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INTRODUCCION

En la presente prueba de habilidades demostraremos destrezas adquiridas a lo largo del curso en ciertos temas como son: (OSPF) el cual requiere solo unos pocos comandos relativamente simples cuando utilizándolo en una red pequeña a mediana. Sin embargo, detrás de esos comandos reside en un protocolo de enrutamiento bastante complejo, con elementos internos que pueden intimidar a los nuevos OSPF. En comparación con el Protocolo de enrutamiento de puerta de enlace interior mejorado menos complejo (EIGRP), OSPF requiere más reflexión al planificar y algunos comandos de configuración más. Adicionalmente, la subyacente complejidad de OSPF hace operando y verificar Un OSPF entre redes Más desafiante.

LACP es una alternativa basada en estándares para PAgP, definida en IEEE 802.3ad (también conocida como IEEE 802.3 Cláusula 43, "Agregación de enlaces"). Los paquetes LACP se intercambian entre conmuta a través de puertos con capacidad EtherChannel. Al igual que con PAgP, los vecinos se identifican y las capacidades del grupo de puertos se aprenden y se comparan con las capacidades del conmutador local, Sin embargo, LACP también asigna roles a los puntos finales de EtherChannel.

Palabras Clave: Protocolo, Planificar, Paquetes, Conmutar, EtherChannel, Agregación, Vecinos .

RESUMEN

En el presente trabajo se analiza la implementación del protocolo OSPFv3, EIGRP, PAgP, LACP, así como los obstáculos que los administradores de red se encuentran para la migración de redes IPv4 a redes nativas de IPv6. El movimiento hacia IPv6 está actualmente efectuado con proveedores de servicio, algunos de ellos están muy cerca de la fase de implementación. Muchas organizaciones de gobierno (en los Estados Unidos) también han recibido mandatos para migrar sus sistemas en anticipación a la necesidad de soportar el protocolo IPv6. La mayoría de las empresas y organizaciones de gobierno no están listas para implementar el IPv6, aún están en las etapas de evaluación o planeación debido a la falta de conciencia y entendimiento de cómo manejar la transición de este dispositivo. Sin embargo, eventualmente estas empresas deben hacer el cambio debido a que sus usuarios, empleados y clientes lo demandarán. Los usuarios y nuevos dispositivos que utilizarán IPv6, manejarán este proceso de transformación.

Palabras clave: IPv6, protocolos de enrutamiento, OSPFv3, IP, Nativas, Transición, Implementación, Organizaciones, Necesidad.

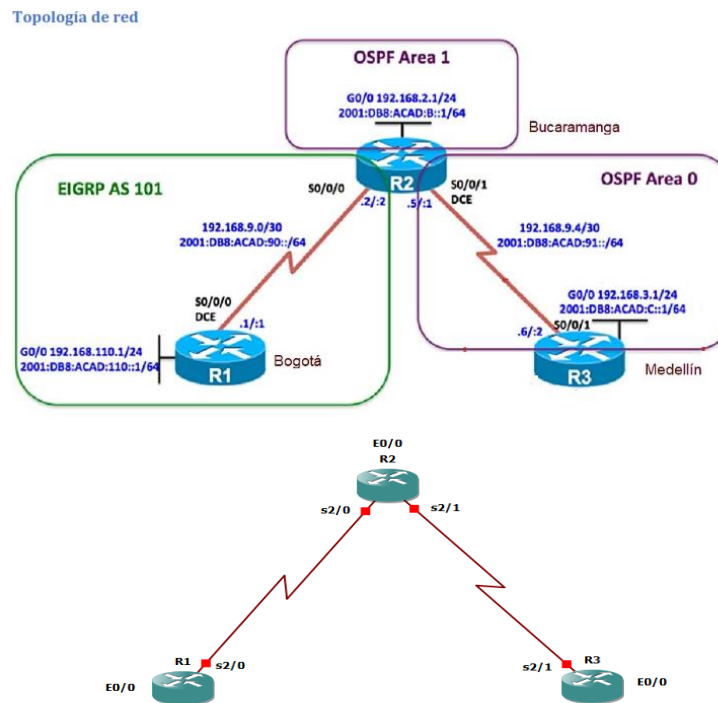
DESARROLLO

Escenario 1

Una empresa de confecciones posee tres sucursales distribuidas en las ciudades de Bogotá, Medellín y Bucaramanga, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.

Topología de red

Figura 1. Escenario 1



Introducción al Escenario 1.

Este escenario basado en habilidades (SBA) corresponde al desempeño práctico final de la formación de la Academia para el curso CCNPv7 ROUTE.

En la Parte 1, se configura los protocolos de ruteo múltiples, nombrados EIGRP, OSPFv3 para crear una red integrada. En la Parte 2, usted crea un script Tcl para probar la Conectividad Del IPv4 y del IPv6 y utiliza los comandos traceroute y show para verificar el ruteo y la selección de la trayectoria. escenario combina la configuración del dispositivo y la solución de problemas.

Objetivos.

Parte 1: Configurar los routers en la topología de acuerdo con el diagrama y las especificaciones proporcionadas.

Parte 2: Probar la red para obtener la conectividad y el control de ruta adecuados.

Parte 1: Configure la red de acuerdo con las especificaciones.

1. Configurar las interfaces con las direcciones IPv4 e IPv6 que se muestran en la topología de red.

ROUTER	INTERFAZ	DIRECCION IP
R1	S2/0	192.168.9.1/30
		192.168.110.1/24
	E0/0	2001:DB8:ACAD:110::1/64
R2	S2/0	192.168.9.2/30
		192.168.2.1/24
	E0/0	2001:DB8:ACAD:B::1/64
	S2/1	192.168.9.5/30
R3		2001:db8:acad:91::1/64
	S2/1	192.168.9.6/30
		2001:db8:acad:91::2/64
	E0/0	192.168.3.1/24
	2001:db8:acad:C::1/64	

Tabla 1 direcciones que se deben asignar a cada router junto a las interfaces

Comandos que debemos ingresar

Enable (para ingresar a modo privilegiado)
conf terminal (para ingresar al modo de configuración global)
hostname R1 (asignamos el nombre el dispositivo)
ipv6 unicast-routing (habilitamos ipv6 en el dispositivo)
int S2/0 (ingresamos a la interfaz a configurar)
ip add 192.168.9.1 255.255.255.252 (asignamos la dirección correspondiente)
no sh (encendemos la interfaz que viene apagada por defecto)
ipv6 add 2001:db8:acad:90::1/64 (asignamos la dirección ipv6 correspondiente)
ipv6 add fe80::1 link-local (asignamos la dirección link local correspondiente)
exit (salimos de la interfaz)
int E0/0
ip add 192.168.110.1 255.255.255.0
ipv6 add 2001:db8:acad:110::1/64
no sh

```
R1#en
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#hostname R1
R1(config)#ipv6 unicast-routing
R1(config)#int S2/0
R1(config-if)#ip add 192.168.9.1 255.255.255.252
R1(config-if)#no sh
R1(config-if)#ipv6 add 2001:db8:acad:90::1/64
R1(config-if)#ipv6 add fe80::1 link-local
R1(config-if)#exit
R1(config)#int E0/0
R1(config-if)#ip add 192.168.110.1 255.255.255.0
R1(config-if)#ipv6 add 2001:DB8:ACAD:110::1/64
R1(config-if)#no sh
R1(config-if)#
```

Figura 1 Aplicamos el script de configuración

R2

en
conf terminal
hostname R2
ipv6 unicast-routing
int S2/0
ip add 192.168.9.2 255.255.255.252
no sh

```
ipv6 add 2001:db8:acad:90::2/64
ipv6 add fe80::2 link-local
exit
int E0/0
ip add 192.168.2.1 255.255.255.0
ipv6 add 2001:db8:acad:b::1/64
no sh
exit
int S2/1
ip add 192.168.9.5 255.255.255.252
no sh
ipv6 add 2001:db8:acad:91::1/64
ipv6 add fe80::3 link-local
```

```
R2#en
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#hostname R2
R2(config)#ipv6 unicast-routing
R2(config)#int S2/0
R2(config-if)#ip add 192.168.9.2 255.255.255.252
R2(config-if)#no sh
R2(config-if)#ipv6 add 2001:db8:acad:90::2/64
R2(config-if)#ipv6 add fe80::2 link-local
R2(config-if)#exit
R2(config)#int E0/0
R2(config-if)#ip add 192.168.2.1 255.255.255.0
R2(config-if)#ipv6 add 2001:DB8:ACAD:B::1/64
R2(config-if)#no sh
R2(config-if)#exit
R2(config)#int S2/1
R2(config-if)#ip add 192.168.9.5 255.255.255.252
R2(config-if)#no sh
R2(config-if)#ipv6 add 2001:db8:acad:91::1/64
R2(config-if)#ipv6 add fe80::3 link-local
R2(config-if)#do wr
```

Figura 2 Configuración aplicada en R2

R3

```
en
conf t
hostname R3
ipv6 unicast-routing
int S2/1
```

```
ip add 192.168.9.6 255.255.255.252
no sh
ipv6 add 2001:db8:acad:91::2/64
ipv6 add fe80::3 link-local
exit
int E0/0
ip add 192.168.3.1 255.255.255.0
ipv6 add 2001:db8:acad:c::1/64
no sh
```

```
R3#en
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#hostname R3
R3(config)#ipv6 unicast-routing
R3(config)#int S2/1
R3(config-if)#ip add 192.168.9.6 255.255.255.252
R3(config-if)#no sh
R3(config-if)#ipv6 add 2001:db8:acad:91::2/64
R3(config-if)#ipv6 add fe80::3 link-local
R3(config-if)#exit
R3(config)#int E0/0
R3(config-if)#ip add 192.168.3.1 255.255.255.0
R3(config-if)#ipv6 add 2001:DB8:ACAD:C::1/64
R3(config-if)#no sh
```

Figura 3 Configuración aplicada en R3

2. Ajustar el ancho de banda a 128 kbps sobre cada uno de los enlaces seriales ubicados en R1, R2, y R3 y ajustar la velocidad de reloj de las conexiones de DCE según sea apropiado.

R1

```
int S2/0 (ingresamos a la interfaz a configurar)
clock rate 128000 (asignamos el dispositivo como DCE)
bandwidth 128 (asignamos el ancho de banda a la interfaz)
```

```
R1(config)#int S2/0
R1(config-if)#clock rate threshold 128000
R1(config-if)#bandwidth 128
R1(config-if)#
```

Figura 4 Configuración aplicada en R1.

R2

```
int S2/1
clock rate threshold 128000 (asignamos el dispositivo como DCE)
bandwidth 128
int S2/0
bandwidth 128
```

```
R2(config)#int S2/1
R2(config-if)#clock rate threshold 128000
R2(config-if)#bandwidth 128
R2(config-if)#int S2/0
R2(config-if)#bandwidth 128
R2(config-if)#
```

Figura 5 Configuración aplicada en R2

R3

```
int S2/1
bandwidth 128
```

```
R3(config)#int S2/1
R3(config-if)#bandwidth 128
R3(config-if)#
```

Figura 6 Configuración aplicada en R3

3. En R2 y R3 configurar las familias de direcciones OSPFv3 para IPv4 e IPv6. Utilice el identificador de enrutamiento 2.2.2.2 en R2 y 3.3.3.3 en R3 para ambas familias de direcciones.

