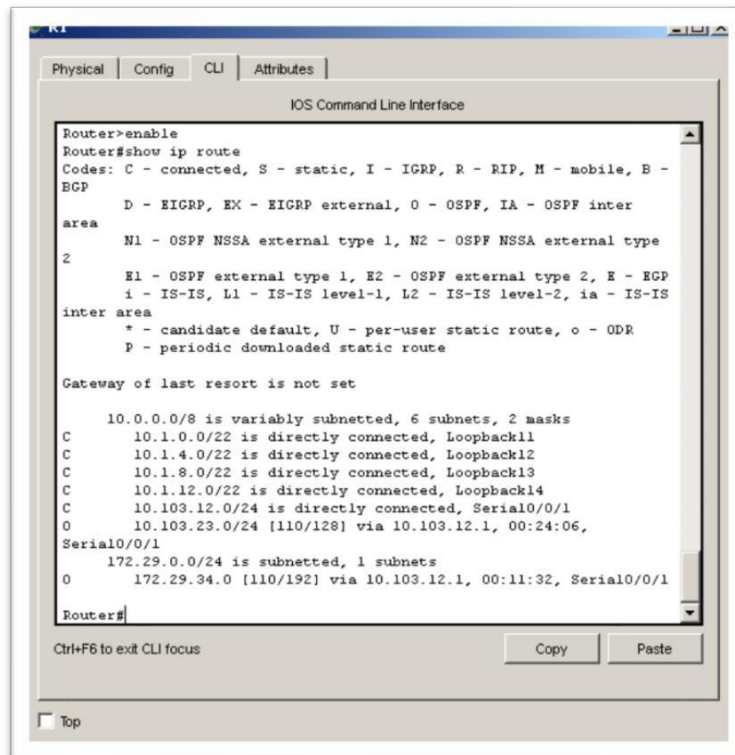
Router(config-router)#redistribute ospf 1 metric 50000 200 255 1 1500

Router(config-router)#auto-summary

Router(config-router)#exit

Router(config)#

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.
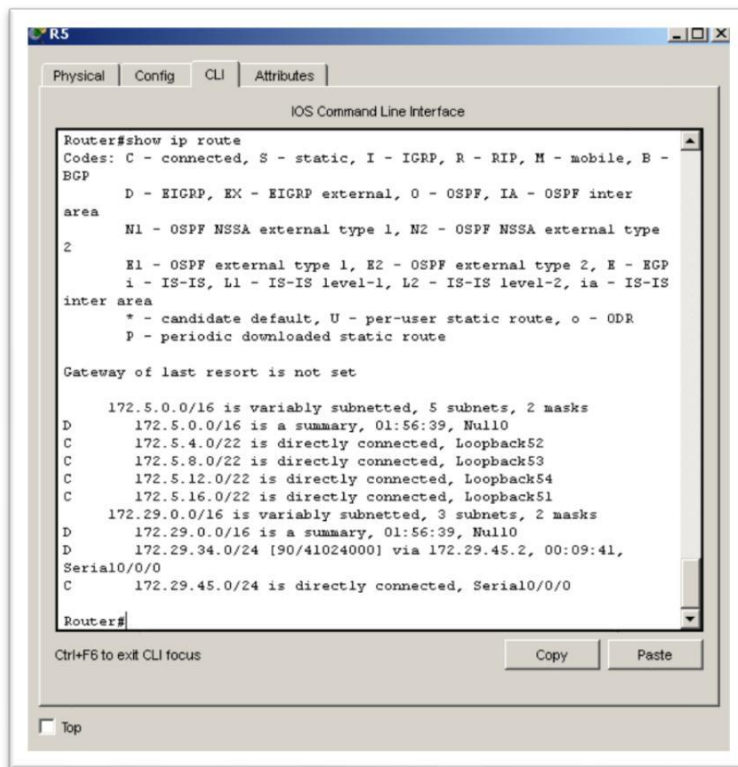
Escenario 2.

Información para configuración de los Routers

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

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

R4

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.

AS1#enable

AS1#configure term

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

AS1(config)#router bgp 1

AS1(config-router)#exit

AS1(config)#no router bgp 1

AS1(config)#router bgp 1

AS1(config-router)#bgp router-id 11.11.11.11

AS1(config-router)#neighbor 192.1.12.2 remote-as 2

AS1(config-router)#network 1.1.1.1 mask 255.0.0.0

AS1(config-router)#network 11.1.0.1 mask 255.255.0.0

AS1(config-router)#exit

AS1(config)#exit

AS1#

```
R1                                                                    _□×

 Physical │ Config │ CLI │ Attributes │

                      IOS Command Line Interface

 AS1>enable
 AS1#show ip bgp
 BGP table version is 6, 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
 Origin codes: i - IGP, e - EGP, ? - incomplete

    Network          Next Hop          Metric LocPrf Weight Path
 *> 1.0.0.0/8        0.0.0.0                0       32768 i
 *                   192.1.12.2             0       0     0 2 i
 *> 11.1.0.0/16      0.0.0.0                0       32768 i

 AS1#show ip route
 Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B -
 BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter
 area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type
 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
 inter area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

 Gateway of last resort is not set

 C    1.0.0.0/8 is directly connected, Loopback0
      11.0.0.0/16 is subnetted, 1 subnets
 C       11.1.0.0 is directly connected, Loopback1
 C    192.1.12.0/24 is directly connected, Serial0/0/0

 AS1#

 Ctrl+F6 to exit CLI focus                        Copy      Paste

 □ Top
```

