DIPLOMADO DE PROFUNDIZACION CISCO
PRUEBA DE HABILIDADES PRÁCTICAS CCNP

LUIS CARLOS LEGUIZAMON ROJAS

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA - UNAD
ESCUELA DE CIENCIAS BÁSICAS TECNOLOGÍA E INGENIERÍA -ECBTI
INGENIERIA DE TELECOMUNICACIONES
SOGAMOSO-BOYACA
2019

DIPLOMADO DE PROFUNDIZACION CISCO
PRUEBA DE HABILIDADES PRÁCTICAS CCNP

LUIS CARLOS LEGUIZAMON ROJAS

Diplomado de opción de grado presentado para optar el título de
INGENIERO DE TELECOMUNICACIONES

DIRECTOR:
MSc. GERARDO GRANADOS ACUÑA

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA - UNAD
ESCUELA DE CIENCIAS BÁSICAS TECNOLOGÍA E INGENIERÍA – ECBTI
INGENIERIA DE TELECOMUNICACIONES
SOGAMOSO-BOYACA
2019

NOTA DE ACEPTACION

_____
_____
_____
_____
_____

_____
Firma Del Presidente Del Jurado

_____
Firma Del Jurado

_____
Firma Del Jurado

Sogamoso, 12 de diciembre de 2019

AGRADECIMIENTOS

Agradezco profundamente a Dios, por darme los deseos de mi corazón, a mi Esposa, que sea la forma que sea me ha apoyado siempre con su amor, a mi Madre, mi Padre, mi Abuela, mi Tía y al Ingeniero Audy, familia, que siempre me han apoyado, impulsado y amado, a la universidad y sus tutores, por su impulso y enseñanza para alcanzar los objetivos y metas propuestas en cuanto a todas las materias del pensum, y el diplomado de profundización CISCO CCNP.

CONTENIDO

LISTA DE TABLAS

LISTA DE FIGURAS

RESUMEN

El desarrollo de este documento de prueba de habilidades consiste en el proceso de conceptualización de los conocimientos y temas aprendidos en el área de Redes y Networking para CISCO Routing y Switching de los módulos de CCNA y el Diplomado de profundización de cisco CCNP, a su vez realizando la aplicación práctica de estos, en programas de simulación lógica diseñados para este fin.

Su principal objetivo, es medir los conocimientos y capacidad de aplicación de los conceptos aprendidos en esta rama de la Electrónica por el estudiante, aplicando sus conocimientos aprendidos a lo largo del desarrollo de los diversos modulo del Diplomado Cisco CCNP.

ABSTRACT

The development of this skills test document consists of the process of conceptualization of the knowledge and topics learned in the area of Networks and Networking for CISCO Routing and Switching of the CCNA modules and the CCNP cisco deepening Diploma, in turn realizing the practical application of these, in logical simulation programs designed for this purpose.

Its main objective is to measure the knowledge and application capacity of the concepts learned in this branch of Electronics by the student, applying their knowledge learned throughout the development of the various module of the Cisco CCNP Diploma.

INTRODUCCION

Hoy en día, la importancia que han adquirido las redes LAN, WAN y MAN, entre otras, se ha incrementado notablemente debido a los constantes cambios en las tecnologías, generan diferentes desafíos y retos para los especialistas en Telecomunicaciones, que abren un mundo de posibilidades al obtener los conocimientos necesarios, mediante los módulos de CCNA y CCNP ofrecidos por CISCO.

Este trabajo contiene el desarrollo de dos escenarios propuestos para su desarrollo, mediante la aplicación de conceptos y conocimientos adquiridos a lo largo de los módulos desarrollados de CCNA y CCNP aplicando las habilidades en el desarrollo de el escenario de Routing y otro de Switching, simulados en programas como Packet tracer, implementando configuraciones de IPv4, IPv6, OSPF, ETHERCHANNEL, SPANNING-TREE y EIGRP.

DESARROLLO

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.

