PRUEBA DE HABILIDADES PRÁCTICAS DIPLOMADO PROFUNDIZACIÓN CISCO CCNP

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INGENIERÍA DE TELECOMUNICACIONES

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Diplomado de profundización para grado

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NOTA DE ACEPTACION

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Presidente del jurado

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Jurado

Bogotá D.C 05 de mayo de 2018

AGRADECIMIENTOS

Al todopoderoso por permitirme avanzar en mi proceso de formación profesional y a todos los miembros de mi familia, por su apoyo incondicional.

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INTRODUCCIÓN

En la actualidad y gracias a los gigantescos avances tecnológicos en materia de Telecomunicaciones, se observa aún más el interés en los desafíos y retos frente al proceso de formación de los futuros Ingenieros. Por ello la importancia de enfatizar en el desarrollo de habilidades en temáticas de alta demanda y prepararlos para enfrentar los retos que implica dicho progreso.

El diplomado de profundización de CISCO CCNP, capacita a los estudiantes para instalar, configurar y operar redes locales y de área amplia, y para brindar servicios de acceso por marcación a organizaciones que tienen redes desde 100 hasta 500 nodos con protocolos y tecnologías tales como TCP/IP, OSPF, EIGRP, BGP, ISDN, Frame Relay, STP y VTP. Además de propender a que se adquieran habilidades y conocimientos avanzados sobre redes que nos permiten instalar, configurar y manejar redes LAN, WAN y servicios de acceso para organizaciones.

Es así como que se dispuso de un espacio denominado “Prueba de habilidades prácticas”, formando parte de las actividades evaluativas del Diplomado de Profundización CCNP, la cual busca identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado y a través de la cual se pondrá a prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking.

Dicho espacio permitió la redacción de este documento, el cual se divide en dos partes que corresponden, primero: en un escenario donde se deberán realizar la tareas acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red, y el segundo: acorde con los lineamientos establecidos para el direccionamiento IP, etherchannels, VLANs y demás aspectos que forman parte del escenario propuesto.

Teniendo en cuenta los lineamientos establecidos para la entrega de este documento, se dispuso a simular dichos procesos de configuración mediante el uso de las herramientas de Simulación Packet Tracer y GNS3. Lo anterior, vista la herramienta Laboratorio SmartLab, dispuesta por la UNAD como opción primaria, no permitió en ninguno de sus escenarios, llegar a la configuración de los parámetros requeridos.

En concordancia con lo anterior a continuación, este informe contiene las evidencias de configuración de los dispositivos para los escenarios planteados.

1. Descripción de escenarios propuestos para la prueba de habilidades

La evaluación denominada “Prueba de habilidades prácticas”, forma parte de las actividades evaluativas del Diplomado de Profundización CCNP, la cual busca identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado y a través de la cual se pondrá a prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking.

Para esta actividad, el estudiante dispone de cerca de dos semanas para realizar las tareas asignadas en cada uno de los escenarios propuestos, acompañado de los respectivos procesos de documentación de la solución, correspondientes al registro de la configuración de cada uno de los dispositivos, la descripción detallada del paso a paso de cada una de las etapas realizadas durante su desarrollo, el registro de los procesos de verificación de conectividad mediante el uso de comandos ping, traceroute, show ip route, entre otros.

Objetivo General:

Identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado CCNP.

Objetivos Específicos:

- Realizar configuración del escenario número 1, propuesto por la prueba de habilidades CCNP.
- Configurar las interfaces con las direcciones IPv4 e IPv6
- Ajustar ancho de banda y velocidad de reloj de las conexiones según lo apropiado.
- Configurar las familias de direcciones OSPFv3 para IPv4 e IPv6.
- Propagar rutas por defecto de IPv4 y IPv6, al interior del dominio OSPFv3.
- Realizar la configuración del protocolo EIGRP para IPv4 como IPv6.
- Configurar la redistribución mutua entre OSPF y EIGRP para IPv4 e IPv6.
- Realizar configuración del escenario número 2, propuesto por la prueba de habilidades CCNP.
- Configurar puertos troncales y Port-channels (LACP y PAgP).
- Configurar VTP versión 3
- Configurar Spanning tree root para las VLAN
- Configurar HSRP con interfaz tracking para VLAN.

3.1 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.

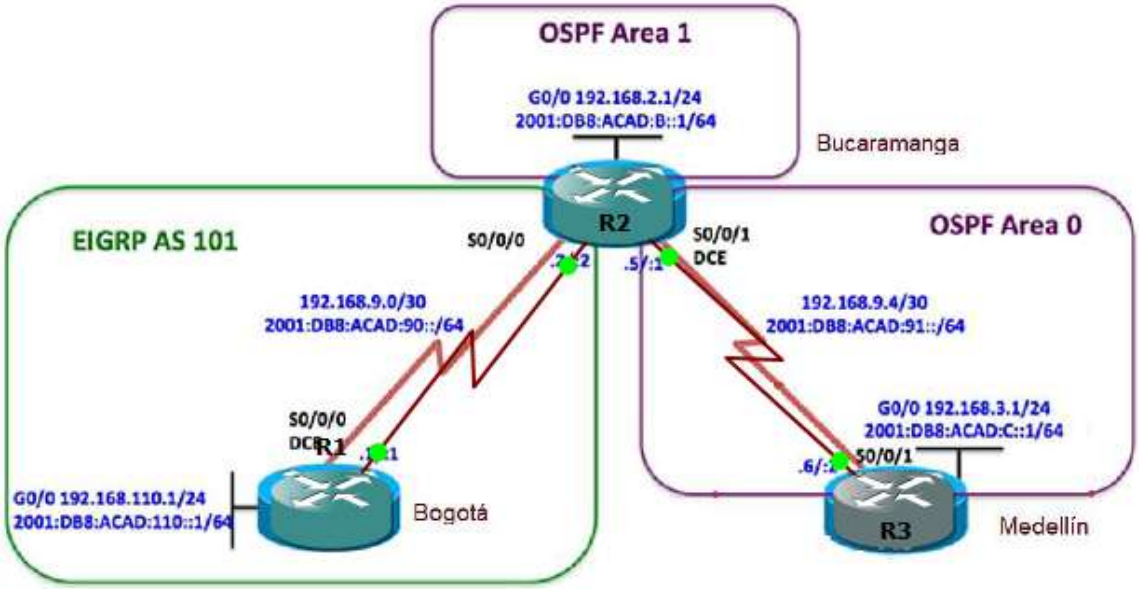


Figura 1. Topología de la Red escenario 1

Configurar la topología de red, de acuerdo con las siguientes especificaciones.

3.1.1 Parte 1: Configuración del escenario propuesto

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

Configuración parámetros (Ítem 1 y 2) en R1

R1#configure terminal
R1(config)#hostname R1
R1(config)#ipv6 unicast-routing

R1(config)#interface FastEthernet0/0
R1(config-if)#ip address 192.168.110.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acad:110::1/64
R1(config-if)#no shutdown
R1(config-if)#interface serial1/0
R1(config-if)#ip address 192.168.9.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acad:90::1/64
R1(config-if)#clock rate 128000
R1(config-if)#bandwidth 128
R1(config-if)#no shutdown
R1(config-if)#

Figura 1 configuración R1

Configuración parámetros (Ítem 1 y 2) en R2

R2(config)#hostname R2
R2(config)#ipv6 unicast-routing
R2(config)#interface FastEthernet0/0
R2(config-if)#ip address 192.168.2.1 255.255.255.0
R2(config-if)#ipv6 address 2001:db8:acad:b::1/64
R2(config-if)#no shutdown
R2(config-if)#interface serial1/0
R2(config-if)#ip address 192.168.9.2 255.255.255.0
R2(config-if)#ipv6 address 2001:db8:acad:90::2/64
R2(config-if)#bandwidth 128
R2(config-if)#no shutdown
R2(config-if)#interface serial1/1
R2(config-if)#interface serial1/1
R2(config-if)#ip address 192.168.9.5 255.255.255.0
R2(config-if)#ipv6 address 2001:db8:acad:91::1/64
R2(config-if)#clock rate 128000
R2(config-if)#bandwidth 128
R2(config-if)#no shutdown

Figura 2 Configuración R2

Configuración parámetros (Ítem 1 y 2) en R3

R3#configure terminal
R3(config)#hostname R3
R3(config)#ipv6 unicast-routing
R3(config)#interface FastEthernet0/0
R3(config-if)#ip address 192.168.3.1 255.255.255.0
R3(config-if)#ipv6 address 2001:db8:acad:c::1/64
R3(config-if)#no shutdown
R3(config-if)#interface serial1/0
R3(config-if)#ip address 192.168.9.6 255.255.255.0
R3(config-if)#ipv6 address 2001:db8:acad:91::2/64
R3(config-if)#bandwidth 128
R3(config-if)#no shutdown

Figura 3 Configuración 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.

Se utilizaron las siguientes instrucciones:

Para R2:

R2(config-if)#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-if)#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 4 Configuración OSPFV3 en R1Para R3

R3(config-if)#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 FastEthernet0/0
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 FastEthernet0/0
R3(config-router-af)#exit-address-family

```
R3#conf ter
Enter configuration commands, one per line.  End with CNTL/Z.
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 FastEthernet0/0
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 FastEthernet0/0
R3(config-router-af)#exit-address-family
R3(config-router)#exit
```

Figura 5 Configuración OSPFV3 en R3

4. En R2, configurar la interfaz F0/0 en el área 1 de OSPF y la conexión serial entre R2 y R3 en OSPF área 0.

Instrucciones utilizadas:

Para R2:

R2(config)#interface FastEthernet0/0
R2(config-if)#ospfv3 1 ipv4 area 1
R2(config-if)#ospfv3 1 ipv6 area 1
R2(config-if)#interface serial1/1
R2(config-if)#ospfv3 1 ipv4 area 0
R2(config-if)#ospfv3 1 ipv6 area 0

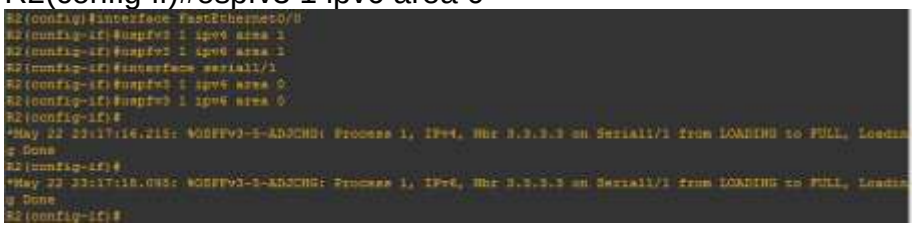


Figura 6 Configuración interfaz en el área 1 OSPFV3 en R2

5. En R3, configurar la interfaz F0/0 y la conexión serial entre R2 y R3 en OSPF área 0.

Instrucciones utilizadas:

R3(config)#interface FastEthernet0/0
R3(config-if)#ospfv3 1 ipv4 area 0
R3(config-if)#ospfv3 1 ipv6 area 0
R3(config-if)#interface serial1/0
R3(config-if)#ospfv3 1 ipv4 area 0
R3(config-if)#ospfv3 1 ipv6 area 0

Figura 7 Configuración interfaz en el área 0 OSPFV3 en R3

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

Configuración área 1

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#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
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 8 Configuración área totalmente Stubby en R2

7. 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
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#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
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 9 Propagación rutas por defecto 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.
9. Configurar las interfaces pasivas para EIGRP según sea apropiado.

Instrucciones utilizadas (Ítem 8 y 9).

R1#conf ter
R1(config)#router eigrp DUAL-STACK
R1(config-router)#address-family ipv4 unicast autonomous-system 4
R1(config-router-af)#af-interface FastEthernet0/0
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 FastEthernet0/0
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

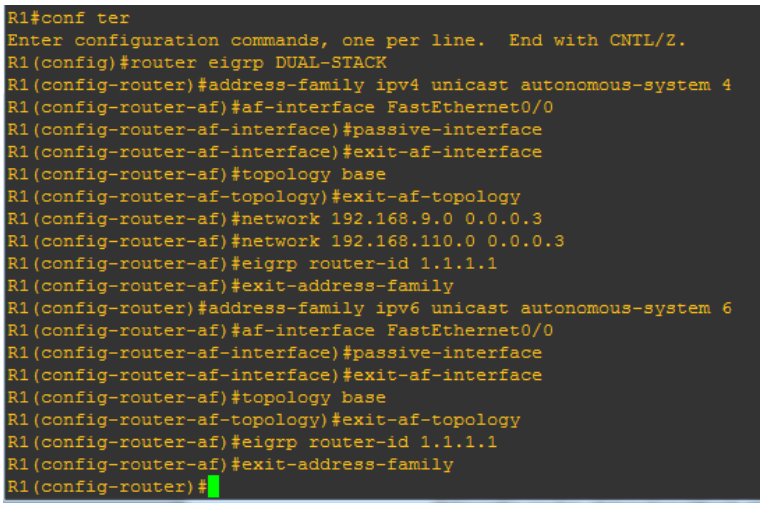


Figura 10 Configuración EIGRP en R1

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-af)#exit-address-family
R2(config-router)#address-family ipv6 unicast autonomous-system 6

R2(config-router-af)#af-interface FastEthernet0/0
R2(config-router-af-interface)#shutdown
R2(config-router-af-interface)#exit-af-interface
R2(config-router-af)#af-interface serial1/0
R2(config-router-af-interface)#shutdown
R2(config-router-af-interface)#exit-af-interface
R2(config-router-af-interface)#exit-af-interface
R2(config-router-af)#eigrp router-id 2.2.2.2
R2(config-router-af)#exit-address-family

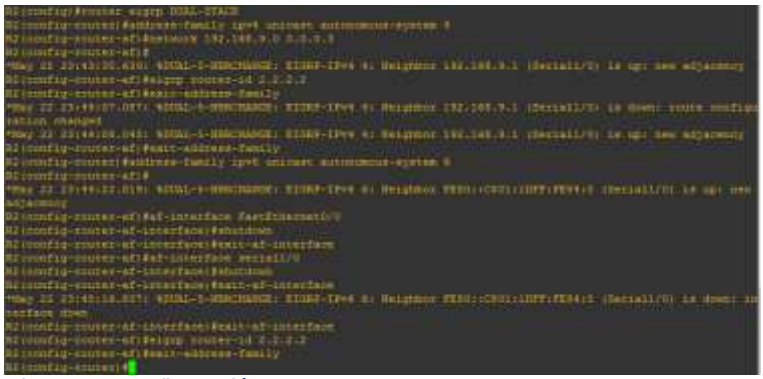


Figura 11 Configuración EIGRP en R2

R2#conf ter
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)#redistribute ospfv3 1 metric 10000 100 255 1 1500
R2(config-router-af-topology)#exit-af-topology

Figura 12 Configuración en R2

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

R2(config)#router eigrp DUAL-STACK
R2(config-router)#address-family ipv4 unicast autonomous-system 4
R2(config-router-af)#topology base

R2(config)#distribute-list R3-to-R1 out
R2(config-router-af-topology)#redistribute ospfv3 1 metric 10000 100 255 1 1500
R2(config-router-af-topology)#exit-af-topology
R2(config-router)#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