AS2>enable
AS2#config term
Enter configuration commands, one per line. End with CNTL/Z.
AS2(config)#router bgp 2
AS2(config-router)#bgp router-id 22.22.22.22
AS2(config-router)#neighbor 192.1.12.1 remote-as 1
AS2(config-router)#neighbor 192.1.34.3 remote-as 3
AS2(config-router)#neighbor 192.1.23.3 remote-as 3
AS2(config-router)#%BGP-5-ADJCHANGE: neighbor 192.1.12.1 Up
AS2(config-router)#network 1.1.1.0
AS2(config-router)#network 11.1.0.0
AS2(config-router)#exit
AS2(config)#exit
AS2#
%SYS-5-CONFIG_I: Configured from console by console

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.

AS3>enable

AS3#config term

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

AS3(config)#router bgp 3

AS3(config-router)#neighbor 192.1.12.2 remote-as 2

AS3(config-router)#neighbor 192.1.23.2 remote-as 2

AS3#%BGP-5-ADJCHANGE: neighbor 192.1.23.2 Up

AS3(config-router)#neighbor 192.1.34.4 remote-as 4

AS3(config-router)#network 4.4.4.4 mask 255.0.0.0

AS3(config-router)#network 14.1.0.1 mask 255.255.0.0

AS3(config-router)#network 2.2.2.2 mask 255.0.0.0

AS3(config-router)#network 12.1.0.1 mask 255.255.0.0

AS3(config-router)#network 3.3.3.3 mask 255.0.0.0

AS3(config-router)#network 13.1.0.1 mask 255.255.0.0

AS3(config-router)#exit

```
R3                                                                    _|□|×|

 Physical  |  Config  |  CLI  |  Attributes  |

                    IOS Command Line Interface

 AS3#show ip route
 Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B -
 BGP
         D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter
 area
         N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type
 2
         E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
         i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
 inter area
         * - candidate default, U - per-user static route, o - ODR
         P - periodic downloaded static route

 Gateway of last resort is not set

 B    1.0.0.0/8 [20/0] via 192.1.23.2, 00:00:00
 C    3.0.0.0/8 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, 00:00:00
      13.0.0.0/16 is subnetted, 1 subnets
 C       13.1.0.0 is directly connected, Loopback1
 C    192.1.23.0/24 is directly connected, FastEthernet0/0
 C    192.1.34.0/24 is directly connected, Serial0/0/0

 AS3#show ip bgp
 BGP table version is 6, local router ID is 13.1.0.1
 Status codes: s suppressed, d damped, h history, * valid, > best, i
 - internal,
               r RIB-failure, S Stale
 Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop         Metric LocPrf Weight Path
 *> 1.0.0.0/8        192.1.23.2            0      0      0 2 i
 *> 3.0.0.0/8        0.0.0.0               0         32768 i
 *> 11.1.0.0/16      192.1.23.2            0      0      0 2 1 i
 *> 13.1.0.0/16      0.0.0.0               0         32768 i
 *  192.1.23.0/24    192.1.23.2            0      0      0 2 i

 AS3#

 Ctrl+F6 to exit CLI focus                              Copy      Paste

 □ Top
```

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.