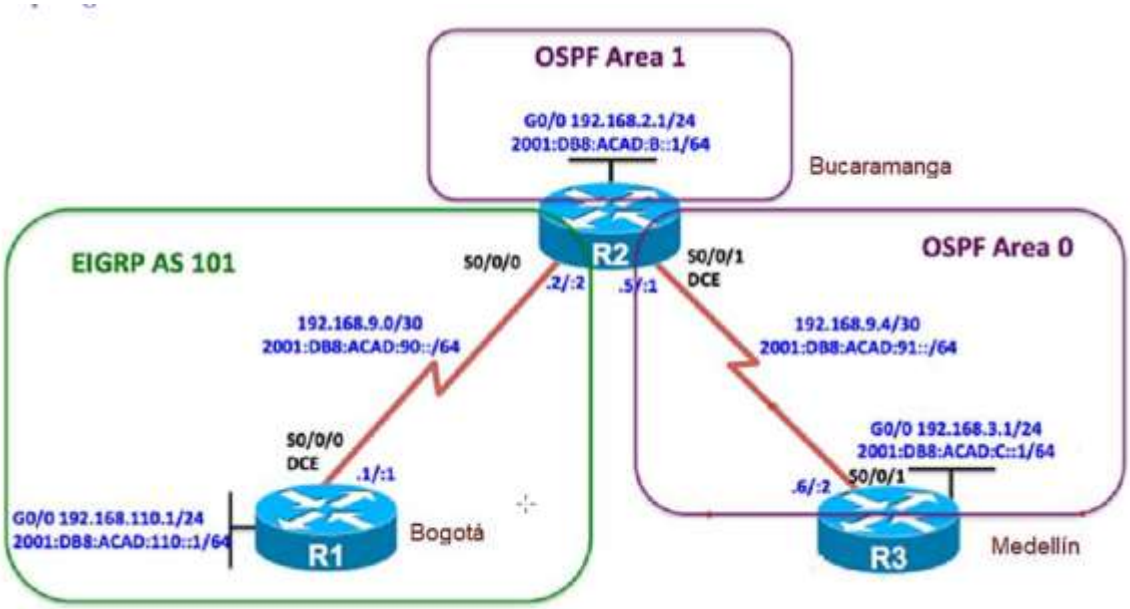


Ilustración 1. Diagrama de topología requerida

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

Parte 1: Configuración del escenario propuesto

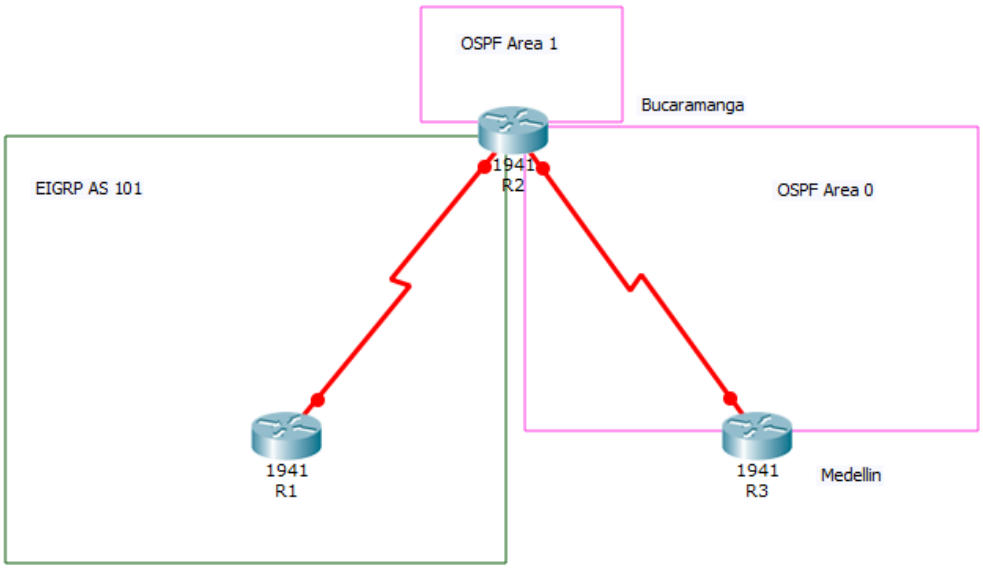


Ilustración 2. Topología de red implementada

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.

```
R1>en
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ipv6 unicast-routing
R1(config)#int g0/0
R1(config-if)#ip address 192.168.110.1 255.255.255.0
% 192.168.110.0 overlaps with Serial0/0/0
R1(config-if)#ipv6 address 2001:db8:acad:110::1/64
%GigabitEthernet0/0: Error: 2001:DB8:ACAD:110::/64 is overlapping with
2001:DB8:ACAD:110::/64 on Serial0/0/0
R1(config-if)#no shut
% 192.168.110.0 overlaps with Serial0/0/0
GigabitEthernet0/0: incorrect IP address assignment
R1(config-if)#int s0/0/0
```

