

**PRUEBA DE HABILIDADES PRÁCTICAS CCNP**

**SANDRA YANNETH RAMIREZ RAMOS**

**COD 42159847**

**UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA  
ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA**

**INGENIERIA DE TELECOMUNICACIONES**

**DIPLOMADO CCNP**

**2018**

**PRUEBA DE HABILIDADES CCNP**

**SANDRA YANNETH RAMIREZ**

**COD 42159847**

**GRUPO: 208014\_1**

**GERARDO GRANADOS ACUÑA**

**TUTOR**

**UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA  
ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA**

**INGENIERIA DE TELECOMUNICACIONES**

**DIPLOMADO CCNP**

**2018**

## CONTENIDO

1. OBJETIVOS.....	4
2. INTRODUCCIÓN.....	5
3. ACTIVIDADES.....	6
ESCENARIO 1 .....	6
ESCENARIO 2 .....	12
ESCENARIO 3 .....	19
4. CONCLUSIONES.....	29
5. BIBLIOGRAFIA.....	30

## **1. OBJETIVOS**

Lograr identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado. Colocando a prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking.

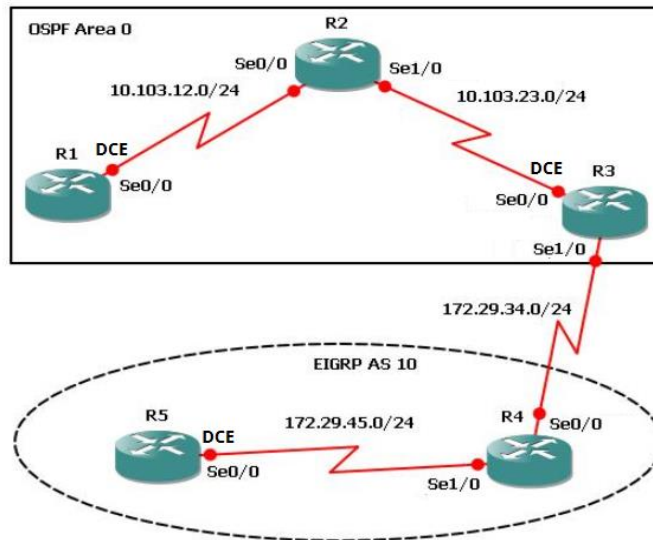
## **2. INTRODUCCIÓN**

Durante esta actividad, se desarrolla las tareas asignadas en cada uno de los tres (3) escenarios propuestos que se basan en las unidades vistas en el diplomado. Se encuentran las configuraciones básicas como la asignación de nombre, cableado las respectivas IP's, entre otras cosas más. Se registra la verificación de conectividad mediante el uso de comandos show ip route y se utiliza las herramientas de GNS3 y Packet Tracer.

En este documento se encontrarán los comandos utilizados para las configuraciones de acuerdo con las instrucciones dadas en la guía propuesta.

### 3. ACTIVIDADES

#### ESCENARIO 1



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

```
Router>enable
Router#configure terminal
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)#logging synchronous
R1(config-line)#exec-timeout 0 0
```

```
Router>enable
Router#configure terminal
Router(config)#hostname R1
R1(config)#no ip domain-lookup
R1(config)#line con 0
R1(config-line)#logging synchronous
R1(config-line)#exec-timeout 0 0
```

**Se realiza los mismos comandos para los demás router**

```
R1(config)#int s0/0/0
R1(config-if)#ip address 10.103.12.1 255.255.255.0
R1(config-if)#clock rate 64000
This command applies only to DCE interfaces
R1(config-if)#no shutdown

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

```
R1(config)#int s0/0/0
R1(config-if)#ip address 10.103.12.1 255.255.255.0
R1(config-if)#clock rate 64000
R1(config-if)#no shutdown
```

```
R2(config)#int s0/0/0
R2(config-if)#ip address 10.103.12.2 255.255.255.0
R2(config-if)#no shutdown