AS4>enable

AS4#config term

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

AS4(config)#router bgp 4

AS4(config-router)#neighbor 192.1.34.3 remote-as 3

AS4(config-router)#%BGP-5-ADJCHANGE: neighbor 192.1.34.3 Up

AS4(config-router)#neighbor 192.1.23.3 remote-as 3

AS4(config-router)#%BGP-5-ADJCHANGE: neighbor 192.1.23.3 Up

AS4(config-router)#neighbor 192.1.23.2 remote-as 2

AS4(config-router)#neighbor 192.1.12.2 remote-as 2

AS4(config-router)#neighbor 192.1.12.1 remote-as 1

AS4(config-router)#%BGP-5-ADJCHANGE: neighbor 192.1.34.3 Up

AS4(config-router)#network 3.3.3.3 mask 255.0.0.0

AS4(config-router)#network 13.1.0.1 mask 255.255.0.0

AS4(config-router)#network 12.1.0.1 mask 255.255.0.0

AS4(config-router)#network 2.2.2.2 mask 255.0.0.0

AS4(config-router)#network 11.1.0.1 mask 255.255.0.0

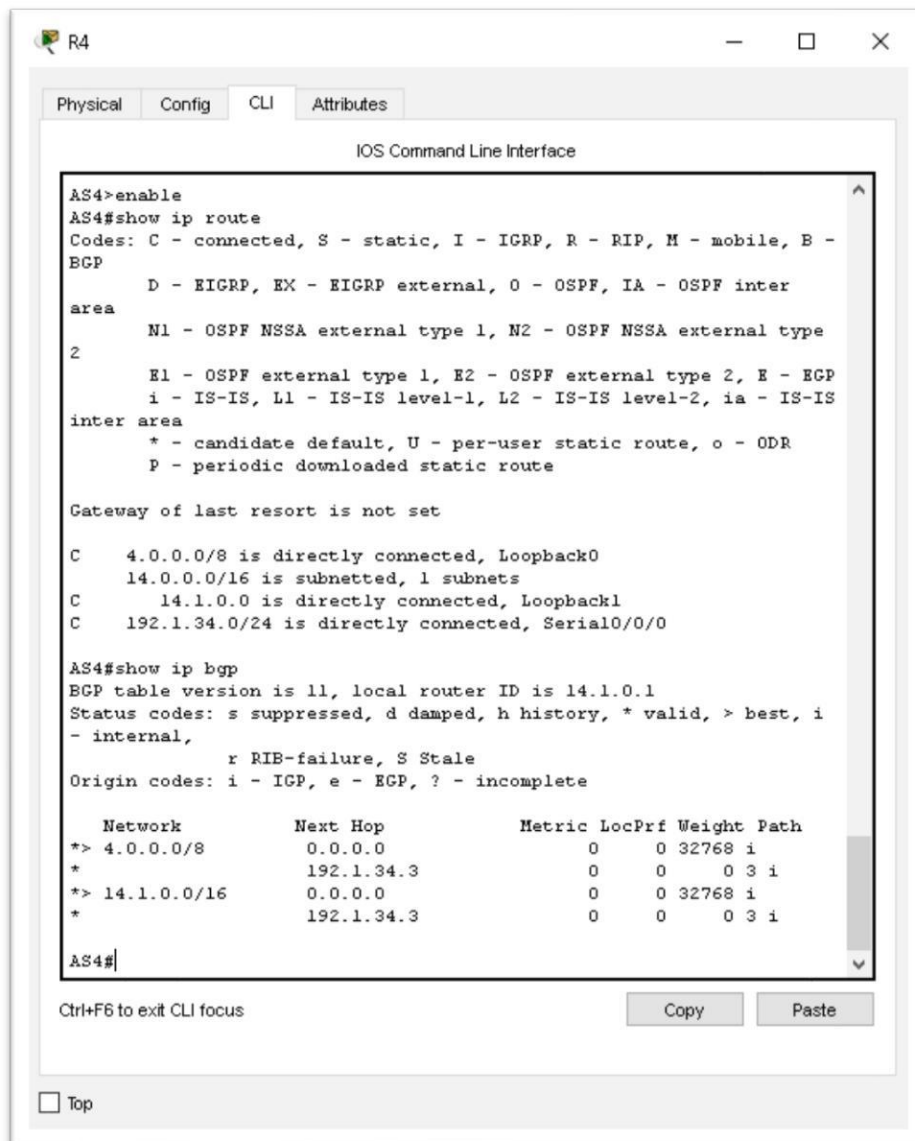AS4(config-router)#network 4.4.4.4 mask 255.0.0.0