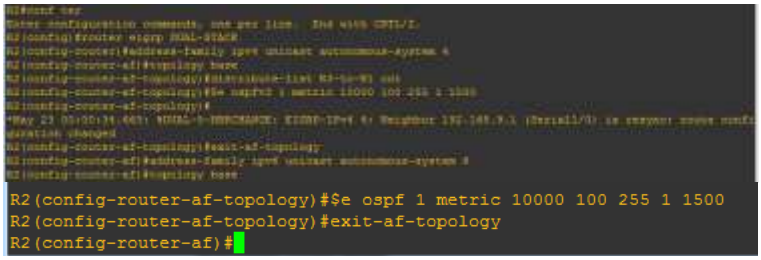


Figura 13 Redistribución mutua entre OSPF y EIGRP para IPv4 e IPv6 en R2

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

R2(config-router)#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

Figura 14 Publicidad de la ruta 192.168.3.0/24 a R1 mediante una lista de distribución y ACL en R2

R2(config)#router ospfv3 1
R2(config-router)#address-family ipv4 unicast
R2(config-router-af)#redistribute eigrp 4
R2(config-router-af)#address-family ipv6 unicast
R2(config-router-af)#redistribute eigrp 6
R2(config-router-af)#exit-address-family

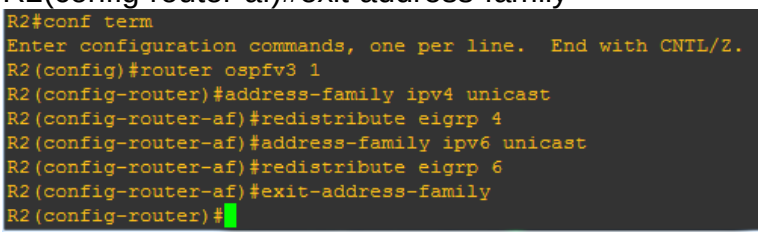


Figura 15 Publicidad de la ruta 192.168.3.0/24 a R1 mediante una lista de distribución y ACL en R2

3.1.2 Parte 2: Verificar conectividad de red y control de la trayectoria.

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

Verificación tabla de enrutamiento comando “show ip route”, “show ipv6 route”, “show ip eigrp neighbors”

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

Gateway of last resort is 192.168.9.2 to network 0.0.0.0

D*EX  0.0.0.0/0 [170/30702000] via 192.168.9.2, 00:16:18, Serial1/0
      192.168.9.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.9.0/24 is directly connected, Serial1/0
L        192.168.9.1/32 is directly connected, Serial1/0
```

Figura 16 Comando show ip route en R1

```
R1#show ipv6 route
IPv6 Routing Table - default - 3 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, l - LISP
C   2001:DB8:ACAD:90::/64 [0/0]
     via Serial1/0, directly connected
L   2001:DB8:ACAD:90::1/128 [0/0]
     via Serial1/0, receive
L   FF00::/8 [0/0]
     via Null0, receive
```

Figura 17 Comando show ipV6 route en 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             Se1/0                   13 00:36:08   16  1170  0  6
```

Figura 18 Comando show ip eigrp neighbors en R1

```
R1#show ipv6 eigrp neighbors
EIGRP-IPv6 VR(DUAL-STACK) Address-Family Neighbors for AS(6)
```

Figura 19 Comando show ipv6 eigrp neighbors en R1

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

Gateway of last resort is 192.168.9.6 to network 0.0.0.0

O*E2  0.0.0.0/0 [110/1] via 192.168.9.6, 00:14:19, Serial1/1
      192.168.9.0/24 is variably subnetted, 3 subnets, 2 masks
C        192.168.9.0/24 is directly connected, Serial1/1
                        is directly connected, Serial1/0
L        192.168.9.2/32 is directly connected, Serial1/0
L        192.168.9.5/32 is directly connected, Serial1/1
```

Figura 20 Comando show ip route en R2

```
R2#show ipv6 route
IPv6 Routing Table - default - 8 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, l - LISP
OE2 ::/0 [110/1], tag 1
     via FE80::C803:22FF:FE30:0, Serial1/1
C    2001:DB8:ACAD:90::/64 [0/0]
     via Serial1/0, directly connected
L    2001:DB8:ACAD:90::2/128 [0/0]
     via Serial1/0, receive
C    2001:DB8:ACAD:91::/64 [0/0]
     via Serial1/1, directly connected
L    2001:DB8:ACAD:91::1/128 [0/0]
     via Serial1/1, receive
L    FF00::/8 [0/0]
     via Null0, receive
```

Figura 21 Comando show ipv6 route en R2

```
R2#show ip eigrp neighbors
EIGRP-IPv4 VR(DUAL-STACK) Address-Family Neighbors for AS(6)
H   Address                 Interface              Hold Uptime   SRTT   RTO  Q  Seq
                                                   (sec)         (ms)       Cnt Num
0   192.168.9.1             Se1/0                    12 00:43:09   21  1170  0  8
R2#show ipv6 eigrp neighbors
EIGRP-IPv4 VR(DUAL-STACK) Address-Family Neighbors for AS(6)
```

Figura 22 Comando show ip eigrp neighbors en R2

```
R2#show ipv6 ospf
 Routing Process "ospfv3 1" with ID 2.2.2.2
 Event-log enabled, Maximum number of events: 1000, Mode: cyclic
 It is an autonomous system boundary router
 Redistributing External Routes from,
     eigrp 6
 Router is not originating router-LSAs with maximum metric
 Initial SPF schedule delay 5000 msecs
 Minimum hold time between two consecutive SPFs 10000 msecs
 Maximum wait time between two consecutive SPFs 10000 msecs
 Minimum LSA interval 5 secs
 Minimum LSA arrival 1000 msecs
 LSA group pacing timer 240 secs
 Interface flood pacing timer 33 msecs
 Retransmission pacing timer 66 msecs
 Number of external LSA 1. Checksum Sum 0x00758C
 Number of areas in this router is 2. 1 normal 1 stub 0 nssa
 Graceful restart helper support enabled
 Reference bandwidth unit is 100 mbps
 RFC1583 compatibility enabled
    Area BACKBONE(0)
        Number of interfaces in this area is 1
        SPF algorithm executed 5 times
        Number of LSA 6. Checksum Sum 0x034A51
        Number of DCbitless LSA 0
        Number of indication LSA 0
        Number of DoNotAge LSA 0
        Flood list length 0
    Area 1
        Number of interfaces in this area is 1
        It is a stub area
        SPF algorithm executed 3 times
        Number of LSA 1. Checksum Sum 0x00A267
        Number of DCbitless LSA 0
        Number of indication LSA 0
        Number of DoNotAge LSA 0
        Flood list length 0
```

Figura 23 Comando show ipv6 ospf en R2

```
R2#show ipv6 ospf database

            OSPFv3 Router with ID (2.2.2.2) (Process ID 1)

                Router Link States (Area 0)

ADV Router       Age         Seq#       Fragment ID  Link count  Bits
 2.2.2.2         1262        0x80000004 0            1           E
 3.3.3.3         1622        0x80000004 0            1           E

                Link (Type-8) Link States (Area 0)

ADV Router       Age         Seq#       Link ID    Interface
 2.2.2.2         718         0x80000003 6          Se1/1
 3.3.3.3         654         0x80000003 4          Se1/1

                Intra Area Prefix Link States (Area 0)

ADV Router       Age         Seq#       Link ID    Ref-lstype  Ref-LSID
 2.2.2.2         718         0x80000003 0          0x2001      0
 3.3.3.3         654         0x80000003 0          0x2001      0

                Router Link States (Area 1)

ADV Router       Age         Seq#       Fragment ID  Link count  Bits
 2.2.2.2         718         0x80000003 0            0           None

                Type-5 AS External Link States

ADV Router       Age         Seq#       Prefix
 3.3.3.3         1622        0x80000002 ::/0
R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

      192.168.9.0/24 is variably subnetted, 3 subnets, 2 masks
C        192.168.9.0/24 is directly connected, Serial1/0
L        192.168.9.6/32 is directly connected, Serial1/0
```

Figura 24 Figura 20 Comando show ipv6 ospf database en R2 Comando show ip route en R3.

```
R3#show ipv6 route
IPv6 Routing Table - default - 3 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, l - LISP
C   2001:DB8:ACAD:91::/64 [0/0]
     via Serial1/0, directly connected
L   2001:DB8:ACAD:91::2/128 [0/0]
     via Serial1/0, receive
L   FF00::/8 [0/0]
     via Null0, receive
```

Figura 25 Comando show ipv6 route en R3

```
R3#show ipv6 ospf
 Routing Process "ospfv3 1" with ID 3.3.3.3
 Event-log enabled, Maximum number of events: 1000, Mode: cyclic
 It is an autonomous system boundary router
 Originate Default Route with always
 Router is not originating router-LSAs with maximum metric
 Initial SPF schedule delay 5000 msecs
 Minimum hold time between two consecutive SPFs 10000 msecs
 Maximum wait time between two consecutive SPFs 10000 msecs
 Minimum LSA interval 5 secs
 Minimum LSA arrival 1000 msecs
 LSA group pacing timer 240 secs
 Interface flood pacing timer 33 msecs
 Retransmission pacing timer 66 msecs
 Number of external LSA 1. Checksum Sum 0x00788C
 Number of areas in this router is 1. 1 normal 0 stub 0 nssa
 Graceful restart helper support enabled
 Reference bandwidth unit is 100 mbps
 RFC1583 compatibility enabled
    Area BACKBONE(0)
        Number of interfaces in this area is 2
        SPF algorithm executed 4 times
        Number of LSA 6. Checksum Sum 0x034A51
        Number of DCbitless LSA 0
        Number of indication LSA 0
        Number of DoNotAge LSA 0
        Flood list length 0
```

Figura 26 Comando show ipv6 ospf en R3

```
R3#show ipv6 ospf database

            OSPFv3 Router with ID (3.3.3.3) (Process ID 1)

                Router Link States (Area 0)

ADV Router       Age         Seq#       Fragment ID  Link count  Bits
 2.2.2.2         1217        0x80000004 0            1           E
 3.3.3.3         1575        0x80000004 0            1           E

                Link (Type-8) Link States (Area 0)

ADV Router       Age         Seq#       Link ID    Interface
 2.2.2.2         673         0x80000003 5          Se1/0
 3.3.3.3         607         0x80000003 4          Se1/0

                Intra Area Prefix Link States (Area 0)

ADV Router       Age         Seq#       Link ID    Ref-lstype  Ref-LSID
 2.2.2.2         673         0x80000003 0          0x2001      0
 3.3.3.3         607         0x80000003 0          0x2001      0

                Type-5 AS External Link States

ADV Router       Age         Seq#       Prefix
 3.3.3.3         1575        0x80000002 ::/0
```

Figura 27 Comando show ipv6 ospf database en R3

Verificar comunicación entre routers mediante el comando ping y traceroute

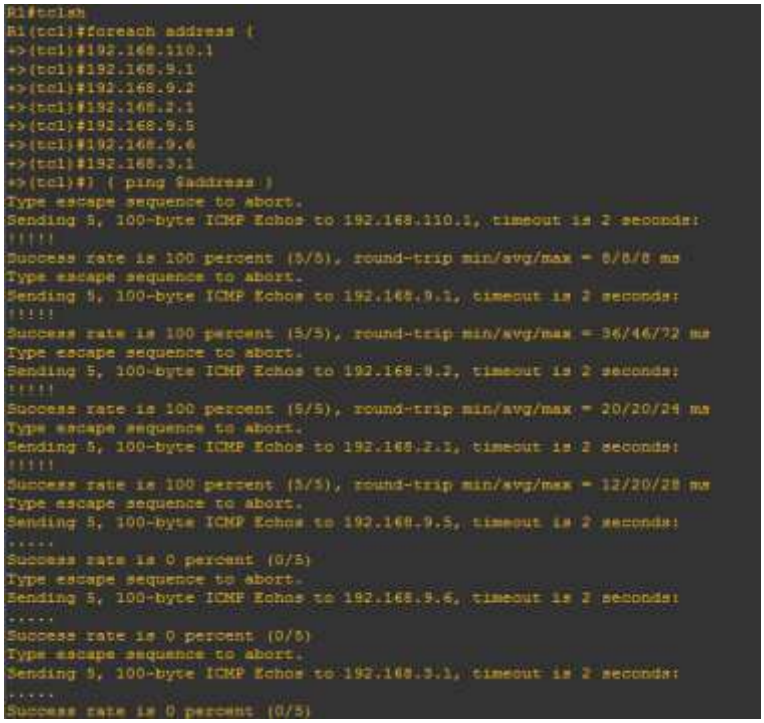


Figura 28 Ping interface ipv4 e ipv6 desde R1

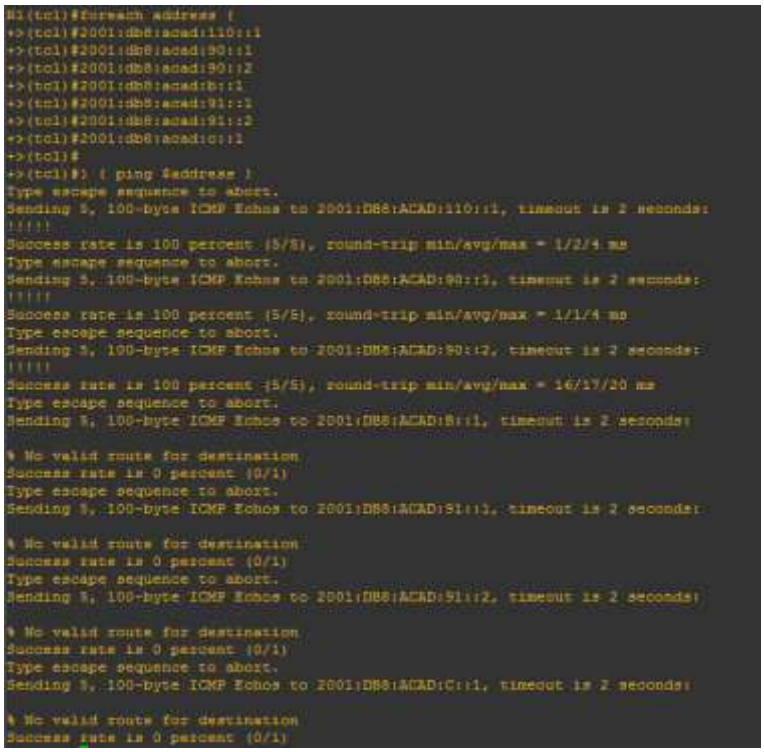


Figura 29 Ping interface ipv6 desde R2

```
R2(tcl)#tclsh
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)#} { 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 = 16/22/36 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 = 8/14/24 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 = 20/24/36 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 = 1/2/4 ms
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.5, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.6, 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)
R2(tcl)#
```

Figura 30 Ping interface ipv4 desde R2

```
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)#} { 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 0 percent (0/5)
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 100 percent (5/5), round-trip min/avg/max = 1/4/8 ms
R3(tcl)#foreach address {
```

Figura 31 Ping interface ipv4 desde R3

```
+>(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)#
+>(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:

% 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::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:B::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::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:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
R3(tcl)#
```

Figura 32 ping interface ipv6 desde R3