R2

```
router ospfv3 1 (ingresamos al protocolo de enrutamiento según escenario)
address-family ipv4 unicast
router-id 2.2.2.2
exit-address-family
address-family ipv6 unicast
router-id 2.2.2.2
exit-address-family
```

```

R2(config)#router ospfv3 1
R2(config-router)#router ospfv3 1
R2(config-router)#address-family ipv4 unicast
R2(config-router-af)#router-id 2.2.2.2
R2(config-router-af)#exit-address-family
R2(config-router)#address-family ipv6 unicast
R2(config-router-af)#router-id 2.2.2.2
R2(config-router-af)#exit-address-family
R2(config-router)#

```

Figura 7 Configuración aplicada en R2

R3

```

router ospfv3 1
address-family ipv4 unicast
router-id 3.3.3.3
passive-interface E0/0
exit-address-family
address-family ipv6 unicast
router-id 3.3.3.3
passive-interface E0/0
exit-address-family

```

```

R3(config)#router ospfv3 1
R3(config-router)#address-family ipv4 unicast
R3(config-router-af)#router-id 3.3.3.3
R3(config-router-af)#passive-interface E0/0
R3(config-router-af)#exit-address-family
R3(config-router)#address-family ipv6 unicast
R3(config-router-af)#router-id 3.3.3.3
R3(config-router-af)#passive-interface E0/0
R3(config-router-af)#exit-address-family
R3(config-router)#

```

Figura 8 Configuración aplicada en R3

4. En R2, configurar la interfaz E0/0 en el área 1 de OSPF y la conexión serial entre R2 y R3 en OSPF área 0.

R2

```

int Et0/0
ospfv3 1 ipv4 area 1
ospfv3 1 ipv6 area 1
int s2/1
ospfv3 1 ipv4 area 0

```

ospfv3 1 ipv6 area 0

```
R2(config)#int Et0/0
R2(config-if)#ospfv3 1 ipv4 area 1
R2(config-if)#ospfv3 1 ipv6 area 1
R2(config-if)#int s2/1
R2(config-if)#ospfv3 1 ipv4 area 0
R2(config-if)#ospfv3 1 ipv6 area 0
R2(config-if)#
```

Figura 9 Configuración aplicada en R2

5. En R3, configurar la interfaz E0/0 y la conexión serial entre R2 y R3 en OSPF área 0.

R3

```
int Et0/0
ospfv3 1 ipv4 area 0
ospfv3 1 ipv6 area 0
int s2/1
ospfv3 1 ipv4 area 0
ospfv3 1 ipv6 area 0
```

```
R3(config)#int Et0/0
R3(config-if)#ospfv3 1 ipv4 area 0
R3(config-if)#ospfv3 1 ipv6 area 0
R3(config-if)#int s2/1
R3(config-if)#ospfv3 1 ipv4 area 0
R3(config-if)#ospfv3 1 ipv6 area 0
R3(config-if)#
```

Figura 10 Configuración aplicada en R3

6. Configurar el área 1 como un área totalmente Stubby.

R2

```
router ospfv3 1
address-family ipv4 unicast
area 1 stub no-summary
exit-address-family
address-family ipv6 unicast
area 1 stub no-summary
exit-address-family
```

```

R2 (config-router)#add
R2 (config-router)#exit
R2 (config)#router ospfv3 1
R2 (config-router)#address-family ipv4 unicast
R2 (config-router-af)#area 1 stub no-summary
R2 (config-router-af)#exit-address-family
R2 (config-router)#address-family ipv6 unicast
R2 (config-router-af)#area 1 stub no-summary
R2 (config-router-af)#exit-address-family
R2 (config-router)#

```

Figura 11 Configuración aplicada en R2.

Propagar rutas por defecto de IPv4 y IPv6 en R3 al interior del dominio OSPFv3.
Nota: Es importante tener en cuenta que una ruta por defecto es diferente a la definición de rutas estáticas.

R3

```

configure terminal
router ospfv3 1
address-family ipv4 unicast
default-information originate always
exit-address-family
address-family ipv6 unicast
default-information originate always
exit-address-family

```

```

R3 (config)#router ospfv3 1
R3 (config-router)#address-family ipv4 unicast
R3 (config-router-af)#default-information originate always
R3 (config-router-af)#exit-address-family
R3 (config-router)#address-family ipv6 unicast
R3 (config-router-af)#default-information originate always
R3 (config-router-af)#exit-address-family
R3 (config-router)#

```

Figura 12 Configuración aplicada en R3

8. Realizar la configuración del protocolo EIGRP para IPv4 como IPv6. Configurar la interfaz F0/0 de R1 y la conexión entre R1 y R2 para EIGRP con el sistema autónomo 101. Asegúrese de que el resumen automático está desactivado.

R1

```

router eigrp DUAL-STACK
address-family ipv4 unicast autonomous-system 4

```

```

af-interface Et0/0
passive-interface
exit-af-interface
topology base
exit-af-topology
network 192.168.9.0 0.0.0.3
network 192.168.110.0 0.0.0.3
eigrp router-id 1.1.1.1
exit-address-family
address-family ipv6 unicast autonomous-system 6
af-interface Et0/0
passive-interface
exit-af-interface
topology base
exit-af-topology
eigrp router-id 1.1.1.1
exit-address-family
no auto-summary

```

```

R1(config)#router eigrp DUAL-STACK
R1(config-router)#address-family ipv4 unicast autonomous-system 4
R1(config-router-af)#af-interface Et0/0
R1(config-router-af-interface)#passive-interface
R1(config-router-af-interface)#exit-af-interface
R1(config-router-af)#topology base
R1(config-router-af-topology)#exit-af-topology
R1(config-router-af)#network 192.168.9.0 0.0.0.3
R1(config-router-af)#network 192.168.110.0 0.0.0.3
R1(config-router-af)#eigrp router-id 1.1.1.1
R1(config-router-af)#exit-address-family
R1(config-router)#address-family ipv6 unicast autonomous-system 6
R1(config-router-af)#af-interface Et0/0
R1(config-router-af-interface)#passive-interface
R1(config-router-af-interface)#exit-af-interface
R1(config-router-af)#topology base
R1(config-router-af-topology)#exit-af-topology
R1(config-router-af)#eigrp router-id 1.1.1.1
R1(config-router-af)#exit-address-family

```

Figura 13 Configuración aplicada en R1

R2

```

router eigrp DUAL-STACK
address-family ipv4 unicast autonomous-system 4
network 192.168.9.0 0.0.0.3
eigrp router-id 2.2.2.2

```

```
exit-address-family
address-family ipv6 unicast autonomous-system 6
af-interface serial 2/0
sh
exit-af-interface
topology base
eigrp router-id 2.2.2.2
exit-address-family
```

```
R2(config)#router eigrp DUAL-STACK
R2(config-router)#address-family ipv4 unicast autonomous-system 4
R2(config-router-af)#network 192.168.9.0 0.0.0.3
R2(config-router-af)#eigrp router-id 2.2.2.2
R2(config-router-af)#exit-address-family
R2(config-router)#address-family ipv6 unicast autonomous-system 6
R2(config-router-af)#af-interface serial 2/0
R2(config-router-af-interface)#sh
R2(config-router-af-interface)#exit-af-interface
R2(config-router-af)#topology base
R2(config-router-af-topology)#eigrp router-id 2.2.2.2
R2(config-router-af)#exit-address-family
R2(config-router)#
```

Figura 14 Configuración aplicada en R2

9. Configurar las interfaces pasivas para EIGRP según sea apropiado.
En R2, configurar la redistribución mutua entre OSPF y EIGRP para IPv4 e IPv6.
Asignar métricas apropiadas cuando sea necesario.

R1

```
router eigrp 10
passive-interface Et0/0
```

```
R1(config)#router eigrp 10
R1(config-router)#passive-interface Et0/0
R1(config-router)#
```

Figura 15 Configuración EIGRP en R1 se Replica en R2, R3

R2

```
router eigrp 10
passive-interface Et0/0
```

```
R2(config)#router eigrp 10
R2(config-router)#passive-interface Et0/0
```

Figura 16 Configuración aplicada en R2

R3

```
router eigrp 10
passive-interface Et0/0
```

```
R3(config)#router eigrp 10
R3(config-router)#passive-interface Et0/0
```

Figura 17 Configuración aplicada en R3

10. En R2, configurar la redistribución mutua entre OSPF y EIGRP para IPv4 e IPv6. Asignar métricas apropiadas cuando sea necesario.

R2

```
router eigrp DUAL-STACK
address-family ipv4 unicast autonomous-system 4
topology base
distribute-list R3-to-R1 out
redistribute ospfv3 1 metric 10000 100 255 1 1500
exit-af-topology
address-family ipv6 unicast autonomous-system 6
topology base
redistribute ospf 1 metric 10000 100 255 1 1500
exit-af-topology
exit
```

```

R2(config)#router eigrp DUAL-STACK
R2(config-router)#address-family ipv4 unicast autonomous-system 4
R2(config-router-af)#topology base
R2(config-router-af-topology)#distribute-list R3-to-R1 out
R2(config-router-af-topology)#$e ospfv3 1 metric 10000 100 255 1 1500
R2(config-router-af-topology)#exit-af-topology
R2(config-router-af)#address-family ipv6 unicast autonomous-system 6
R2(config-router-af)#topology base
R2(config-router-af-topology)#redistribute ospf 1 metric 10000 100 255 1 1500
R2(config-router-af-topology)#exit-af-topology
R2(config-router-af)#exit

```

Figura 18 Configuración aplicada en R2

11. En R2, de hacer publicidad de la ruta 192.168.3.0/24 a R1 mediante una lista de distribución y ACL.

R2

```

ip access-list standard R3-to-R1
remark ACL to filter 192.168.3.0/24
deny 192.168.3.0 0.0.0.255
permit any

```

```

R2(config)#ip access-list standard R3-to-R1
R2(config-std-nacl)#remark ACL to filter 192.168.3.0/24
R2(config-std-nacl)#deny 192.168.3.0 0.0.0.255
R2(config-std-nacl)#permit any
R2(config-std-nacl)#

```

Figura 19 Configuración aplicada en R2

Parte 2: Pruebe la conectividad de red y el control de ruta.

a. Registrar las tablas de enrutamiento en cada uno de los routers, acorde con los parámetros de configuración establecidos en el escenario propuesto.

R1

```

R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       a - application
       + - replicated route, % - next hop override

Gateway of last resort is not set

D EX 192.168.2.0/24 [170/50752000] via 192.168.9.2, 00:06:00, Serial2/0
     192.168.9.0/24 is variably subnetted, 3 subnets, 2 masks
C     192.168.9.0/30 is directly connected, Serial2/0
L     192.168.9.1/32 is directly connected, Serial2/0
D EX 192.168.9.4/30 [170/50752000] via 192.168.9.2, 00:06:00, Serial2/0
     192.168.110.0/24 is variably subnetted, 2 subnets, 2 masks
C     192.168.110.0/24 is directly connected, Ethernet0/0
L     192.168.110.1/32 is directly connected, Ethernet0/0
R1#

```

Figura 20 Verificación de los protocolos

```

R1#show ipv6 route
IPv6 Routing Table - default - 5 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
       H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
       IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, la - LISP alt
       lr - LISP site-registrations, ld - LISP dyn-eid, a - Application
C 2001:DB8:ACAD:90::/64 [0/0]
  via Serial2/0, directly connected
L 2001:DB8:ACAD:90::1/128 [0/0]
  via Serial2/0, receive
C 2001:DB8:ACAD:110::/64 [0/0]
  via Ethernet0/0, directly connected
L 2001:DB8:ACAD:110::1/128 [0/0]
  via Ethernet0/0, receive
L FF00::/8 [0/0]
  via Null0, receive
R1#
R1#show ip eigrp neighbors
EIGRP-IPv4 VR(DUAL-STACK) Address-Family Neighbors for AS(4)
H  Address                Interface                Hold Uptime    SRTT   RTO   Q   Seq
                          (sec)                (ms)          Cnt Num
0  192.168.9.2              Se2/0                    13 00:19:19    20  1170  0   6
EIGRP-IPv4 Neighbors for AS(10)
R1#

```

Figura 21 Verificación de los protocolos

R2

```

R2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

Gateway of last resort is not set

      192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, Ethernet0/0
L       192.168.2.1/32 is directly connected, Ethernet0/0
      192.168.9.0/24 is variably subnetted, 4 subnets, 2 masks
C       192.168.9.0/30 is directly connected, Serial2/0
L       192.168.9.2/32 is directly connected, Serial2/0
C       192.168.9.4/30 is directly connected, Serial2/1
L       192.168.9.5/32 is directly connected, Serial2/1
D       192.168.110.0/24 [90/50752000] via 192.168.9.1, 00:19:58, Serial2/0
R2#

```

Figura 22 Verificación de los protocolos

```

R2#show ipv6 route
IPv6 Routing Table - default - 5 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
       H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
       IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, la - LISP alt
       lr - LISP site-registrations, ld - LISP dyn-eid, a - Application
C 2001:DB8:ACAD:B::/64 [0/0]
   via Ethernet0/0, directly connected
L 2001:DB8:ACAD:B::1/128 [0/0]
   via Ethernet0/0, receive
C 2001:DB8:ACAD:90::/64 [0/0]
   via Serial2/0, directly connected
L 2001:DB8:ACAD:90::2/128 [0/0]
   via Serial2/0, receive
L FF00::/8 [0/0]
   via Null0, receive
R2#

```

Figura 23 Verificación de los protocolos 1

```
R2#show ip eigrp neighbors
EIGRP-IPv4 VR(DUAL-STACK) Address-Family Neighbors for AS(4)
H   Address                Interface          Hold Uptime      SRTT   RTO  Q  Seq
                               (sec)            (ms)            Cnt Num
0   192.168.9.1             Se2/0              11 00:21:01     25  1170  0  5
EIGRP-IPv4 Neighbors for AS(10)
R2#
```

Figura 24 Mostrando los vecinos conectados

R3

```

R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

Gateway of last resort is not set

192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.3.0/24 is directly connected, Ethernet0/0
L       192.168.3.1/32 is directly connected, Ethernet0/0
192.168.9.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.9.4/30 is directly connected, Serial2/1
L       192.168.9.6/32 is directly connected, Serial2/1
R3#

```

Figura 25 Verificación de los protocolos de enrutamiento

```

R3#show ipv6 route
IPv6 Routing Table - default - 5 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
       H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
       IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, la - LISP alt
       lr - LISP site-registrations, ld - LISP dyn-eid, a - Application
C       2001:DB8:ACAD:C::/64 [0/0]
       via Ethernet0/0, directly connected
L       2001:DB8:ACAD:C::1/128 [0/0]
       via Ethernet0/0, receive
C       2001:DB8:ACAD:91::/64 [0/0]
       via Serial2/1, directly connected
L       2001:DB8:ACAD:91::2/128 [0/0]
       via Serial2/1, receive
L       FF00::/8 [0/0]
       via Null0, receive
R3#

```

Figura 26 Verificación de los protocolos

```

R3#show ip eigrp neighbors
EIGRP-IPv4 Neighbors for AS(10)
R3#

```

Figura 27 verificación de protocolo de enrutamiento vecino

b. Verificar comunicación entre routers mediante el comando ping y traceroute.