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

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

R2(config-if)#int s0/0/1
R2(config-if)#ip address 10.103.23.2 255.255.255.0
R2(config-if)#no shutdown

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

```
R2(config)#int s0/0/0
R2(config-if)#ip address 10.103.12.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#int s0/0/1
R2(config-if)#ip address 10.103.23.2 255.255.255.0
R2(config-if)#no shutdown
```

```
R3(config)#int s0/0/0
R3(config-if)#ip address 10.103.23.1 255.255.255.0
R3(config-if)#clock rate 64000
R3(config-if)#no shutdown

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

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

R3(config-if)#int s0/0/1
R3(config-if)#ip address 172.29.34.2 255.255.255.0
R3(config-if)#no shutdown

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

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

```
R3(config-if)#ip address 10.103.23.1 255.255.255.0
R3(config-if)#clock rate 64000
R3(config-if)#no shutdown
R3(config-if)#int s0/0/1
R3(config-if)#ip address 172.29.34.2 255.255.255.0
R3(config-if)#no shutdown
```

```
R4(config)#int s0/0/0
R4(config-if)#ip address 172.29.34.1 255.255.255.0
R4(config-if)#no shutdown
```

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

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

```
R4(config-if)#int s0/0/1
R4(config-if)#ip address 172.29.45.2 255.255.255.0
R4(config-if)#no shutdown
```

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

```
R4(config)#int s0/0/0
R4(config-if)#ip address 172.29.34.1 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#int s0/0/1
R4(config-if)#ip address 172.29.45.2 255.255.255.0
R4(config-if)#no shutdown
```

```
R5(config)#int s0/0/0
R5(config-if)#ip address 172.29.45.1 255.255.255.0
R5(config-if)#clock rate 64000
R5(config-if)#no shutdown
```

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

```
R5(config)#int s0/0/0
R5(config-if)#ip address 172.29.45.1 255.255.255.0
R5(config-if)#clock rate 64000
R5(config-if)#no shutdown
```

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



```

R1(config)#int loopback0
R1(config-if)#ip address 10.1.0.1 255.255.255.0
R1(config-if)#ip ospf 1 area 0
R1(config-if)#ip ospf network point-to-point
R1(config-if)#int loopback1
R1(config-if)#ip address 10.1.1.1 255.255.255.0
R1(config-if)#ip ospf 1 area 0
R1(config-if)#ip ospf network point-to-point
R1(config-if)#int loopback2
R1(config-if)#ip address 10.1.2.1 255.255.255.0
R1(config-if)#ip ospf 1 area 0
R1(config-if)#ip ospf network point-to-point
R1(config-if)#int loopback3
R1(config-if)#ip address 10.1.3.1 255.255.255.0
R1(config-if)#ip ospf 1 area 0
R1(config-if)#ip ospf network point-to-point
R1(config-if)#end

```

```

R1(config)#int loopback0
R1(config-if)#ip address 10.1.0.1 255.255.255.0
R1(config-if)#ip ospf 1 area 0
R1(config-if)#ip ospf network point-to-point
R1(config-if)#int loopback1
R1(config-if)#ip address 10.1.1.1 255.255.255.0
R1(config-if)#ip ospf 1 area 0
R1(config-if)#ip ospf network point-to-point
R1(config-if)#int loopback2
R1(config-if)#ip address 10.1.2.1 255.255.255.0
R1(config-if)#ip ospf 1 area 0
R1(config-if)#ip ospf network point-to-point
R1(config-if)#int loopback3
R1(config-if)#ip address 10.1.3.1 255.255.255.0
R1(config-if)#ip ospf 1 area 0
R1(config-if)#ip ospf network point-to-point
R1(config-if)#end

```

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