```
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)#
+>(tcl)#) { ping $address }
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:110::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/10/20 ms
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 = 4/6/8 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 = 1/1/4 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 = 1/2/4 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)
R2(tcl)#
```

Figura 33 ping interface ipv4 desde R3

c. Verificar que las rutas filtradas no están presentes en las tablas de enrutamiento de los routers correctas.

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.

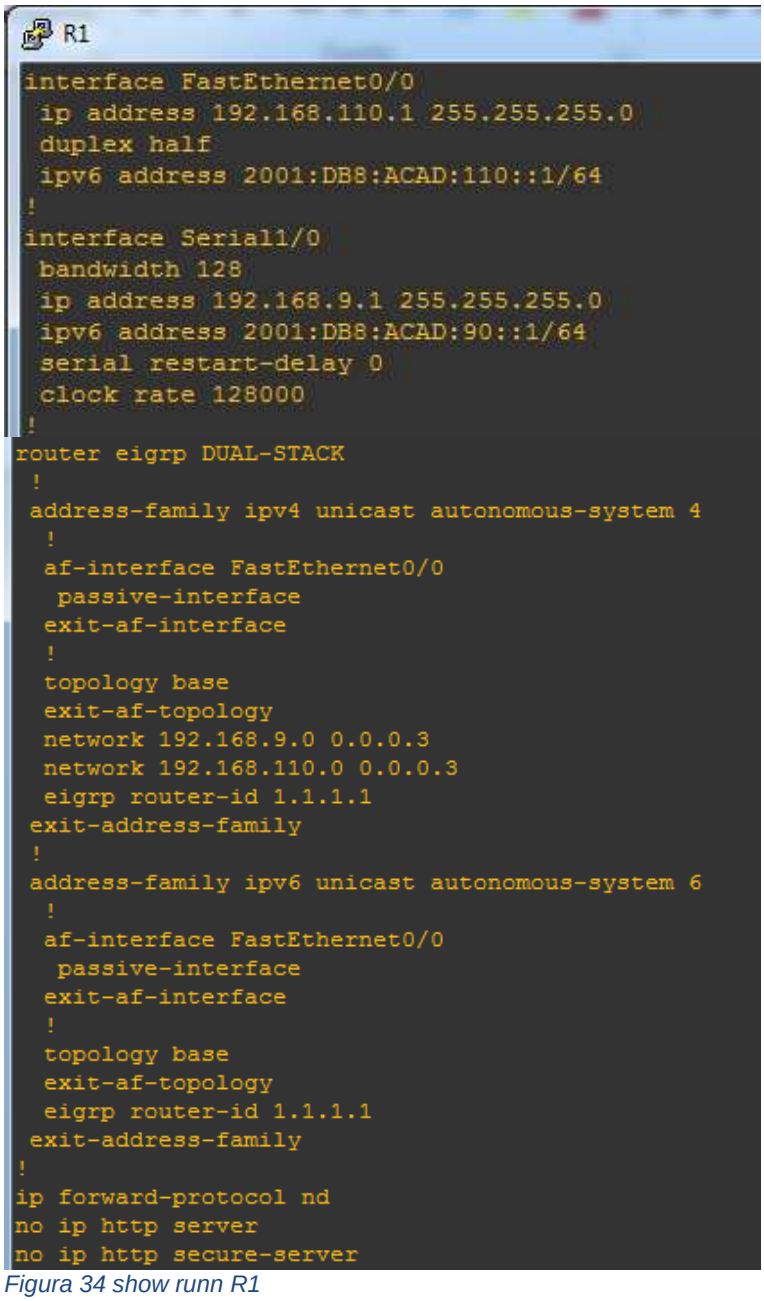


Figura 34 show runn R1

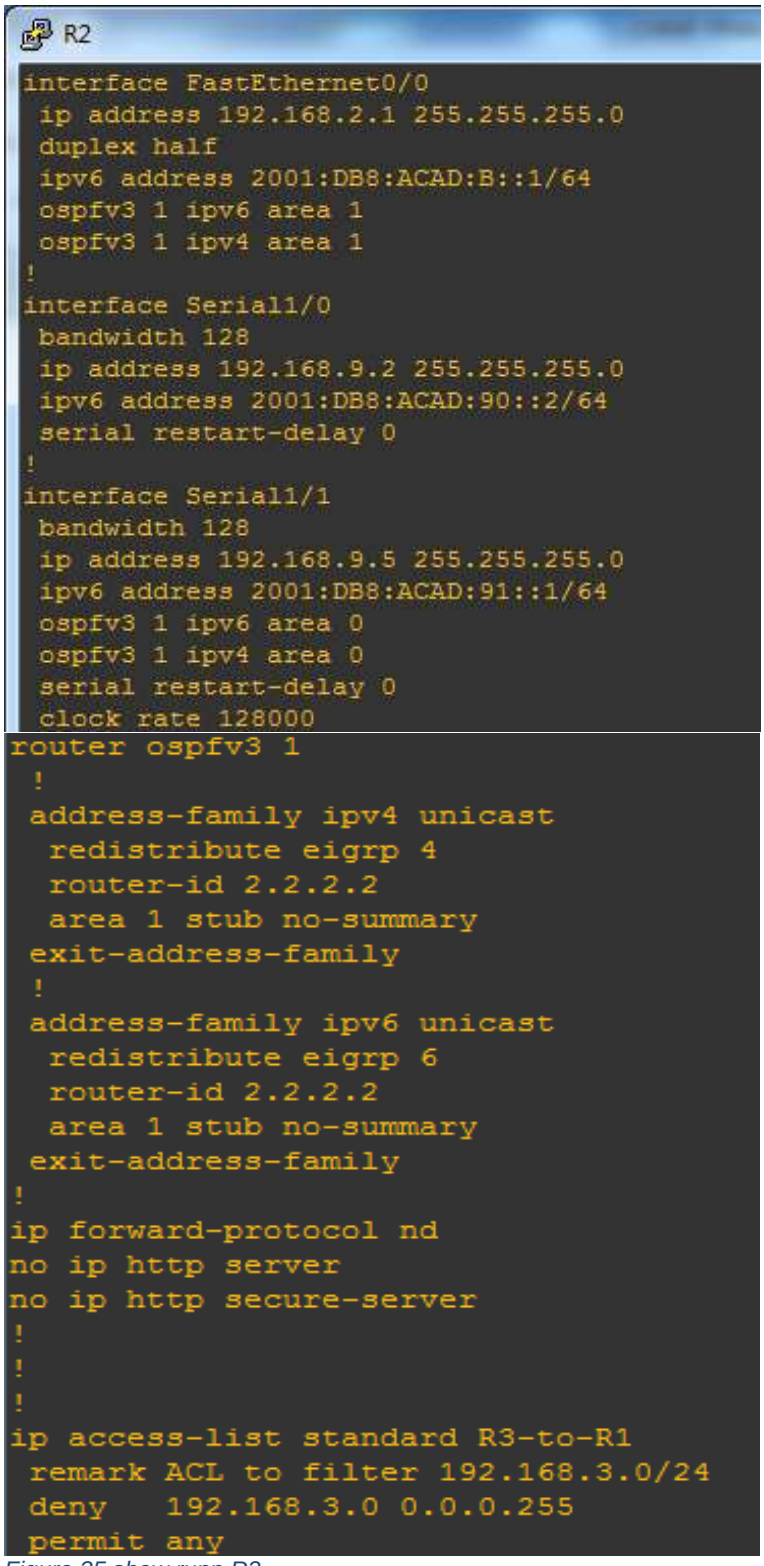


Figura 35 show runn R2

```
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 FastEthernet0/0
   shutdown
  exit-af-interface
  !
  af-interface Serial1/0
   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
 exit-address-family
```

Figura 36 show runn R2

```
interface FastEthernet0/0
 ip address 192.168.3.1 255.255.255.0
 duplex half
 ipv6 address 2001:DB8:ACAD:C::1/64
 ospfv3 1 ipv6 area 0
 ospfv3 1 ipv4 area 0
!
interface Serial1/0
 bandwidth 128
 ip address 192.168.9.6 255.255.255.0
 ipv6 address 2001:DB8:ACAD:91::2/64
 ospfv3 1 ipv6 area 0
 ospfv3 1 ipv4 area 0
 serial restart-delay 0
router ospfv3 1
 !
 address-family ipv4 unicast
  passive-interface FastEthernet0/0
  default-information originate always
  router-id 3.3.3.3
 exit-address-family
 !
 address-family ipv6 unicast
  passive-interface FastEthernet0/0
  default-information originate always
  router-id 3.3.3.3
 exit-address-family
```

Figura 37 show runn R3

3.2 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

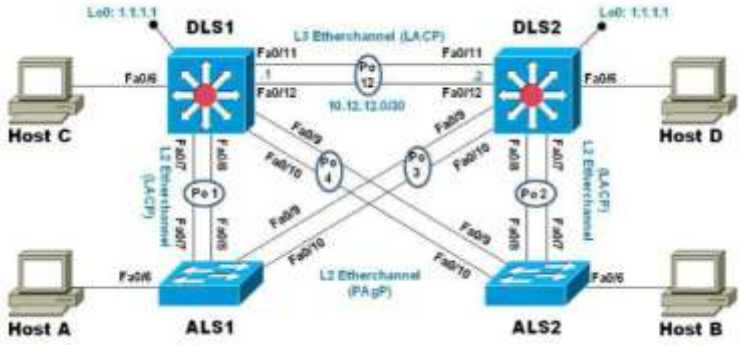


Figura 38 Topología de red

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

a. Apagar todas las interfaces en cada switch.

Para eso ingresamos a cada interface y ejecutamos el comando Shutdown

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface range FastEthernet0/1-24, GigabitEthernet0/1-2
Switch(config-if-range)#shutdown
```

Figura 39 Apagar interfaces

```
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES unset  administratively down down
FastEthernet0/2        unassigned      YES unset  administratively down down
FastEthernet0/3        unassigned      YES unset  administratively down down
FastEthernet0/4        unassigned      YES unset  administratively down down
FastEthernet0/5        unassigned      YES unset  administratively down down
FastEthernet0/6        unassigned      YES unset  administratively down down
FastEthernet0/7        unassigned      YES unset  administratively down down
FastEthernet0/8        unassigned      YES unset  administratively down down
FastEthernet0/9        unassigned      YES unset  administratively down down
FastEthernet0/10       unassigned      YES unset  administratively down down
FastEthernet0/11       unassigned      YES unset  administratively down down
FastEthernet0/12       unassigned      YES unset  administratively down down
FastEthernet0/13       unassigned      YES unset  administratively down down
FastEthernet0/14       unassigned      YES unset  administratively down down
FastEthernet0/15       unassigned      YES unset  administratively down down
FastEthernet0/16       unassigned      YES unset  administratively down down
FastEthernet0/17       unassigned      YES unset  administratively down down
FastEthernet0/18       unassigned      YES unset  administratively down down
FastEthernet0/19       unassigned      YES unset  administratively down down
FastEthernet0/20       unassigned      YES unset  administratively down down
FastEthernet0/21       unassigned      YES unset  administratively down down
FastEthernet0/22       unassigned      YES unset  administratively down down
FastEthernet0/23       unassigned      YES unset  administratively down down
FastEthernet0/24       unassigned      YES unset  administratively down down
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down


Switch1#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES unset  administratively down down
FastEthernet0/2        unassigned      YES unset  administratively down down
FastEthernet0/3        unassigned      YES unset  administratively down down
FastEthernet0/4        unassigned      YES unset  administratively down down
FastEthernet0/5        unassigned      YES unset  administratively down down
FastEthernet0/6        unassigned      YES unset  administratively down down
FastEthernet0/7        unassigned      YES unset  administratively down down
FastEthernet0/8        unassigned      YES unset  administratively down down
FastEthernet0/9        unassigned      YES unset  administratively down down
FastEthernet0/10       unassigned      YES unset  administratively down down
FastEthernet0/11       unassigned      YES unset  administratively down down
FastEthernet0/12       unassigned      YES unset  administratively down down
FastEthernet0/13       unassigned      YES unset  administratively down down
FastEthernet0/14       unassigned      YES unset  administratively down down
FastEthernet0/15       unassigned      YES unset  administratively down down
FastEthernet0/16       unassigned      YES unset  administratively down down
FastEthernet0/17       unassigned      YES unset  administratively down down
FastEthernet0/18       unassigned      YES unset  administratively down down
FastEthernet0/19       unassigned      YES unset  administratively down down
FastEthernet0/20       unassigned      YES unset  administratively down down
FastEthernet0/21       unassigned      YES unset  administratively down down
FastEthernet0/22       unassigned      YES unset  administratively down down
FastEthernet0/23       unassigned      YES unset  administratively down down
FastEthernet0/24       unassigned      YES unset  administratively down down
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

Figura 40 Evidencia apagado interfaces DSL1 y DSL2

```
Switch2#
%SYS-5-CONFIG_I: Configured from console by console

Switch2#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES unset  administratively down down
FastEthernet0/2        unassigned      YES unset  administratively down down
FastEthernet0/3        unassigned      YES unset  administratively down down
FastEthernet0/4        unassigned      YES unset  administratively down down
FastEthernet0/5        unassigned      YES unset  administratively down down
FastEthernet0/6        unassigned      YES unset  administratively down down
FastEthernet0/7        unassigned      YES unset  administratively down down
FastEthernet0/8        unassigned      YES unset  administratively down down
FastEthernet0/9        unassigned      YES unset  administratively down down
FastEthernet0/10       unassigned      YES unset  administratively down down
FastEthernet0/11       unassigned      YES unset  administratively down down
FastEthernet0/12       unassigned      YES unset  administratively down down
FastEthernet0/13       unassigned      YES unset  administratively down down
FastEthernet0/14       unassigned      YES unset  administratively down down
FastEthernet0/15       unassigned      YES unset  administratively down down
FastEthernet0/16       unassigned      YES unset  administratively down down
FastEthernet0/17       unassigned      YES unset  administratively down down
FastEthernet0/18       unassigned      YES unset  administratively down down
FastEthernet0/19       unassigned      YES unset  administratively down down
FastEthernet0/20       unassigned      YES unset  administratively down down
FastEthernet0/21       unassigned      YES unset  administratively down down
FastEthernet0/22       unassigned      YES unset  administratively down down
FastEthernet0/23       unassigned      YES unset  administratively down down
FastEthernet0/24       unassigned      YES unset  administratively down down
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down


Switch3#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES unset  administratively down down
FastEthernet0/2        unassigned      YES unset  administratively down down
FastEthernet0/3        unassigned      YES unset  administratively down down
FastEthernet0/4        unassigned      YES unset  administratively down down
FastEthernet0/5        unassigned      YES unset  administratively down down
FastEthernet0/6        unassigned      YES unset  administratively down down
FastEthernet0/7        unassigned      YES unset  administratively down down
FastEthernet0/8        unassigned      YES unset  administratively down down
FastEthernet0/9        unassigned      YES unset  administratively down down
FastEthernet0/10       unassigned      YES unset  administratively down down
FastEthernet0/11       unassigned      YES unset  administratively down down
FastEthernet0/12       unassigned      YES unset  administratively down down
FastEthernet0/13       unassigned      YES unset  administratively down down
FastEthernet0/14       unassigned      YES unset  administratively down down
FastEthernet0/15       unassigned      YES unset  administratively down down
FastEthernet0/16       unassigned      YES unset  administratively down down
FastEthernet0/17       unassigned      YES unset  administratively down down
FastEthernet0/18       unassigned      YES unset  administratively down down
FastEthernet0/19       unassigned      YES unset  administratively down down
FastEthernet0/20       unassigned      YES unset  administratively down down
FastEthernet0/21       unassigned      YES unset  administratively down down
FastEthernet0/22       unassigned      YES unset  administratively down down
FastEthernet0/23       unassigned      YES unset  administratively down down
FastEthernet0/24       unassigned      YES unset  administratively down down
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

Figura 41 Evidencia apagado interfaces ALS1 y ALS2

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

Con el siguiente comando cambiamos el nombre a cada uno de los switch.