R1

```

R1#
R1#tclsh
R1(tcl)#foreach address {
+>(tcl)#192.168.110.1
+>(tcl)#192.168.9.1
+>(tcl)#192.168.9.2
+>(tcl)#192.168.2.1
+>(tcl)#192.168.9.5
+>(tcl)#192.168.9.6
+>(tcl)#192.168.3.1
+>(tcl)#172.16.1.1
+>(tcl)#172.16.1.2
+>(tcl)#172.16.2.1
+>(tcl)#172.16.2.2
+>(tcl)#172.16.4.1
+>(tcl)#} { ping $address }
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.110.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/5 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 37/38/39 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 19/20/21 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 19/19/20 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.5, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 19/19/20 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.6, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.

```

Figura 28 ping a través de tclsh.

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 19/19/20 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.5, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 19/19/20 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.6, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.2, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.2.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.2.2, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.4.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
R1(tcl)#
```

Figura 29 continuación fig. 30

R2

```
R2(tcl)#foreach address {
+>(tcl)#2001:db8:acad:110::1
+>(tcl)#2001:db8:acad:90::1
+>(tcl)#2001:db8:acad:90::2
+>(tcl)#2001:db8:acad:b::1
+>(tcl)#2001:db8:acad:91::1
+>(tcl)#2001:db8:acad:91::2
+>(tcl)#2001:db8:acad:c::1
+>(tcl)#2001:db8:feed:1::1
+>(tcl)#2001:db8:feed:1::2
+>(tcl)#2001:db8:feed:2::1
+>(tcl)#2001:db8:feed:2::2
+>(tcl)#2001:db8:cafe:4::1
+>(tcl)#} { ping $address }
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:110::1, timeout is 2 seconds:

% No valid route for destination
Success rate is 0 percent (0/1)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:90::1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 19/19/20 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:90::2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/5 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:B::1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 5/5/5 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:91::1, timeout is 2 seconds:

% No valid route for destination
Success rate is 0 percent (0/1)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:91::2, timeout is 2 seconds:

% No valid route for destination
Success rate is 0 percent (0/1)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:C::1, timeout is 2 seconds:

% No valid route for destination
Success rate is 0 percent (0/1)
Type escape sequence to abort.
```

Figura 30 continuacion fig. 30

Figura 32

```

R2(tcl)#foreach address {
+>(tcl)#192.168.110.1
+>(tcl)#192.168.9.1
+>(tcl)#192.168.9.2
+>(tcl)#192.168.2.1
+>(tcl)#192.168.9.5
+>(tcl)#192.168.9.6
+>(tcl)#192.168.3.1
+>(tcl)#172.16.1.1
+>(tcl)#172.16.1.2
+>(tcl)#172.16.2.1
+>(tcl)#172.16.2.2
+>(tcl)#172.16.4.1
+>(tcl)#} { ping $address }
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.110.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 18/19/20 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 19/19/20 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/38/39 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 5/5/5 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.5, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 38/38/40 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.6, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 19/20/21 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.

```

Figura 31 continuacion fig. 30

R3

```
R3#tclsh
R3(tcl)#foreach address {
+>(tcl)#192.168.110.1
+>(tcl)#192.168.9.1
+>(tcl)#192.168.9.2
+>(tcl)#192.168.2.1
+>(tcl)#192.168.9.5
+>(tcl)#192.168.9.6
+>(tcl)#192.168.3.1
+>(tcl)#172.16.1.1
+>(tcl)#172.16.1.2
+>(tcl)#172.16.2.1
+>(tcl)#172.16.2.2
+>(tcl)#172.16.4.1
+>(tcl)#} { ping $address }
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.110.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.2, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.5, timeout is 2 seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 17/19/20 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.6, timeout is 2 seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 38/38/40 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.1, timeout is 2 seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 5/5/5 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
```

Figura 32 continuacion fig. 30

R1

```
!  
interface Ethernet0/0  
ip address 192.168.110.1 255.255.255.0  
ipv6 address 2001:DB8:ACAD:110::1/64  
!  
interface Ethernet0/1  
no ip address  
shutdown  
!  
interface Ethernet0/2  
no ip address  
shutdown  
!  
interface Ethernet0/3  
no ip address  
shutdown  
!  
interface Ethernet1/0  
no ip address  
shutdown  
!  
interface Ethernet1/1  
no ip address  
shutdown  
!  
interface Ethernet1/2  
no ip address  
shutdown  
!  
interface Ethernet1/3  
no ip address  
shutdown  
!  
interface Serial2/0  
bandwidth 128  
ip address 192.168.9.1 255.255.255.252  
ipv6 address FE80::1 link-local  
ipv6 address 2001:DB8:ACAD:90::1/64  
serial restart-delay 0  
!  
interface Serial2/1  
no ip address  
shutdown  
serial restart-delay 0  
!  
interface Serial2/2  
no ip address  
shutdown  
serial restart-delay 0  
--More--
```

Figura 34 continuacion fig. 33

R2

```
R2
!
interface Ethernet0/0
 ip address 192.168.2.1 255.255.255.0
 ipv6 address 2001:DB8:ACAD:B::1/64
 ospfv3 1 ipv6 area 1
 ospfv3 1 ipv4 area 1
!
interface Ethernet0/1
 no ip address
 shutdown
!
interface Ethernet0/2
 no ip address
 shutdown
!
interface Ethernet0/3
 no ip address
 shutdown
!
interface Ethernet1/0
 no ip address
 shutdown
!
interface Ethernet1/1
 no ip address
 shutdown
!
interface Ethernet1/2
 no ip address
 shutdown
!
interface Ethernet1/3
 no ip address
 shutdown
!
interface Serial2/0
 bandwidth 128
 ip address 192.168.9.2 255.255.255.252
 ipv6 address FE80::2 link-local
 ipv6 address 2001:DB8:ACAD:90::2/64
 serial restart-delay 0
!
interface Serial2/1
 bandwidth 128
 ip address 192.168.9.5 255.255.255.252
 ipv6 address FE80::3 link-local
 ipv6 address 2001:DB8:ACAD:91::1/64
 ospfv3 1 ipv6 area 0
 ospfv3 1 ipv4 area 0
 serial restart-delay 0
--More-- █
```

Figura 35 continuacion fig. 33

 R2

```
!  
interface Serial2/0  
bandwidth 128  
ip address 192.168.9.2 255.255.255.252  
ipv6 address FE80::2 link-local  
ipv6 address 2001:DB8:ACAD:90::2/64  
serial restart-delay 0  
!  
interface Serial2/1  
bandwidth 128  
ip address 192.168.9.5 255.255.255.252  
ipv6 address FE80::3 link-local  
ipv6 address 2001:DB8:ACAD:91::1/64  
ospfv3 1 ipv6 area 0  
ospfv3 1 ipv4 area 0  
serial restart-delay 0  
!  
interface Serial2/2  
no ip address  
shutdown  
serial restart-delay 0  
!  
interface Serial2/3  
no ip address  
shutdown  
serial restart-delay 0  
!  
interface Serial3/0  
no ip address  
shutdown  
serial restart-delay 0  
!  
interface Serial3/1  
no ip address  
shutdown  
serial restart-delay 0  
!  
interface Serial3/2  
no ip address  
shutdown  
serial restart-delay 0  
!  
interface Serial3/3  
no ip address  
shutdown  
serial restart-delay 0  
!  
!  
router eigrp DUAL-STACK  
!  
--More-- █
```

Figura 36 continuacion fig. 33

```

R2
!
router eigrp DUAL-STACK
!
address-family ipv4 unicast autonomous-system 4
!
  topology base
    distribute-list R3-to-R1 out
    redistribute ospfv3 1 metric 10000 100 255 1 1500
  exit-af-topology
  network 192.168.9.0 0.0.0.3
  eigrp router-id 2.2.2.2
exit-address-family
!
address-family ipv6 unicast autonomous-system 6
!
  af-interface Serial2/0
    shutdown
  exit-af-interface
!
  topology base
    redistribute ospf 1 metric 10000 100 255 1 1500
  exit-af-topology
  eigrp router-id 2.2.2.2
  shutdown
exit-address-family
!
!
router eigrp 10
  passive-interface Ethernet0/0
!
router ospfv3 1
  area 1 stub
!
  address-family ipv4 unicast
    router-id 2.2.2.2
    area 1 stub no-summary
  exit-address-family
!
  address-family ipv6 unicast
    router-id 2.2.2.2
    area 1 stub no-summary
  exit-address-family
!
ip forward-protocol nd
!
!
no ip http server
no ip http secure-server
!
ip access-list standard R3-to-R1
--More-- █

```

Figura 37 continuacion fig. 33

 R2

```
area 1 stub
!
address-family ipv4 unicast
  router-id 2.2.2.2
  area 1 stub no-summary
exit-address-family
!
address-family ipv6 unicast
  router-id 2.2.2.2
  area 1 stub no-summary
exit-address-family
!
ip forward-protocol nd
!
!
no ip http server
no ip http secure-server
!
ip access-list standard R3-to-R1
  remark ACL to filter 192.168.3.0/24
  deny 192.168.3.0 0.0.0.255
  permit any
!
!
!
control-plane
!
!
!
!
line con 0
  exec-timeout 0 0
  privilege level 15
  logging synchronous
line aux 0
  exec-timeout 0 0
  privilege level 15
  logging synchronous
line vty 0 4
  login
  transport input none
!
!
```

Figura 38 continuacion fig. 33

R3

```
R3
!
interface Ethernet0/0
 ip address 192.168.3.1 255.255.255.0
 ipv6 address 2001:DB8:ACAD:C::1/64
 ospfv3 1 ipv6 area 0
 ospfv3 1 ipv4 area 0
!
interface Ethernet0/1
 no ip address
 shutdown
!
interface Ethernet0/2
 no ip address
 shutdown
!
interface Ethernet0/3
 no ip address
 shutdown
!
interface Ethernet1/0
 no ip address
 shutdown
!
interface Ethernet1/1
 no ip address
 shutdown
!
interface Ethernet1/2
 no ip address
 shutdown
!
interface Ethernet1/3
 no ip address
 shutdown
--More--
```

Figura 39 continuacion fig. 33

 R3

```
interface Serial2/0
  no ip address
  shutdown
  serial restart-delay 0
!
interface Serial2/1
  bandwidth 128
  ip address 192.168.9.6 255.255.255.252
  ipv6 address FE80::3 link-local
  ipv6 address 2001:DB8:ACAD:91::2/64
  ospfv3 1 ipv6 area 0
  ospfv3 1 ipv4 area 0
  serial restart-delay 0
!
interface Serial2/2
  no ip address
  shutdown
  serial restart-delay 0
!
interface Serial2/3
  no ip address
  shutdown
  serial restart-delay 0
!
interface Serial3/0
  no ip address
  shutdown
  serial restart-delay 0
!
interface Serial3/1
  no ip address
  shutdown
  serial restart-delay 0
!
--More--
```

Figura 40 verificación de rutas filtradas

R3