```

R5(config)#int lo0
R5(config-if)#ip address 172.5.0.1 255.255.255.0
R5(config-if)#int lo1
R5(config-if)#ip address 172.5.1.1 255.255.255.0
R5(config-if)#int lo2
R5(config-if)#ip address 172.5.2.1 255.255.255.0
R5(config-if)#int lo3
R5(config-if)#ip address 172.5.3.1 255.255.255.0

```

```

R5(config-if)#exit
R5(config)#router eigrp 10
R5(config-router)#network 172.5.0.0 0.0.3.255
R5(config-router)#end

```

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, 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       10.103.23.1/32 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       172.29.34.2/32 is directly connected, Serial0/0/1

```

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.

```

R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#redistribute eigrp 10 metric 50000 subnets
R3(config-router)#exit
R3(config)#router eigrp 10

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

```

```

R3(config)#router ospf 1
R3(config-router)#redistribute eigrp 10 metric 50000 subnets
R3(config-router)#exit
R3(config)#router eigrp 10
R3(config-router)#redistribute ospf 1 metric 1544 2000 255 1 1500
R3(config-router)#end

```

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#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, 10 subnets, 2 masks  
C 10.1.0.0/24 is directly connected, Loopback0  
L 10.1.0.1/32 is directly connected, Loopback0  
C 10.1.1.0/24 is directly connected, Loopback1  
L 10.1.1.1/32 is directly connected, Loopback1  
C 10.1.2.0/24 is directly connected, Loopback2  
L 10.1.2.1/32 is directly connected, Loopback2  
C 10.1.3.0/24 is directly connected, Loopback3  
L 10.1.3.1/32 is directly connected, Loopback3  
C 10.103.12.0/24 is directly connected, Serial0/0/0  
L 10.103.12.1/32 is directly connected, Serial0/0/0

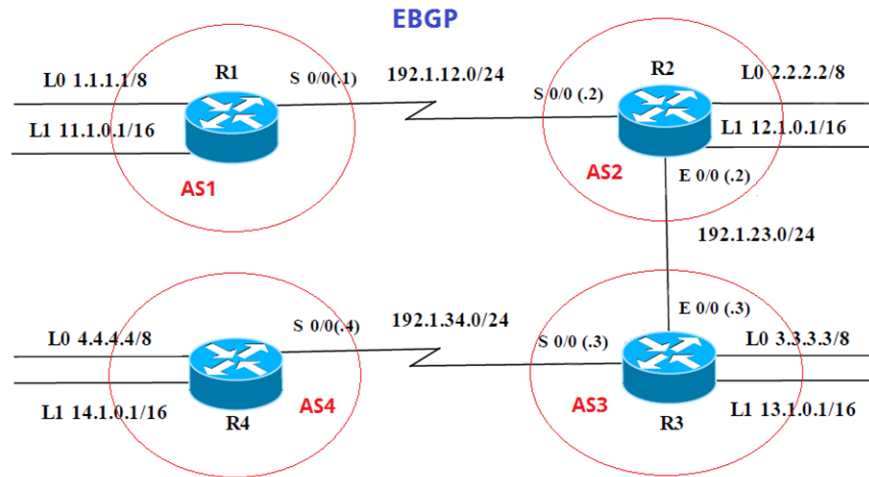
R5#show ip route

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, 8 subnets, 2 masks  
C 172.5.0.0/24 is directly connected, Loopback0  
L 172.5.0.1/32 is directly connected, Loopback0  
C 172.5.1.0/24 is directly connected, Loopback1  
L 172.5.1.1/32 is directly connected, Loopback1  
C 172.5.2.0/24 is directly connected, Loopback2  
L 172.5.2.1/32 is directly connected, Loopback2  
C 172.5.3.0/24 is directly connected, Loopback3  
L 172.5.3.1/32 is directly connected, Loopback3  
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 172.29.45.1/32 is directly connected, Serial0/0/0