Switch1>enable
Switch1#configure terminal
Switch1(config)#hostname DLS1

```
Switch1>enable
Switch1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch1(config)#hostname DLS1
DLS1(config)#
```

```
Switch2>enable
Switch2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch2(config)#hostname DLS2
DLS2(config)#
```

```
Switch#enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname ALS1
ALS1(config)#
```

```
Switch3#enable
Switch3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch3(config)#hostname ALS2
ALS2(config)#
```

Figura 42 Asignación nombres dispositivos

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.

Creamos el port channel capa 3 y luego lo asignamos a las interfaces, esto lo debemos hacer en el Router DLS1 y DLS2.

DLS1>en
DLS1#conf ter
DLS1(config)#interface port-channel 12
DLS1(config-if)#no switchport
DLS1(config-if)#ip address 10.12.12.1 255.255.255.252
DLS1(config-if)#exit
DLS1(config)#interface range fa0/11-12
DLS1(config-if-range)#no switchport
DLS1(config-if-range)#channel-group 12 mode active
DLS1(config-if-range)#exit
DLS1(config)#exit

DLS2>en
DLS2#conf ter
DLS2(config)#interface port-channel 12

```
DLS2(config-if)#no switchport
DLS2(config-if)#ip address 10.12.12.2 255.255.255.252
DLS2(config-if)#exit
DLS2(config)#interface range fa0/11-12
DLS2(config-if-range)#no switchport
DLS2(config-if-range)#channel-group 12 mode active
DLS2(config-if-range)#exit
```

Para validar el estado del Etherchannel usamos el comando: show etherchannel summary

```
DLS1#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 1
Number of aggregators:           1

Group  Port-channel  Protocol    Ports
------+-------------+-----------
+---------------------------------------------

12     Po12(RU)           LACP   Fa0/11(P) Fa0/12(P)
DLS2#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 1
Number of aggregators:           1

Group  Port-channel  Protocol    Ports
------+-------------+-----------
+---------------------------------------------

12     Po12(RU)           LACP   Fa0/11(P) Fa0/12(P)
```

Figura 43 Comando show etherchannel summary en DLS1 y DLS2

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

Para etherchannel capa 2 usamos los siguientes comandos:

DLS1#en
DLS1#conf term
DLS1(config)#int ran fa0/7-8
DLS1(config-if-range)#switchport trunk encapsulation dot1q
DLS1(config-if-range)#switchport mode trunk
DLS1(config-if-range)#channel-group 1 mode active
DLS1(config-if-range)#no shutdown

```
DLS1#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------
+---------------------------------------------

1      Po1(SU)           LACP   Fa0/7(P) Fa0/8(P)
12     Po12(RU)           LACP   Fa0/11(P) Fa0/12(P)
```

Figura 44 Port channel 1 DSL1

ALS1(config)#int ran fa0/7-8
ALS1(config-if-range)#switchport trunk encapsulation dot1q
ALS1(config-if-range)#switchport mode trunk
ALS1(config-if-range)#channel-group 1 mode active
ALS1(config-if-range)#no shutdown

```
ALS1#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 1
Number of aggregators:           1

Group  Port-channel  Protocol    Ports
------+-------------+-----------
+---------------------------------------------

1      Po1(SU)           LACP   Fa0/7(P) Fa0/8(P)
```

Figura 45 Port channel 1 ALS1

DLS2(config)#int ran fa0/7-8
DLS2(config-if-range)#switchport trunk encapsulation dot1q
DLS2(config-if-range)#switchport mode trunk
DLS2(config-if-range)#channel-group 2 mode active
DLS2(config-if-range)#no shutdown

```
DLS2#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------
+---------------------------------------------

2      Po2(SU)           LACP   Fa0/7(P) Fa0/8(P)
12     Po12(RU)           LACP   Fa0/11(D) Fa0/12(P)
```

Figura 46 Port channel 2 DSL2

ALS2(config)#int ran fa0/7-8
ALS2(config-if-range)#switchport trunk encapsulation dot1q
ALS2(config-if-range)#switchport mode trunk
ALS2(config-if-range)#channel-group 2 mode active
ALS2(config-if-range)#no shutdown

```
ALS2#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 1
Number of aggregators:           1

Group  Port-channel  Protocol    Ports
------+-------------+-----------
+---------------------------------------------

2      Po2(SU)           LACP   Fa0/7(P) Fa0/8(P)
```

Figura 47 Portchannel 2 ALS2

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

Para etherchannel capa 2 usamos los siguientes comandos:

DLS1(config)#int ran fa0/9-10
DLS1(config-if-range)# switchport trunk encapsulation dot1q
DLS1(config-if-range)# switchport mode trunk
DLS1(config-if-range)#channel-group 4 mode desirable
Creating a port-channel interface Port-channel 4
DLS1(config-if-range)#no shutdown

```
DLS1#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 3
Number of aggregators:           3

Group  Port-channel  Protocol    Ports
------+-------------+-----------
+---------------------------------------------

1      Po1(SU)           LACP   Fa0/7(P) Fa0/8(P)
4      Po4(SU)           PAgP   Fa0/9(P) Fa0/10(P)
12     Po12(RU)           LACP   Fa0/11(D) Fa0/12(P)
```

Figura 48 Port channel 4 DSL1

ALS2(config)#int ran fa0/9-10
ALS2(config-if-range)# switchport trunk encapsulation dot1q
ALS2(config-if-range)# switchport mode trunk
ALS2(config-if-range)#channel-group 4 mode desirable
Creating a port-channel interface Port-channel 4
ALS2(config-if-range)#no shutdown

```
ALS2#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------
+-----------------------------------------------

2      Po2(SU)           LACP   Fa0/7(P) Fa0/8(P)
4      Po4(SU)           PAgP   Fa0/9(P) Fa0/10(P)
```

Figura 49 Port channel 4 ALS2

DLS2(config)#int ran fa0/9-10
DLS2(config-if-range)# switchport trunk encapsulation dot1q
DLS2(config-if-range)# switchport mode trunk
DLS2(config-if-range)#channel-group 3 mode desirable
Creating a port-channel interface Port-channel 3
DLS2(config-if-range)#no shutdown

```
DLS2#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 3
Number of aggregators:           3

Group  Port-channel  Protocol    Ports
------+-------------+-----------
+-----------------------------------------------

2      Po2(SU)           LACP   Fa0/7(P) Fa0/8(P)
3      Po3(SU)           PAgP   Fa0/9(P) Fa0/10(P)
12     Po12(RU)          LACP   Fa0/11(D) Fa0/12(P)
```

Figura 50 Port channel 3 DSL2

ALS1(config)#int ran fa0/9-10
ALS1(config-if-range)# switchport trunk encapsulation dot1q
ALS1(config-if-range)# switchport mode trunk
ALS1(config-if-range)#channel-group 3 mode desirable
Creating a port-channel interface Port-channel 3
ALS1(config-if-range)#no shutdown

```
ALS1#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------
+-----------------------------------------------

1      Po1(SU)           LACP   Fa0/7(P) Fa0/8(P)
3      Po3(SU)           PAgP   Fa0/9(P) Fa0/10(P)
```

Figura 51 Portchannel 3 ALS1

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

Para validar que puertos son troncales usamos el siguiente comando en cada uno de los switches:

DLS1#show interfaces trunk

```
DLS1#show interface trunk
Port        Mode         Encapsulation  Status        Native vlan
Po1         on           802.1q         trunking      1
Po4         on           802.1q         trunking      1

Port        Vlans allowed on trunk
Po1         1-1005
Po4         1-1005

Port        Vlans allowed and active in management domain
Po1         1
Po4         1

Port        Vlans in spanning tree forwarding state and not pruned
Po1         1
Po4         1
```

Figura 52 Verificación puertos Trunk DLS1

Luego usamos el siguiente comando para asignar la vlan 800 como vlan nativa para todos los puertos troncales en todos los Switches, en nuestro caso son la inerfaces que pertenecen a los pot-channel 1, 2, 3 y 4.

DLS1#conf ter
DLS1(config)#interface Po1
DLS1(config-if)#switchport trunk native vlan 800
DLS1(config-if)#exit
DLS1(config)#interface Po4
DLS1(config-if)#switchport trunk native vlan 800
DLS1(config-if)#exit

```
DLS1#show interface trunk
Port        Mode         Encapsulation  Status        Native vlan
Po1         on           802.1q         trunking      800
Po4         on           802.1q         trunking      800

Port        Vlans allowed on trunk
Po1         1-1005
Po4         1-1005

Port        Vlans allowed and active in management domain
Po1         1
Po4         1

Port        Vlans in spanning tree forwarding state and not
pruned
Po1         1
Po4         1
```

Figura 53 Configuración vlan 800 como vlan nativa DLS1

DLS2(config)#interface Po2
DLS2(config-if)#switchport trunk native vlan 800
DLS2(config-if)#exit
DLS2(config-if)#interface Po3
DLS2(config-if)#switchport trunk native vlan 800
DLS2(config-if)#exit

```
DLS2#sh int trun
Port        Mode         Encapsulation  Status        Native vlan
Po2         on           802.1q         trunking      800
Po3         on           802.1q         trunking      800

Port        Vlans allowed on trunk
Po2         1-1005
Po3         1-1005

Port        Vlans allowed and active in management domain
Po2         1
Po3         1

Port        Vlans in spanning tree forwarding state and not pruned
Po2         1
Po3         1
```

Figura 54 Configuración vlan 800 como vlan nativa DLS1

ALS1(config-if)#interface Po1
ALS1(config-if)#switchport trunk native vlan 800
ALS1(config-if)#exit

ALS1(config)#interface Po3
ALS1(config-if)#switchport trunk native vlan 800

```
ALS1#
ALS1#show interface trunk
Port        Mode         Encapsulation  Status        Native vlan
Po1         on           802.1q         trunking      800
Po3         on           802.1q         trunking      800

Port        Vlans allowed on trunk
Po1         1-1005
Po3         1-1005

Port        Vlans allowed and active in management domain
Po1         1
Po3         1

Port        Vlans in spanning tree forwarding state and not
pruned
Po1         1
Po3         1
```

Figura 55 Configuración vlan 800 como vlan nativa ALS1

ALS2(config)#interface Po2
ALS2(config-if)#switchport trunk native vlan 800
ALS2(config-if)#interface Po4
ALS2 (config-if)#switchport trunk native vlan 800

```
ALS2#
ALS2#show interface trunk
Port        Mode         Encapsulation  Status        Native vlan
Po2         on           802.1q         trunking      800
Po4         on           802.1q         trunking      800

Port        Vlans allowed on trunk
Po2         1-1005
Po4         1-1005

Port        Vlans allowed and active in management domain
Po2         1
Po4         1

Port        Vlans in spanning tree forwarding state and not
pruned
Po2         1
Po4         1
```

Figura 56 Configuración vlan 800 como vlan nativa ALS2

d. Configurar DLS1, ALS1, y ALS2 para utilizar VTP versión 2

1) Utilizar el nombre de dominio UNAD con la contraseña cisco123

DLS1(config)#vtp domain UNAD
Domain name already set to UNAD.
DLS1(config)#vtp pass cisco123
Setting device VLAN database password to cisco123
DLS1(config)#vtp version 2

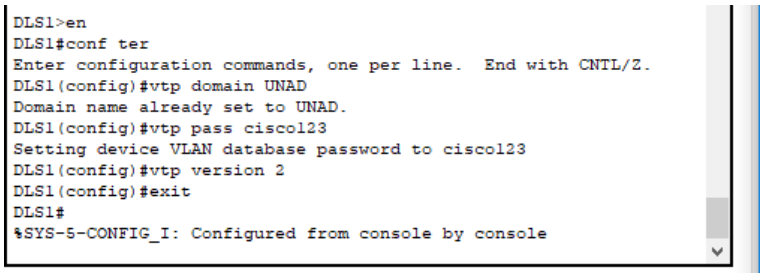


Figura 57 Configuración DLS1 para utilizar VTP versión 2

ALS1(config)#vtp domain UNAD
Domain name already set to UNAD.
ALS1(config)#vtp pass cisco123
Setting device VLAN database password to cisco123
ALS1(config)#vtp version 2

```
ALS1#conf ter
Enter configuration commands, one per line.  End with CNTL/Z.
ALS1(config)#vtp domain UNAD
Domain name already set to UNAD.
ALS1(config)#vtp pass cisco123
Setting device VLAN database password to cisco123
ALS1(config)#vtp version 2
ALS1(config)#exit
ALS1#
%SYS-5-CONFIG_I: Configured from console by console
```

Figura 58 Configuración ALS1 para utilizar VTP versión 2

ALS2(config)#vtp domain UNAD
Changing VTP domain name from NULL to UNAD
ALS2(config)#vtp pass cisco123
Setting device VLAN database password to cisco123
ALS2(config)#vtp version 2

```
ALS2(config)#vtp domain UNAD
Changing VTP domain name from NULL to UNAD
ALS2(config)#vtp pass cisco123
Setting device VLAN database password to cisco123
ALS2(config)#vtp version 2
ALS2(config)#
ALS2(config)#exit
ALS2#
%SYS-5-CONFIG_I: Configured from console by console
```

Figura 59 Configuración ALS2 para utilizar VTP versión 2

2) Configurar DLS1 como servidor principal para las VLAN.

DLS1(config)#vtp mode server
Device mode already VTP SERVER.

```
DLS1#show vtp status
VTP Version capable             : 1 to 3
VTP version running             : 2
VTP Domain Name                 : UNAD
VTP Pruning Mode                : Disabled
VTP Traps Generation            : Disabled
Device ID                       : 0001.4308.20E0
Configuration last modified by 0.0.0.0 at 3-1-93 01:22:00
Local updater ID is 0.0.0.0 (no valid interface found)

Feature VLAN :
--------------
VTP Operating Mode                : Server
Maximum VLANs supported locally   : 1005
Number of existing VLANs          : 5
Configuration Revision            : 4
MD5 digest                        : 0xE1 0x49 0x27 0x9E 0x91 0xA7
0x8F 0x51
                                    0x6A 0x28 0x0A 0x21 0xCD 0xF2
0x8B 0x11
DLS1#
```

Figura 60 Comando Vtp status DSL1

3) Configurar ALS1 y ALS2 como clientes VTP.

Usamos los siguientes comandos:

ALS1(config)#vtp mode client
Setting device to VTP CLIENT mode.

```
ALS1#show vtp status
VTP Version capable             : 1 to 3
VTP version running             : 2
VTP Domain Name                 : UNAD
VTP Pruning Mode                : Disabled
VTP Traps Generation            : Disabled
Device ID                       : 0001.C77E.3100
Configuration last modified by 0.0.0.0 at 3-1-93 01:22:00

Feature VLAN :
--------------
VTP Operating Mode                : Client
Maximum VLANs supported locally   : 1005
Number of existing VLANs          : 5
Configuration Revision            : 4
MD5 digest                        : 0xE1 0x49 0x27 0x9E 0x91 0xA7
0x8F 0x51
                                    0x6A 0x28 0x0A 0x21 0xCD 0xF2
0x8B 0x11
ALS1#
```

Figura 61 Comando Vtp status ALS1

```
ALS2#show vtp status
VTP Version capable             : 1 to 3
VTP version running             : 2
VTP Domain Name                 : UNAD
VTP Pruning Mode                : Disabled
VTP Traps Generation            : Disabled
Device ID                       : 0003.E407.9200
Configuration last modified by 0.0.0.0 at 3-1-93 01:22:00

Feature VLAN :
--------------
VTP Operating Mode                : Client
Maximum VLANs supported locally   : 1005
Number of existing VLANs          : 5
Configuration Revision            : 4
MD5 digest                        : 0xE1 0x49 0x27 0x9E 0x91 0xA7
0x8F 0x51
                                    0x6A 0x28 0x0A 0x21 0xCD 0xF2
0x8B 0x11
ALS2#
```

Figura 62 Comando Vtp status ALS2

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	101	VOZ
111	VIDEONET	345	ADMINISTRACIÓN

Este escenario fue simulado mediante Cisco Packet Tracer Version 7.1.1.0138 utilizando la imagen “C3560 Boot Loader (C3560-HBOOT-M) Version 12.2(25r)SEC, RELEASE SOFTWARE (fc4)” . El Switch no nos permite configurar vlan de mayor rango que 1005 debido a que el VTP solo permite vlan normales y NO extendidas, por lo cual tuvimos que tomar otras vlan para continuar con el laboratorio.

```
DLS1#SHOW VLAN

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/13, Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                Fa0/23, Fa0/24, Gig0/1, Gig0/2
12   EJECUTIVOS                       active
101  VOZ                              active
111  VIDEONET                         active
123  MANTENIMIENTO                    active
234  HUESPEDES                        active
345  ADMINISTRACION                   active
434  ESTACIONAMIENTO                  active
800  NATIVA                           active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
 --More-- |
```

Figura 63 Comando show vlan aplicado en DLS1

f. En DLS1, suspender la VLAN 434.