R1(config-if)#ip address 192.168.9.1 255.255.255.0
% 192.168.9.0 overlaps with Serial0/0/1
R1(config-if)#ipv6 address 2001:db8:acad:90::1/64
%Serial0/0/0: Error: 2001:DB8:ACAD:90::/64 is overlapping with
2001:DB8:ACAD:90::/64 on Serial0/0/1
R1(config-if)#clock rate 128000
R1(config-if)#bandw
R1(config-if)#bandwidth 128
R1(config-if)#no shut

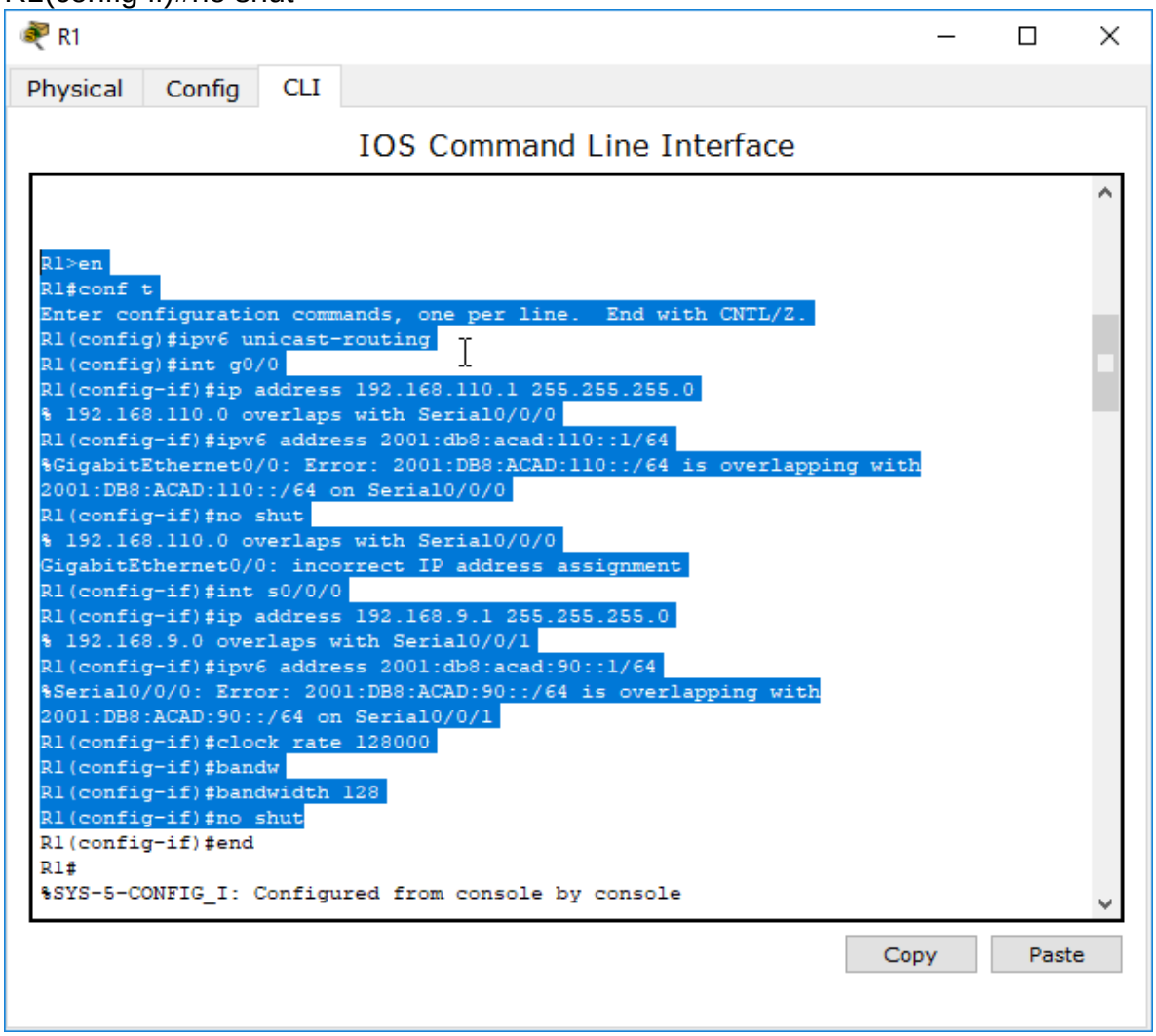


Ilustración 3. Configuración R1

R2>en
R2#conf ty

```
^
% Invalid input detected at '^' marker.
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ipv6 unicast-routing
R2(config)#int g0/0
R2(config-if)#ip address 192.168.2.1 255.255.255.0
% 192.168.2.0 overlaps with Serial0/0/0
R2(config-if)#ipv6 address 2001:db8:acad:b::1/64
%GigabitEthernet0/0: Error: 2001:DB8:ACAD:B::/64 is overlapping with
2001:DB8:ACAD:B::/64 on Serial0/0/0
R2(config-if)#no shutdown
% 192.168.2.0 overlaps with Serial0/0/0
GigabitEthernet0/0: incorrect IP address assignment
R2(config-if)#int s0/0/0
R2(config-if)#ip address 192.168.9.2 255.255.255.0
% 192.168.9.0 overlaps with Serial0/0/1