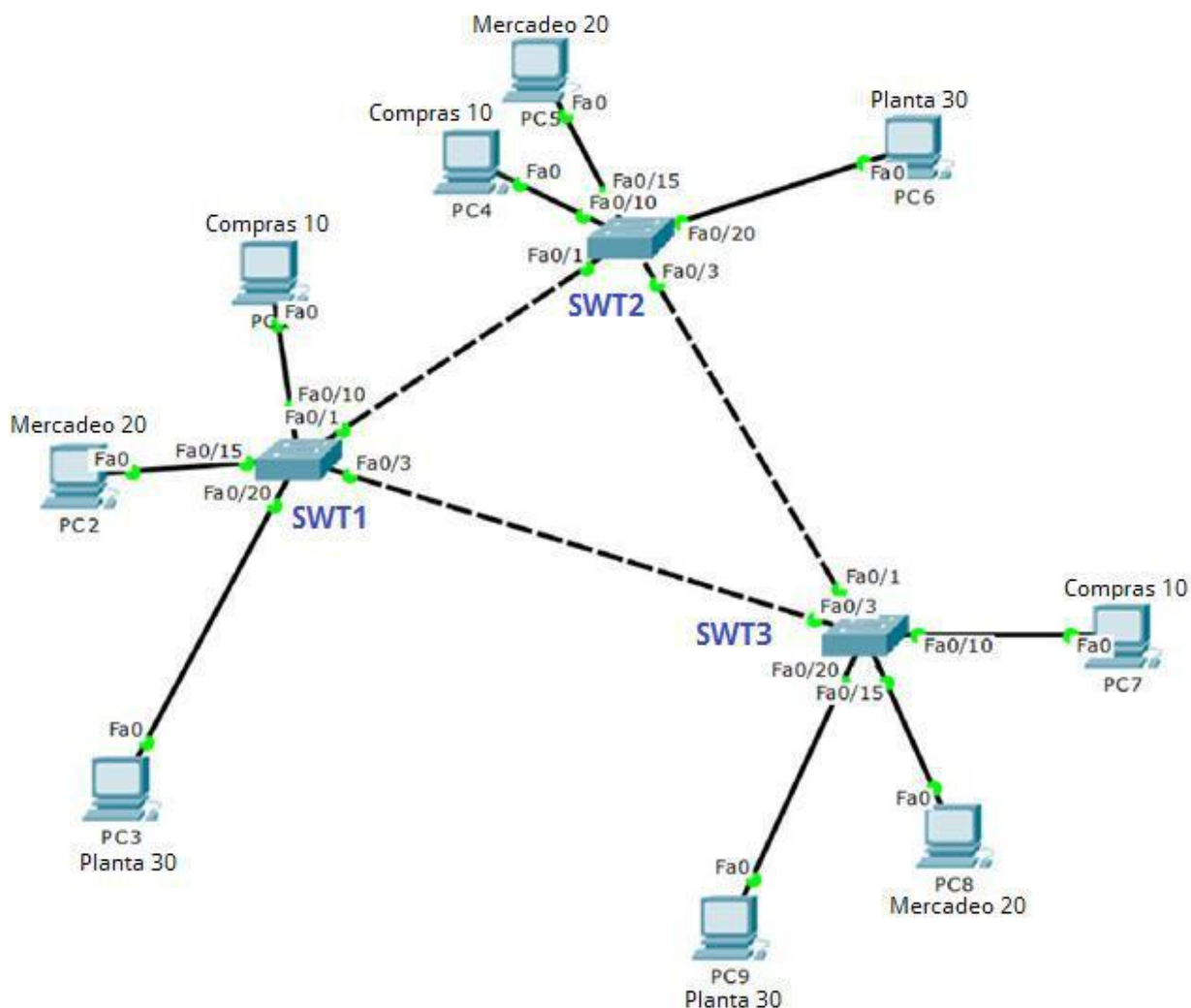AS4(config-router)#network 14.1.0.1 mask 255.255.0.0

AS4(config-router)#exit

AS4(config)#exit

AS4#

%SYS-5-CONFIG_I: Configured from console by console

```
R4                                                    —    □    ×

 Physical    Config    CLI    Attributes
                        IOS Command Line Interface

 AS4>enable
 AS4#show ip route
 Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B -
 BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter
 area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type
 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
 inter area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

 Gateway of last resort is not set

 C    4.0.0.0/8 is directly connected, Loopback0
      14.0.0.0/16 is subnetted, 1 subnets
 C       14.1.0.0 is directly connected, Loopback1
 C    192.1.34.0/24 is directly connected, Serial0/0/0

 AS4#show ip bgp
 BGP table version is 11, local router ID is 14.1.0.1
 Status codes: s suppressed, d damped, h history, * valid, > best, i
 - internal,
              r RIB-failure, S Stale
 Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop          Metric LocPrf Weight Path
 *> 4.0.0.0/8        0.0.0.0                0      0 32768 i
 *                   192.1.34.3             0      0     0 3 i
 *> 14.1.0.0/16      0.0.0.0                0      0 32768 i
 *                   192.1.34.3             0      0     0 3 i

 AS4#

 Ctrl+F6 to exit CLI focus                    Copy        Paste

 □ Top
```

Escenario 3.

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#config terminal

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

Switch(config)#hostname SWT1

SWT1(config)#vtp domain CCNP

Changing VTP domain name from NULL to CCNP

SWT1(config)#vtp version 2

SWT1(config)#vtp mode client

Setting device to VTP CLIENT mode.

SWT1(config)#vtp password cisco

Setting device VLAN database password to cisco

SWT1(config)#

Switch>enable

Switch#configure terminal

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

Switch(config)#hostname SWT3

SWT3(config)#vtp domain CCNP

Changing VTP domain name from NULL to

CCNP SWT3(config)#vtp version 2

SWT3(config)#vtp mode client Setting device to

VTP CLIENT mode.