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

```
DLS1(config)#vlan 434
DLS1(config-vlan)#state suspend
                    ^
% Invalid input detected at '^' marker.

DLS1(config-vlan)#
```

Figura 64 Evidencia comando state suspend

Para la version de Switch que nos proporciona packet tracert 7.1.1, no se puede ejecutar este comando, por lo cual no podemos suspender la vlan.

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

```
DLS2#conf ter
Enter configuration commands, one per line.  End with CNTL/Z.
DLS2(config)#vlan 800
DLS2(config-vlan)#name NATIVA
DLS2(config-vlan)#vlan 12
DLS2(config-vlan)#name EJECUTIVOS
DLS2(config-vlan)#vlan 234
DLS2(config-vlan)#name HUESPEDES
DLS2(config-vlan)#vlan 111
DLS2(config-vlan)#name VIDEONET
DLS2(config-vlan)#vlan 434
DLS2(config-vlan)#name ESTACIONAMIENTO
DLS2(config-vlan)#vlan 123
DLS2(config-vlan)#name MANTENIMIENTO
DLS2(config-vlan)#vlan 101
DLS2(config-vlan)#name VOZ
DLS2(config-vlan)#vlan 345
DLS2(config-vlan)#name ADMINISTRACION
DLS2(config-vlan)#EXIT
DLS2(config)#
```

```
DLS2#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/13, Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                Fa0/23, Fa0/24, Gig0/1, Gig0/2
12   EJECUTIVOS                       active
101  VOZ                              active
111  VIDEONET                         active
123  MANTENIMIENTO                    active
234  HUESPEDES                        active
345  ADMINISTRACION                   active
434  ESTACIONAMIENTO                  active
800  NATIVA                           active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
 --More--
```

Figura 65 Configuración Vlan en DLS2

DLS2(config)#vtp mod trans
Setting device to VTP TRANSPARENT mode.

DLS2(config)#vtp ver 2

```
DLS2(config)#vtp mod trans
Setting device to VTP TRANSPARENT mode.
```

Figura 66 Habilitación vtp mode transparent

h. Suspender VLAN 434 en DLS2.

DLS2(config)#vlan 434
DLS2(config-vlan)# state suspend
DLS2(config)#

Para la version de Switch que nos proporciona packet tracert 7.1.1, no se puede ejecutar este comando, por lo cual no podemos suspender la vlan.

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.

Creamos la vlan

DLS2#configure terminal
DLS2(config)#vlan 567
DLS2(config-vlan)#name CONTABILIDAD

```
DLS2#conf ter
Enter configuration commands, one per line.  End with CNTL/Z.
DLS2(config)#vlan 567
DLS2(config-vlan)#name CONTABILIDAD
DLS2(config-vlan)#exit
DLS2(config)#
```

Figura 67 Configuración vlan 567 en DLS2

Luego en los 2 port-channel truncales negamos el paso de la vlan 567.

DLS2(config)#interface port-channel 2
DLS2(config-if)#switchport trunk allowed vlan except 567
DLS2(config)#interface port-channel 3
DLS2(config-if)#switchport trunk allowed vlan except 567

```
DLS2(config)#interface port-channel 2
DLS2(config-if)#switchport trunk allowed vlan except 567
DLS2(config-if)#interface port-channel 3
DLS2(config-if)#switchport trunk allowed vlan except 567
DLS2(config-if)#exit
DLS2(config)#
```

Figura 68 Configuración negación al paso vlan 567

j. Configurar DLS1 como Spanning tree root para las VLAN 1, 12, 434, 800, 101, 111 y 345 y como raíz secundaria para las VLAN 123 y 234.

DLS1(config)#spanning-tree vlan 1,12,434,800,101,111,345 root primary
DLS1(config)#spanning-tree vlan 123,234 root secondary

```
DLS1(config)#spanning-tree vlan 1,12,434,800,101,111,345 root primary
DLS1(config)#spanning-tree vlan 123,234 root secondary
DLS1(config)#
```

```
 switchport trunk native vlan 800
 switchport trunk allowed vlan 1-566,568-1005
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
interface Port-channel3
 switchport trunk native vlan 800
 switchport trunk allowed vlan 1-566,568-1005
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
interface Port-channel12
 no switchport
 ip address 10.12.12.2 255.255.255.252
!
interface FastEthernet0/7
 switchport trunk native vlan 800
 switchport trunk allowed vlan 1-566,568-1005
 switchport trunk encapsulation dot1q
 switchport mode trunk
 channel-group 2 mode active
!
interface FastEthernet0/8
 switchport trunk native vlan 800
 switchport trunk allowed vlan 1-566,568-1005
 switchport trunk encapsulation dot1q
 switchport mode trunk
 channel-group 2 mode active
!
interface FastEthernet0/9
 switchport trunk native vlan 800
 switchport trunk allowed vlan 1-566,568-1005
 switchport trunk encapsulation dot1q
 switchport mode trunk
 channel-group 3 mode desirable
!
interface FastEthernet0/10
 switchport trunk native vlan 800
 switchport trunk allowed vlan 1-566,568-1005
 switchport trunk encapsulation dot1q
 switchport mode trunk
 channel-group 3 mode desirable
!
interface FastEthernet0/11
 no switchport
 no ip address
 channel-group 12 mode active
 duplex auto
 speed auto
!
!
interface FastEthernet0/12
 no switchport
 no ip address
 channel-group 12 mode active
 duplex auto
 speed auto
!
```

Figura 69 Configuración spanning-tree

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 1,12,434,800,101,111,345 root secondary

```
DLS2#conf term
Enter configuration commands, one per line.  End with CNTL/Z.
DLS2(config)#spanning-tree vlan 123,234 root primary
DLS2(config)#spanning-tree vlan 1,12,434,800,101,111,345 root secondary
DLS2(config)#
```

Figura 70 Configuración spanning-tree

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 estos puertos.

DLS1

Physical | Config | CLI | Attributes

IOS Comm

```
interface Port-channel1
 switchport trunk native vlan 800
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
interface Port-channel4
 switchport trunk native vlan 800
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
interface Port-channel12
 no switchport
 ip address 10.12.12.1 255.255.255.252
```

```
interface FastEthernet0/7
 switchport trunk native vlan 800
 switchport trunk encapsulation dot1q
 switchport mode trunk
 channel-group 1 mode active
!
interface FastEthernet0/8
 switchport trunk native vlan 800
 switchport trunk encapsulation dot1q
 switchport mode trunk
 channel-group 1 mode active
!
interface FastEthernet0/9
 switchport trunk native vlan 800
 switchport trunk encapsulation dot1q
 switchport mode trunk
 channel-group 4 mode desirable
!
interface FastEthernet0/10
 switchport trunk native vlan 800
 switchport trunk encapsulation dot1q
 switchport mode trunk
 channel-group 4 mode desirable
```

DLS2

Physical | Config | CLI | Attributes

IOS Command Line Inte

```
!
interface Port-channel2
 switchport trunk native vlan 800
 switchport trunk allowed vlan 1-566,568-1005
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
interface Port-channel3
 switchport trunk native vlan 800
 switchport trunk allowed vlan 1-566,568-1005
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
interface Port-channel12
 no switchport
 ip address 10.12.12.2 255.255.255.252
!
```

```
interface FastEthernet0/7
 switchport trunk native vlan 800
 switchport trunk allowed vlan 1-566,568-1005
 switchport trunk encapsulation dot1q
 switchport mode trunk
 channel-group 2 mode active
!
interface FastEthernet0/8
 switchport trunk native vlan 800
 switchport trunk allowed vlan 1-566,568-1005
 switchport trunk encapsulation dot1q
 switchport mode trunk
 channel-group 2 mode active
!
interface FastEthernet0/9
 switchport trunk native vlan 800
 switchport trunk allowed vlan 1-566,568-1005
 switchport trunk encapsulation dot1q
 switchport mode trunk
 channel-group 3 mode desirable
!
interface FastEthernet0/10
 switchport trunk native vlan 800
 switchport trunk allowed vlan 1-566,568-1005
 switchport trunk encapsulation dot1q
 switchport mode trunk
 channel-group 3 mode desirable
!
```

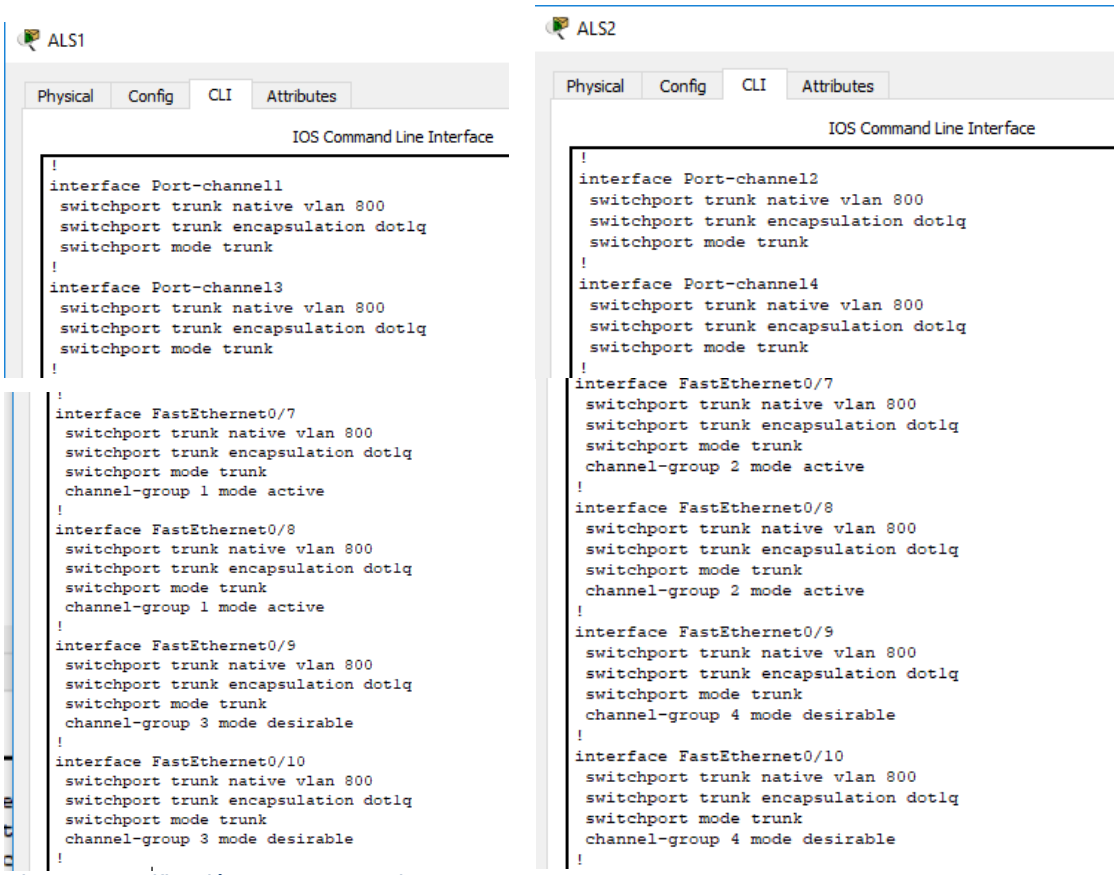


Figura 71 Verificación puertos troncales

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

Interfaz	DLS1	DLS2	ALS1	ALS2
Interfaz Fa0/6	3456	12 , 1010	123, 1010	234
Interfaz Fa0/15	1111	1111	1111	1111
Interfaces F0 /16-18		567		

Usamos el siguiente comando en cada una de las interfaces que conectan cada uno de los hosts y asignando la respectiva vlan según la tabla.

Se debe tener en cuenta que si un puerto está en acceso solo se puede asignar una sola vlan, si queremos configurar más vlan como acceso debemos tener más puertos disponibles, o configurar el puerto como troncal.

DLS1(config-if)#interface fastEthernet 0/6
DLS1(config-if)#switchport mode access

DLS1(config-if)#switchport access vlan 345
DLS1(config-if)#spanning-tree portfast
DLS1(config-if)#no shutdown