R2(config-if)#int s0/0/1
R2(config-if)#shut

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to administratively down
R2(config-if)#int s0/0/0
R2(config-if)#ipv6 address 2001:db8:acad:90::2/64
%Serial0/0/0: Error: 2001:DB8:ACAD:90::/64 is overlapping with
2001:DB8:ACAD:90::/64 on Serial0/0/1
R2(config-if)#bandwidth 128
R2(config-if)#
R2(config-if)#no shut
R2(config-if)#int s0/0/1
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)#bandw
% Incomplete command.
R2(config-if)#da
^
% Invalid input detected at '^' marker.
R2(config-if)#bandw
R2(config-if)#bandwidth 128
R2(config-if)#no shut
```

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R2(config-if)#

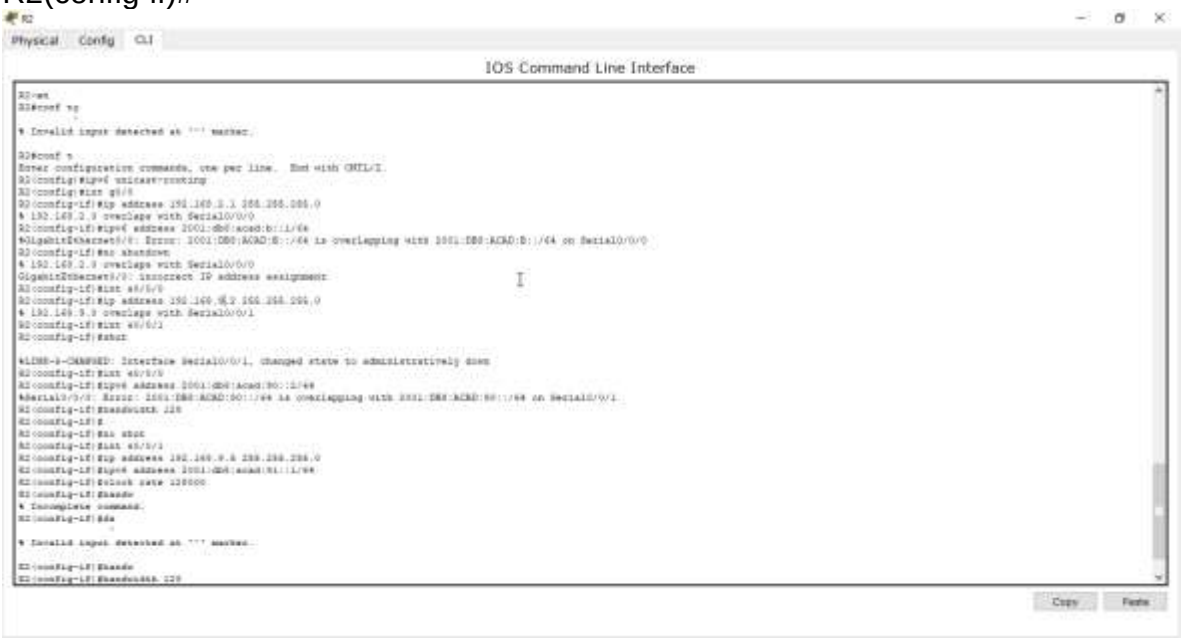


Ilustración 4. Configuración R2

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#ipv6 uni
R3(config)#ipv6 unicast-routing
R3(config)#int g0/0
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)#
R3(config-if)#no shut

R3(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
int s0/0/0
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)#bandw