```
interface Serial3/0
  no ip address
  shutdown
  serial restart-delay 0
!
interface Serial3/1
  no ip address
  shutdown
  serial restart-delay 0
!
interface Serial3/2
  no ip address
  shutdown
  serial restart-delay 0
!
interface Serial3/3
  no ip address
  shutdown
  serial restart-delay 0
!
!
router eigrp 10
  passive-interface Ethernet0/0
!
router ospfv3 1
!
  address-family ipv4 unicast
    passive-interface Ethernet0/0
    default-information originate always
    router-id 3.3.3.3
  exit-address-family
!
  address-family ipv6 unicast
    passive-interface Ethernet0/0
    default-information originate always
    router-id 3.3.3.3
  exit-address-family
!
ip forward-protocol nd
!
!
no ip http server
no ip http secure-server
!
!
!
!
control-plane
--More--
```

Figura 41 continuación de figura 42

Nota: Puede ser que Una o más direcciones no serán accesibles desde todos los routers después de la configuración final debido a la utilización de listas de distribución para filtrar rutas y el uso de IPv4 e IPv6 en la misma red.

DESARROLLO

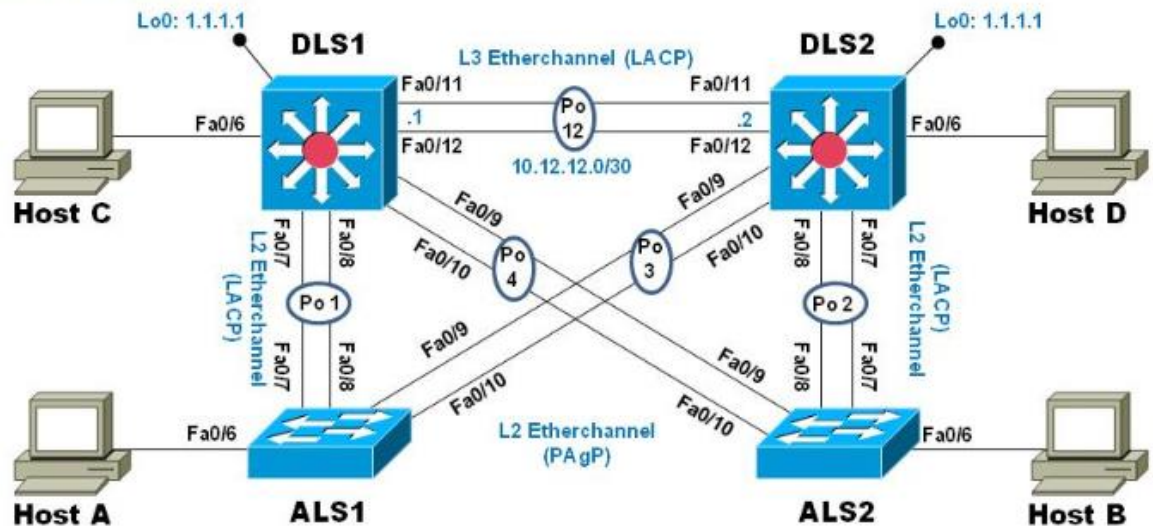
Escenario 2

Una empresa de comunicaciones presenta una estructura Core acorde a la topología de red, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, etherchannels, VLANs y demás aspectos que forman parte del escenario propuesto.

Topología de red

Figura 1. Escenario 2

Topología de red



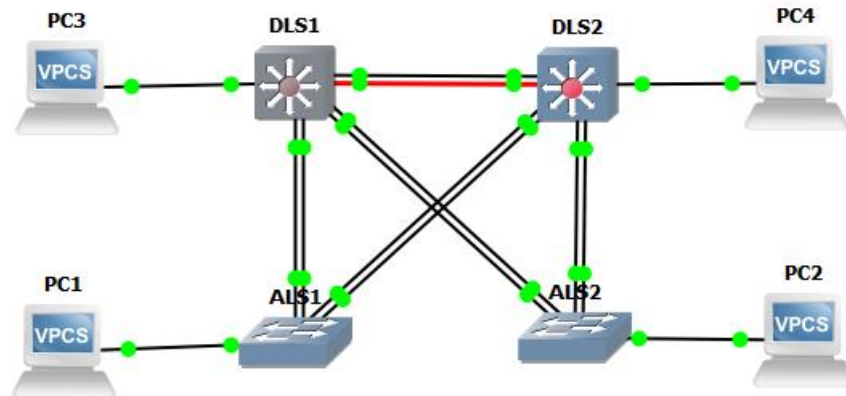


Figura 1 Escenario 2

Introducción al Escenario 2

Este escenario basado en habilidades (SBA) es el desempeño práctico final para la formación de la Academia para el curso CCNPv7 SWITCH.

En la Parte 1, se crea la red física. En la parte 2, usted configura diversas características tales como trunking, EtherChannel, VTP, VLANs, SVI, links ruteados, y HSRP. En la Parte 3, usted crea un script Tcl para probar la Conectividad IP y utiliza los comandos show para verificar las opciones configuradas. Este escenario combina la configuración del dispositivo y la solución de problemas.

Objetivos

Parte 1: Construir la topología de red física.

Parte 2: Configurar los switches en la topología de acuerdo con el diagrama y las especificaciones proporcionadas.

Parte 3: Probar la red para la conectividad y las opciones configuradas.

SWITCH	INTERFAZ	DIRECCION IP
DLS1	Lo	1.1.1.1
DLS2	Port-channel 12	10.12.12.2 /30 10.12.12.1/30
	Lo	1.1.1.1
ALS1		
ALS2		

Tabla 2 tablas de direccionamiento de cada dispositivo y sus respectivas interfaces

Parte 1: Configurar la red de acuerdo con las especificaciones.

a. Apagar todas las interfaces en cada switch.

```
DLS1#en (para ingresar a modo privilegiado)
DLS1#conf t (para ingresar al modo de configuración global)
DLS1(config)#int range Et0/0-3,Et1/0-2 (ingresamos al rango de interfaces a configurar)
DLS1(config-if-range)#shutdown (apagamos las interfaces según el escenario)
DLS1(config-if-range)#
```

```
DLS1#CONF T
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#int range Et0/0-3,Et1/0-2
DLS1(config-if-range)#shutdown
DLS1(config-if-range)#exit
```

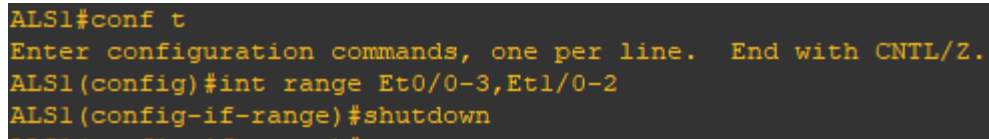
Figura 42 Apagar rango de interfaces

```
DLS2#conf t
DLS2(config)#int range Et0/0-3,Et1/0-2
DLS2(config-if-range)#shutdown
```

```
DLS2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#int range Et0/0-3,Et1/0-2
DLS2(config-if-range)#shutdown
DLS2(config-if-range)#
```

Figura 43 Configuración aplicada en DLS2

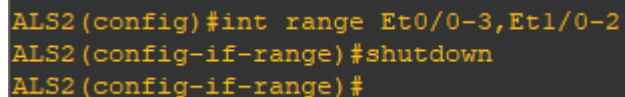
```
ALS1#conf t
ALS1(config)#int range Et0/0-3,Et1/0-2
ALS1(config-if-range)#shutdown
```

A screenshot of a terminal window showing the configuration commands for ALS1. The text is as follows:

```
ALS1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ALS1(config)#int range Et0/0-3,Et1/0-2
ALS1(config-if-range)#shutdown
```

Figura 44 Configuración aplicada en ALS1

```
ALS2#conf t
ALS2(config)#int range Et0/0-3,Et1/0-2
ALS2(config-if-range)#shutdown
```

A screenshot of a terminal window showing the configuration commands for ALS2. The text is as follows:

```
ALS2(config)#int range Et0/0-3,Et1/0-2
ALS2(config-if-range)#shutdown
ALS2(config-if-range)#
```

Figura 45 Configuración aplicada en ALS2

b. Asignar un nombre a cada switch acorde al escenario establecido.

```
DLS1(config)#hostname DLS1
```

```
DLS2(config)#hostname DLS2
```

```
ALS1(config)#hostname ALS1
```

```
ALS2(config)#hostname ALS2
```

c. Configurar los puertos troncales y Port-channels tal como se muestra en el diagrama.

1) La conexión entre DLS1 y DLS2 será un EtherChannel capa-3 utilizando LACP. Para DLS1 se utilizará la dirección IP 10.12.12.1/30 y para DLS2 utilizará 10.12.12.2/30.

```
DLS1(config)#int range Et1/0-1
DLS1(config-if-range)#no switchport
DLS1(config-if-range)#channel-group 12 mode active
DLS1(config-if-range)#no shutdown
DLS1(config-if-range)#
```

```

DLS1(config)#int range Et1/0-1
DLS1(config-if-range)#no switchport
DLS1(config-if-range)#channel-group 12 mode active
Creating a port-channel interface Port-channel 12

DLS1(config-if-range)#no
*Dec 6 16:26:21.681: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to down
*Dec 6 16:26:21.681: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to down
DLS1(config-if-range)#no shutdown
DLS1(config-if-range)#

```

Figura 46 de acuerdo al escenario creamos EtherChannel en los puertos

```

DLS1(config)#int range Et0/0-1
DLS1(config-if-range)#no switchport
DLS1(config-if-range)#channel-group 1 mode active
DLS1(config-if-range)#no shutdown

```

```

DLS1(config)#int range Et0/0-1
DLS1(config-if-range)#no switchport
DLS1(config-if-range)#channel-group 1 mode active
Creating a port-channel interface Port-channel 1

DLS1(config-if-range)#no shutdown
*Dec 6 16:27:19.476: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to down
*Dec 6 16:27:19.476: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/1, changed state to down
DLS1(config-if-range)#no shutdown
DLS1(config-if-range)#

```

Figura 47 de acuerdo al escenario creamos EtherChannel en los puertos

```

DLS1(config)#int range Et0/2-3
DLS1(config-if-range)#no switchport
DLS1(config-if-range)#channel-group 4 mode desirable
DLS1(config-if-range)#no shut

```

```

DLS1(config)#int range Et0/2-3
DLS1(config-if-range)#no switchport
DLS1(config-if-range)#channel-group 4 mode desirable
Creating a port-channel interface Port-channel 4

DLS1(config-if-range)#
*Dec 6 16:29:12.023: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/2, changed state to
*Dec 6 16:29:12.023: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/3, changed state to
DLS1(config-if-range)#no sh
DLS1(config-if-range)#

```

Figura 48 de acuerdo al escenario creamos EtherChannel en los puertos

```
DLS2(config)#int range Et1/0-1
DLS2(config-if-range)#no switchport
DLS2(config-if-range)#channel-group 12 mode active
DLS2(config-if-range)#no shut
```

```
DLS2(config)#int range Et1/0-1
DLS2(config-if-range)#no switchport
DLS2(config-if-range)#channel-group 12 mode active
Creating a port-channel interface Port-channel 12

DLS2(config-if-range)#
*Dec 6 16:30:41.543: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed
*Dec 6 16:30:41.543: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed
DLS2(config-if-range)#no shut
DLS2(config-if-range)#
```

Figura 49 de acuerdo al escenario creamos EtherChannel en los puertos

```
DLS2(config)#int range Et0/0-1
DLS2(config-if-range)#no switchport
DLS2(config-if-range)#channel-group 2 mode active
DLS2(config-if-range)#no sh
```

```
DLS2(config)#int range Et0/0-1
DLS2(config-if-range)#no switchport
DLS2(config-if-range)#channel-group 2 mode active
Creating a port-channel interface Port-channel 2

DLS2(config-if-range)#
*Dec 6 16:31:26.857: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0,
*Dec 6 16:31:26.857: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/1,
DLS2(config-if-range)#no sh
DLS2(config-if-range)#
```

Figura 50 de acuerdo al escenario creamos EtherChannel en negociación en los puertos