## 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
R2	Loopback 0	2.2.2.2	255.0.0.0
	Loopback 1	12.1.0.1	255.255.0.0
	S 0/0	192.1.12.2	255.255.255.0
	E 0/0	192.1.23.2	255.255.255.0
R3	Loopback 0	3.3.3.3	255.0.0.0
	Loopback 1	13.1.0.1	255.255.0.0
	E 0/0	192.1.23.3	255.255.255.0
	S 0/0	192.1.34.3	255.255.255.0
R4	Loopback 0	4.4.4.4	255.0.0.0
	Loopback 1	14.1.0.1	255.255.0.0
	S 0/0	192.1.34.4	255.255.255.0

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

```
R1(config)#int lo0
R1(config-if)#ip address 1.1.1.1 255.0.0.0
R1(config-if)#int lo1
R1(config-if)#ip address 11.1.0.1 255.255.0.0
R1(config-if)#exit
R1(config)#int s0/0/0
R1(config-if)#ip address 192.1.12.1 255.255.255.0
R1(config-if)#exit
R1(config)#router bgp 1
R1(config-router)#bgp router-id 11.11.11.11
R1(config-router)#neighbor 192.1.12.2 remote-as 2
R1(config-router)#network 1.1.1.0 mask 255.0.0.0
R1(config-router)#network 11.1.0.0 mask 255.255.0.0
R1(config-router)#exit
```

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

```
Gateway of last resort is not set
```

```

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

```

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

Gateway of last resort is not set

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

```

```

R2(config)#int lo 0
R2(config-if)#ip address 2.2.2.2 255.0.0.0
R2(config-if)#int lo 1
R2(config-if)#ip address 12.1.0.1 255.255.0.0
R2(config-if)#exit
R2(config)#int S0/0/0
R2(config-if)#ip address 192.1.12.2 255.255.255.0
R2(config-if)#no shutdown
R2(config)#router bgp 2
R2(config-router)#bgp router-id 22.22.22.22
R2(config-router)#neighbor 192.1.12.1 remote-as 1
R2(config-router)#neighbor 192.1.23.3 remote-as 3
R2(config-router)#network 2.2.2.0 mask 255.0.0.0
R2(config-router)#network 12.1.0.0 mask 255.255.0.0
R2(config-router)#exit

```

```

R2(config)#int lo 0
R2(config-if)#ip address 2.2.2.2 255.0.0.0
R2(config-if)#int lo 1
R2(config-if)#ip address 12.1.0.1 255.255.0.0
R2(config-if)#exit
R2(config)#int S1/0
R2(config-if)#ip address 192.1.12.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#router bgp 2
R2(config-router)#bgp router-id 22.22.22.22
R2(config-router)#neighbor 192.1.12.1 remote-as 1
R2(config-router)#neighbor 192.1.23.3 remote-as 3
R2(config-router)#network 2.2.2.0 mask 255.0.0.0
% BGP: Incorrect network or mask configured
R2(config-router)#network 12.1.0.0 mask 255.255.0.0

```

```

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, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

B    1.0.0.0/8 [20/0] via 192.1.12.1, 00:00:00
     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
     11.0.0.0/16 is subnetted, 1 subnets
B    11.1.0.0/16 [20/0] via 192.1.12.1, 00:00:00
     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
     192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.12.0/24 is directly connected, Serial10/0/0
L    192.1.12.2/32 is directly connected, Serial10/0/0

```

```

R2#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

C    2.0.0.0/8 is directly connected, Loopback0
     12.0.0.0/16 is subnetted, 1 subnets
C    12.1.0.0 is directly connected, Loopback1

```

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

```

Router#configure terminal
Router(config)#hostname R3
R3(config)#int lo 0
R3(config-if)#ip address 3.3.3.3 255.0.0.0
R3(config-if)#int lo 1
R3(config-if)#ip address 13.1.0.1 255.255.0.0
R3(config-if)#exit
R3(config)#int s0/0/0
R3(config-if)#ip address 192.1.34.3 255.255.255.0
R3(config-if)#no shut
R3(config-if)#exit
R3(config)#router bgp 3
R3(config-router)#bgp router-id 33.33.33.33
R3(config-router)#neighbor 192.1.23.2 remote-as 2

```