R3(config-if)#bandwidth 128
R3(config-if)#no shut

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

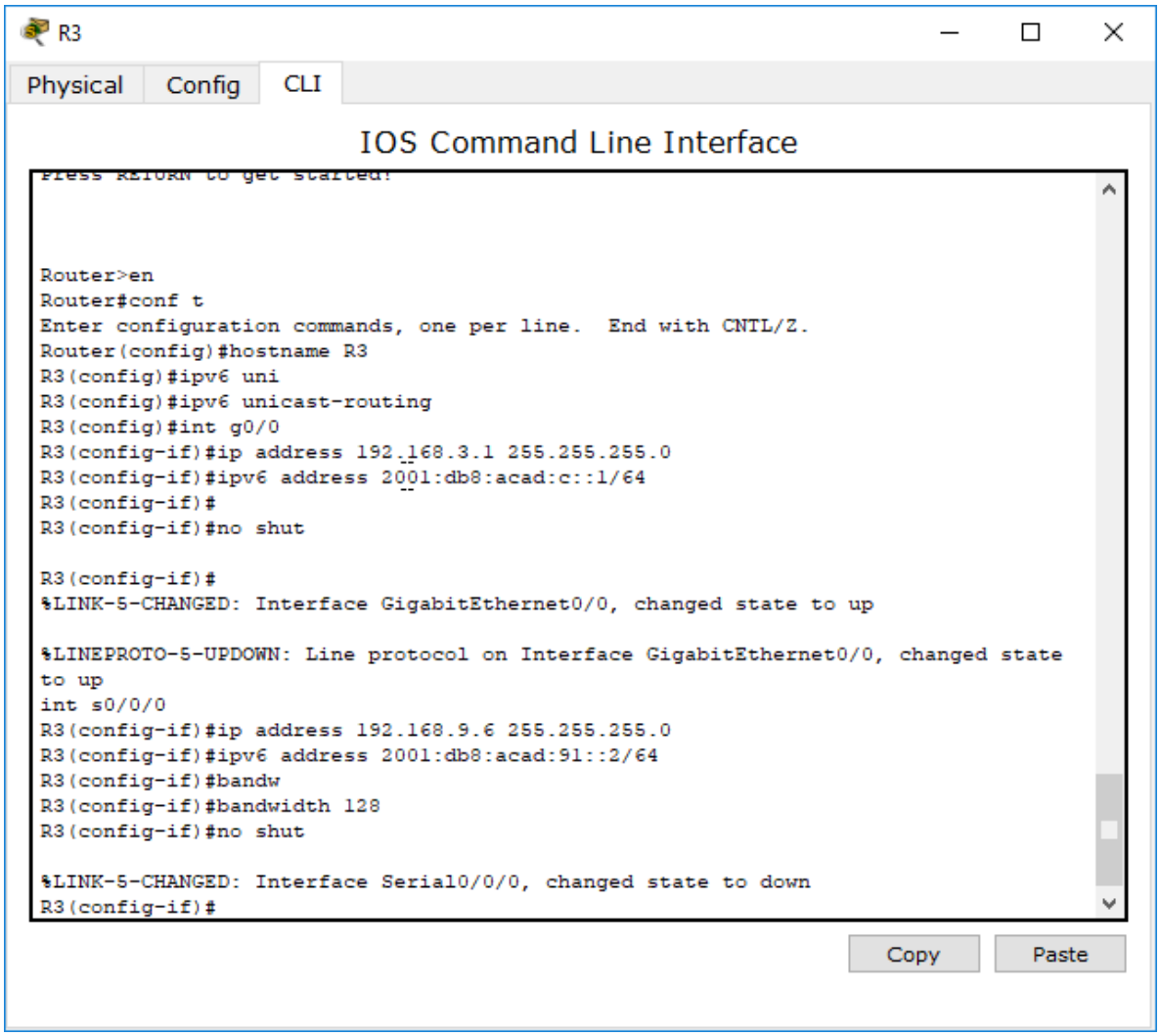


Ilustración 5. Configuración R3

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.

Para R2 se usaron los siguientes comandos:

```
R2>en
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#rout
R2(config)#router ospf 1
R2(config-router)#address-family ipv4 unicast
^
% Invalid input detected at '^' marker.
R2(config-router)#router-id 2.2.2.2
R2(config-router)#exit-address-family
^
% Invalid input detected at '^' marker.
R2(config-router)#address-family ipv6 unicast
^
% Invalid input detected at '^' marker.
R2(config-router)#router-id 2.2.2.2
R2(config-router)#exit-address-family
^
% Invalid input detected at '^' marker.
R2(config-router)#
R2#
%SYS-5-CONFIG_I: Configured from console by console
```