```
DLS2(config)#int range Et0/2-3
DLS2(config-if-range)#no switchport
DLS2(config-if-range)#channel-group 3 mode desirable
DLS2(config-if-range)#no shutdown
```

```
DLS2(config)#int range Et0/2-3
DLS2(config-if-range)#no switchport
DLS2(config-if-range)#channel-group 3 mode desirable
Creating a port-channel interface Port-channel 3

DLS2(config-if-range)#n
*Dec 6 16:32:16.395: %LINEPROTO-5-UPDOWN: Line protocol on Inter
*Dec 6 16:32:16.395: %LINEPROTO-5-UPDOWN: Line protocol on Inter
DLS2(config-if-range)#no sh
DLS2(config-if-range)#
```

Figura 51 de acuerdo al escenario creamos EtherChannel activo en los puertos

```
ALS1(config)#int range Et0/0-1
ALS1(config-if-range)#no switchport
ALS1(config-if-range)#channel-group 1 mode active
ALS1(config-if-range)#no shtutdown
```

```
ALS1(config)#int range Et0/0-1
ALS1(config-if-range)#no switchport
ALS1(config-if-range)#channel-group 1 mode active
Creating a port-channel interface Port-channel 1

ALS1(config-if-range)#
*Dec 6 16:33:21.231: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, c
ged state to down
*Dec 6 16:33:21.231: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/1, c
ged state to down
ALS1(config-if-range)#no sh
ALS1(config-if-range)#
*Dec 6 16:33:26.011: %LINK-3-UPDOWN: Interface Ethernet0/0, changed state to up
*Dec 6 16:33:26.011: %LINK-3-UPDOWN: Interface Ethernet0/1, changed state to up
```

Figura 52 de acuerdo al escenario creamos EtherChannel en negociación en los puertos

```
ALS1(config)#int range Et0/2-3
ALS1(config-if-range)#no switchport
ALS1(config-if-range)#channel-group 3 mode desirable
ALS1(config-if-range)#no shut
```

```

ALS1(config)#int range Et0/2-3
ALS1(config-if-range)#no switchport
ALS1(config-if-range)#channel-group 3 mode desirable
Creating a port-channel interface Port-channel 3

ALS1(config-if-range)#no sh
ALS1(config-if-range)#
*Dec 6 16:34:12.387: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/2, cha
ged state to down
*Dec 6 16:34:12.397: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/3, cha

```

Figura 53 de acuerdo al escenario creamos EtherChannel activo en los puertos

```

ALS2(config)#int range Et0/2-3
ALS2(config-if-range)#no switchport
ALS2(config-if-range)#channel-group 4 mode desirable
ALS2(config-if-range)#no shut

```

```

ALS2(config)#int range Et0/2-3
ALS2(config-if-range)#no switchport
ALS2(config-if-range)#channel-group 4 mode desirable
Creating a port-channel interface Port-channel 4

ALS2(config-if-range)#n
*Dec 6 16:35:29.083: %LINEPROTO-5-UPDOWN: Line protocol on Interf
tate to down
*Dec 6 16:35:29.083: %LINEPROTO-5-UPDOWN: Line protocol on Interf
tate to down
ALS2(config-if-range)#no sh

```

Figura 54 de acuerdo al escenario creamos EtherChannel activo en los puertos

```
ALS2(config-if-range)#int range Et0/0-1
ALS2(config-if-range)#no switchport
ALS2(config-if-range)#channel-group 2 mode active
ALS2(config-if-range)#no shutdown
```

```
ALS2(config)#int range Et0/0-1
ALS2(config-if-range)#no switchport
ALS2(config-if-range)#channel-group 2 mode active
Creating a port-channel interface Port-channel 2

ALS2(config-if-range)#no sh
*Dec  6 16:36:06.263: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0,
state to down
*Dec  6 16:36:06.264: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/1,
state to down
ALS2(config-if-range)#no sh
ALS2(config-if-range)#
*Dec  6 16:36:11.062: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel2
state to up
```

Figura 55 de acuerdo al escenario creamos EtherChannel en negociación en los puertos

```
DLS1(config)#int port-channel 12
DLS1(config-if)#ip address 10.12.12.1 255.255.255.252
```

```
DLS1(config)#int port-channel 12
DLS1(config-if)#ip address 10.12.12.1 255.255.255.252
DLS1(config-if)#
```

Figura 56 asignación de ip al puerto po 12

```
DLS2(config)#int port-channel 12
DLS2(config-if)#ip address 10.12.12.2 255.255.255.252
```

```
DLS2(config)#int port-channel 12
DLS2(config-if)#ip address 10.12.12.2 255.255.255.252
DLS2(config-if)#
```

Figura 57 asignación de ip al puerto po 12

2) Los Port-channels en las interfaces Fa0/7 y Fa0/8 utilizarán LACP.

```
DLS1(config-if)#int range Et0/0-1
DLS1(config-if-range)#no switchport
DLS1(config-if-range)#channel-group 1 mode active
DLS1(config-if-range)#no shutdown
```

```
DLS1(config)#int range Et0/0-1
DLS1(config-if-range)#no switchport
DLS1(config-if-range)#channel-group 1 mode active
DLS1(config-if-range)#no shutdown
DLS1(config-if-range)#
```

Figura 58 configuración del rango de puertos como LACP

```
ALS1(config)#int range Et0/0-1
ALS1(config-if-range)#no switchport
ALS1(config-if-range)#channel-group 1 mode active
ALS1(config-if-range)#no shtutdown
```

```
ALS1(config)#int range Et0/0-1
ALS1(config-if-range)#no switchport
ALS1(config-if-range)#channel-group 1 mode active
ALS1(config-if-range)#no shut
ALS1(config-if-range)#
```

Figura 59 configuración del rango de puertos como LACP

```
DLS2(config)#int range Et0/0-1
DLS2(config-if-range)#channel-group 2 mode active
DLS2(config-if-range)#no shut
```

```
DLS2(config)#int range Et0/0-1
DLS2(config-if-range)#channel-group 2 mode active
DLS2(config-if-range)#no shut
DLS2(config-if-range)#
```

Figura 60 configuración del rango de puertos como LACP

```
ALS2(config-if-range)#int range Et0/0-1
ALS2(config-if-range)#channel-group 2 mode active
ALS2(config-if-range)#no shutdown
```

```
ALS2(config)#int range Et0/0-1
ALS2(config-if-range)#channel-group 2 mode active
ALS2(config-if-range)#no shutdown
ALS2(config-if-range)#
```

Figura 61 configuración del rango de puertos como LACP

3) Los Port-channels en las interfaces F0/9 y fa0/10 utilizará PAgP.

```
DLS1(config)#int range Et0/2-3
DLS1(config-if-range)#channel-group 4 mode desirable
DLS1(config-if-range)#no shut
```

```
DLS1(config)#int range Et0/2-3
DLS1(config-if-range)#channel-group 4 mode desirable
DLS1(config-if-range)#no shut
DLS1(config-if-range)#
```

Figura 62 configuración del rango de puertos como PAgP

```
DLS2(config)#int range Et0/2-3
DLS2(config-if-range)#channel-group 3 mode desirable
DLS2(config-if-range)#no shutdown
```

```
DLS2(config)#int range Et0/2-3
DLS2(config-if-range)#channel-group 3 mode desirable
DLS2(config-if-range)#no sh
DLS2(config-if-range)#
```

Figura 63 configuración del rango de puertos como PAgP

```
ALS1(config)#int range Et0/2-3
ALS1(config-if-range)#channel-group 3 mode desirable
ALS1(config-if-range)#no shut
```

```
ALS1(config)#int range Et0/2-3
ALS1(config-if-range)#channel-group 3 mode desirable
ALS1(config-if-range)#no sh
ALS1(config-if-range)#
```

Figura 64 configuración del rango de puertos como PAgP

```
ALS2(config)#int range Et0/2-3
ALS2(config-if-range)#channel-group 4 mode desirable
ALS2(config-if-range)#no shutdown
```

```
ALS2(config)#int range Et0/2-3
ALS2(config-if-range)#channel-group 4 mode desirable
ALS2(config-if-range)#no sh
ALS2(config-if-range)#
```

Figura 65 configuración del rango de puertos como PAGP

4) Todos los puertos troncales serán asignados a la VLAN 800 como la VLAN nativa.

```
DLS1(config)#int range Et0/0-3
DLS1(config-if-range)#switchport trunk encapsulation dot1q
DLS1(config-if-range)#switchport trunk native vlan 800
DLS1(config-if-range)#switchport mode trunk
DLS1(config-if-range)#switchport nonegotiate
DLS1(config-if-range)#no shutdown
```

```
DLS1(config)#int range Et0/0-3
DLS1(config-if-range)#switchport trunk encapsulation dot1q
Command rejected: Et0/0 is not a switching port.
% Range command terminated because it failed on Ethernet0/0
DLS1(config-if-range)#switchport
DLS1(config-if-range)#switchport trunk encapsulation dot1q
DLS1(config-if-range)#
*Dec 6 17:16:31.990: %LINK-3-UPDOWN: Interface Ethernet0/2, changed state to up
*Dec 6 17:16:31.991: %LINK-3-UPDOWN: Interface Ethernet0/3, changed state to up
*Dec 6 17:16:32.995: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/2, changed state to up
*Dec 6 17:16:32.995: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/3, changed state to up
DLS1(config-if-range)#switchport trunk native vlan 800
DLS1(config-if-range)#switchport mode trunk
DLS1(config-if-range)#
*Dec 6 17:16:46.244: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/2, changed state to down
*Dec 6 17:16:46.244: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/3, changed state to down
DLS1(config-if-range)#
*Dec 6 17:16:49.078: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/3, changed state to up
*Dec 6 17:16:49.248: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/2, changed state to up
DLS1(config-if-range)#switchport nonegotiate
DLS1(config-if-range)#no shutdown
DLS1(config-if-range)#
```

Figura 66 asignación de puertos a la vlan 800

```
DLS2(config)#int range Et0/0-3
DLS2(config-if-range)#switchport trunk encapsulation dot1q
DLS2(config-if-range)#switchport trunk native vlan 800
DLS2(config-if-range)#switchport mode trunk
DLS2(config-if-range)#switchport nonegotiate
DLS2(config-if-range)#no shutdown
```

```
DLS2(config)#int range Et0/0-3
DLS2(config-if-range)#switchport
DLS2(config-if-range)#switchport trunk encapsulation dot1q
DLS2(config-if-range)#switchport trunk native vlan 800
DLS2(config-if-range)#switchport mode trunk
DLS2(config-if-range)#switchport nonegotiate
DLS2(config-if-range)#no shutdown
DLS2(config-if-range)#
```

Figura 67 asignación de puertos a la vlan 800

```
ALS1(config)#int range Et0/0-3
ALS1(config-if-range)#switchport trunk encapsulation dot1q
ALS1(config-if-range)#switchport trunk native vlan 800
ALS1(config-if-range)#switchport mode trunk
ALS1(config-if-range)#switchport nonegotiate
ALS1(config-if-range)#no shutdown
```

```
ALS1(config)#int range Et0/0-3
ALS1(config-if-range)#switchport
ALS1(config-if-range)#switchport trunk encapsulation dot1q
ALS1(config-if-range)#switchport trunk native vlan 800
ALS1(config-if-range)#switchport mode trunk
ALS1(config-if-range)#switchport nonegotiate
ALS1(config-if-range)#no shutdown
ALS1(config-if-range)#
```

Figura 68 asignación de puertos a la vlan 800

```
ALS2(config)#int range Et0/0-3
ALS2(config-if-range)#switchport trunk encapsulation dot1q
ALS2(config-if-range)#switchport trunk native vlan 800
ALS2(config-if-range)#switchport mode trunk
ALS2(config-if-range)#switchport nonegotiate
ALS2(config-if-range)#no shutdown
```

```
ALS2(config)#int range Et0/0-3
ALS2(config-if-range)#switchport
ALS2(config-if-range)#switchport trunk encapsulation dot1q
ALS2(config-if-range)#switchport trunk native vlan 800
ALS2(config-if-range)#switchport mode trunk
ALS2(config-if-range)#switchport nonegotiate
ALS2(config-if-range)#no shutdown
```

Figura 69 asignación de puertos a la vlan 800

d. Configurar DLS1, ALS1, y ALS2 para utilizar VTP versión 3

```
DLS1(config)#vtp domain UNAD
DLS1(config)#vtp version 3
DLS1(config)#vtp password cisco123
```

```
DLS1(config)#vtp version 3
DLS1(config)#vtp password cisco123
Setting device VTP password to cisco123
DLS1(config)#
```

Figura 70 activación de vtp versión 3

```
ALS1(config)#vtp domain UNAD
ALS1(config)#vtp version 3
ALS1(config)#vtp password cisco123
```

```
ALS1(config)#vtp domain UNAD
Domain name already set to UNAD.
ALS1(config)#vtp version 3
ALS1(config)#vtp password cisco123
Setting device VTP password to cisco123
ALS1(config)#
```

Figura 71 activación de vtp versión 3

```
ALS2(config)#vtp domain UNAD
ALS2(config)#vtp version 3
ALS2(config)#vtp password cisco123
```

```
ALS2(config)#vtp domain UNAD
Domain name already set to UNAD.
ALS2(config)#vtp version 3
ALS2(config)#vtp password cisco123
Setting device VTP password to cisco123
ALS2(config)#
```

Figura 72 Figura 72 activación de vtp versión 3

2) Configurar DLS1 como servidor principal para las VLAN.