SWT3(config)#vtp password cisco

Setting device VLAN database password to

cisco SWT3(config)#

Switch>enable

Switch#configure terminal

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

Switch(config)#hostname SWT2

SWT2(config)#vtp domain CCNP

Changing VTP domain name from NULL to

CCNP SWT2(config)#vtp version 2
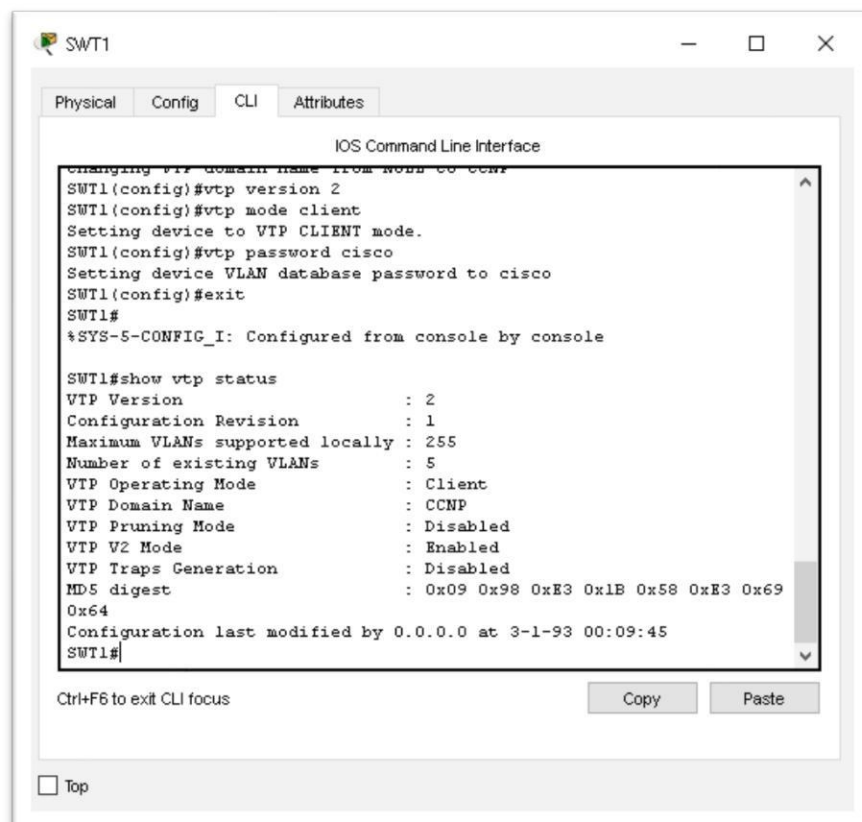
SWT2(config)#vtp mode server Device mode

already VTP SERVER.

SWT2(config)#vtp password cisco

Setting device VLAN database password to

cisco SWT2(config)#

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

SWT2

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
SWT2(config)#vtp version 2
SWT2(config)#vtp mode server
Device mode already VTP SERVER.
SWT2(config)#vtp password cisco
Setting device VLAN database password to cisco
SWT2(config)#exit
SWT2#
%SYS-5-CONFIG_I: Configured from console by console

SWT2#show vtp status
VTP Version                     : 2
Configuration Revision          : 1
Maximum VLANs supported locally : 255
Number of existing VLANs        : 5
VTP Operating Mode              : Server
VTP Domain Name                 : CCNP
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Enabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0x0B 0x55 0x88 0xF6 0xE6 0x09 0x7A
0xBB
Configuration last modified by 0.0.0.0 at 3-1-93 00:12:53
Local updater ID is 0.0.0.0 (no valid interface found)
SWT2#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

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SWT3

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
Changing VTP domain name from NULL to CCNP
SWT3(config)#vtp version 2
SWT3(config)#vtp mode client
Setting device to VTP CLIENT mode.
SWT3(config)#vtp password cisco
Setting device VLAN database password to cisco
SWT3(config)#exit
SWT3#
%SYS-5-CONFIG_I: Configured from console by console

SWT3#show vtp status
VTP Version                     : 2
Configuration Revision          : 1
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                     : Enabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0x03 0x36 0x09 0xA7 0xDF 0x90 0xF3
0xD6
Configuration last modified by 0.0.0.0 at 3-1-93 00:11:47
SWT3#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

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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>enable
SWT1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
SWT1(config)#interface fa
SWT1(config)#interface fastEthernet 0/1
SWT1(config-if)#switchport mode dynamic desirable
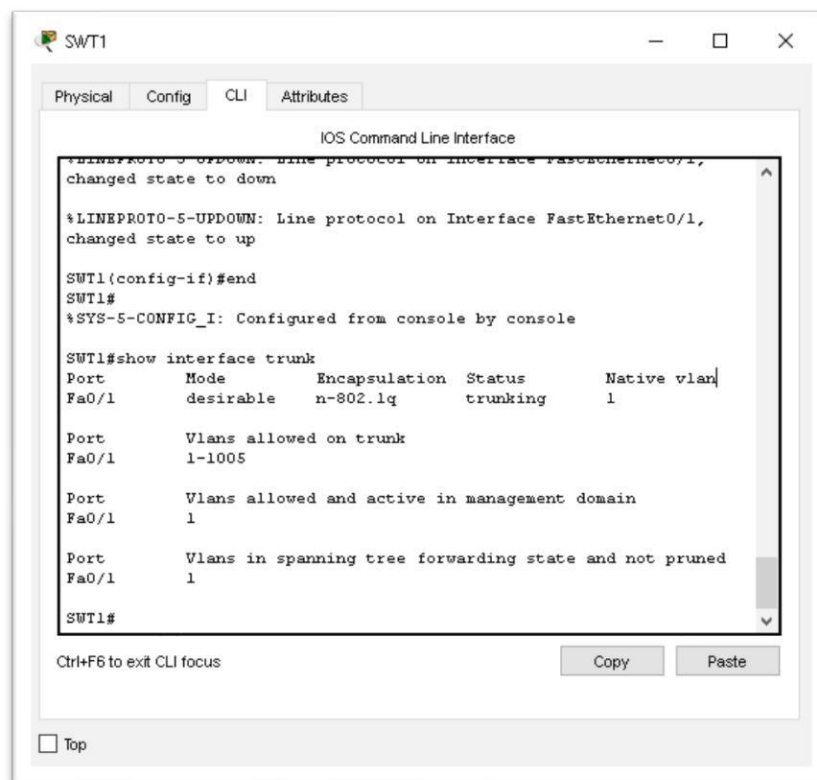
SWT1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