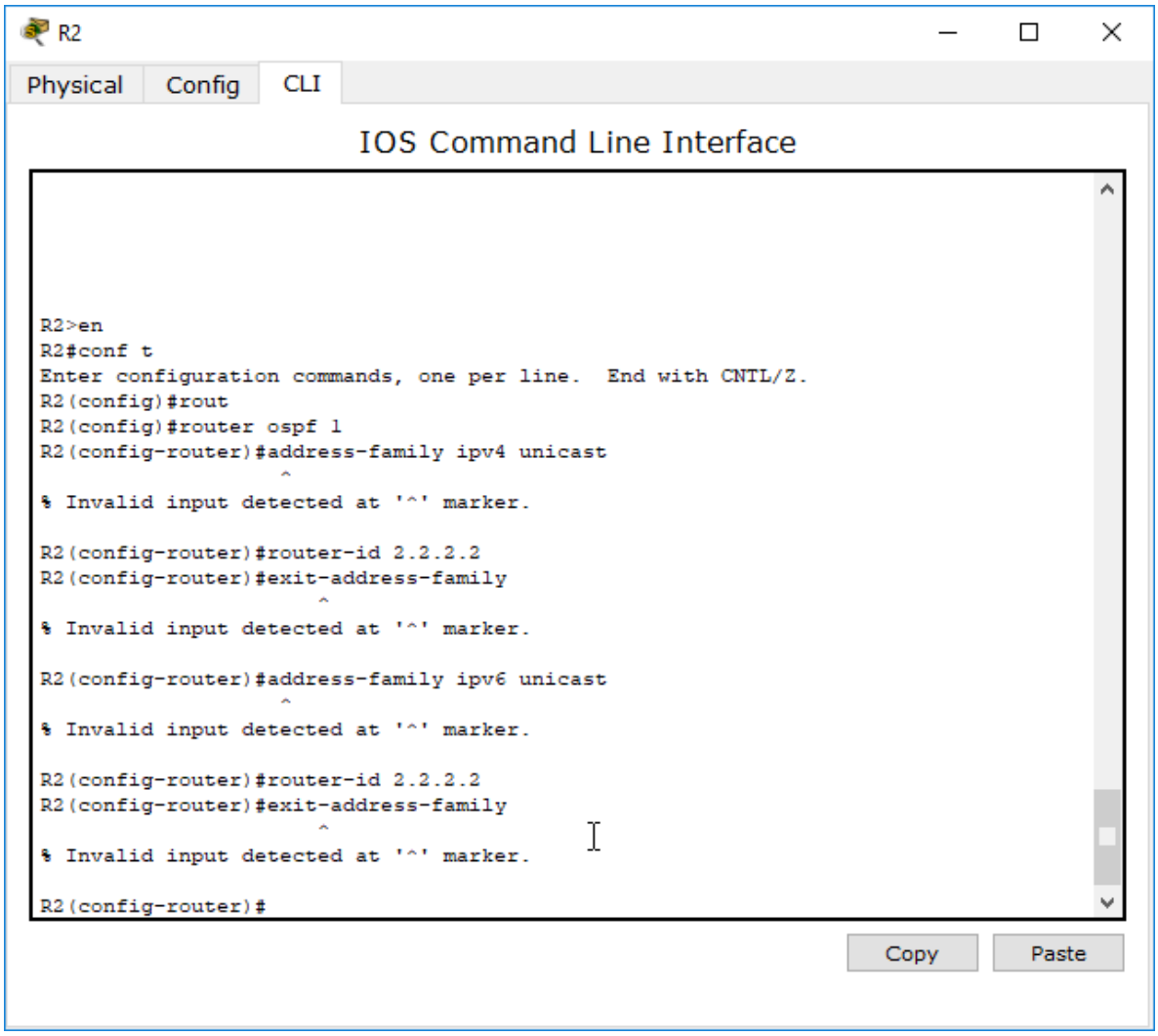


Ilustración 6. Configuración OSPFv3 para R2

R3>en
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#address-family ipv4 unicast
^
% Invalid input detected at '^' marker.
R3(config-router)#router-id 3.3.3.3
R3(config-router)#passive-interface g0/0
R3(config-router)#exit-address-family

```
^
% Invalid input detected at '^' marker.
R3(config-router)#exit-address-family
^
% Invalid input detected at '^' marker.
R3(config-router)#
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#address-family ipv6 unicast
^
% Invalid input detected at '^' marker.
R3(config-router)#router-id 3.3.3.3
R3(config-router)#
R3(config-router)#passive-interface FastEthernet0/0
%Invalid interface type and number
R3(config-router)#passive-interface g0/0
R3(config-router)#exit
```

