SOLUCIÓN DE ESTUDIOS DE CASO BAJO EL USO DE TECNOLOGÍA CISCO

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Informe de sustentación Diplomado de Profundización CISCO CCNP para optar al título de Ingeniera Electrónica

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CONTENIDO

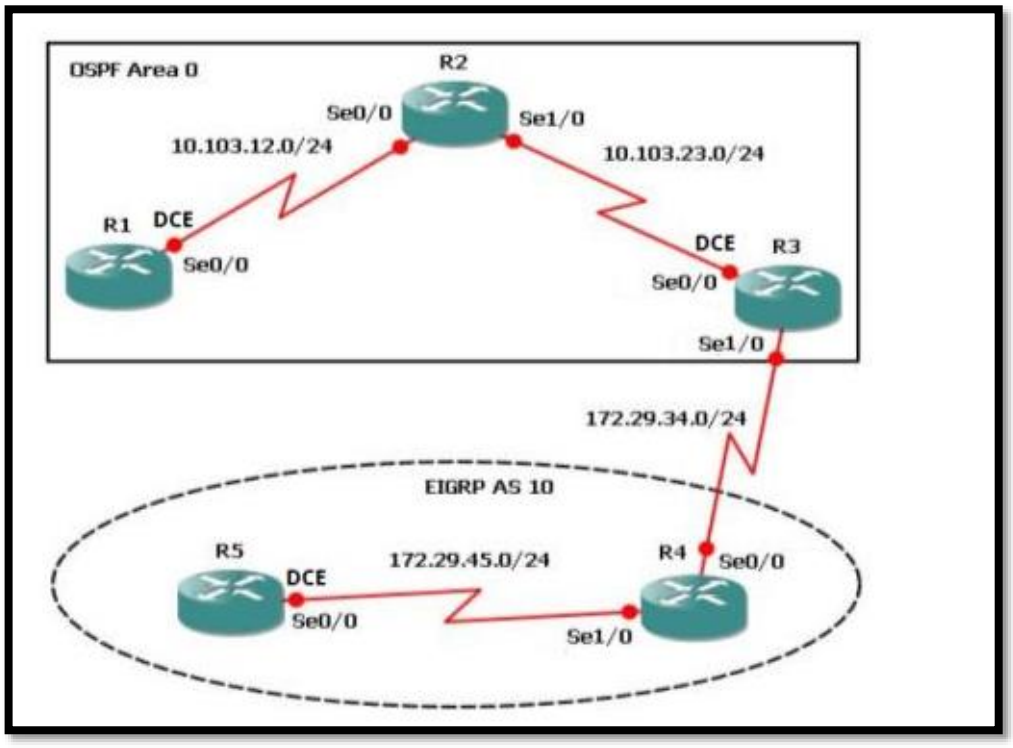
INTRODUCCIÓN

Este trabajo se hizo con el fin de llevar a cabo la Prueba de Habilidades Prácticas implementada como parte de las actividades evaluativas del Diplomado de Profundización CCNP, la cual busca identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado y poner a prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking. Se requiere que los estudiantes para el desarrollo de las actividades planteadas, apliquen el contenido de las temáticas abordadas a lo largo del curso, correspondientes a Protocolos de Enrutamiento Avanzado, Implementación de soluciones soportadas en enrutamiento avanzado, configuración de sistemas de red soportados en VLANs, y Administración, Seguridad y Escalabilidad en redes conmutadas.

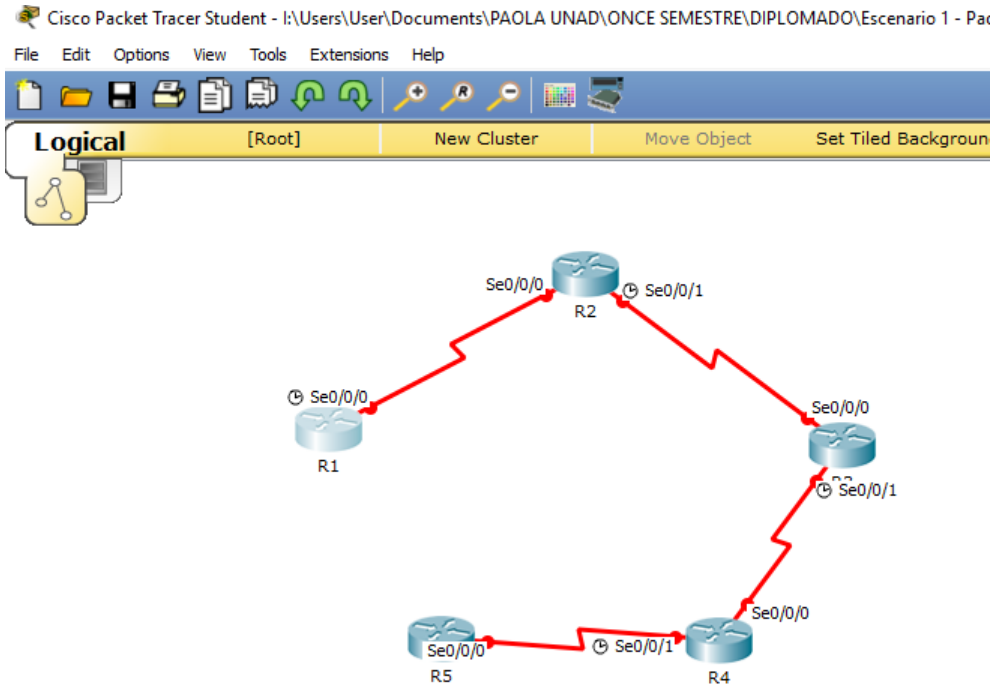
Se plantean 3 escenarios distintos sobre los cuales cada estudiante deberá realizar las tareas asignadas, y con base en ellas, sustentar con los respectivos procesos de documentación de la solución, correspondientes al registro de la configuración de cada uno de los dispositivos, la descripción detallada del paso a paso de cada una de las etapas realizadas durante su desarrollo, el registro de los procesos de verificación de conectividad mediante el uso de comandos ping, traceroute, show ip route, entre otros., empleando cualquiera de las herramientas de Simulación: PACKET TRACER o GNS3. Finalmente, y con base en lo anterior, consolidarán el informe como evidencia del proceso de configuración realizado.

ACTIVIDAD A DESARROLLAR

1. 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 la red.



Se configuran las interfaces para cada router:

R1:

Router>en

Router#conf t

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

Router(config)#hostname R1

R1(config)#end

R1#

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

R1#conf t

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

R1(config)#int s 0/0/0

R1(config-if)#ip address 10.103.12.1 255.255.255.0

R1(config-if)#clock rate 64000

R1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#exit
R1(config)#

R2:

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int s0/0/0
R2(config-if)#ip address 10.103.12.2 255.255.255.0
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

R2(config-if)#exit
R2(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

R2(config)#int s0/0/1
R2(config-if)#ip address 10.103.23.1 255.255.255.0
R2(config-if)#clock rate 64000
R2(config-if)#no shutodwn

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R2(config-if)#exit
R2(config)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R3:

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#int s0/0/0
R3(config-if)#ip address 10.103.23.2 255.255.255.0
R3(config-if)#no shutdown

R3(config-if)#

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

R3(config-if)#exit
R3(config)#int s0/0/1
R3(config-if)#ip address
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

% Incomplete command.
R3(config-if)#ip address 172.29.34.1 255.255.255.0
R3(config-if)#clock rate 64000
R3(config-if)#no shutdown

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

R4:

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R4
R4(config)#END
R4#
%SYS-5-CONFIG_I: Configured from console by console

R4#conf t
Enter configuration commands, one per line. End with CNTL/Z.