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

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

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

SWT1>enable

SWT1#configure terminal

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

SWT1(config)#interface fa

SWT1(config)#interface fastEthernet 0/3

SWT1(config-if)#switchport mode trunk

SWT1(config-if)#

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

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

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

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

SWT2>enable

SWT2#configure terminal

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

SWT2(config)#interface fa

SWT2(config)#interface fastEthernet 0/3

SWT2(config-if)#switchport mode trunk

SWT2(config-if)#

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

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

SWT2(config-if)#exit

SWT2(config)#

SWT3>enable

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

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

SWT3#configure terminal

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

SWT3(config)#interface fa

SWT3(config)#interface fastEthernet 0/1

SWT3(config-if)#switchport mode trunk

SWT3(config-if)#exit

SWT3(config)#end

SWT3#

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).

En STW1

SWT1>enable

SWT1#configure terminal

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

SWT1(config)#vlan 10

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

SWT1(config)#

En STW2

SWT2>enable

SWT2#configure terminal

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

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
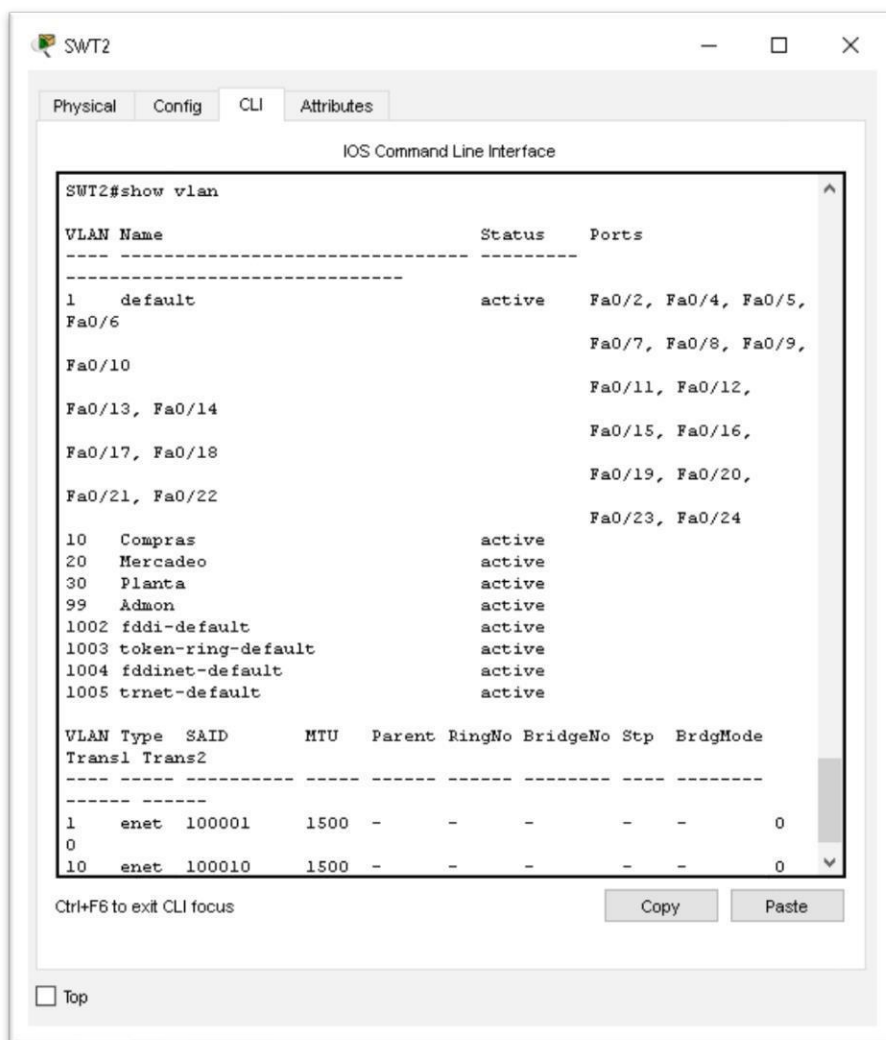
SWT2(config-vlan)#vlan 99

SWT2(config-vlan)#name Admon

SWT2(config-vlan)#exit

SWT2(config)#

2. Verifique que las VLANs han sido agregadas correctamente.

En SWT1: No se pude crear la vlan 10 ya que en el switch 1 tiene un vtp en modo cliente, lo que no permite crear la Vlan.