```

R3(config-router)#neighbor 192.1.34.4 remote-as 4
R3(config-router)#network 3.3.3.0 mask 255.0.0.0
R3(config-router)#network 13.1.0.0 mask 255.255.0.0
R3(config-router)#exit
R3(config)#exit

```

```

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

    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
    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

```

```

R3(config)#int lo 0
R3(config-if)#ip address 3.3.3.3 255.0.0.0
R3(config-if)#int lo 1
R3(config-if)#ip address 13.1.0.1 255.255.0.0
R3(config-if)#exit
R3(config)#int s1/0
R3(config-if)#ip address 192.1.34.3 255.255.255.0
R3(config-if)#no shut
R3(config-if)#exit
R3(config)#router bgp 3
R3(config-router)#bgp router-id 33.33.33.33
R3(config-router)#neighbor 192.1.23.2 remote-as 2
R3(config-router)#neighbor 192.1.34.4 remote-as 4
R3(config-router)#network 3.3.3.0 mask 255.0.0.0
% BGP: Incorrect network or mask configured
R3(config-router)#network 13.1.0.0 mask 255.255.0.0
R3(config-router)#exit

```

```

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

Gateway of last resort is not set

C       3.0.0.0/8 is directly connected, Loopback0
C       192.1.34.0/24 is directly connected, Serial1/0
C       13.0.0.0/16 is subnetted, 1 subnets
C         13.1.0.0 is directly connected, Loopback1
B       14.0.0.0/16 is subnetted, 1 subnets
B         14.1.0.0 [20/0] via 192.1.34.4, 00:01:12

```



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*.

```
R4(config)#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)#int s0/0/0
R4(config-if)#ip address 192.1.34.4 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#exit
R4(config)#router bgp 4
R4(config-router)#bgp router-id 44.44.44.44
R4(config-router)#neighbor 192.1.34.3 remote-as 3
R4(config-router)#network 4.4.4.0 mask 255.0.0.0
R4(config-router)#network 14.1.0.0 mask 255.255.0.0
R4(config-router)#exit
```

```
R4(config)#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)#int s1/0
R4(config-if)#ip address 192.1.34.4 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#exit
R4(config)#router bgp 4
R4(config-router)#bgp router-id 44.44.44.44
R4(config-router)#neighbor 192.1.34.3 remote-as 3
R4(config-router)#network 4.4.4.0 mask 255.0.0.0
% BGP: Incorrect network or mask configured
R4(config-router)#network 14.1.0.0 mask 255.255.0.0
R4(config-router)#exit
```

```

R4#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

C    4.0.0.0/8 is directly connected, Loopback0
C    192.1.34.0/24 is directly connected, Serial1/0
     13.0.0.0/16 is subnetted, 1 subnets
B       13.1.0.0 [20/0] via 192.1.34.3, 00:00:13
     14.0.0.0/16 is subnetted, 1 subnets
C       14.1.0.0 is directly connected, Loopback1

```

```

R3(config)#router bgp 3
R3(config-router)#neighbor 4.4.4.4 remote-as 4
R3(config-router)#neighbor 4.4.4.4 update-source lo0

```

```

R3(config)#router bgp 3
R3(config-router)# neighbor 4.4.4.4 remote-as 4
R3(config-router)# neighbor 4.4.4.4 update-source lo0

```

```

R4(config)#router bgp 4
R4(config-router)#neighbor 3.3.3.3 remote-as 3
R4(config-router)#neighbor 3.3.3.3 update-source lo0
R4(config-router)#exit

```