R4(config)#int s0/0/0
R4(config-if)#ip address 172.29.34.2 255.255.255.0
R4(config-if)#no shutdown

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

R4(config-if)#exit
R4(config)#int s0/0/1
R4(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

R4(config-if)#ip address 172.29.45.1 255.255.255.0
R4(config-if)#clock rate 64000
R4(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R4(config-if)#exit
R4(config)#

R5:

Router>EN
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R5
R5(config)#end
R5#

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

R5#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R5(config)#int s0/0/0
R5(config-if)#ip address 172.29.45.2 255.255.255.0
R5(config-if)#no shutdown

R5(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

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

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

R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int Lo1
%LINK-5-CHANGED: Interface Loopback1, changed state to up
R1(config-if)#ip address 10.1.0.1 255.255.252.0
R1(config-if)#exit
R1(config)#int Lo2
%LINK-5-CHANGED: Interface Loopback2, changed state to up
R1(config-if)#ip address 10.1.0.2 255.255.252.0
% 10.1.0.0 overlaps with Loopback1

R1(config-if)#exit
R1(config)#int Lo3

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

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

R1(config-if)#ip address 10.1.0.3 255.255.252.0
% 10.1.0.0 overlaps with Loopback1
R1(config-if)#exit
R1(config)#int Lo4

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

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

R1(config-if)#ip address 10.1.0.4 255.255.252.0
% 10.1.0.0 overlaps with Loopback1
R1(config-router)#exit
R1(config)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

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

R5#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R5(config)#int Lo1

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

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

R5(config-if)#ip address 172.5.0.1 255.255.252.0
R5(config-if)#exit
R5(config)#int Lo2

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

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

R5(config-if)#ip address 172.5.0.2 255.255.252.0
% 172.5.0.0 overlaps with Loopback1
R5(config-if)#exit
R5(config)#int Lo3

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

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

R5(config-if)#ip address 172.5.0.3 255.255.252.0
% 172.5.0.0 overlaps with Loopback1
R5(config-if)#exit
R5(config)#int Lo4

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

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

R5(config-if)#ip address 172.5.0.4 255.255.252.0
% 172.5.0.0 overlaps with Loopback1
R5(config-if)#exit
R5(config)#router eigrp 10
R5(config-router)#no auto-summary
R5(config-router)#network 172.5.0.0 0.0.3.255
R5(config-router)#exit
R5(config)#end
R5#
%SYS-5-CONFIG_I: Configured from console by console

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

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.103.23.0/24 is directly connected, Serial0/0/0
L       10.103.23.2/32 is directly connected, Serial0/0/0
     172.29.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       172.29.34.0/24 is directly connected, Serial0/0/1
L       172.29.34.1/32 is directly connected, Serial0/0/1
R3#
```

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

R3>en

R3#conf t

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

R3(config)#router eigrp 10

R3(config-router)#redistribute ospf 1 metric 10000 100 255 1 1500

R3(config-router)#network 172.5.0.0 0.0.3.255

R3(config-router)#auto-summary

R3(config-router)#exit

R3(config)#router ospf 1

R3(config-router)#log-adjacency-changes

R3(config-router)#redistribute eigrp 10 subnets

R3(config-router)#network 10.1.0.0 0.0.3.255 area 0

R3(config-router)#exit

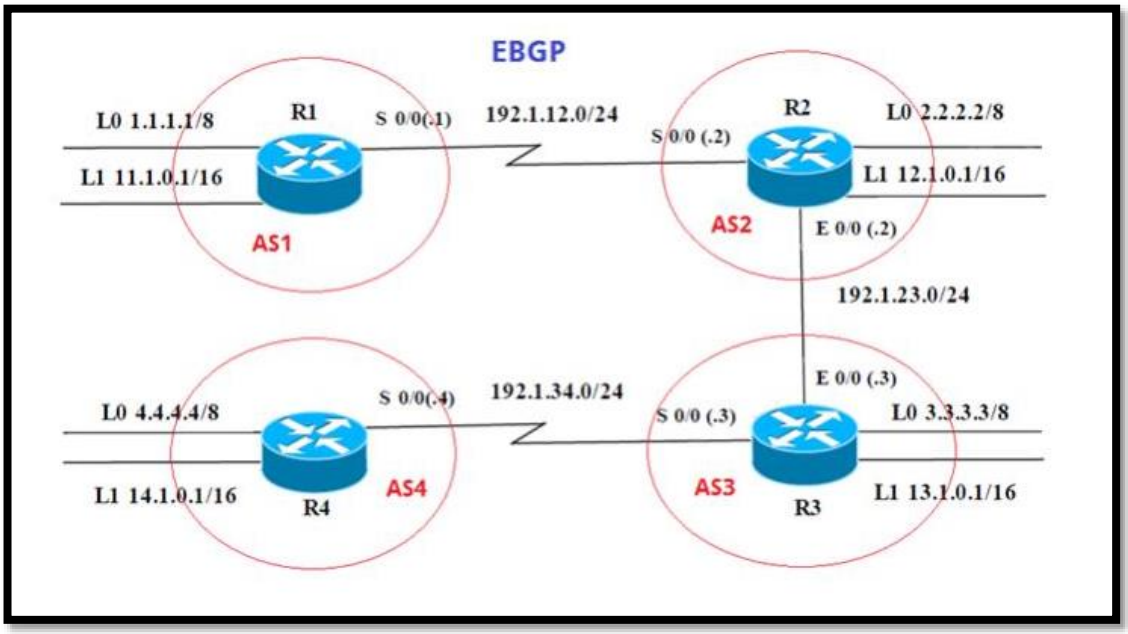
R3(config)#

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:**

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

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 4 subnets, 3 masks
C       10.1.0.0/22 is directly connected, Loopback1
L       10.1.0.1/32 is directly connected, Loopback1
C       10.103.12.0/24 is directly connected, Serial0/0/0
L       10.103.12.1/32 is directly connected, Serial0/0/0
R1#
```

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

Gateway of last resort is not set

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

2. ESCENARIO 2



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 0/0	192.1.12.1	255.255.255.0

R2

Interfaz	Dirección IP	Máscara
Loopback 0	2.2.2.2	255.0.0.0
Loopback 1	12.1.0.1	255.255.0.0
S 0/0	192.1.12.2	255.255.255.0
E 0/0	192.1.23.2	255.255.255.0