Packet tracer n o soporta algunos comandos

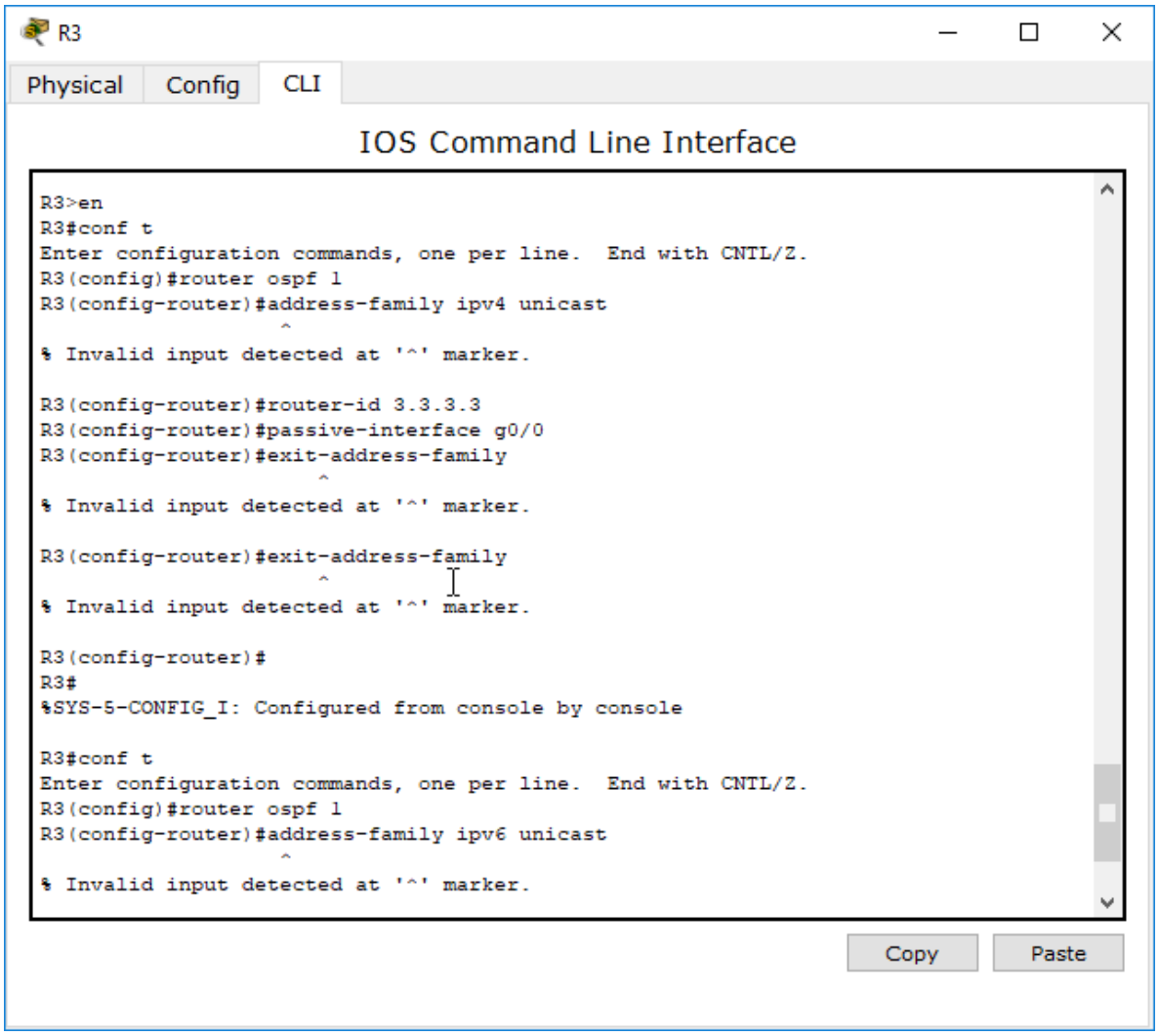


Ilustración 7. configuración ospfv3 para R3

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.