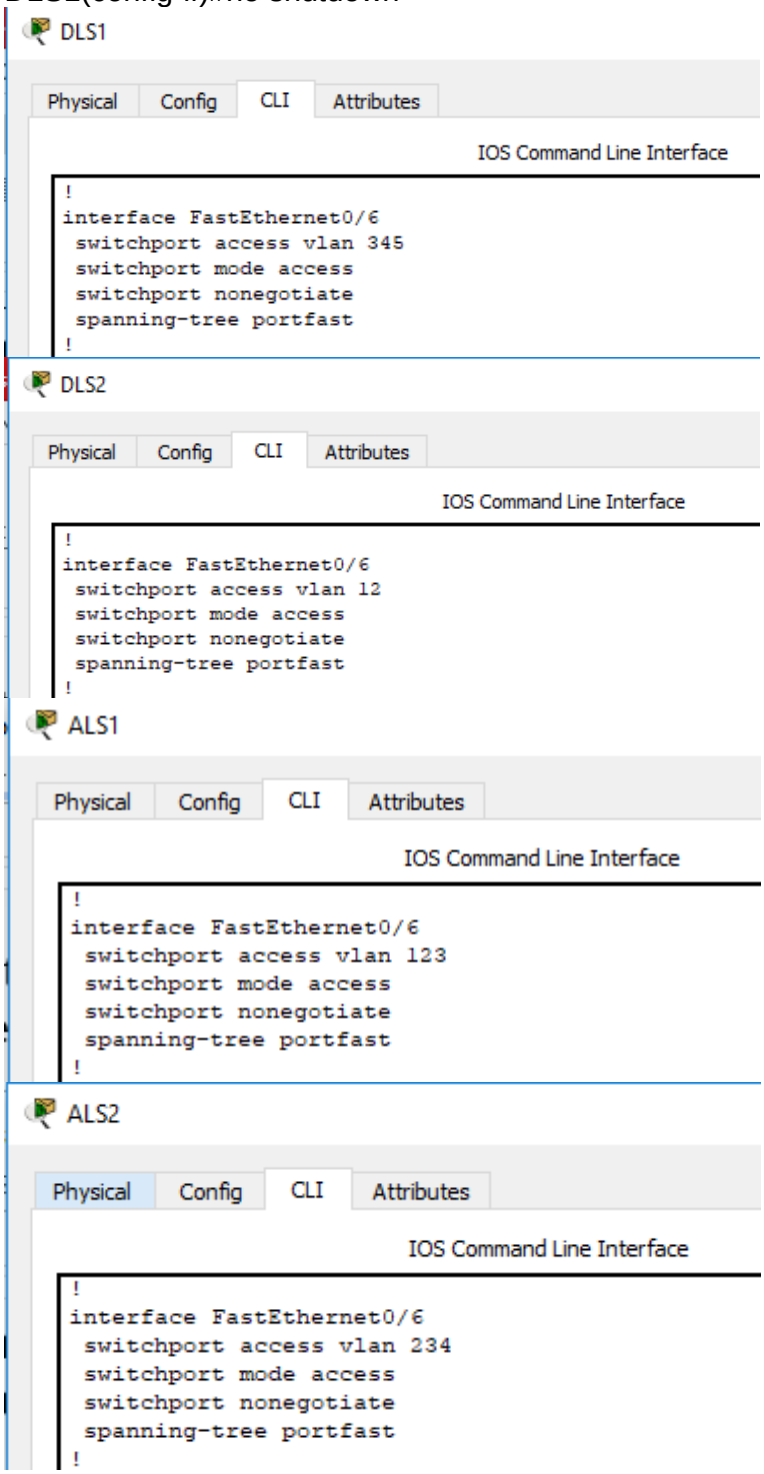


Figura 72 Asignación de interface como puertos de acceso

n. Todas las interfaces que no sean utilizadas o asignadas a alguna VLAN deberán ser apagadas.

```
DLS1#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
Port-channel1          unassigned      YES unset  up                    up
Port-channel4          unassigned      YES unset  up                    up
Port-channel12         10.12.12.1      YES manual up                    up
FastEthernet0/1        unassigned      YES unset  administratively down down
FastEthernet0/2        unassigned      YES unset  administratively down down
FastEthernet0/3        unassigned      YES unset  administratively down down
FastEthernet0/4        unassigned      YES unset  administratively down down
FastEthernet0/5        unassigned      YES unset  administratively down down
FastEthernet0/6        unassigned      YES unset  up                    up
FastEthernet0/7        unassigned      YES unset  up                    up
FastEthernet0/8        unassigned      YES unset  up                    up
FastEthernet0/9        unassigned      YES unset  up                    up
FastEthernet0/10       unassigned      YES unset  up                    up
FastEthernet0/11       unassigned      YES unset  up                    up
FastEthernet0/12       unassigned      YES unset  up                    up
FastEthernet0/13       unassigned      YES unset  administratively down down
FastEthernet0/14       unassigned      YES unset  administratively down down
FastEthernet0/15       unassigned      YES unset  administratively down down
FastEthernet0/16       unassigned      YES unset  administratively down down
FastEthernet0/17       unassigned      YES unset  administratively down down
FastEthernet0/18       unassigned      YES unset  administratively down down
FastEthernet0/19       unassigned      YES unset  administratively down down
FastEthernet0/20       unassigned      YES unset  administratively down down
FastEthernet0/21       unassigned      YES unset  administratively down down
FastEthernet0/22       unassigned      YES unset  administratively down down
FastEthernet0/23       unassigned      YES unset  administratively down down
FastEthernet0/24       unassigned      YES unset  administratively down down
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

```
DLS2#show ip interface brief
Interface              IP-Address      OK? Method Status
Protocol
Port-channel2          unassigned      YES unset  up                    up
Port-channel3          unassigned      YES unset  up                    up
Port-channel12         10.12.12.2      YES manual up                    up
FastEthernet0/1        unassigned      YES unset  administratively down down
FastEthernet0/2        unassigned      YES unset  administratively down down
FastEthernet0/3        unassigned      YES unset  administratively down down
FastEthernet0/4        unassigned      YES unset  administratively down down
FastEthernet0/5        unassigned      YES unset  administratively down down
FastEthernet0/6        unassigned      YES unset  up                    up
FastEthernet0/7        unassigned      YES unset  up                    up
FastEthernet0/8        unassigned      YES unset  up                    up
FastEthernet0/9        unassigned      YES unset  up                    up
FastEthernet0/10       unassigned      YES unset  up                    up
FastEthernet0/11       unassigned      YES unset  up                    up
FastEthernet0/12       unassigned      YES unset  up                    up
FastEthernet0/13       unassigned      YES unset  administratively down down
FastEthernet0/14       unassigned      YES unset  administratively down down
FastEthernet0/15       unassigned      YES unset  administratively down down
FastEthernet0/16       unassigned      YES unset  administratively down down
FastEthernet0/17       unassigned      YES unset  administratively down down
FastEthernet0/18       unassigned      YES unset  administratively down down
FastEthernet0/19       unassigned      YES unset  administratively down down
FastEthernet0/20       unassigned      YES unset  administratively down down
FastEthernet0/21       unassigned      YES unset  administratively down down
FastEthernet0/22       unassigned      YES unset  administratively down down
FastEthernet0/23       unassigned      YES unset  administratively down down
FastEthernet0/24       unassigned      YES unset  administratively down down
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

```
ALS1#show ip interface brief
Interface              IP-Address      OK? Method Status
Protocol
Port-channel1          unassigned      YES unset  up                    up
Port-channel3          unassigned      YES unset  up                    up
FastEthernet0/1        unassigned      YES unset  administratively down down
FastEthernet0/2        unassigned      YES unset  administratively down down
FastEthernet0/3        unassigned      YES unset  administratively down down
FastEthernet0/4        unassigned      YES unset  administratively down down
FastEthernet0/5        unassigned      YES unset  administratively down down
FastEthernet0/6        unassigned      YES unset  up                    up
FastEthernet0/7        unassigned      YES unset  up                    up
FastEthernet0/8        unassigned      YES unset  up                    up
FastEthernet0/9        unassigned      YES unset  up                    up
FastEthernet0/10       unassigned      YES unset  up                    up
FastEthernet0/11       unassigned      YES unset  down                  down
FastEthernet0/12       unassigned      YES unset  down                  down
FastEthernet0/13       unassigned      YES unset  administratively down down
FastEthernet0/14       unassigned      YES unset  administratively down down
FastEthernet0/15       unassigned      YES unset  administratively down down
FastEthernet0/16       unassigned      YES unset  administratively down down
FastEthernet0/17       unassigned      YES unset  administratively down down
FastEthernet0/18       unassigned      YES unset  administratively down down
FastEthernet0/19       unassigned      YES unset  administratively down down
FastEthernet0/20       unassigned      YES unset  administratively down down
FastEthernet0/21       unassigned      YES unset  administratively down down
FastEthernet0/22       unassigned      YES unset  administratively down down
FastEthernet0/23       unassigned      YES unset  administratively down down
FastEthernet0/24       unassigned      YES unset  administratively down down
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
ALS2#show ip interface brief
Interface              IP-Address      OK? Method Status
Protocol
Port-channel2          unassigned      YES unset  up                    up
Port-channel4          unassigned      YES unset  up                    up
FastEthernet0/1        unassigned      YES unset  administratively down down
FastEthernet0/2        unassigned      YES unset  administratively down down
FastEthernet0/3        unassigned      YES unset  administratively down down
FastEthernet0/4        unassigned      YES unset  administratively down down
FastEthernet0/5        unassigned      YES unset  administratively down down
FastEthernet0/6        unassigned      YES unset  up                    up
FastEthernet0/7        unassigned      YES unset  up                    up
FastEthernet0/8        unassigned      YES unset  up                    up
FastEthernet0/9        unassigned      YES unset  up                    up
FastEthernet0/10       unassigned      YES unset  up                    up
FastEthernet0/11       unassigned      YES unset  down                  down
FastEthernet0/12       unassigned      YES unset  down                  down
FastEthernet0/13       unassigned      YES unset  administratively down down
FastEthernet0/14       unassigned      YES unset  administratively down down
FastEthernet0/15       unassigned      YES unset  administratively down down
FastEthernet0/16       unassigned      YES unset  administratively down down
FastEthernet0/17       unassigned      YES unset  administratively down down
FastEthernet0/18       unassigned      YES unset  administratively down down
FastEthernet0/19       unassigned      YES unset  administratively down down
FastEthernet0/20       unassigned      YES unset  administratively down down
FastEthernet0/21       unassigned      YES unset  administratively down down
FastEthernet0/22       unassigned      YES unset  administratively down down
FastEthernet0/23       unassigned      YES unset  administratively down down
FastEthernet0/24       unassigned      YES unset  administratively down down
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

Figura 73 Verificación de interface Dispositivos

o. Configurar SVI en DLS1 y DLS2 como soporte de todas las VLAN y de enrutamiento entre las VLAN. Utilice la siguiente tabla para las asignaciones de subred:

VLAN	Nombre de VLAN	subred	VLAN	Nombre de VLAN	subred
12	EJECUTIVOS	10.0.12.0/24	123	MANTENIMIENTO	10.0.123.0/24
234	HUESPEDES	10.0.234.0/24	101	VOZ	10.10.10.0/24
111	VIDEONET	10.11.11.0/24	345	ADMINISTRACIÓN	10.34.56.0/24

- DLS1 siempre utilizará la dirección .252 y DLS2 siempre utilizará la dirección .253 para las direcciones IPv4.

- Para crear cada una de las vlan interface, ejecutamos los siguientes comandos tanto en DLS1 como en DLS2, con cada una de las vlan según la tabla.

DLS1(config)#interface vlan 12
DLS1(config-if)#ip address 10.0.12.252 255.255.255.0
DLS1(config-if)#no shutdown

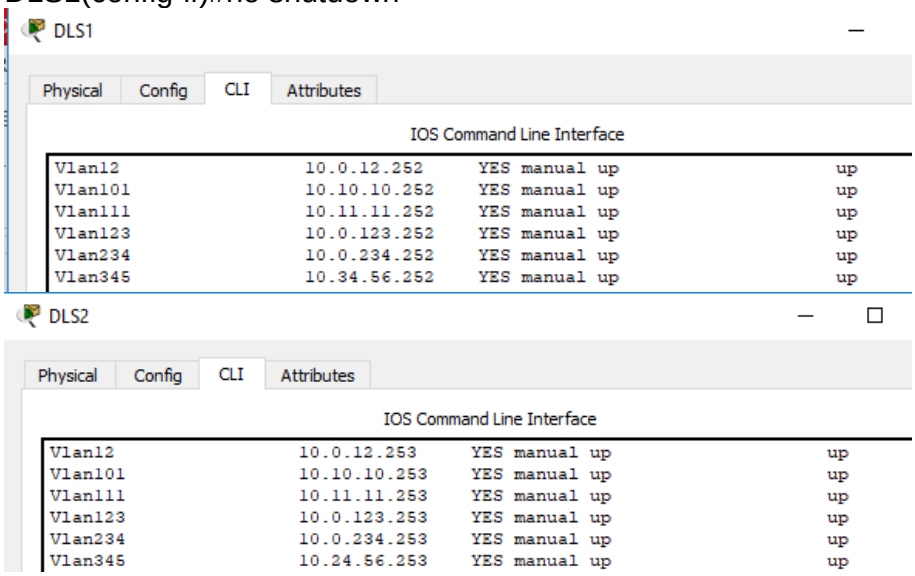


Figura 74 verificación de las Vlan acuerdo topología

La VLAN 567 en DLS2 no podrá ser soportada para enrutamiento.

p. Configurar una interfaz Loopback 0 en DLS1 y DLS2. Esta interfaz será configurada con la dirección IP 1.1.1.1/32 en ambos Switch.

Para eso usamos los siguientes comandos tanto en DLS1 como en DLS2.

DLS1#conf terminal

DLS1(config)#interface loopback 0
DLS1(config-if)#ip address 1.1.1.1 255.255.255.255

```
DLS1>en
DLS1#conf ter
Enter configuration commands, one per line.  End with CNTL/Z.
DLS1(config)#interface loopback 0

DLS1(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

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

DLS1(config-if)#ip address 1.1.1.1 255.255.255.255
DLS1(config-if)#
```

```
DLS2#conf terminal
Enter configuration commands, one per line.  End with CNTL/Z.
DLS2(config)#interface loopback 0

DLS2(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

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

DLS2(config-if)#ip address 1.1.1.1 255.255.255.255
DLS2(config-if)#
```

Figura 75 Creación interface Lo0

q. Configurar HSRP con interfaz tracking para las VLAN 12, 123, 234, 101, y 111.

1) Utilizar HSRP version 2

2) Crear dos grupos HSRP, alineando VLAN 12, 101, 111, y 345 para el primer grupo y las VLAN 123 y 234 para el segundo grupo.

3) DLS1 será el Switch principal de las VLAN 12, 101, 111, y 345 y DLS2 será el Switch principal para las VLAN 123 y 234.

Utilizar la dirección virtual .254 como la dirección de Standby de todas las VLAN

Usamos los siguientes comandos para cada vlan según se requiere.
Debemos tener en cuenta de cambiar la prioridad para el Swith especifico sea principal de algunas vlan según solicitud.

DLS1(config)#interface Vlan 12
DLS1(config-if)#standby 1 ip 10.0.12.254
DLS1(config-if)#standby 1 priority 200
DLS1(config-if)#standby 1 preempt
DLS1(config-if)#standby 1 track FastEthernet0/11
DLS1(config-if)#standby 1 track FastEthernet0/12
DLS1(config-if)#interface Vlan 101
DLS1(config-if)#standby 1 ip 10.10.10.254
DLS1(config-if)#standby 1 priority 200
DLS1(config-if)#standby 1 preempt
DLS1(config-if)#standby 1 track FastEthernet0/11
DLS1(config-if)#standby 1 track FastEthernet0/12

```
DLS1(config-if)#interface Vlan 111
DLS1(config-if)#standby 1 ip 10.11.11.254
DLS1(config-if)#standby 1 priority 200
DLS1(config-if)#standby 1 preempt
DLS1(config-if)#standby 1 track FastEthernet0/11
DLS1(config-if)#standby 1 track FastEthernet0/12
DLS1(config-if)#interface Vlan 345
DLS1(config-if)#standby 1 ip 10.34.56.254
DLS1(config-if)#standby 1 priority 200
DLS1(config-if)#standby 1 preempt
DLS1(config-if)#standby 1 track FastEthernet0/11
DLS1(config-if)#standby 1 track FastEthernet0/12
DLS1(config-if)#interface Vlan 123
DLS1(config-if)#standby 2 ip 10.0.123.254
DLS1(config-if)#standby 2 priority 100
DLS1(config-if)#standby 2 preempt
DLS1(config-if)#standby 2 track FastEthernet0/11
DLS1(config-if)#standby 2 track FastEthernet0/12
DLS1(config-if)#interface Vlan 234
DLS1(config-if)#standby 2 ip 10.0.234.254
DLS1(config-if)#standby 2 priority 100
DLS1(config-if)#standby 2 preempt
DLS1(config-if)#standby 2 track FastEthernet0/11
DLS1(config-if)#standby 2 track FastEthernet0/12
```

Con el comando Show Standby podemos verificar que las vlan correspondientes hayan quedado Active y las demás Standby.

Se relaciona a continuación el resultado del comando en el Switch DLS1:

```
 DLS1#Show Standby
Vlan12 - Group 1
State is Active
5 state changes, last state change 00:08:02
Virtual IP address is 10.0.12.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 2.289 secs
Preemption enabled
Active router is local
Standby router is 10.0.12.253
Priority 200 (configured 200)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
```

Group name is hsrp-Vl1-1 (default)
Vlan101 - Group 1
State is Active
5 state changes, last state change 00:08:16
Virtual IP address is 10.10.10.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 1.935 secs
Preemption enabled
Active router is local
Standby router is 10.10.10.253
Priority 200 (configured 200)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl1-1 (default)
Vlan111 - Group 1
State is Active
6 state changes, last state change 00:08:46
Virtual IP address is 10.11.11.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 1.635 secs
Preemption enabled
Active router is local
Standby router is 10.11.11.253
Priority 200 (configured 200)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl1-1 (default)
Vlan123 - Group 2
State is Standby
10 state changes, last state change 00:15:47
Virtual IP address is 10.0.123.254
Active virtual MAC address is 0000.0C07.AC02
Local virtual MAC address is 0000.0C07.AC02 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 1.965 secs
Preemption enabled
Active router is 10.0.123.253, priority 200 (expires in 7 sec)
MAC address is 0000.0C07.AC02
Standby router is local
Priority 100 (default 100)
Track interface FastEthernet0/11 state Up decrement 10

Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl1-2 (default)
Vlan234 - Group 2
State is Standby
7 state changes, last state change 00:15:57
Virtual IP address is 10.0.234.254
Active virtual MAC address is 0000.0C07.AC02
Local virtual MAC address is 0000.0C07.AC02 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 2.316 secs
Preemption enabled
Active router is 10.0.234.253, priority 200 (expires in 8 sec)
MAC address is 0000.0C07.AC02
Standby router is local
Priority 100 (default 100)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl2-2 (default)
Vlan345 - Group 1
State is Active
6 state changes, last state change 00:08:58
Virtual IP address is 10.34.56.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 0.337 secs
Preemption enabled
Active router is local
Standby router is 10.34.56.253
Priority 200 (configured 200)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl3-1 (default)

Se relaciona a continuación el resultado del comando en el Switch DLS2:

DLS2(config)#interface Vlan 12
DLS2(config-if)#standby 1 ip 10.0.12.254
DLS2(config-if)#standby 1 priority 100
DLS2(config-if)#standby 1 preempt
DLS2(config-if)#standby 1 track FastEthernet0/11
DLS2(config-if)#standby 1 track FastEthernet0/12
DLS2(config-if)#interface Vlan 101
DLS2(config-if)#standby 1 ip 10.10.10.254

```
DLS2(config-if)#standby 1 priority 100
DLS2(config-if)#standby 1 preempt
DLS2(config-if)#standby 1 track FastEthernet0/11
DLS2(config-if)#standby 1 track FastEthernet0/12
DLS2(config-if)#interface Vlan 111
DLS2(config-if)#standby 1 ip 10.11.11.254
DLS2(config-if)#standby 1 priority 100
DLS2(config-if)#standby 1 preempt
DLS2(config-if)#standby 1 track FastEthernet0/11
DLS2(config-if)#standby 1 track FastEthernet0/12
DLS2(config-if)#interface Vlan 345
DLS2(config-if)#standby 1 ip 10.34.56.254
DLS2(config-if)#standby 1 priority 100
DLS2(config-if)#standby 1 preempt
DLS2(config-if)#standby 1 track FastEthernet0/11
DLS2(config-if)#standby 1 track FastEthernet0/12
DLS2(config-if)#interface Vlan 123
DLS2(config-if)#standby 2 ip 10.0.123.254
DLS2(config-if)#standby 2 priority 200
DLS2(config-if)#standby 2 preempt
DLS2(config-if)#standby 2 track FastEthernet0/11
DLS2(config-if)#standby 2 track FastEthernet0/12
DLS2(config-if)#interface Vlan 234
DLS2(config-if)#standby 2 ip 10.0.234.254
DLS2(config-if)#standby 2 priority 200
DLS2(config-if)#standby 2 preempt
DLS2(config-if)#standby 2 track FastEthernet0/11
DLS2(config-if)#standby 2 track FastEthernet0/12


DLS2#Show Standby
Vlan12 - Group 1
State is Standby
3 state changes, last state change 00:15:13
Virtual IP address is 10.0.12.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 0.13 secs
Preemption enabled
Active router is 10.0.12.252
Standby router is local
Priority 100 (default 100)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
```

Group name is hsrp-Vl1-1 (default)
Vlan101 - Group 1
State is Standby
3 state changes, last state change 00:15:23
Virtual IP address is 10.10.10.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 0.05 secs
Preemption enabled
Active router is 10.10.10.252
Standby router is local
Priority 100 (default 100)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl1-1 (default)
Vlan111 - Group 1
State is Standby
3 state changes, last state change 00:15:37
Virtual IP address is 10.11.11.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 1.112 secs
Preemption enabled
Active router is 10.11.11.252
Standby router is local
Priority 100 (default 100)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl1-1 (default)
Vlan123 - Group 2
State is Active
2 state changes, last state change 00:15:38
Virtual IP address is 10.0.123.254
Active virtual MAC address is 0000.0C07.AC02
Local virtual MAC address is 0000.0C07.AC02 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 0.238 secs
Preemption enabled
Active router is local
Standby router is 10.0.123.252, priority 100 (expires in 7 sec)
Priority 200 (configured 200)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10

Group name is hsrp-Vl1-2 (default)
Vlan234 - Group 2
State is Active
2 state changes, last state change 00:15:47
Virtual IP address is 10.0.234.254
Active virtual MAC address is 0000.0C07.AC02
Local virtual MAC address is 0000.0C07.AC02 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 1.988 secs
Preemption enabled
Active router is local
Standby router is 10.0.234.252, priority 100 (expires in 8 sec)
Priority 200 (configured 200)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl2-2 (default)
Vlan345 - Group 1
State is Standby
3 state changes, last state change 00:15:45
Virtual IP address is 10.34.56.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 2.807 secs
Preemption enabled
Active router is 10.34.56.252
Standby router is local
Priority 100 (default 100)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl3-1 (default)

r. Configurar DLS1 como un servidor DHCP para las VLAN 12, 123 y 234

1) Excluir las direcciones desde .251 hasta .254 en cada subred

2) Establecer el servidor DNS a 1.1.1.1 para los tres Pool.

3) Establecer como default-router las direcciones virtuales HSRP para cada VLAN

Para esto usamos los siguientes comandos:
DLS1(config)#ip dhcp excluded-address 10.0.12.251 10.0.12.254
DLS1(config)#ip dhcp pool VLAN12_DHCP
DLS1(dhcp-config)#network 10.0.12.0 255.255.255.0

DLS1(dhcp-config)#default-router 10.0.12.252
DLS1(dhcp-config)#dns-server 1.1.1.1

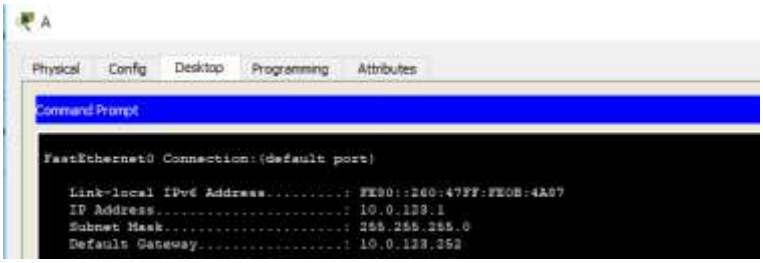
DLS1(dhcp-config)#ip dhcp excluded-address 10.0.123.251 10.0.12.254
DLS1(config)#ip dhcp pool VLAN123_DHCP
DLS1(dhcp-config)#network 10.0.123.0 255.255.255.0
DLS1(dhcp-config)#default-router 10.0.123.252
DLS1(dhcp-config)#dns-server 1.1.1.1

DLS1(dhcp-config)#ip dhcp excluded-address 10.0.234.251 10.0.12.254
DLS1(config)#ip dhcp pool VLAN234_DHCP
DLS1(dhcp-config)#network 10.0.234.0 255.255.255.0
DLS1(dhcp-config)#default-router 10.0.234.252
DLS1(dhcp-config)#dns-server 1.1.1.1

```
DLS1>en
DLS1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
DLS1(config)#ip dhcp excluded-address 10.0.12.251 10.0.12.254
DLS1(config)#ip dhcp pool VLAN12_DHCP
DLS1(dhcp-config)#network 10.0.12.0 255.255.255.0
DLS1(dhcp-config)#default-router 10.0.12.252
DLS1(dhcp-config)#dns-server 1.1.1.1
DLS1(dhcp-config)#exit
DLS1(config)#ip dhcp excluded-address 10.0.123.251 10.0.12.254
DLS1(config)#ip dhcp pool VLAN123_DHCP
DLS1(dhcp-config)#network 10.0.123.0 255.255.255.0
DLS1(dhcp-config)#default-router 10.0.123.252
DLS1(dhcp-config)#dns-server 1.1.1.1
DLS1(dhcp-config)#exit
DLS1(config)#ip dhcp excluded-address 10.0.234.251 10.0.12.254
DLS1(config)#ip dhcp pool VLAN234_DHCP
DLS1(dhcp-config)#network 10.0.234.0 255.255.255.0
DLS1(dhcp-config)#default-router 10.0.234.252
DLS1(dhcp-config)#dns-server 1.1.1.1
DLS1(dhcp-config)#exit
DLS1(config)#
```

Figura 76 Configuración rutas

s. Obtener direcciones IPv4 en los host A, B, y D a través de la configuración por DHCP que fue realizada.



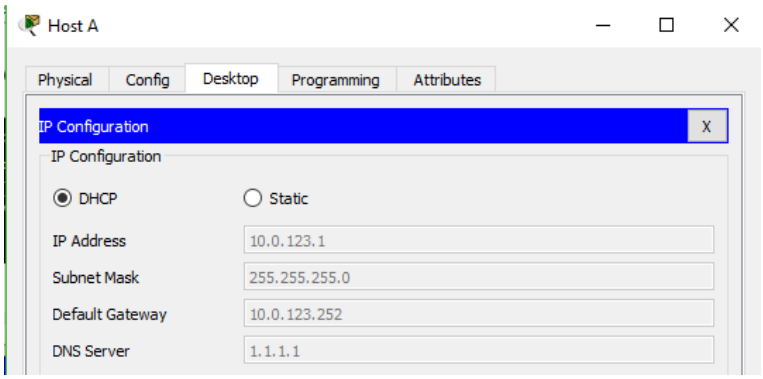


Figura 77 verificación IPv4 Host A

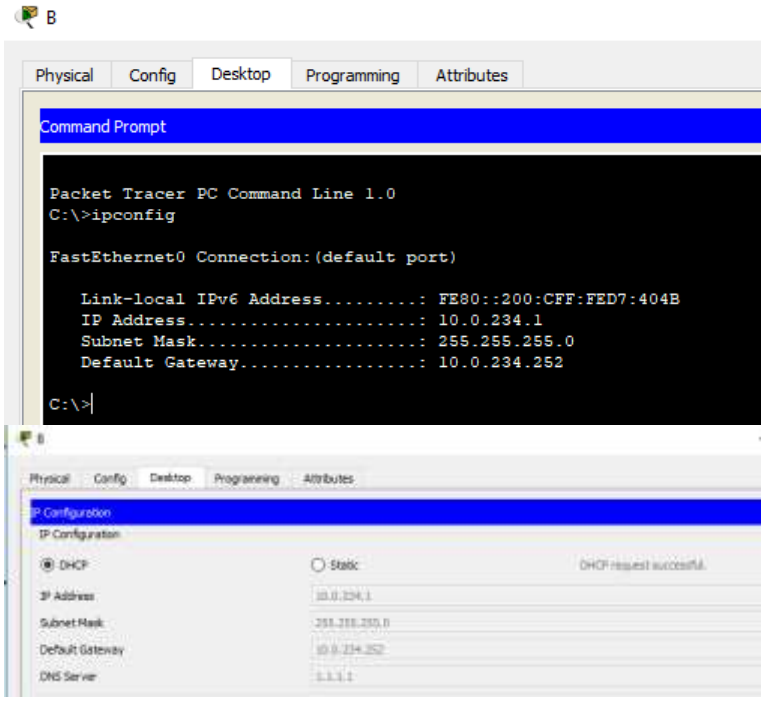


Figura 78 verificación IPv4 Host B

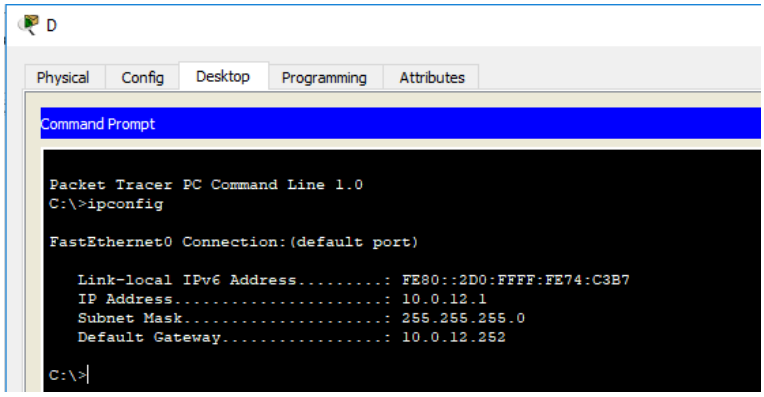


Figura 79 verificación IPv4 Host D

Como podemos observar cada uno de los Host recibe una dirección IPV4 de forma dinámica por medio del DHCP creado en el Switch DLS1.

3.2.2 Parte 2: conectividad de red de prueba y las opciones configuradas.

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

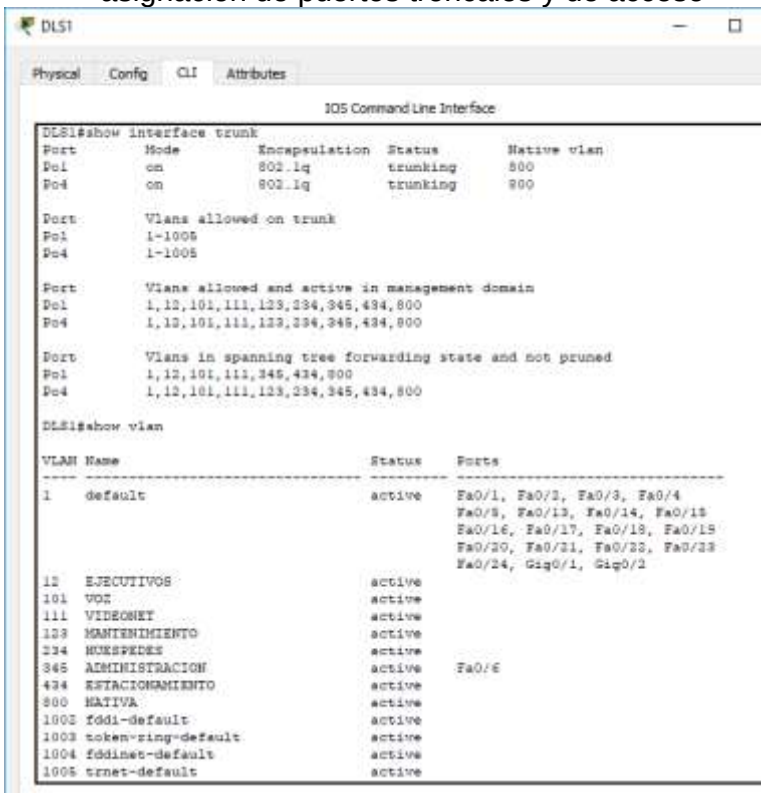


Figura 80 verificación Vlan e interface trunk en DLS1

```
DLS2#show interface trunk
Port        Mode         Encapsulation  Status        Native vlan
Po2         on           802.1q         trunking      800
Po3         on           802.1q         trunking      800