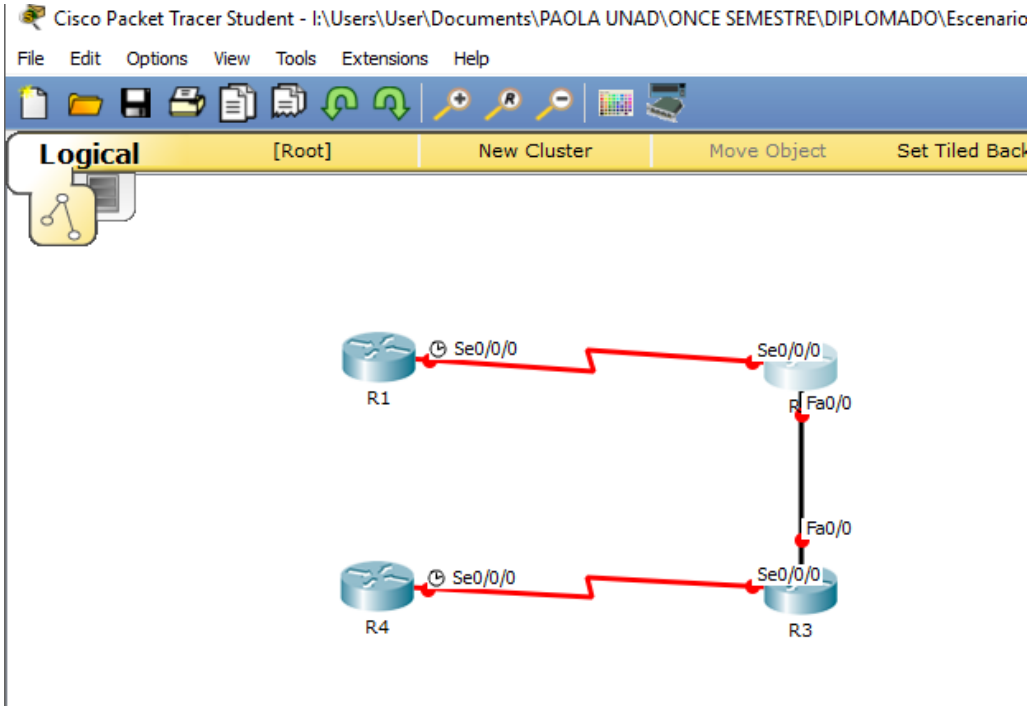
R3

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 0/0	192.1.23.3	255.255.255.0
S 0/0	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 0/0	192.1.34.4	255.255.255.0

1. Configure una relación de vecino BGP entre R1 y R2. R1 debe estar en AS1 y R2 debe estar en AS2. Anuncie las direcciones de Loopback de 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 como los comandos utilizados y salida del comando **show ip route**



Realizamos la configuración de los routers:

R1:

Router>EN

Router#conf t

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

Router(config)#hostname R1

R1(config)#end

R1#

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

```
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int s0/0/0
R1(config-if)#ip address 192.1.12.1 255.255.255.0
R1(config-if)#clock rate 64000
R1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#exit
R1(config)#int Lo0

R1(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

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

R1(config-if)#ip address 1.1.1.1 255.0.0.0
R1(config-if)#exit
R1(config)#int Lo1

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

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

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

R2:

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int Lo0

R2(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

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

R2(config-if)#ip address 2.2.2.2 255.0.0.0
R2(config-if)#exit
R2(config)#int Lo1

R2(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up

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

R2(config-if)#ip address 12.1.0.1 255.255.0.0
R2(config-if)#exit
R2(config)#int s0/0/0
R2(config-if)#ip address 192.1.12.2 255.255.255.0
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

R2(config-if)#exit
R2(config)#int e
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
% Incomplete command.
R2(config)#int e0/0
%Invalid interface type and number
R2(config)#int f0/0
R2(config-if)#ip address 192.1.23.2 255.255.255.0
R2(config-if)#exit
R2(config)#

R3:

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#exit
R3#

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

R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#int Lo0

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

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

R3(config-if)#ip address 3.3.3.3 255.0.0.0
R3(config-if)#exit
R3(config)#int Lo1

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

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

R3(config-if)#ip address 13.1.0.1 255.255.0.0
R3(config-if)#exit
R3(config)#int f0/0/0
%Invalid interface type and number
R3(config)#int f0/0
R3(config-if)#ip address 192.1.23.3 255.255.255.0
R3(config-if)#exit
R3(config)#int s0/0/0

R3(config-if)#ip address 192.1.34.3 255.255.255.0
R3(config-if)#no shutdown

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

R4:

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R4
R4(config)#END
R4#
%SYS-5-CONFIG_I: Configured from console by console

R4#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#int Lo0

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

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

R4(config-if)#ip address 4.4.4.4 255.0.0.0
R4(config-if)#exit

R4(config)#int Lo1

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

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up
R4(config-if)#ip address 14.1.0.1 255.255.0.0
R4(config-if)#exit
R4(config)#int s0/0/0
R4(config-if)#ip address 192.1.34.4 255.255.255.0
R4(config-if)#clock rate 64000
R4(config-if)#no shutdown

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

R4(config-if)#exit
R4(config)#

Se configure el vecino BGP para R1 y R2:

R1:

R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router bgp 100
R1(config-router)#network 192.1.12.1 mask 255.255.255.0
R1(config-router)#neighbor 192.1.12.2 remote-as 200
R1(config-router)#

R2:

R2>

R2>en

R2#conf t

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

R2(config)#router bgp 200

R2(config-router)#network 192.1.12.2 mask 255.255.255.0

R2(config-router)#neighbor 192.1.12.1 remote-as 100

R2(config-router)#%BGP-5-ADJCHANGE: neighbor 192.1.12.1 Up

Se comprueba el funcionamiento de la relación BGP establecida:

```
R1#ping 192.1.12.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.1.12.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/23/115 ms

R1#
```

```
R2#ping 192.1.12.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.1.12.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/14 ms

R2#
```

Se codifican los ID para los routers BGP:

R1#conf t

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

R1(config)#router bgp 100

R1(config-router)#bgp router-id 11.11.11.11

R1(config-router)#%BGP-5-ADJCHANGE: neighbor 192.1.12.2 Up

R2#conf t

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

R2(config)#router bgp 200

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

R2(config-router)#%BGP-5-ADJCHANGE: neighbor 192.1.12.1 Up

```
R1#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
R1#
```

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 Loopback de R3 en BGP. Codifique el ID del router R3 como 33.33.33.33. Presente el paso como los comandos utilizados y salida del comando **show ip route**

R2:

R2#conf t

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

R2(config)#router bgp 200

R2(config-router)#network 192.1.12.2 mask 255.255.255.0

R2(config-router)#neighbor 192.1.12.3 remote-as 300

R2(config-router)#

R3:

```
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router bgp 300
R3(config-router)#network 192.1.12.3 mask 255.255.255.0
R3(config-router)#neighbor 192.1.12.2 remote-as 200
R3(config-router)#
```

Se codifica el ID para el router R3:

```
R3#CONF T
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router bgp 300
R3(config-router)#bgp router-id 33.33.33.33
R3(config-router)#exit
R3(config)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#show ip bgp
BGP table version is 1, local router ID is 33.33.33.33
```

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 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 como los comandos utilizados y salida del comando **show ip route**

R3:

R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router bgp 300
R3(config-router)#network 3.3.3.3 mask 255.0.0.0
R3(config-router)#neighbor 4.4.4.4 remote-as 400
R3(config-router)#exit
R3(config)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R4:

R4#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#router bgp 400
R4(config-router)#network 4.4.4.4 mask 255.0.0.0
R4(config-router)#neighbor 3.3.3.3 remote-as 300
R4(config-router)#exit
R4(config)#end
R4#
%SYS-5-CONFIG_I: Configured from console by console

Se codifica el ID para el router R4:

R4#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#router bgp 400

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

R4(config-router)#exit

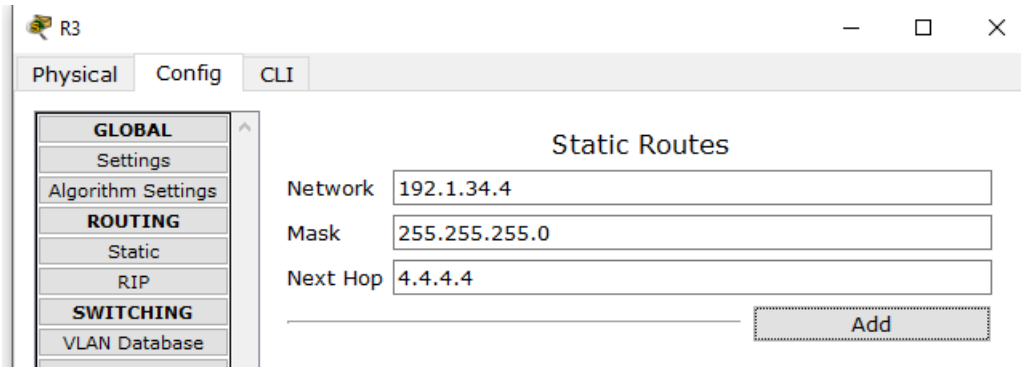
R4(config)#end

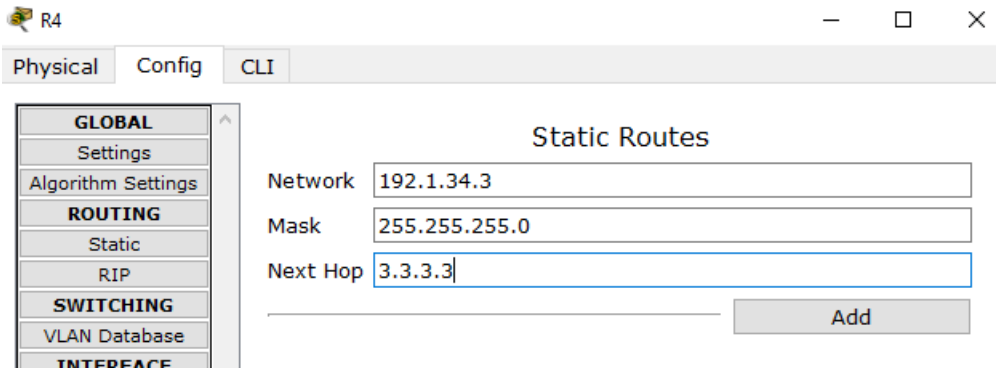
R4#

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

```
R4#show ip bgp
BGP table version is 2, 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
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

R4#
```

Se crea la ruta estática:





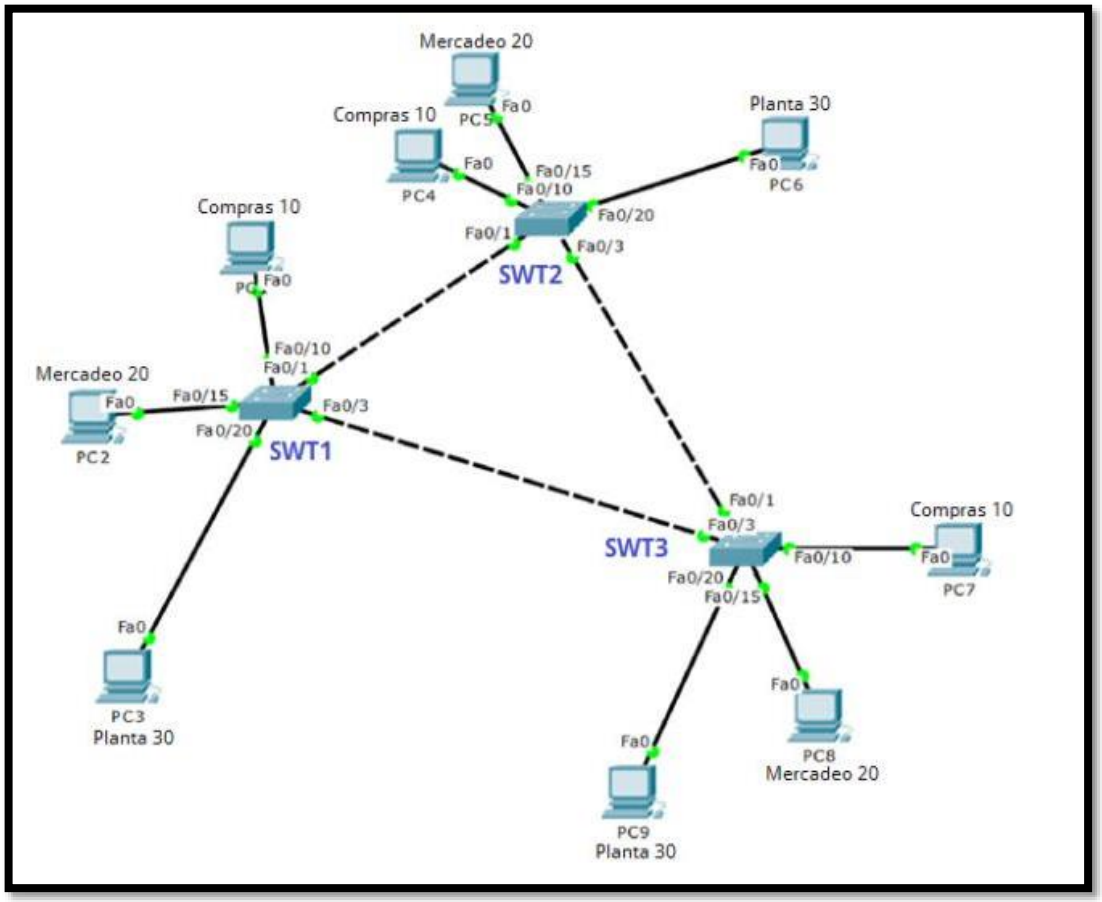
Se comprueba el funcionamiento de la conexión establecida:

```
R3#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 = 1/2/5 ms

R3#
```

```
R4>en
R4#ping 192.1.34.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.1.34.3, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/7/35 ms

R4#
```

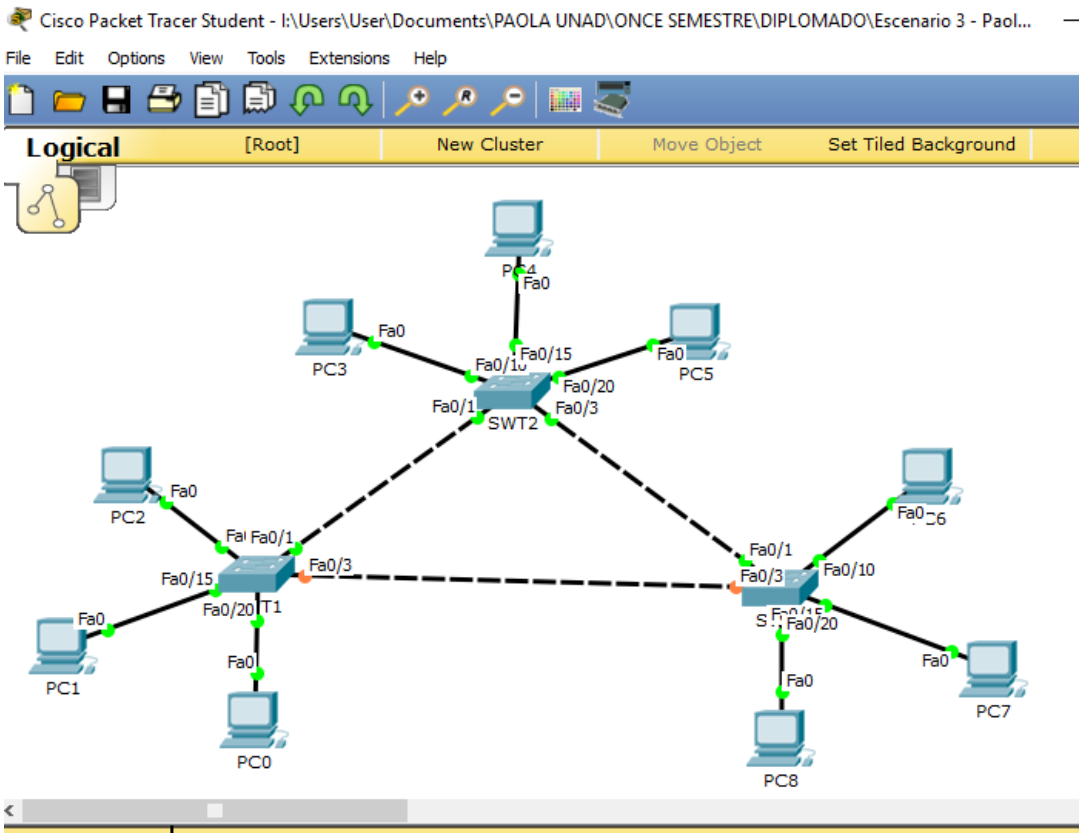
```
R4#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       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
R4#
```

3. 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 SWTI1 y SWT3 se configurarán como clientes. Los switches estarán en el dominio VTP llamado CCNP y usando la contraseña cisco.



SWT1:

Switch>en

Switch#conf t

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

Switch(config)#VTP domain CCNP

Changing VTP domain name from NULL to CCNP

Switch(config)#vtp mode client

Setting device to VTP CLIENT mode.

Switch(config)#vtp password cisco

Setting device VLAN database password to cisco

SWT2:

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SWT2
SWT2(config)#end
SWT2#
%SYS-5-CONFIG_I: Configured from console by console

SWT2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SWT2(config)#vtp mode server
Device mode already VTP SERVER.
SWT2(config)#vtp domain CCNP
Domain name already set to CCNP.
SWT2(config)#vtp password cisco
Setting device VLAN database password to cisco
SWT2(config)#

SWT3:

Switch>en
Switch#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SWT3
SWT3(config)#end
SWT3#
%SYS-5-CONFIG_I: Configured from console by console

SWT3#conf t

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

SWT3(config)#VTP domain CCNP

Changing VTP domain name from NULL to CCNP

SWT3(config)#vtp mode client

Setting device to VTP CLIENT mode.

SWT3(config)#vtp password cisco

Setting device VLAN database password to cisco

SWT3(config)#

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