```
DLS1#vtp primary vlan
```

```
DLS1#vtp primary vlan
*Dec  6 17:29:55.498: %SYS-5-CONFIG_I: Configured from console by console
DLS1#vtp primary vlan
This system is becoming primary server for feature vlan
```

Figura 73 configuración DLS 1 como servidor para las vlan

3) Configurar ALS1 y ALS2 como clientes VTP.

```
ALS1(config)#vtp mode client
```

```
ALS1(config)#vtp mode client
Setting device to VTP Client mode for VLANS.
ALS1(config)#
```

Figura 74 configuración de como vtp cliente

```
ALS2(config)#vtp mode client
```

```
ALS2(config)#vtp mode client
Setting device to VTP Client mode for VLANS.
ALS2(config)#
```

Figura 75 configuración de como vtp cliente

e. Configurar en el servidor principal las siguientes VLAN:

Número de VLAN	Nombre de VLAN	Número de VLAN	Nombre de VLAN
800	NATIVA	434	ESTACIONAMIENTO
12	EJECUTIVOS	123	MANTENIMIENTO
234	HUESPEDES	1010	VOZ
1111	VIDEONET	3456	ADMINISTRACIÓN

Tabla 3 Vlan a crear con sus nombres

```

DLS1(config)#vlan 800
DLS1(config-vlan)#name NATIVA
DLS1(config-vlan)#exit
DLS1(config)#vlan 434
DLS1(config-vlan)#name ESTACIONAMIENTO
DLS1(config-vlan)#state suspend
DLS1(config-vlan)#exit
DLS1(config)#vlan 12
DLS1(config-vlan)#name EJECUTIVOS
DLS1(config-vlan)#exit
DLS1(config)#vlan 123
DLS1(config-vlan)#name MANTENIMIENTO
DLS1(config-vlan)#exit
DLS1(config)#vlan 234
DLS1(config-vlan)#name HUESPEDES
DLS1(config-vlan)#exit
DLS1(config)#vlan 1010
DLS1(config-vlan)#name VOZ
DLS1(config-vlan)#exit
DLS1(config)#vlan 1111
DLS1(config-vlan)#name VIDEONET
DLS1(config-vlan)#exit
DLS1(config)#vlan 3456
DLS1(config-vlan)#name ADMINISTRACION
DLS1(config-vlan)#exit

```

```

DLS1(config)#vlan 800
DLS1(config-vlan)#name NATIVA
DLS1(config-vlan)#exit
DLS1(config)#vlan 434
DLS1(config-vlan)#name ESTACIONAMIENTO
DLS1(config-vlan)#state suspend
DLS1(config-vlan)#exit
DLS1(config)#vlan 12
DLS1(config-vlan)#name EJECUTIVOS
DLS1(config-vlan)#exit
DLS1(config)#vlan 123
DLS1(config-vlan)#name MANTENIMIENTO
DLS1(config-vlan)#exit
DLS1(config)#vlan 234
DLS1(config-vlan)#name HUESPEDES
DLS1(config-vlan)#exit
DLS1(config)#vlan 1010
DLS1(config-vlan)#name VOZ
DLS1(config-vlan)#exit
DLS1(config)#vlan 1111
DLS1(config-vlan)#name VIDEONET
DLS1(config-vlan)#exit
DLS1(config)#vlan 3456
DLS1(config-vlan)#name ADMINISTRACION
DLS1(config-vlan)#exit

```

Figura 76 creación de vlan´s según tabla 2

f. En DLS1, suspender la VLAN 434.

```

DLS1(config)#vlan 434
DLS1(config-vlan)#name ESTACIONAMIENTO
DLS1(config-vlan)#state suspend

```

```

DLS1(config)#vlan 434
DLS1(config-vlan)#name ESTACIONAMIENTO
DLS1(config-vlan)#state suspend
DLS1(config-vlan)#

```

Figura 77 colocar la vlan 434 como suspend

g. Configurar DLS2 en modo VTP transparente VTP utilizando VTP versión 2, y configurar en DLS2 las mismas VLAN que en DLS1.

```
DLS2(config)#vtp version 2
```

```
DLS2(config)#vtp mode transparent
```

```
DLS2 (config) #vtp version 2
DLS2 (config) #vtp mode transparent
Setting device to VTP Transparent mode for VLANs.
DLS2 (config) #vlan 800
DLS2 (config-vlan) #name NATIVA
DLS2 (config-vlan) #exit
DLS2 (config) #vlan 434
DLS2 (config-vlan) #name ESTACIONAMIENTO
DLS2 (config-vlan) #state suspend
DLS2 (config-vlan) #exit
DLS2 (config) #vlan 12
DLS2 (config-vlan) #name EJECUTIVOS
DLS2 (config-vlan) #exit
DLS2 (config) #vlan 123
DLS2 (config-vlan) #name MANTENIMIENTO
DLS2 (config-vlan) #exit
DLS2 (config) #vlan 234
DLS2 (config-vlan) #name HUESPEDES
DLS2 (config-vlan) #exit
DLS2 (config) #vlan 1010
DLS2 (config-vlan) #name VOZ
DLS2 (config-vlan) #exit
DLS2 (config) #vlan 1111
DLS2 (config-vlan) #name VIDEONET
DLS2 (config-vlan) #exit
DLS2 (config) #vlan 3456
DLS2 (config-vlan) #name ADMINISTRACION
DLS2 (config-vlan) #exit
```

Figura 78 configurar vtp versión 2 y las vlan según tabla 1 en DLS2.

h. Suspende VLAN 434 en DLS2.

```
DLS2(config)#vlan 434
DLS2(config-vlan)#name ESTACIONAMIENTO
DLS2(config-vlan)#state suspend
```

```
DLS2 (config) #vlan 434
DLS2 (config-vlan) #name ESTACIONAMIENTO
DLS2 (config-vlan) #state suspend
DLS2 (config-vlan) #
```

Figura 79 colocar la vlan 434 como suspend

i. En DLS2, crear VLAN 567 con el nombre de CONTABILIDAD. La VLAN de CONTABILIDAD no podrá estar disponible en cualquier otro Switch de la red.

```
DLS2(config)#vlan 567
DLS2(config-vlan)#name CONTABILIDAD
DLS2(config-vlan)#exit
```

```
DLS2 (config-vlan) #vlan 567
DLS2 (config-vlan) #name CONTABILIDAD
DLS2 (config-vlan) #EXIT
```

Figura 80 creación de la vlan 534 en DLS 2

j. Configurar DLS1 como Spanning tree root para las VLAN 1, 12, 434, 800, 1010, 1111 y 3456 y como raíz secundaria para las VLAN 123 y 234.

```
DLS1(config)#spanning-tree vlan 1,12,434,800,1010,1111,3456 root primary
DLS1(config)#spanning-tree vlan 123,234 root secondary
```

```
DLS1 (config) #spanning-tree vlan 1,12,434,800,1010,1111,3456 root primary
DLS1 (config) #spanning-tree vlan 123,234 root secondary
DLS1 (config) #
```

Figura 81 creación Spanning tree root

k. Configurar DLS2 como Spanning tree root para las VLAN 123 y 234 y como una raíz secundaria para las VLAN 12, 434, 800, 1010, 1111 y 3456.

```
DLS2(config)#spanning-tree vlan 123,234 root primary
DLS2(config)#spanning-tree vlan 1,12,434,800,1010,1111,3456 root secondary
```

```
DLS2(config)#spanning-tree vlan 123,234 root primary
DLS2(config)#spanning-tree vlan 1,12,434,800,1010,1111,3456 root secondary
```

Figura 82 creación Spanning tree root

l. Configurar todos los puertos como troncales de tal forma que solamente las VLAN que se han creado se les permitirá circular a través de éstos puertos.

```
DLS1(config)#int range Et0/0-3
DLS1(config-if-range)#switchport trunk allowed vlan
12,123,234,800,1010,1111,3456
```

```
DLS1(config)#int range Et0/0-3
DLS1(config-if-range)#$trunk allowed vlan 12,123,234,800,1010,1111,3456
```

Figura 83 configurar los puertos como troncal

```
DLS2(config)#int range Et0/0-3
DLS2(config-if-range)# switchport trunk allowed vlan
12,123,234,800,1010,1111,3456
```

```
DLS2(config)#int range Et0/0-3
DLS2(config-if-range)#$trunk allowed vlan 12,123,234,800,1010,1111,3456
DLS2(config-if-range)#
```

Figura 84 configurar los puertos como troncal

```
ALS1(config)#int range Et0/0-3
ALS1(config-if-range)# switchport trunk allowed vlan
12,123,234,800,1010,1111,3456
```

```
ALS1(config)#int range Et0/0-3
ALS1(config-if-range)#$trunk allowed vlan 12,123,234,800,1010,1111,3456
ALS1(config-if-range)#
```

Figura 85 configurar los puertos como troncal

```
ALS2(config)#int range Et0/0-3
ALS2(config-if-range)# switchport trunk allowed vlan
12,123,234,800,1010,1111,3456
```

```
ALS2(config)#int range Et0/0-3
ALS2(config-if-range)#$trunk allowed vlan 12,123,234,800,1010,1111,3456
ALS2(config-if-range)#
```

Figura 86 configurar los puertos como troncal

m. Configurar las siguientes interfaces como puertos de acceso, asignados a las VLAN de la siguiente manera:

```
DLS1(config)#int Et1/2
DLS1(config-if)#switchport host
DLS1(config-if)#switchport mode access
DLS1(config-if)#switchport access vlan 3456
DLS1(config-if)#no shutdown
```

```
DLS1(config)#int Et1/2
DLS1(config-if)#switchport host
switchport mode will be set to access
spanning-tree portfast will be enabled
channel group will be disabled

DLS1(config-if)#switchport mode access
DLS1(config-if)#switchport access vlan 3456
DLS1(config-if)#no shutdown
DLS1(config-if)#
```

Figura 87 configurar las interfaces como puerto de acceso

```
DLS1(config-if)#int Et1/3
DLS1(config-if)#switchport host
DLS1(config-if)#switchport mode access
DLS1(config-if)#switchport access vlan 1111
DLS1(config-if)#no shutdown
```

```
DLS1(config)#int Et1/3
DLS1(config-if)#switchport host
switchport mode will be set to access
spanning-tree portfast will be enabled
channel group will be disabled

DLS1(config-if)#switchport mode access
DLS1(config-if)#switchport access vlan 1111
DLS1(config-if)#no shutdown
DLS1(config-if)#
```

Figura 88 configurar las interfaces como puerto de acceso

```
DLS2(config)#int Et1/2
DLS2(config-if)#switchport mode access
DLS2(config-if)#switchport access vlan 12
DLS2(config-if)#switchport host
DLS2(config-if)#no shut
DLS2(config-if)#int Et1/2
DLS2(config-if)#switchport host
DLS2(config-if)#switchport mode access
DLS2(config-if)#switchport access vlan 1010
DLS2(config-if)#no shutdown
DLS2(config-if)#int Et1/3
DLS2(config-if)#switchport host
DLS2(config-if)#switchport mode access
DLS2(config-if)#switchport access vlan 1111
DLS2(config-if)#no shutdown
DLS2(config-if)#int range Et2/1-2
DLS2(config-if-range)#switchport host
DLS2(config-if-range)#switchport mode access
DLS2(config-if-range)#switchport access vlan 567
DLS2(config-if-range)#no shutdown
```