En SWT2:

3. 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

En SWT1.

SWT1>enable

SWT1#configure terminal

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

SWT1(config)#interface vlan 10

SWT1(config-if)#

%LINK-5-CHANGED: Interface Vlan10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to up

SWT1(config-if)#ip address 190.108.10.1 255.255.255.0

SWT1(config-if)#exit

SWT1(config)#interface vlan 20

SWT1(config-if)#

%LINK-5-CHANGED: Interface Vlan20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan20, changed state to up

SWT1(config-if)#ip address 190.108.20.1 255.255.255.0

SWT1(config-if)#exit

SWT1(config)#interface vlan 30

SWT1(config-if)#

%LINK-5-CHANGED: Interface Vlan30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan30, changed state to up

SWT1(config-if)#ip address 190.108.30.1 255.255.255.0

SWT1(config-if)#exit

En SWT2.

SWT2>enable

SWT2#configure terminal

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

SWT2(config)#interface vlan 10

SWT2(config-if)#ip address 190.108.10.2 255.255.255.0

SWT2(config-if)#exit

SWT2(config)#interface vlan 20

SWT2(config-if)#ip address 190.108.20.2 255.255.255.0

SWT2(config-if)#exit

SWT2(config)#interface vlan 30

SWT2(config-if)#ip address 190.108.30.2 255.255.255.0

SWT2(config-if)#exit

En SWT3

SWT3>enable

SWT3#configure terminal

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

SWT3(config)#interface vlan 10

SWT3(config-if)#

%LINK-5-CHANGED: Interface Vlan10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to up

SWT3(config-if)#ip address 190.108.10.3 255.255.255.0

SWT3(config-if)#exit

SWT3(config)#interface vlan 20

SWT3(config-if)#

%LINK-5-CHANGED: Interface Vlan20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan20, changed state to up

SWT3(config-if)#ip address 190.108.20.3 255.255.255.0

SWT3(config-if)#exit

SWT3(config)#interface vlan 30

SWT3(config-if)#

%LINK-5-CHANGED: Interface Vlan30, changed state to up %LINEPROTO-5-

UPDOWN: Line protocol on Interface Vlan30, changed state to up SWT3(config-

if)#ip address 190.108.30.3 255.255.255.0 SWT3(config-if)#exit

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

En SWT1.

SWT1>enable

SWT1#configure terminal

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

SWT1(config)#interface fa

SWT1(config)#interface fastEthernet 0/10

SWT1(config-if)#switchport mode access

SWT1(config-if)#switchport access vlan 10

SWT1(config-if)#exit

SWT1(config)#exit

SWT1#

%SYS-5-CONFIG_I: Configured from console by console

En SWT2.

SWT2(config)#interface fa

SWT2(config)#interface fastEthernet 0/10

SWT2(config-if)#switchport mode access

SWT2(config-if)#switchport access vlan 10

SWT2(config-if)#exit

SWT2(config)#

SWT2#

En SWT3.

SWT3>enable

SWT3#configure terminal

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

SWT3(config)#interface fa

SWT3(config)#interface fastEthernet 0/10

SWT3(config-if)#switchport mode access

SWT3(config-if)#switchport access vlan 10

SWT3(config-if)#exit

SWT3(config)#exit

SWT3#

%SYS-5-CONFIG_I: Configured from console by console

SWT3#

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.

En SWT1.