```
SWT1#show vtp status
VTP Version                     : 2
Configuration Revision          : 0
Maximum VLANs supported locally : 255
Number of existing VLANs        : 5
VTP Operating Mode              : Client
VTP Domain Name                 : CCNP
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Disabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0xDA 0xBF 0x42 0x0D 0x90 0xBC 0xBE 0x41
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
SWT1#
```

```
SWT2#show vtp status
VTP Version                     : 2
Configuration Revision          : 0
Maximum VLANs supported locally : 255
Number of existing VLANs        : 5
VTP Operating Mode              : Server
VTP Domain Name                 : CCNP
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Disabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0xDA 0xBF 0x42 0x0D 0x90 0xBC 0xBE 0x41
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
Local updater ID is 0.0.0.0 (no valid interface found)
SWT2#
```

```
SWT3#show vtp status
VTP Version                     : 2
Configuration Revision          : 0
Maximum VLANs supported locally : 255
Number of existing VLANs        : 5
VTP Operating Mode              : Client
VTP Domain Name                 : CCNP
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Disabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0xDA 0xBF 0x42 0x0D 0x90 0xBC 0xBE 0x41
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
SWT3#
```

B. Configurar DTP

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

SWT1:

SWT1>EN
SWT1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SWT1(config)#int fa0/1
SWT1(config-if)#switchport mode dynamic desirable

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

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

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

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

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

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

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/1       1
Fa0/3       none
SWT1#
```

3. Entre SWT1 y SWT3 configure un enlace “trunk” estático utilizando el comando **switchport mode trunk** en la interfaz f0/3 de SWT1

SWT1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SWT1(config)#int fa0/3
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

SWT1(config-if)#exit

SWT1(config)#end

SWT1#

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

4. Verifique el enlace “trunk” con el comando **show interfaces trunk** en SWT1

```
SWT1#show interfaces trunk
Port        Mode         Encapsulation  Status        Native vlan
Fa0/1       on           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       none
SWT1#
```

5. Configure un enlace “trunk” permanente entre SWT2 y SWT3

SWT2>en

SWT2#conf t

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

SWT2(config)#int fa0/3

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)#end
SWT2#
%SYS-5-CONFIG_I: Configured from console by console

```
SWT2#show interfaces trunk
Port        Mode         Encapsulation  Status        Native vlan
Fa0/1       on           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
SWT2#
```

C. Agregar VLANs y asignar puertos

1. En SWT1 agregue la VLAN 10. En SWT2 agregue las VLANS Compras (10), Mercadeo (20), Planta (30) y Admon (99)

SWT2:

SWT2>en
SWT2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SWT2(config)#vlan 10
SWT2(config-vlan)#name VLAN_Compras

SWT2(config-vlan)#exit
SWT2(config)#vlan 20
SWT2(config-vlan)#name VLAN_Mercadeo
SWT2(config-vlan)#exit
SWT2(config)#vlan 30
SWT2(config-vlan)#name VLAN_Planta
SWT2(config-vlan)#exit
SWT2(config)#vlan 99
SWT2(config-vlan)#name VLAN_Admon
SWT2(config-vlan)#exit
SWT2(config)#end
SWT2#
%SYS-5-CONFIG_I: Configured from console by console

SWT1:

SWT1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SWT1(config)#int fa0/10
SWT1(config-if)#sw access vlan 10
SWT1(config-if)#exit
SWT1(config)#end
SWT1#
%SYS-5-CONFIG_I: Configured from console by console

2. Verifique que las VLANs han sido agregadas correctamente

```
SWT1#show vlan

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/2, Fa0/4, Fa0/5, Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9, 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   VLAN_Compras                      active    Fa0/10
20   VLAN_Mercadeo                     active
30   VLAN_Planta                       active
99   VLAN_Admon                        active
1002 fddi-default                      act/unsup
1003 token-ring-default                act/unsup
1004 fddinet-default                   act/unsup
1005 trnet-default                     act/unsup

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
10   enet  100010     1500  -      -      -        -    -        0      0
20   enet  100020     1500  -      -      -        -    -        0      0
30   enet  100030     1500  -      -      -        -    -        0      0
99   enet  100099     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
```

3. Asocie los puertos a las VLAN y configure las direcciones IP de acuerdo a 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

SWT1:

SWT1#conf t

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

SWT1(config)#int fa0/10

SWT1(config-if)#switchport mode access

SWT1(config-if)#switchport access vlan 10

SWT1(config-if)#exit

SWT1(config)#int fa0/15

SWT1(config-if)#

SWT1#

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

SWT1#conf t

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

SWT1(config)#int fa0/15

SWT1(config-if)#switchport mode access

SWT1(config-if)#switchport access vlan 20

SWT1(config-if)#exit

SWT1(config)#int fa0/20

SWT1(config-if)#switchport mode access

SWT1(config-if)#switchport access vlan 30

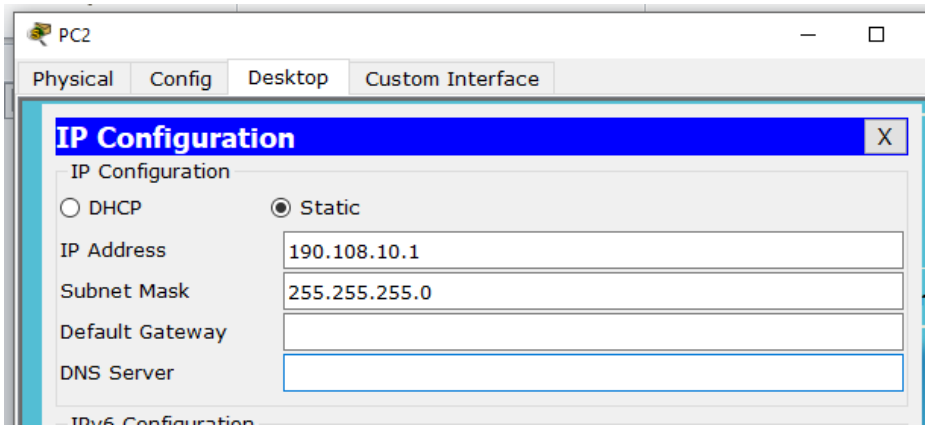
SWT1(config-if)#exit

SWT1(config)#end

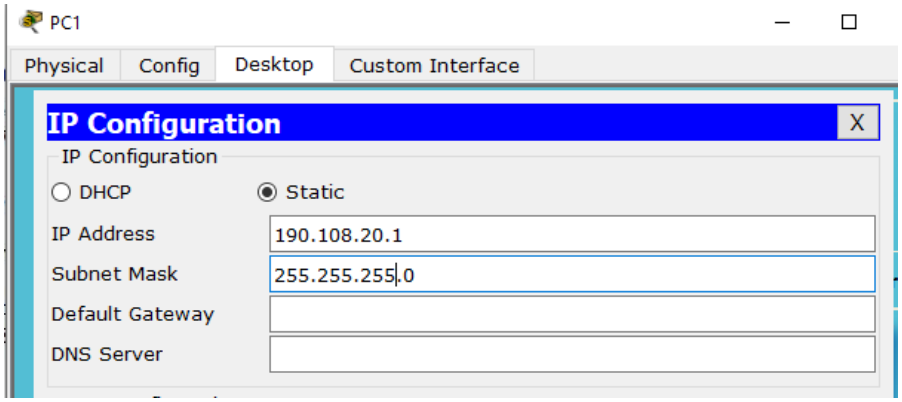
SWT1#

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

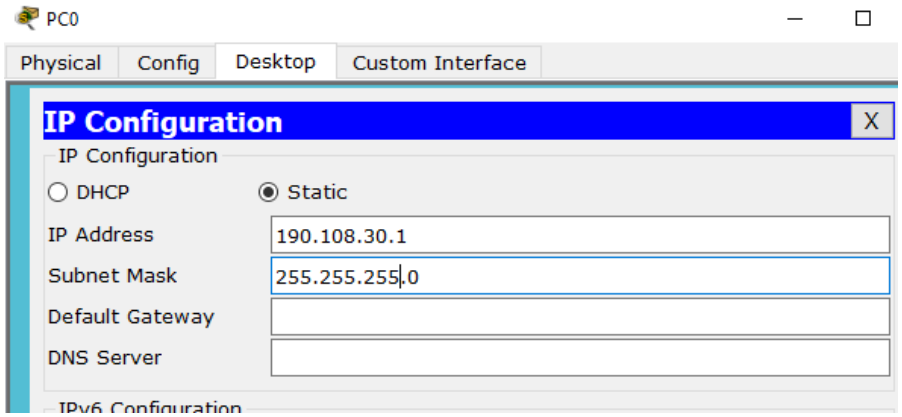
PC Compras:



PC Mercadeo



PC Planta



SWT2:

SWT2>EN

SWT2#conf t

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

SWT2(config)#int fa0/10

SWT2(config-if)#switchport mode access

SWT2(config-if)#switchport access vlan 10

SWT2(config-if)#exit

SWT2(config)#int fa0/15

SWT2(config-if)#switchport mode access

SWT2(config-if)#switchport access vlan 20

SWT2(config-if)#exit

SWT2(config)#int fa0/20

SWT2(config-if)#switchport mode access

SWT2(config-if)#switchport access vlan 30

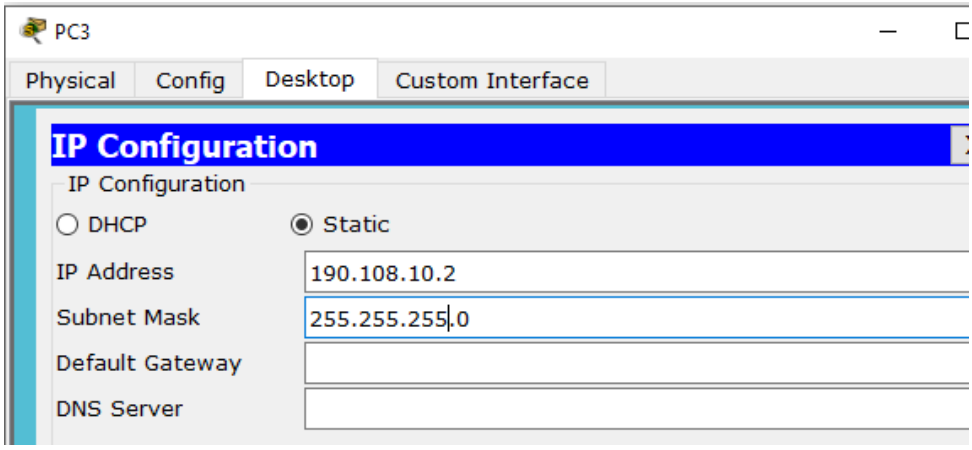
SWT2(config-if)#exit

SWT2(config)#end

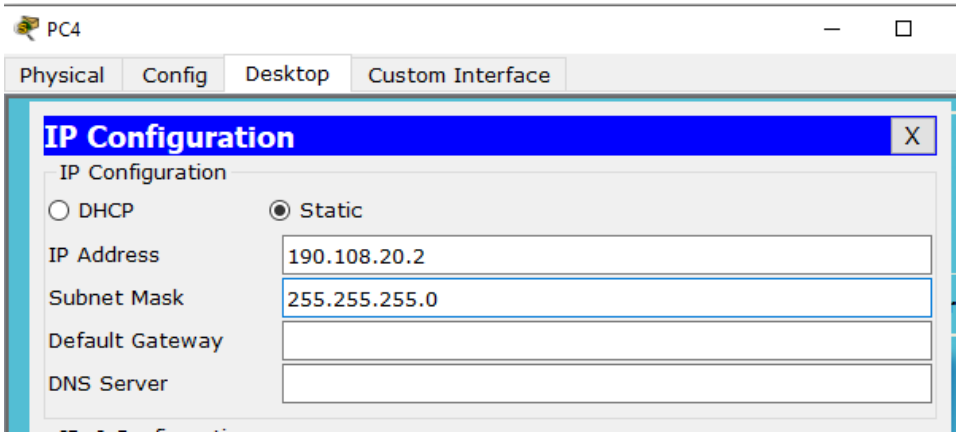
SWT2#

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

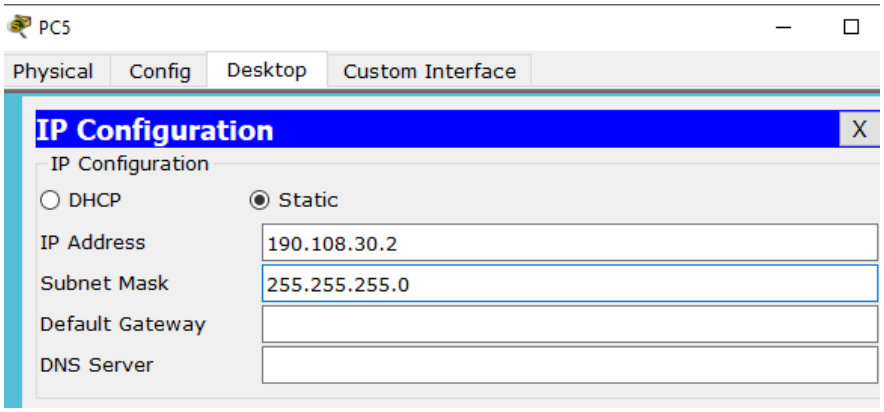
PC Compras:



PC Mercadeo:



PC Planta:



SWT3:

SWT3>EN

SWT3#conf t

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

SWT3(config)#int fa0/10

SWT3(config-if)#switchport mode access

SWT3(config-if)#switchport access vlan 10

SWT3(config-if)#exit

SWT3(config)#int fa0/15

SWT3(config-if)#switchport mode access

SWT3(config-if)#switchport access vlan 20

SWT3(config-if)#exit

SWT3(config)#int fa0/20

SWT3(config-if)#switchport mode access

SWT3(config-if)#switchport access vlan 30

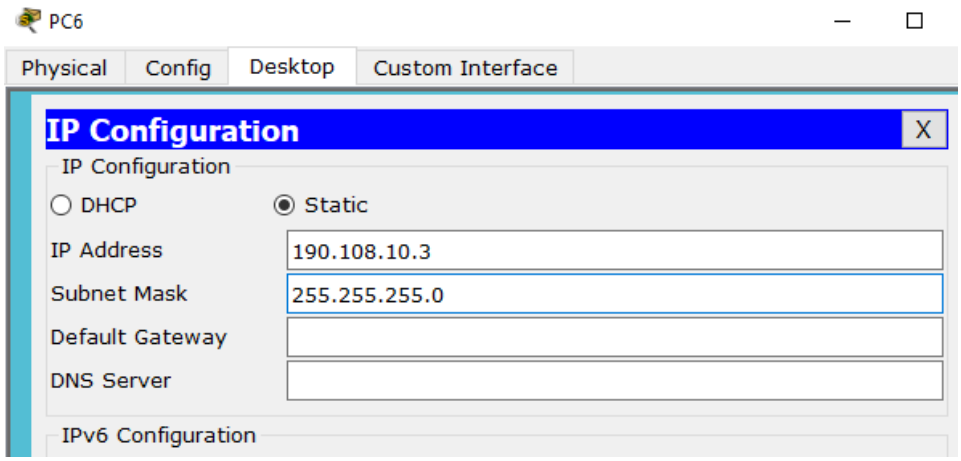
SWT3(config-if)#exit

SWT3(config)#end

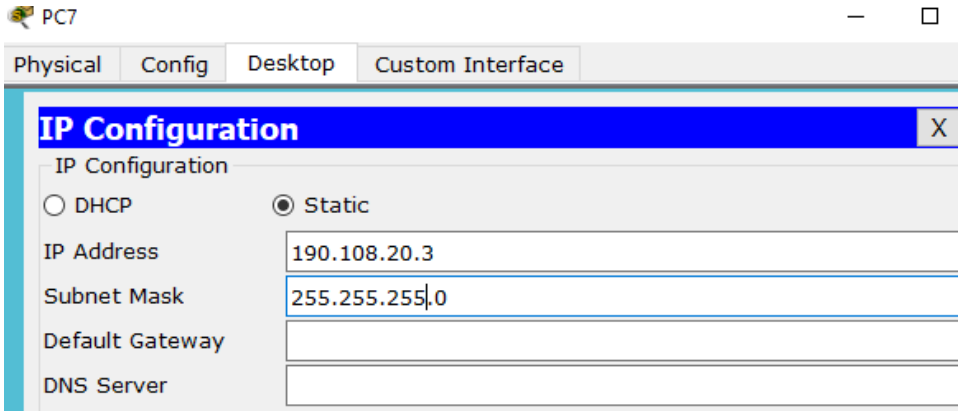
SWT3#

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

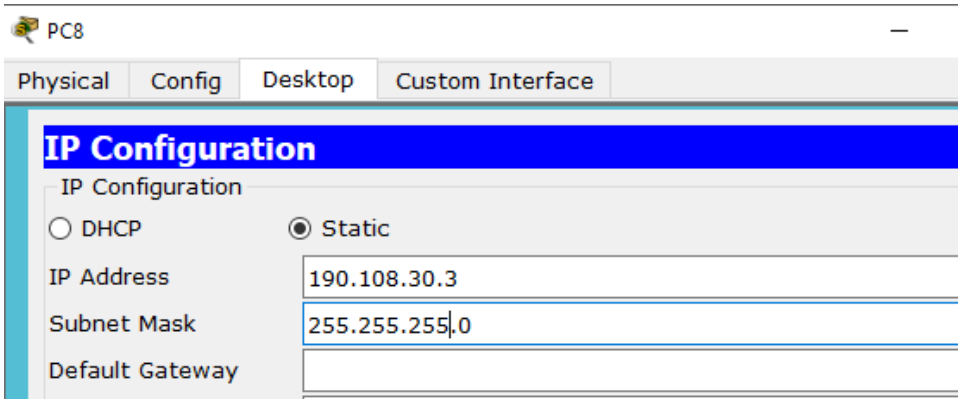
PC Compras:



PC Mercadeo:



PC Planta:



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.

D. Configurar las direcciones IP en los switches

1. En cada uno de los switches asigne una dirección IP al SVI 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

SWT1:

SWT1>en
SWT1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SWT1(config)#int vlan 99
SWT1(config-if)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up

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

SWT1(config-if)#ip address 190.108.99.1 255.255.255.0
SWT1(config-if)#no shutdown
SWT1(config-if)#exit
SWT1(config)#end

SWT1#
%SYS-5-CONFIG_I: Configured from console by console

SWT2:

SWT2>en
SWT2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SWT2(config)#int vlan 99
SWT2(config-if)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up

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

SWT2(config-if)#ip address 190.108.99.2 255.255.255.0
SWT2(config-if)#no shutdown
SWT2(config-if)#exit
SWT2(config)#end
SWT2#
%SYS-5-CONFIG_I: Configured from console by console

SWT3:

SWT3>en
SWT3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SWT3(config)#int vlan 99
SWT3(config-if)#

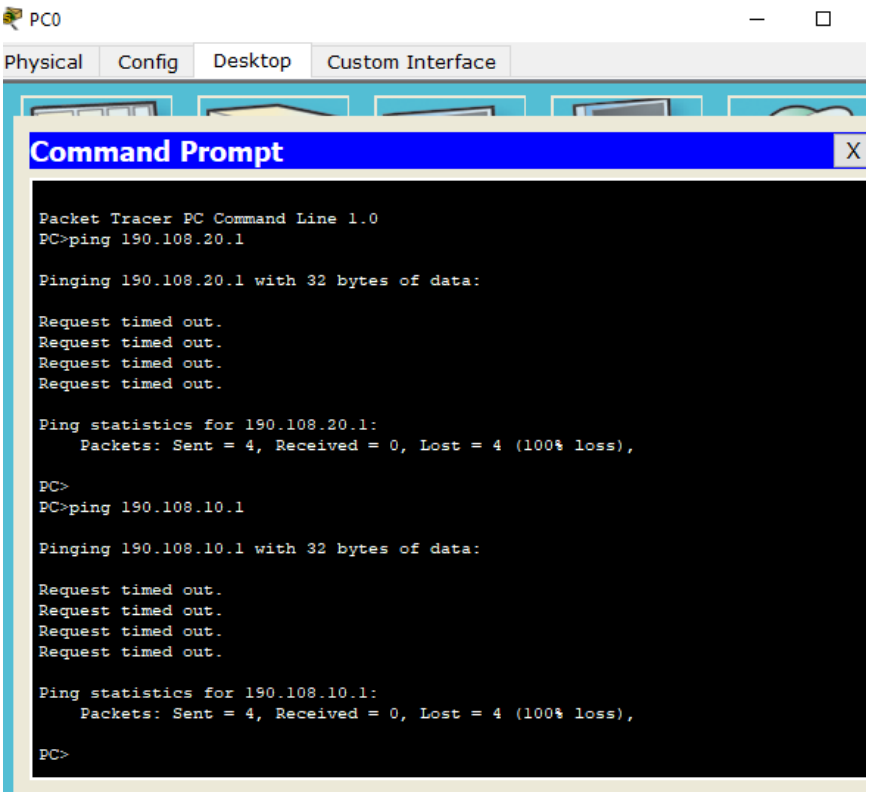
%LINK-5-CHANGED: Interface Vlan99, changed state to up