```

DLS2(config)#int Et1/2
DLS2(config-if)#switchport mode access
DLS2(config-if)#switchport access vlan 12
DLS2(config-if)#switchport host
switchport mode will be set to access
spanning-tree portfast will be enabled
channel group will be disabled

DLS2(config-if)#no shut
DLS2(config-if)#int Et1/2
DLS2(config-if)#switchport host
switchport mode will be set to access
spanning-tree portfast will be enabled
channel group will be disabled

DLS2(config-if)#switchport mode access
DLS2(config-if)#switchport access vlan 1010
DLS2(config-if)#no shutdown
DLS2(config-if)#int Et1/3
DLS2(config-if)#switchport host
switchport mode will be set to access
spanning-tree portfast will be enabled
channel group will be disabled

DLS2(config-if)#switchport mode access
DLS2(config-if)#switchport access vlan 1111
DLS2(config-if)#no shutdown
DLS2(config-if)#int range Et2/1-2
DLS2(config-if-range)#switchport host
switchport mode will be set to access
spanning-tree portfast will be enabled
channel group will be disabled

DLS2(config-if-range)#switchport mode access
DLS2(config-if-range)#switchport access vlan 567
DLS2(config-if-range)#no shutdown

```

Figura 89 configurar las interfaces como puerto de acceso

```

ALS1(config)#int Et1/2
ALS1(config-if)#switchport host
ALS1(config-if)#switchport mode access
ALS1(config-if)#switchport access vlan 123
ALS1(config-if)#switchport access vlan 1010
ALS1(config-if)#no shutdown

```

```

ALS1(config-if)#int Et1/3
ALS1(config-if)#switchport host
ALS1(config-if)#switchport mode access
ALS1(config-if)#switchport access vlan 1111
ALS1(config-if)#no shutdown

```

```
ALS1(config)#int Et1/2
ALS1(config-if)#switchport host
switchport mode will be set to access
spanning-tree portfast will be enabled
channel group will be disabled

ALS1(config-if)#switchport mode access
ALS1(config-if)#switchport access vlan 123
ALS1(config-if)#switchport access vlan 1010
ALS1(config-if)#no shutdown
ALS1(config-if)#int Et1/3
ALS1(config-if)#switchport host
switchport mode will be set to access
spanning-tree portfast will be enabled
channel group will be disabled

ALS1(config-if)#switchport mode access
ALS1(config-if)#switchport access vlan 1111
ALS1(config-if)#no shutdown
ALS1(config-if)#
```

Figura 90 configurar las interfaces como puerto de acceso

```
ALS2(config)#int Et1/2
ALS2(config-if)#switchport host
ALS2(config-if)#switchport mode access
ALS2(config-if)#switchport access vlan 234
ALS2(config-if)#no shutdown

ALS2(config-if)#int Et1/3
ALS2(config-if)#switchport host
ALS2(config-if)#switchport mode access
ALS2(config-if)#switchport access vlan 1111
ALS2(config-if)#no shutdown
```

```
ALS2(config)#int Et1/2
ALS2(config-if)#switchport host
switchport mode will be set to access
spanning-tree portfast will be enabled
channel group will be disabled

ALS2(config-if)#switchport mode access
ALS2(config-if)#switchport access vlan 234
ALS2(config-if)#no shutdown
ALS2(config-if)#int Et1/3
ALS2(config-if)#switchport host
switchport mode will be set to access
spanning-tree portfast will be enabled
channel group will be disabled

ALS2(config-if)#switchport mode access
ALS2(config-if)#switchport access vlan 1111
ALS2(config-if)#no shutdown
ALS2(config-if)#
*Dec  6 17:52:12.233: %LINK-3-UPDOWN: Interface E
*Dec  6 17:52:13.238: %LINEPROTO-5-UPDOWN: Line p
tate to up
ALS2(config-if)#
```

Figura 91 configurar las interfaces como puerto de acceso

Part 2: conectividad de red de prueba y las opciones configuradas.

- Verificar la existencia de las VLAN correctas en todos los switches y la asignación de puertos troncales y de acceso.

```
DLS1#show interfaces trunk

Port      Mode          Encapsulation  Status      Native vlan
Et0/0     on            802.1q         trunking    800
Et0/1     on            802.1q         trunking    800
Et0/2     on            802.1q         trunking    800
Et0/3     on            802.1q         trunking    800

Port      Vlans allowed on trunk
Et0/0     12,123,234,800,1010,1111,3456
Et0/1     12,123,234,800,1010,1111,3456
Et0/2     12,123,234,800,1010,1111,3456
Et0/3     12,123,234,800,1010,1111,3456

Port      Vlans allowed and active in management domain
Et0/0     12,123,234,800,1010,1111,3456
Et0/1     12,123,234,800,1010,1111,3456
Et0/2     12,123,234,800,1010,1111,3456
Et0/3     12,123,234,800,1010,1111,3456

Port      Vlans in spanning tree forwarding state and not pruned
Et0/0     12,123,234,800,1010,1111,3456
Et0/1     12,800,1010,1111,3456
Et0/2     12,800,1010,1111,3456
Et0/3     12,800,1010,1111,3456
```

Figura 92 verificación de la configuración aplicada

```
DLS2#show interfaces trunk

Port      Mode          Encapsulation  Status      Native vlan
Et0/0     on            802.1q         trunking    800
Et0/1     on            802.1q         trunking    800
Et0/2     on            802.1q         trunking    800
Et0/3     on            802.1q         trunking    800

Port      Vlans allowed on trunk
Et0/0     12,123,234,800,1010,1111,3456
Et0/1     12,123,234,800,1010,1111,3456
Et0/2     12,123,234,800,1010,1111,3456
Et0/3     12,123,234,800,1010,1111,3456

Port      Vlans allowed and active in management domain
Et0/0     12,123,234,800,1010,1111,3456
Et0/1     12,123,234,800,1010,1111,3456
Et0/2     12,123,234,800,1010,1111,3456
Et0/3     12,123,234,800,1010,1111,3456

Port      Vlans in spanning tree forwarding state and not pruned
Et0/0     123,234
Et0/1     123,234
Et0/2     12,123,234,800,1010,1111,3456
Et0/3     123,234
```

Figura 93 verificación de la configuración aplicada

```

ALS1#show interfaces trunk

Port      Mode      Encapsulation  Status      Native vlan
Et0/0     on        802.1q         trunking    800
Et0/1     on        802.1q         trunking    800
Et0/2     on        802.1q         trunking    800
Et0/3     on        802.1q         trunking    800

Port      Vlans allowed on trunk
Et0/0     12,123,234,800,1010,1111,3456
Et0/1     12,123,234,800,1010,1111,3456
Et0/2     12,123,234,800,1010,1111,3456
Et0/3     12,123,234,800,1010,1111,3456

Port      Vlans allowed and active in management domain
Et0/0     12,123,234,800,1010,1111,3456
Et0/1     12,123,234,800,1010,1111,3456
Et0/2     12,123,234,800,1010,1111,3456
Et0/3     12,123,234,800,1010,1111,3456

Port      Vlans in spanning tree forwarding state and not pruned
Et0/0     12,123,234,800,1010,1111,3456
Et0/1     123,234
Et0/2     12,123,234,800,1010,1111,3456
Et0/3     12,800,1010,1111,3456

```

Figura 94 verificación de la configuración aplicada

```

ALS2#show interfaces trunk

Port      Mode      Encapsulation  Status      Native vlan
Et0/0     on        802.1q         trunking    800
Et0/1     on        802.1q         trunking    800
Et0/2     on        802.1q         trunking    800
Et0/3     on        802.1q         trunking    800

Port      Vlans allowed on trunk
Et0/0     12,123,234,800,1010,1111,3456
Et0/1     12,123,234,800,1010,1111,3456
Et0/2     12,123,234,800,1010,1111,3456
Et0/3     12,123,234,800,1010,1111,3456

Port      Vlans allowed and active in management domain
Et0/0     12,123,234,800,1010,1111,3456
Et0/1     12,123,234,800,1010,1111,3456
Et0/2     12,123,234,800,1010,1111,3456
Et0/3     12,123,234,800,1010,1111,3456

Port      Vlans in spanning tree forwarding state and not pruned
Et0/0     12,123,234,800,1010,1111,3456
Et0/1     12,800,1010,1111,3456
Et0/2     12,123,234,800,1010,1111,3456
Et0/3     123,234

```

Figura 95 verificación de la configuración aplicada

Anexo de script de configuración aplicada a los dispositivos DLS1.

DLS1 configuracion.

```
spanning-tree mode pvst
spanning-tree extend system-id
spanning-tree vlan 1,12,434,800,1010,1111,3456 priority 24576
spanning-tree vlan 123,234 priority 28672
!
vlan internal allocation policy ascending
!
ip tcp synwait-time 5
!
interface Port-channel12
no switchport
ip address 10.12.12.1 255.255.255.252
!
interface Port-channel1
no switchport
no ip address
!
interface Port-channel4
no switchport
no ip address
!
interface Ethernet0/0
switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
switchport trunk encapsulation dot1q
switchport trunk native vlan 800
switchport nonegotiate
switchport mode trunk
duplex auto
!
interface Ethernet0/1
switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
switchport trunk encapsulation dot1q
switchport trunk native vlan 800
switchport nonegotiate
switchport mode trunk
duplex auto
!
interface Ethernet0/2
switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
switchport trunk encapsulation dot1q
switchport trunk native vlan 800
```

```

switchport nonegotiate
switchport mode trunk
duplex auto
!
interface Ethernet0/3
switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
switchport trunk encapsulation dot1q
switchport trunk native vlan 800
switchport nonegotiate
switchport mode trunk
duplex auto
!
interface Ethernet1/0
no switchport
no ip address
duplex auto
channel-group 12 mode active
!
interface Ethernet1/1
no switchport
no ip address
duplex auto
channel-group 12 mode active
!
interface Ethernet1/2
switchport access vlan 3456
switchport mode access
spanning-tree portfast
!
interface Ethernet1/3
switchport access vlan 1111
switchport mode access
spanning-tree portfast

```

DLS2 configuracion.

```

vtp domain UNAD
vtp mode transparent
no ip icmp rate-limit unreachable
!
no ip domain-lookup
ip cef
no ipv6 cef
!
spanning-tree mode pvst

```

```
spanning-tree extend system-id
spanning-tree vlan 1,12,434,800,1010,1111,3456 priority 28672
spanning-tree vlan 123,234 priority 24576
!
vlan internal allocation policy ascending
!
vlan 12
  name EJECUTIVOS
!
vlan 123
  name MANTENIMIENTO
!
vlan 234
  name HUESPEDES
!
vlan 434
  name ESTACIONAMIENTO
  state suspend
!
vlan 567
  name CONTABILIDAD
!
vlan 800
  name NATIVA
!
vlan 1010
  name VOZ
!
vlan 1111
  name VIDEONET
!
vlan 3456
  name ADMINISTRACION
!
ip tcp synwait-time 5
!
interface Port-channel3
  no switchport
  no ip address
!
interface Port-channel2
  no switchport
  no ip address
!
interface Port-channel12
```

```

no switchport
ip address 10.12.12.2 255.255.255.252
!
interface Ethernet0/0
switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
switchport trunk encapsulation dot1q
switchport trunk native vlan 800
switchport nonegotiate
switchport mode trunk
duplex auto
!
interface Ethernet0/1
switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
switchport trunk encapsulation dot1q
switchport trunk native vlan 800
switchport nonegotiate
switchport mode trunk
duplex auto
!
interface Ethernet0/2
switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
switchport trunk encapsulation dot1q
switchport trunk native vlan 800
switchport nonegotiate
switchport mode trunk
duplex auto
!
interface Ethernet0/3
switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
switchport trunk encapsulation dot1q
switchport trunk native vlan 800
switchport nonegotiate
switchport mode trunk
duplex auto
!
interface Ethernet1/0
no switchport
no ip address
duplex auto
channel-group 12 mode active
!
interface Ethernet1/1
no switchport
no ip address
duplex auto

```

```

channel-group 12 mode active
!
interface Ethernet1/2
switchport access vlan 1010
switchport mode access
spanning-tree portfast
!
interface Ethernet1/3
switchport access vlan 1111
switchport mode access
spanning-tree portfast
!
interface Ethernet2/0
!
interface Ethernet2/1
switchport access vlan 567
switchport mode access
spanning-tree portfast
!
interface Ethernet2/2
switchport access vlan 567
switchport mode access
spanning-tree portfast

```

ALS 1 configuracion