SWT1>enable

SWT1#configure terminal

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

SWT1(config)#interface fa

SWT1(config)#interface fastEthernet 0/15

SWT1(config-if)#switchport mode access

SWT1(config-if)#switchport access vlan 20

SWT1(config-if)#exit

SWT1(config)#interface fa

SWT1(config)#interface fastEthernet 0/20

SWT1(config-if)#switchport mode access

SWT1(config-if)#switchport access vlan 30

SWT1(config-if)#exit

SWT1(config)#exit

SWT1#

%SYS-5-CONFIG_I: Configured from console by console

En SWT2

SWT2>enable

SWT2#configure terminal

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

SWT2(config)#interface fa

SWT2(config)#interface fastEthernet 0/15

SWT2(config-if)#switchport mode access

SWT2(config-if)#switchport access vlan 20

SWT2(config-if)#no shut

SWT2(config-if)#exit

SWT2(config)#interface fa

SWT2(config)#interface fastEthernet 0/20

SWT2(config-if)#switchport mode access

SWT2(config-if)#switchport access vlan 30

SWT2(config-if)#end

SWT2#

%SYS-5-CONFIG_I: Configured from console by console

En SWT3

SWT3>enable

SWT3#configure terminal

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

SWT3(config)#interface fa

SWT3(config)#interface fastEthernet 0/15

SWT3(config-if)#switchport mode access

SWT3(config-if)#switchport access vlan 20

SWT3(config-if)#exit

SWT3(config)#interface fa

SWT3(config)#interface fastEthernet 0/20

SWT3(config-if)#switchport mode access

SWT3(config-if)#switchport access vlan 30

SWT3(config-if)#exit

SWT3(config)#exit

SWT3#

%SYS-5-CONFIG_I: Configured from console by console

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

En SWT1.

SWT1>enable

SWT1#config terminal

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

SWT1(config)#interface vlan99

SWT1(config-if)#

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

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

SWT1(config-if)#ip address 190.108.99.1 255.255.255.0

SWT1(config-if)#exit

SWT1(config)#

En SWT2.

SWT2>enable

SWT2#configure terminal

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

SWT2(config)#interface vlan 99

SWT2(config-if)#

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

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

SWT2(config-if)#ip address 190.108.99.2 255.255.255.0

SWT2(config-if)#exit

En SWT3.

SWT3>enable

SWT3#configure terminal

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

SWT3(config)#interface vlan 99

SWT3(config-if)#

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

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

SWT3(config-if)#ip address 190.108.99.3 255.255.255.0

SWT3(config-if)#exit

SWT3(config)#end

SWT3#

%SYS-5-CONFIG_I: Configured from console by console

SWT3#

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 es exitoso entre equipos de la misma vlan.

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

El ping entre los switch es exitoso porque existe una ip asociada a la vlan 99, los ping se

realizan a esas direcciones ip

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

Los pings entre switch a cada pc son exitosos, porque no existe restricción en los

troncales.

CONCLUSIONES

En la resolución de la primer escenario se logra crear areas estas areas en este caso el area 0 su principal beneficio es crear una reducción en el número de rutas a propagar, adicional a esto se evidencia como es posible redistribiur redes con diferentes protocols esto es muy común cuando las redes son grandes.

Para el escenario dos logramos concretar el objetivo del BGP que es intercambiar información entre SA garantizando rutas libres de bucles, adicional se logró establecer conexion entre mas de dos peers que pertenecen a SAs diferntes lo cul lo denomina EBGP, como se anunciaron como vecinos esto posibilita que compartan información sobre las rutas.

Con el desarrollo del curso logramos aplicar algunos temas como el desarrollado en el laboratorio tres en el cual se configuró y se entendió el funcionamiento de las VLAN's como red virtual ya que son agrupaciones lógicas de dispositivos, que en general tiene el proposito de segmentar la LAN, se logra también implementar los protocolos VTP que permiten administrar en una red de switches las VLAN's y poder agergar una VLAN sin tener que configurarla en todas partes, se aplico la forma de poner un segmento de la red en modo trunk, con todo este conocimiento se puede determinar si una red se encuentra bien configurada o si por lo contrario necesita mejoras y se logró una profundización a la configuración de puertos modo Access o trunk.

REFERENCIAS BIBLIOGRÁFICAS

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-NT1IlnWR0hoMxgBNv1CJ

Froom, R., Frahim, E. (2015). CISCO Press (Ed). InterVLAN Routing. Implementing Cisco IP Switched Networks (SWITCH) Foundation Learning Guide CCNP SWITCH 300-115. Recuperado de https://1drv.ms/b/s!AmIJYei-NT1IlnWR0hoMxgBNv1CJ

Froom, R., Frahim, E. (2015). CISCO Press (Ed). Fundamentals Review. Implementing Cisco IP Switched Networks (SWITCH) Foundation Learning Guide CCNP SWITCH 300-115. Recuperado de https://1drv.ms/b/s!AmIJYei-NT1IlnWR0hoMxgBNv1CJ

Froom, R., Frahim, E. (2015). CISCO Press (Ed). Campus Network Architecture. Implementing Cisco IP Switched Networks (SWITCH) Foundation Learning Guide CCNP SWITCH 300-115. Recuperado de https://1drv.ms/b/s!AmIJYei-NT1IlnWR0hoMxgBNv1CJ

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-NT1IlnMfy2rhPZHwEoWx

Teare, D., Vachon B., Graziani, R. (2015). CISCO Press (Ed). EIGRP Implementation.

Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide CCNP ROUTE 300-

101. Recuperado de https://1drv.ms/b/s!AmIJYei-NT1IlnMfy2rhPZHwEoWx

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-NT1IlnMfy2rhPZHwEoWx

Teare, D., Vachon B., Graziani, R. (2015). CISCO Press (Ed). Manipulating Routing

Updates. Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide CCNP

ROUTE 300-101. Recuperado de https://1drv.ms/b/s!AmIJYei-