Port        Vlans allowed on trunk
Po2         1-566,568-1005
Po3         1-566,568-1005

Port        Vlans allowed and active in management domain
Po2         1,12,101,111,123,234,345,434,800
Po3         1,12,101,111,123,234,345,434,800

Port        Vlans in spanning tree forwarding state and not pruned
Po2         1,12,101,111,123,234,345,434,800
Po3         123,234

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                 Fa0/5, Fa0/13, Fa0/14, Fa0/15
                                                 Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                 Fa0/20, Fa0/21, Fa0/22, Fa0/23
                                                 Fa0/24, Gig0/1, Gig0/2
12   EJECUTIVOS                        active    Fa0/6
101  VOZ                               active
111  VIDEONET                          active
123  MANTENIMIENTO                     active
234  HUESPEDES                         active
345  ADMINISTRACION                    active
434  ESTACIONAMIENTO                   active
567  CONTABILIDAD                      active
800  NATIVA                            active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
```

Figura 81 verificación Vlan e interface trunk en DLS2

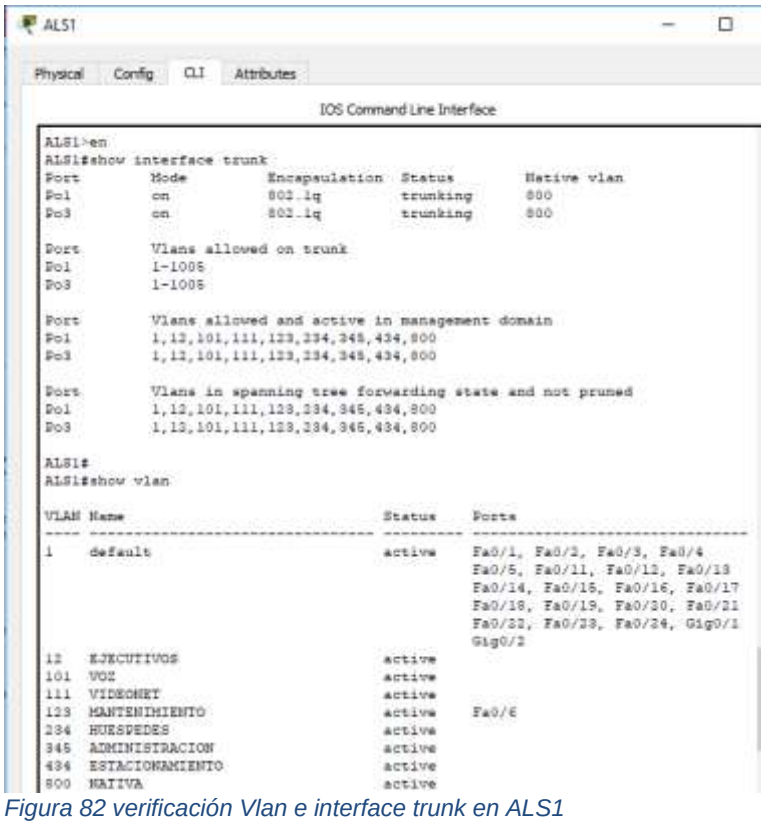


Figura 82 verificación Vlan e interface trunk en ALS1

Figura 83 verificación Vlan e interface trunk en ALS2

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

```
DLS1#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 3
Number of aggregators:           3

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------

1      Po1(SU)           LACP   Fa0/7(P) Fa0/8(P)
4      Po4(SU)           PAgP   Fa0/9(P) Fa0/10(P)
12     Po12(RU)           LACP   Fa0/11(P) Fa0/12(P)
DLS1#
```

Figura 84 verificación Etherhannel DLS1

```
ALS1#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------

1      Po1(SU)           LACP    Fa0/7(P) Fa0/8(P)
3      Po3(SU)           PAgP    Fa0/9(P) Fa0/10(P)
ALS1#
```

Figura 85 verificación Etherhannel DLS2

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

```
DLS1#sh spanning-tree
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    24577
             Address     0000.0C32.B676
             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     0000.0C32.B676
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Po4              Desg FWD 9         128.29   Shr
Po1              Desg FWD 9         128.28   Shr

VLAN0012
  Spanning tree enabled protocol ieee
  Root ID    Priority    24588
             Address     0000.0C32.B676
             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     0000.0C32.B676
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa0/7            Desg FWD 19        128.7    P2p
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p
Po4              Desg FWD 9         128.29   Shr
Po1              Desg FWD 9         128.28   Shr
```

Figura 86 Verificación spanning-tree DSL1

```
VLAN0101
  Spanning tree enabled protocol ieee
  Root ID     Priority    24677
              Address     0000.0C32.B676
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    24677  (priority 24576 sys-id-ext 101)
              Address     0000.0C32.B676
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa0/7            Desg FWD 19        128.7    P2p
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p
Po4              Desg FWD 9         128.29   Shr
Po1              Desg FWD 9         128.28   Shr

VLAN0111
  Spanning tree enabled protocol ieee
  Root ID     Priority    24687
              Address     0000.0C32.B676
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    24687  (priority 24576 sys-id-ext 111)
              Address     0000.0C32.B676
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20
```

```
Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa0/7            Desg FWD 19        128.7    P2p
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p
Po4              Desg FWD 9         128.29   Shr
Po1              Desg FWD 9         128.28   Shr

VLAN0123
  Spanning tree enabled protocol ieee
  Root ID     Priority    24699
              Address     000C.851A.A495
              Cost        18
              Port        29(Port-channel4)
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    28795  (priority 28672 sys-id-ext 123)
              Address     0000.0C32.B676
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa0/7            Desg FWD 19        128.7    P2p
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p
Po4              Root FWD 9         128.29   Shr
Po1              Altn BLK 9         128.28   Shr
```

Figura 87 Verificación spanning-tree DSL1

```
VLAN0234
  Spanning tree enabled protocol ieee
  Root ID     Priority    24810
              Address     000C.851A.A495
              Cost        18
              Port        19(Port-channel4)
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    28906  (priority 28672 sys-id-ext 234)
              Address     0000.0C32.B676
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa0/7            Desg FWD 19        128.7    P2p
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p
Po4              Root FWD 9         128.29   Shr
Po1              Altn BLK 9         128.28   Shr

VLAN0345
  Spanning tree enabled protocol ieee
  Root ID     Priority    24921
              Address     0000.0C32.B676
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    24921  (priority 24576 sys-id-ext 345)
              Address     0000.0C32.B676
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa0/7            Desg FWD 19        128.7    P2p
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/6            Desg FWD 19        128.6    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p
Po4              Desg FWD 9         128.29   Shr
Po1              Desg FWD 9         128.28   Shr

VLAN0434
  Spanning tree enabled protocol ieee
  Root ID     Priority    25010
              Address     0000.0C32.B676
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    25010  (priority 24576 sys-id-ext 434)
              Address     0000.0C32.B676
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa0/7            Desg FWD 19        128.7    P2p
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p
Po4              Desg FWD 9         128.29   Shr
Po1              Desg FWD 9         128.28   Shr

VLAN0800
  Spanning tree enabled protocol ieee
  Root ID     Priority    25376
              Address     0000.0C32.B676
              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     0000.0C32.B676
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa0/7            Desg FWD 19        128.7    P2p
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p
Po4              Desg FWD 9         128.29   Shr
Po1              Desg FWD 9         128.28   Shr
```

Figura 88 Verificación spanning-tree DSL1

Se valida con el comando show spanning-tree en DLS1observando que se encuentra correctamente configurado.

```
DLS1#show standby
Vlan12 - Group 1
State is Active
5 state changes, last state change 03:02:03
Virtual IP address is 10.0.12.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 0.315 secs
Preemption enabled
Active router is local
Standby router is 10.0.12.253
Priority 200 (configured 200)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl1-1 (default)
Vlan101 - Group 1
State is Active
5 state changes, last state change 03:14:23
Virtual IP address is 10.10.10.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 0.02 secs
Preemption enabled
Active router is local
Standby router is 10.10.10.253
Priority 200 (configured 200)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl1-1 (default)
Vlan111 - Group 1
State is Active
7 state changes, last state change 03:16:02
Virtual IP address is 11.11.11.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 0.231 secs
```

Preemption enabled
Active router is local
Standby router is 10.11.11.253
Priority 200 (configured 200)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl1-1 (default)
Vlan123 - Group 1
State is Standby
6 state changes, last state change 03:34:46
Virtual IP address is 10.0.123.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 1.494 secs
Preemption enabled
Active router is 10.0.123.253, priority 200 (expires in 7 sec)
MAC address is 0000.0C07.AC01
Standby router is local
Priority 100 (default 100)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl1-1 (default)
Vlan234 - Group 1
State is Standby
8 state changes, last state change 03:35:24
Virtual IP address is 10.0.234.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 0.902 secs
Preemption enabled
Active router is 10.0.234.253, priority 200 (expires in 5 sec)
MAC address is 0000.0C07.AC01
Standby router is local
Priority 100 (default 100)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl2-1 (default)
Vlan345 - Group 1
State is Active
4 state changes, last state change 03:20:14
Virtual IP address is 10.24.56.254

Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 0.215 secs
Preemption enabled
Active router is local
Standby router is 10.24.56.253
Priority 200 (configured 200)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl3-1 (default)

DLS2#show standby
Vlan12 - Group 1
State is Standby
3 state changes, last state change 01:17:21
Virtual IP address is 10.0.12.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 2.171 secs
Preemption enabled
Active router is 10.0.12.252
Standby router is local
Priority 100 (default 100)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl1-1 (default)
Vlan101 - Group 1
State is Standby
3 state changes, last state change 01:17:21
Virtual IP address is 10.10.10.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 0.321 secs
Preemption enabled
Active router is 10.10.10.252
Standby router is local
Priority 100 (default 100)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10

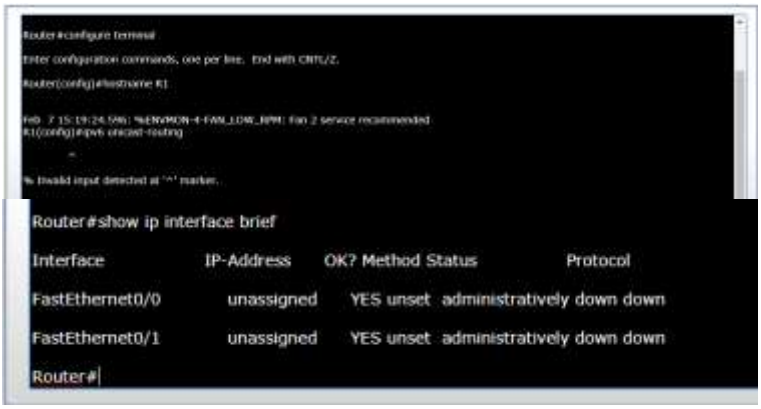
Group name is hsrp-Vl1-1 (default)
Vlan111 - Group 1
State is Standby
3 state changes, last state change 01:17:22
Virtual IP address is 10.11.11.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 1.715 secs
Preemption enabled
Active router is 10.11.11.252
Standby router is local
Priority 100 (default 100)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl1-1 (default)
Vlan123 - Group 2
State is Active
2 state changes, last state change 01:18:48
Virtual IP address is 10.0.123.254
Active virtual MAC address is 0000.0C07.AC02
Local virtual MAC address is 0000.0C07.AC02 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 1.241 secs
Preemption enabled
Active router is local
Standby router is 10.0.123.252, priority 100 (expires in 7 sec)
Priority 200 (default 100)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl1-2 (default)
Vlan234 - Group 2
State is Active
2 state changes, last state change 01:17:03
Virtual IP address is 10.0.234.254
Active virtual MAC address is 0000.0C07.AC02
Local virtual MAC address is 0000.0C07.AC02 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 1.1 secs
Preemption enabled
Active router is local
Standby router is 10.0.234.252, priority 100 (expires in 8 sec)
Priority 200 (configured 200)

Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl2-2 (default)
Vlan345 - Group 1
State is Standby
3 state changes, last state change 01:17:21
Virtual IP address is 10.34.56.254
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 0.406 secs
Preemption enabled
Active router is 10.34.56.252
Standby router is local
Priority 100 (default 100)
Track interface FastEthernet0/11 state Up decrement 10
Track interface FastEthernet0/12 state Up decrement 10
Group name is hsrp-Vl3-1 (default)
DLS2

Notas adicionales:

Se valido la realizacion de estas practicas desde “POD I, POD2, POD3, POD4 Y POD5” para el primer escenario, y en cada uno de esos entornos se evidenciaron problemas para la simulación. A continuación relaciono por separado los problemas arrojados en cada entorno, así:

Simulación escenario 1, POD 1: R1 no admite comando “ipv6 unicast-routing” y los puertos seriales no están habilitados para su configuración. Este mismo error se repite en todos los POD disponibles para dicha simulación.



El R2 de la red, es el unico dispositivo que me permite realizar configuracion de los puertos serial (solo para IPv4). R2 tampoco admite el comando “ipv6 unicast-routing”

Imagenes Errores laboratorio SmartLab.

En razon a lo anterior, ambos ninguno de los laboratorios logro ser desarrollado bajo el entorno Cisco SmartLabs

2. CONCLUSIONES

- Las areas stub y totally stubby son de gran importancia, ya que reduce la tabla de enrutamiento de manera considerable, permitiendo también reducir los requerimientos de hardware como memoria y CPU de los enrutadores.

- Por medio de la redistribución de protocolos, es posible conectar redes que tengan configurado distinto protocolo, debido a que este proceso importa y exporta las rutas de las distintas redes.

- EIGRP es un protocolo de transporte de datos bastante confiable, con capacidad de establecer adyacencias, utiliza métrica compuesta y utiliza el algoritmo de actualización por difusión (DUAL).

- El área a través de la cual configura el enlace virtual OSPF, se denomina área de tránsito, debe tener información completa de enrutamiento y no fue ser un área stub.

- En NAT existen tipos de funcionamiento, tales como estática, dinámica, sobrecarga y solapamiento. NAT Habilita las redes de IP privado que utilizan los IP Address no registrados para conectar con el Internet.

- Es de gran importancia encriptar las contraseñas que usamos para accesar los enrutadores, con el método más seguro, como lo es por medio de un servidor radius, esto nos permite blindar nuestra red impidiendo que intrusos puedan adquirir información valiosa.

- Para evitar que un Router ajeno, sea introducido de manera clandestina a la red, es necesario la implementación de una autenticación de los mensajes de actualización de las rutas, para el protocolo usado en nuestros enrutadores.

- Es de gran utilidad el protocolo HSRP, el cual es de propiedad de Cisco, y nos permite tener enlaces redundantes en nuestra red, lo cual minimiza la afectación de los servicios, estableciendo una nueva ruta para el reenvío de tráfico.

- El protocolo GLBP nos permite balancear las cargas asignando varias direcciones MAC a una misma IP virtual, es de gran utilidad debido a que podemos duplicar el ancho de banda y así se aprovecha los recursos sin un exceso de carga administrativa.

- Implementar Network Time Protocol (NTP) en una red permite sincronizar el control de tiempo de una red de computadoras y este a su vez se ejecuta en User Datagram Protocol (UDP), permitiendo realizar seguimiento de eventos en la red y correcta interpretación de los archivos syslog y de los certificados digitales.

- SNMP es un protocolo estándar de internet para administrar dispositivos en redes IP, dicho protocolo está compuesto por administrador de SNMP, agente SNMP y los dispositivos administrados. En su tercera versión SNMP agrega mejoras en la seguridad y en la configuración remota, como por ejemplo el protocolo de autenticación MD5 y SHA

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