```

interface Port-channel3
no switchport
no ip address
!
interface Port-channel1
no switchport
no ip address
!
interface Ethernet0/0
switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
switchport trunk encapsulation dot1q
switchport trunk native vlan 800
switchport nonegotiate
switchport mode trunk
duplex auto
!
interface Ethernet0/1
switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
switchport trunk encapsulation dot1q

```

```

switchport trunk native vlan 800
switchport nonegotiate
switchport mode trunk
duplex auto
!
interface Ethernet0/2
switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
switchport trunk encapsulation dot1q
switchport trunk native vlan 800
switchport nonegotiate
switchport mode trunk
duplex auto
!
interface Ethernet0/3
switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
switchport trunk encapsulation dot1q
switchport trunk native vlan 800
switchport nonegotiate
switchport mode trunk
duplex auto
!
interface Ethernet1/0
shutdown
!
interface Ethernet1/1
shutdown
!
interface Ethernet1/2
switchport access vlan 1010
switchport mode access
spanning-tree portfast
!
interface Ethernet1/3
switchport access vlan 1111
switchport mode access
spanning-tree portfast
ALS 2 configuracion.

interface Port-channel2
no switchport
no ip address
!
interface Port-channel4
no switchport
no ip address

```

```

!
interface Ethernet0/0
 switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 800
 switchport nonegotiate
 switchport mode trunk
 duplex auto
!
interface Ethernet0/1
 switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 800
 switchport nonegotiate
 switchport mode trunk
 duplex auto
!
interface Ethernet0/2
 switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 800
 switchport nonegotiate
 switchport mode trunk
 duplex auto
!
interface Ethernet0/3
 switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 800
 switchport nonegotiate
 switchport mode trunk
 duplex auto
!
interface Ethernet1/0
 shutdown
!
interface Ethernet1/1
 shutdown
!
interface Ethernet1/2
 switchport access vlan 234
 switchport mode access
 spanning-tree portfast
!
interface Ethernet1/3

```

```
switchport access vlan 1111
switchport mode access
spanning-tree portfast
!
interface Ethernet2/0
!
interface Ethernet2/1
!
interface Ethernet2/2
!
interface Ethernet2/3
!
interface Ethernet3/0
!
interface Ethernet3/1
!
interface Ethernet3/2
!
interface Ethernet3/3
!
interface Vlan1
no ip address
```

b. Verificar que el EtherChannel entre **DLS1** y **ALS1** está configurado correctamente

```
ALS1#show interfaces port-channel 1
Port-channell is up, line protocol is up (connected)
Hardware is EtherChannel, address is 0000.0000.0000 (bia 0000.0000.0000)
MTU 1500 bytes, BW 10000 Kbit/sec, DLY 1000 usec,
  reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Auto-duplex, Auto-speed, media type is unknown
input flow-control is off, output flow-control is unsupported
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:01, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
 1338 packets input, 142871 bytes, 0 no buffer
Received 1338 broadcasts (0 IP multicasts)
 0 runts, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
 0 input packets with dribble condition detected
 0 packets output, 0 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets
 0 unknown protocol drops
 0 babbles, 0 late collision, 0 deferred
 0 lost carrier, 0 no carrier
 0 output buffer failures, 0 output buffers swapped out
```

Figura 96 verificación de la configuración aplicada

```
DLS1#show interfaces port-channel 1
Port-channell is up, line protocol is up (connected)
Hardware is EtherChannel, address is 0000.0000.0000 (bia 0000.0000.0000)
MTU 1500 bytes, BW 10000 Kbit/sec, DLY 1000 usec,
  reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Auto-duplex, Auto-speed, media type is unknown
input flow-control is off, output flow-control is unsupported
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:00, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
 426 packets input, 38650 bytes, 0 no buffer
Received 426 broadcasts (0 IP multicasts)
 0 runts, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
 0 input packets with dribble condition detected
 0 packets output, 0 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets
 0 unknown protocol drops
 0 babbles, 0 late collision, 0 deferred
 0 lost carrier, 0 no carrier
 0 output buffer failures, 0 output buffers swapped out
```

Figura 97 verificación de la configuración aplica

c. Verificar la configuración de Spanning tree entre **DLS1** o **DLS2** para cada VLAN.

DLS1#show spanning-tree

VLAN0001

Spanning tree enabled protocol ieee

Root ID Priority 24577

Address aabb.cc00.0100

This bridge is the root

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 24577 (priority 24576 sys-id-ext 1)

Address aabb.cc00.0100

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et2/0	Desg	FWD	100	128.9	Shr
Et2/1	Desg	FWD	100	128.10	Shr
Et2/2	Desg	FWD	100	128.11	Shr
Et2/3	Desg	FWD	100	128.12	Shr
Et3/0	Desg	FWD	100	128.13	Shr
Et3/1	Desg	FWD	100	128.14	Shr
Et3/2	Desg	FWD	100	128.15	Shr
Et3/3	Desg	FWD	100	128.16	Shr

VLAN0012

Spanning tree enabled protocol ieee

Root ID Priority 24588

Address aabb.cc00.0100

This bridge is the root

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 24588 (priority 24576 sys-id-ext 12)

Address aabb.cc00.0100

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr

VLAN0123

Spanning tree enabled protocol ieee

Root ID Priority 24699

Address aabb.cc00.0200

Cost 200

Port 3 (Ethernet0/2)

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 28795 (priority 28672 sys-id-ext 123)

Address aabb.cc00.0100

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/2	Root	FWD	100	128.3	Shr
Et0/3	Altn	BLK	100	128.4	Shr

VLAN0234

Spanning tree enabled protocol ieee

Root ID Priority 24810

Address aabb.cc00.0200

Cost 200

Port 3 (Ethernet0/2)

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 28906 (priority 28672 sys-id-ext 234)

Address aabb.cc00.0100

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/2	Root	FWD	100	128.3	Shr
Et0/3	Altn	BLK	100	128.4	Shr

VLAN0800

Spanning tree enabled protocol ieee

Root ID Priority 25376

Address aabb.cc00.0100

This bridge is the root

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 25376 (priority 24576 sys-id-ext 800)

Address aabb.cc00.0100

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr

VLAN1010

Spanning tree enabled protocol ieee

Root ID Priority 25586

Address aabb.cc00.0100

This bridge is the root

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 25586 (priority 24576 sys-id-ext 1010)

Address aabb.cc00.0100

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr

VLAN1111

Spanning tree enabled protocol ieee

Root ID Priority 25687

Address aabb.cc00.0100

This bridge is the root

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 25687 (priority 24576 sys-id-ext 1111)

Address aabb.cc00.0100

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr
Et1/3	Desg	FWD	100	128.8	Shr Edge

VLAN3456

Spanning tree enabled protocol ieee

Root ID Priority 28032

Address aabb.cc00.0100

This bridge is the root

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 28032 (priority 24576 sys-id-ext 3456)

Address aabb.cc00.0100

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr
Et1/2	Desg	FWD	100	128.7	Shr Edge

DLS2#show spanning-tree

VLAN0001

Spanning tree enabled protocol ieee

Root ID Priority 28673

Address aabb.cc00.0200

This bridge is the root

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 28673 (priority 28672 sys-id-ext 1)

Address aabb.cc00.0200

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et2/0	Desg	FWD	100	128.9	Shr
Et2/3	Desg	FWD	100	128.12	Shr
Et3/0	Desg	FWD	100	128.13	Shr
Et3/1	Desg	FWD	100	128.14	Shr
Et3/2	Desg	FWD	100	128.15	Shr
Et3/3	Desg	FWD	100	128.16	Shr

VLAN0012

Spanning tree enabled protocol ieee

Root ID Priority 24588

Address aabb.cc00.0100

Cost 200
Port 1 (Ethernet0/0)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 28684 (priority 28672 sys-id-ext 12)
Address aabb.cc00.0200
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/0	Root	FWD	100	128.1	Shr
Et0/1	Altn	BLK	100	128.2	Shr
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr

VLAN0123

Spanning tree enabled protocol ieee
Root ID Priority 24699
Address aabb.cc00.0200
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 24699 (priority 24576 sys-id-ext 123)
Address aabb.cc00.0200
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/0	Desg	FWD	100	128.1	Shr
Et0/1	Desg	FWD	100	128.2	Shr
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr

VLAN0234

Spanning tree enabled protocol ieee
Root ID Priority 24810
Address aabb.cc00.0200
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 24810 (priority 24576 sys-id-ext 234)
Address aabb.cc00.0200
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/0	Desg	FWD	100	128.1	Shr
Et0/1	Desg	FWD	100	128.2	Shr
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr

VLAN0567

Spanning tree enabled protocol ieee

Root ID Priority 33335

Address aabb.cc00.0200

This bridge is the root

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 33335 (priority 32768 sys-id-ext 567)

Address aabb.cc00.0200

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et2/1	Desg	FWD	100	128.10	Shr Edge
Et2/2	Desg	FWD	100	128.11	Shr Edge

VLAN0800

Spanning tree enabled protocol ieee

Root ID Priority 25376

Address aabb.cc00.0100

Cost 200

Port 1 (Ethernet0/0)

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 29472 (priority 28672 sys-id-ext 800)

Address aabb.cc00.0200

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/0	Root	FWD	100	128.1	Shr
Et0/1	Altn	BLK	100	128.2	Shr
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr

VLAN1010

Spanning tree enabled protocol ieee

Root ID Priority 25586
Address aabb.cc00.0100
Cost 200
Port 1 (Ethernet0/0)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 29682 (priority 28672 sys-id-ext 1010)
Address aabb.cc00.0200
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/0	Root	FWD	100	128.1	Shr
Et0/1	Altn	BLK	100	128.2	Shr
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr
Et1/2	Desg	FWD	100	128.7	Shr Edge

VLAN1111

Spanning tree enabled protocol ieee

Root ID Priority 25687
Address aabb.cc00.0100
Cost 200
Port 1 (Ethernet0/0)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 29783 (priority 28672 sys-id-ext 1111)
Address aabb.cc00.0200
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/0	Root	FWD	100	128.1	Shr
Et0/1	Altn	BLK	100	128.2	Shr
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr
Et1/3	Desg	FWD	100	128.8	Shr Edge

VLAN3456

Spanning tree enabled protocol ieee

Root ID Priority 28032

Address aabb.cc00.0100

Cost 200

Port 1 (Ethernet0/0)

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32128 (priority 28672 sys-id-ext 3456)

Address aabb.cc00.0200

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Et0/0	Root	FWD	100	128.1	Shr
Et0/1	Altn	BLK	100	128.2	Shr
Et0/2	Desg	FWD	100	128.3	Shr
Et0/3	Desg	FWD	100	128.4	Shr

CONCLUSIONES

En la ejecución del trabajo final practico tipo de prueba de habilidades CCNP se pudieron aplicar en gran escala cada una de las de las destrezas y conocimientos que se obtuvieron a lo largo del diplomado, aplicándolas en los escenarios propuestos buscando siempre un entorno acorde al estándar de la industria basado en casos.

Se realizaron las configuraciones a la medida de cada uno de los ejercicios, estableciendo los protocolos de enrutamiento a gran escala y direccionamiento de IP tanto en ipv4 como en ipv6, por los que se adquirieron grandes destrezas en los manejos de dispositivos como routers y switches, con sus respectivos servicios.

Demostrando así que se pudieron dar soluciones a las dificultades que se obtuvieron en el desarrollo de la prueba de habilidades prácticas y un excelente manejo del programa de GNS3 , y el SmartLabs.

Todos los protocolos de enrutamiento tienen el mismo propósito: conocer sobre redes remotas y adaptarse rápidamente cuando ocurre un cambio en la topología. El método que usa un protocolo de enrutamiento para lograr su propósito depende del algoritmo que use y de las características operativas de ese protocolo. Las operaciones de un protocolo de enrutamiento dinámico varían según el tipo de protocolo de enrutamiento y el protocolo de enrutamiento en sí.

EtherChannel es una tecnología de cisco construida de acuerdo con los estándares 802.3, el cual permite la agrupación lógica de varios enlaces físicos ethernet, la cual es tratada como un único enlace permitiendo así sumar la velocidad nominal de cada puerto físico ethernet usado y así obtener un único enlace troncal permitiendo el reparto de carga.

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