```

R4(config)#router bgp 4
R4(config-router)#neighbor 3.3.3.3 remote-as 3
R4(config-router)#neighbor update-source lo0
R4(config)#ip route 3.3.3.3 255.0.0.0 192.1.34.3
R4(config)#ip route 4.4.4.4 255.0.0.0 192.1.34.4

```

```

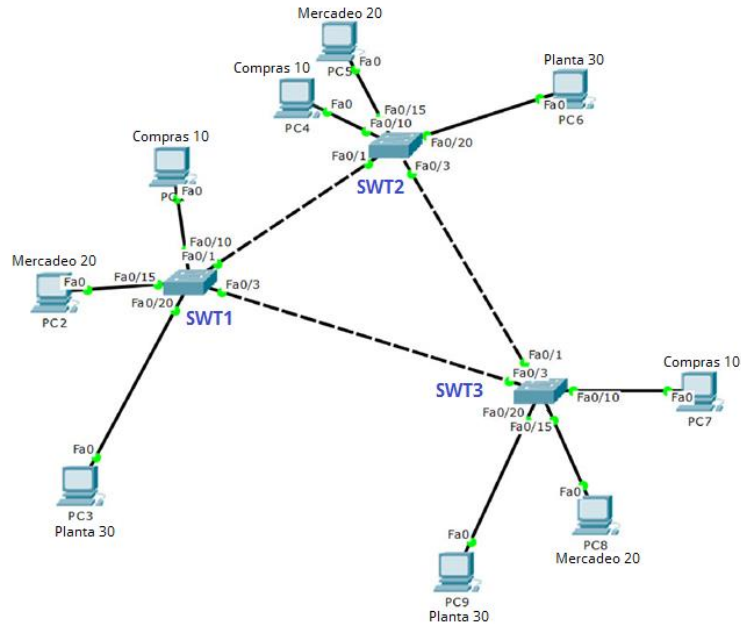
R4#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

C    4.0.0.0/8 is directly connected, Loopback0
C    192.1.34.0/24 is directly connected, Serial1/0
     13.0.0.0/16 is subnetted, 1 subnets
B       13.1.0.0 [20/0] via 192.1.34.3, 00:36:49
     14.0.0.0/16 is subnetted, 1 subnets
C       14.1.0.0 is directly connected, Loopback1

```

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

```
Switch>enable
Switch#configure terminal
Switch(config)#vtp domain CCNP
Switch(config)#vtp mode server
Switch(config)#vtp password cisco
Switch(config)#hostname SWT2
SWT2(config)#exit
```

```

Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SWT1
SWT1(config)#vtp domain CCNP
Changing VTP domain name from NULL to CCNP
SWT1(config)#vtp mode client
Setting device to VTP CLIENT mode.
SWT1(config)#vtp password cisco
Setting device VLAN database password to cisco
SWT1(config)#exit

```

```

Switch>enable
Switch#configure terminal
Switch(config)#hostname SWT1
SWT1(config)#vtp domain CCNP
SWT1(config)#vtp mode client
SWT1(config)#vtp password cisco
SWT1(config)#exit

```

```

Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SWT3
SWT3(config)#vtp domain CCNP
Changing VTP domain name from NULL to CCNP
SWT3(config)#vtp mode cliente
^
% Invalid input detected at '^' marker.

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

```

```

Switch#configure terminal
Switch(config)#hostname SWT3
SWT3(config)#vtp domain CCNP
SWT3(config)#vtp mode client
SWT3(config)#vtp password cisco
SWT3(config)#exit

```

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

```

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

```

```

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

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

```

## B. CONFIGURAR DTP (DYNAMIC TRUNKING PROTOCOL)

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

```

SWT1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
SWT1(config)#int f0/1
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

```

```

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*.