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

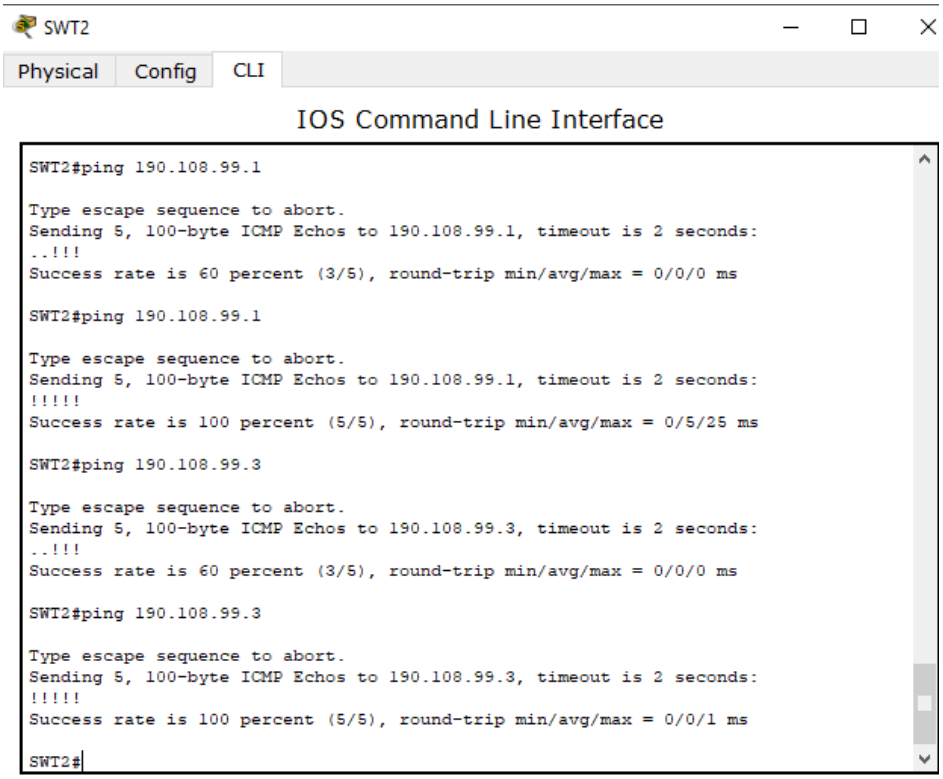
SWT3(config-if)#ip address 190.108.99.3 255.255.255.0
SWT3(config-if)#no shutdown
SWT3(config-if)#exit
SWT3(config)#end
SWT3#
%SYS-5-CONFIG_I: Configured from console by console

E. Verificar la conectividad Extremo a Extremo

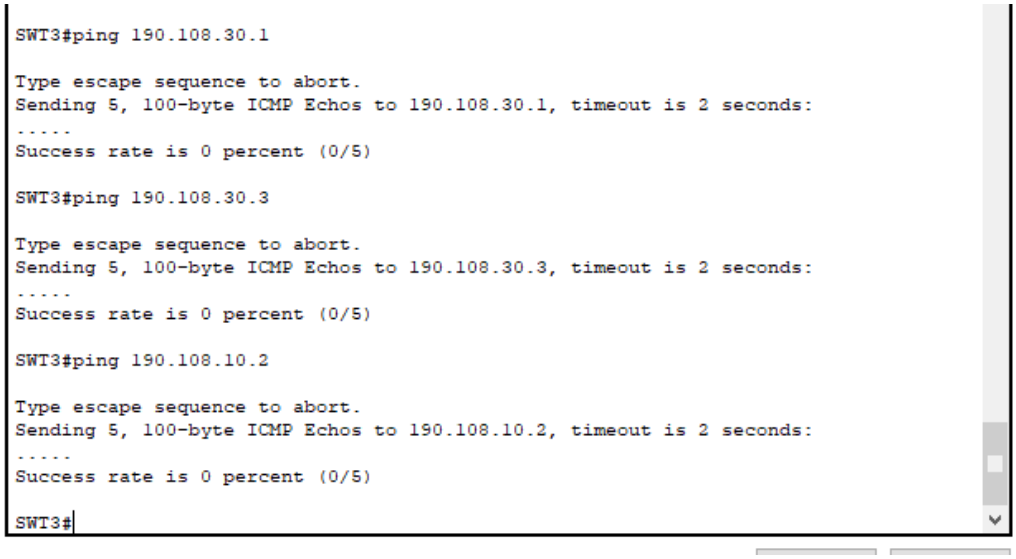
1. Ejecute un Píng desde cada PC a los demás. Explique por qué el ping tuvo o no tuvo éxito



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



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



CONCLUSIONES

- Se llevó a cabo el desarrollo de la Prueba de Habilidades Prácticas implementada como parte de las actividades evaluativas del Diplomado de Profundización CCNP, mediante la cual identificamos el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del curso, poniendo a prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking.

- Aplicamos las temáticas abordadas a lo largo del curso, correspondientes a Protocolos de Enrutamiento Avanzado, Implementación de soluciones soportadas en enrutamiento avanzado, configuración de sistemas de red soportados en VLANs, y Administración, Seguridad y Escalabilidad en redes conmutadas.

- Realizamos procesos de configuración de protocolos de enrutamiento para routers, de interfaces Loopback, asignación de direcciones IP, configuración OSPF y EIGPR, y redistribución de rutas a partir de las topologías y criterios planteados para el escenario 1.

- Se establecieron relaciones de vecino BGP, anunciando las direcciones Loopback correspondientes, codificando los ID de los routers y comprobando el funcionamiento de las conexiones realizadas de acuerdo a los parámetros definidos para el escenario 2.

- Se aplicaron los procesos de configuración VTP para las actualizaciones de VLAN, empleando configuraciones de tipo servidor y cliente, y estableciendo dominios y contraseñas predeterminados. Adicional, se configuraron enlaces troncales dinámicos, estáticos y permanentes, con el

fin de establecer la configuración DTP para la topología planteada en el escenario 3. Se puso en práctica la definición de redes VLAN y la asignación de puertos, verificando y evidenciando que se hubieran agregado correctamente.

- Finalmente, se sustentó el desarrollo de cada escenario con los respectivos procesos de documentación de la solución, correspondientes al registro de la configuración de cada uno de los dispositivos, la descripción detallada del paso a paso de cada una de las etapas realizadas durante su desarrollo, el registro de los procesos de verificación de conectividad mediante el uso de los comandos requeridos para cada caso, empleando la herramienta de simulación Packet Tracer.

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