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

Port      Vlans allowed on trunk
Fa0/1     1-1005

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

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

SWT2>enable
SWT2#show interfaces trunk
Port      Mode      Encapsulation  Status      Native vlan
Fa0/1     auto      n-802.1q       trunking    1

Port      Vlans allowed on trunk
Fa0/1     1-1005

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

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

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

```
SWT1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SWT1(config)#int f0/3
SWT1(config-if)#switchport mode trunk

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

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

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

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

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

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

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

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

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

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

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

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

## 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 la Vlan 10 no permite la configuración debido a que esta en modo cliente

```
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 Mercado
SWT2(config-vlan)#vlan 30
SWT2(config-vlan)#name Planta
SWT2(config-vlan)#vlan 99
SWT2(config-vlan)#name Admon
```

```
SWT2(config)#vlan 10
SWT2(config-vlan)#name Compras
SWT2(config-vlan)#vlan 20
SWT2(config-vlan)#name Mercado
SWT2(config-vlan)#vlan 30
SWT2(config-vlan)#name Planta
SWT2(config-vlan)#vlan 99
SWT2(config-vlan)#name Admon
```

2. Verifique que las VLANs han sido agregadas correctamente.

```
SWT2#show vlan brief

VLAN Name                Status    Ports
-----
1    default                active    Fa0/2, Fa0/4, Fa0/5,
Fa0/6                                Fa0/7, Fa0/8, Fa0/9,
Fa0/10                                Fa0/11, Fa0/12,
Fa0/13, Fa0/14                        Fa0/15, Fa0/16,
Fa0/17, Fa0/18                        Fa0/19, Fa0/20,
Fa0/21, Fa0/22                        Fa0/23, Fa0/24,
Gig0/1, Gig0/2
10   Compras                 active
20   Mercado                 active
30   Planta                  active
99   Admon                   active
1002 fddi-default             active
1003 token-ring-default    active
1004 fddinet-default        active
1005 trnet-default          active
```

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

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

```
SWT1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SWT1(config)#int f0/10
SWT1(config-if)#switchport mode access
SWT1(config-if)#switchport access vlan 10
```

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



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

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

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

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

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

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

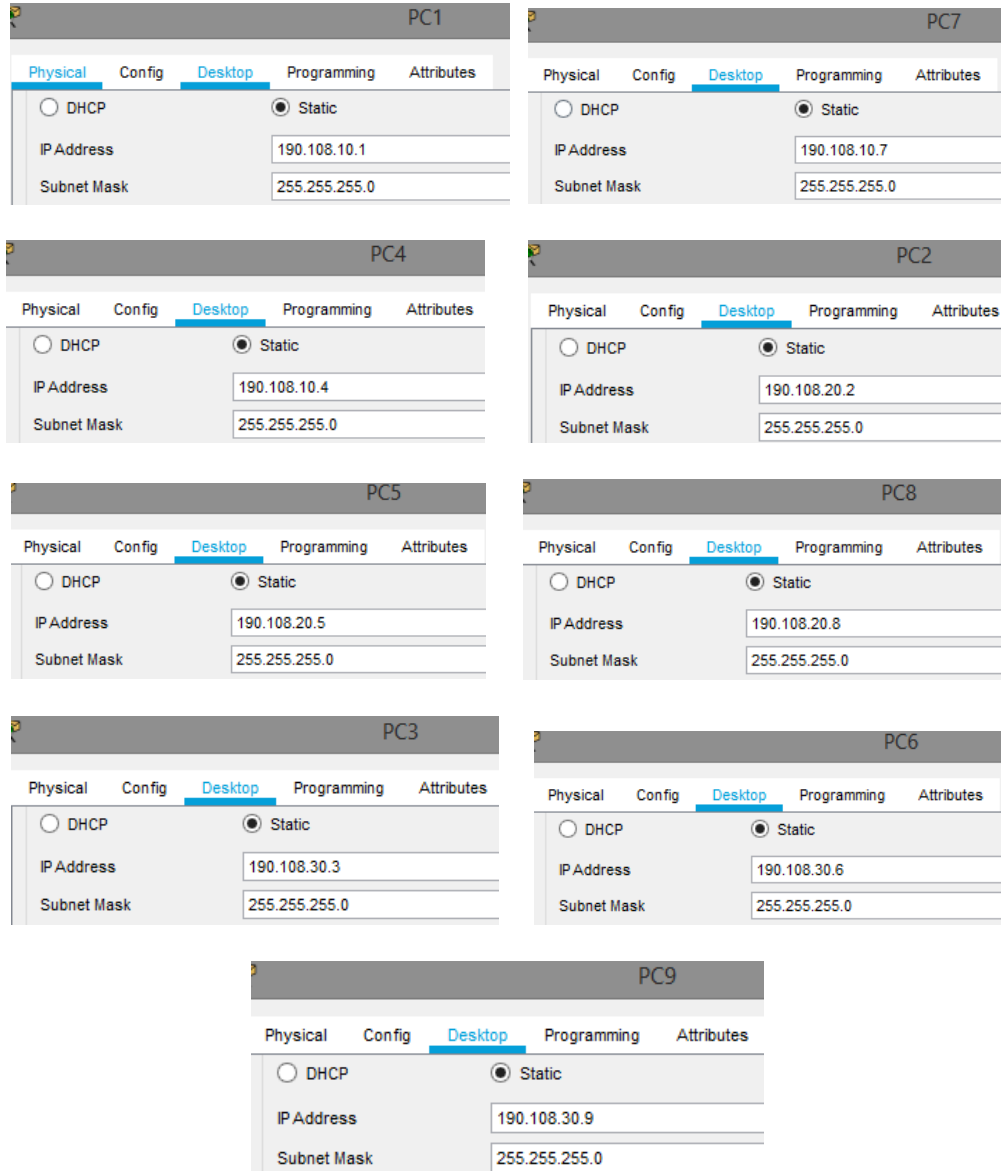
```
SWT3(config-if)#int f0/15
SWT3(config-if)#switchport mode access
SWT3(config-if)#switchport access vlan 20
SWT3(config-if)#int f0/20
SWT3(config-if)#switchport mode access
SWT3(config-if)#switchport access vlan 30
```

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

```

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

```



#### 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

```

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 shut

```

```

SWT1(config)#int vlan 99
SWT1(config-if)#ip address 190.108.99.1 255.255.255.0
SWT1(config-if)#no shutdown

```

```

SWT2(config)#int vlan 99
SWT2(config-if)#
%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)#int vlan 99
SWT2(config-if)#ip address 190.108.99.2 255.255.255.0
SWT2(config-if)#no shutdown

```

```

SWT3(config)#int vlan 99
SWT3(config-if)#
%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)#int vlan 99
SWT3(config-if)#ip address 190.108.99.3 255.255.255.0
SWT3(config-if)#no shutdown

```

## E. VERIFICAR LA CONECTIVIDAD EXTREMO A EXTREMO

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

**No es exitoso porque no están en la misma Vlan y no tiene la misma red**

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

**Es exitoso porque tienen la misma Vlan y la misma red**

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

**No es exitoso porque no están en la misma Vlan ni en la misma red**

#### **4. CONCLUSIONES**

EIGRP es un protocolo de enrutamiento que tiene como función configurar redes libres de bucles y realización de convergencias rápidas. Además de soportar diferentes dispositivos mediante configuraciones sencillas y anchos de banda reducido.

Para contribuir con la administración de la red se utiliza el VTP, con el cual se distribuye una VLAN a toda la red evitando realizar la configuración de esta en cada uno de los dispositivos.

Para la creación de redes independientes, se utiliza el recurso de las VLAN (Red de área local virtual), estas no son físicas y no involucran un ajuste del cableado estructurado y permitiendo disminuir el tamaño del dominio de difusión, pues su objetivo principal es crear secciones pequeñas para enviar información o actualizaciones a un segmento en particular.

## 5. BIBLIOGRAFIA

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

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

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

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