R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int g0/0
R2(config-if)#ospf 1 ?
% Unrecognized command
R2(config-if)#ospf 1 ospfv3 1 ipv4 area 1
^
% Invalid input detected at '^' marker.

```
R2(config-if)#ospf 1 ospfv3 1 ipv6 area 1
^
% Invalid input detected at '^' marker.
R2(config-if)#int s0/0/1
R2(config-if)#ospf 1 ospfv3 1 ipv4 area 1
^
% Invalid input detected at '^' marker.
R2(config-if)#ospf 1 ospfv3 1 ipv6 area 1
^
% Invalid input detected at '^' marker.
R2(config-if)#
```

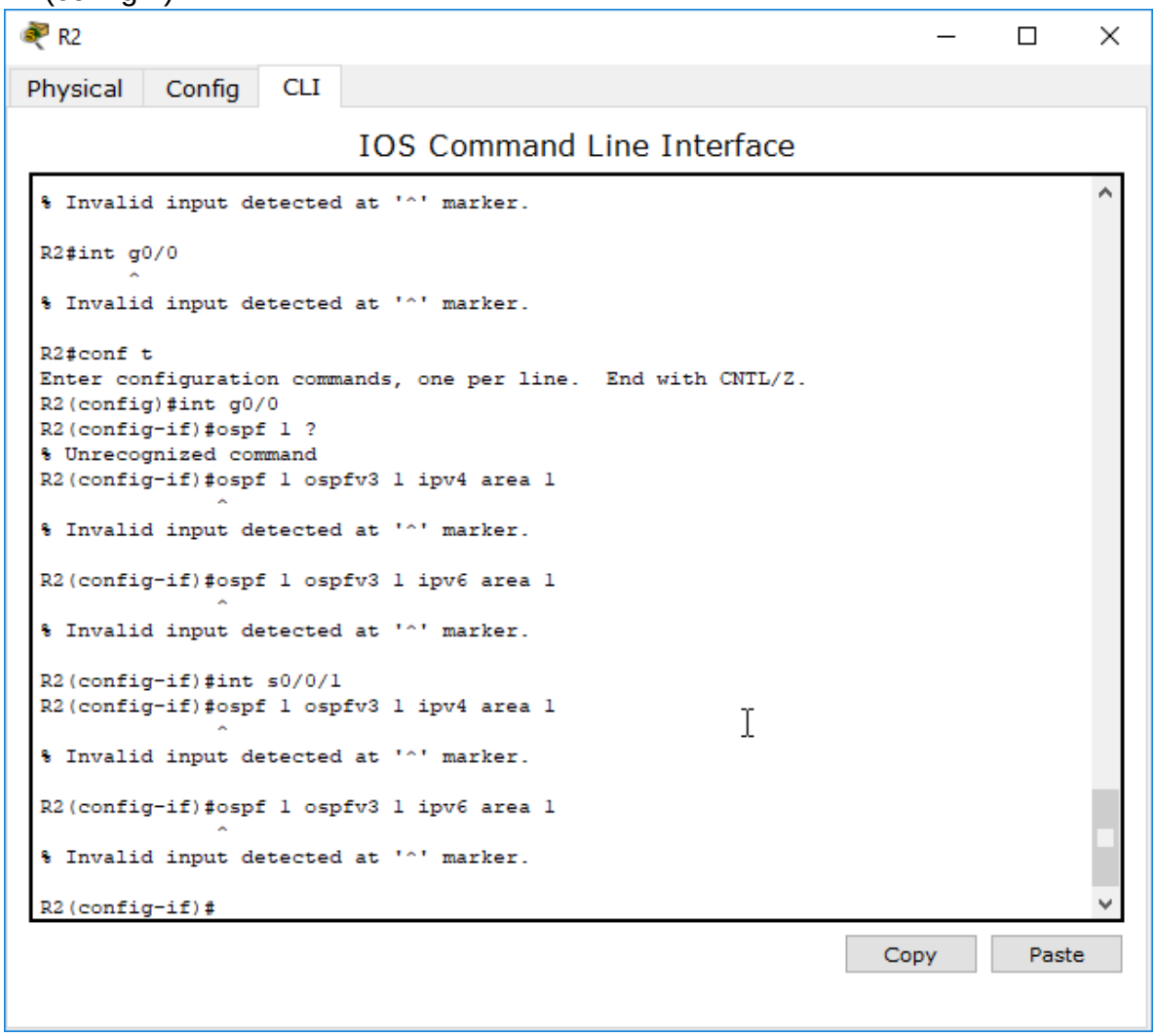


Ilustración 8. configuración interfaz área 1 en R2

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

```
R3(config)#
R3(config)#int g0/0
R3(config-if)#ospfv3 1 ipv4 area 0
             ^
% Invalid input detected at '^' marker.

R3(config-if)#ospfv3 1 ipv6 area 0
             ^
% Invalid input detected at '^' marker.

R3(config-if)#int s0/0/0
R3(config-if)#ospfv3 1 ipv4 area 0
             ^
% Invalid input detected at '^' marker.

R3(config-if)#ospfv3 1 ipv6 area 0
             ^
% Invalid input detected at '^' marker.

R3(config-if)#
```

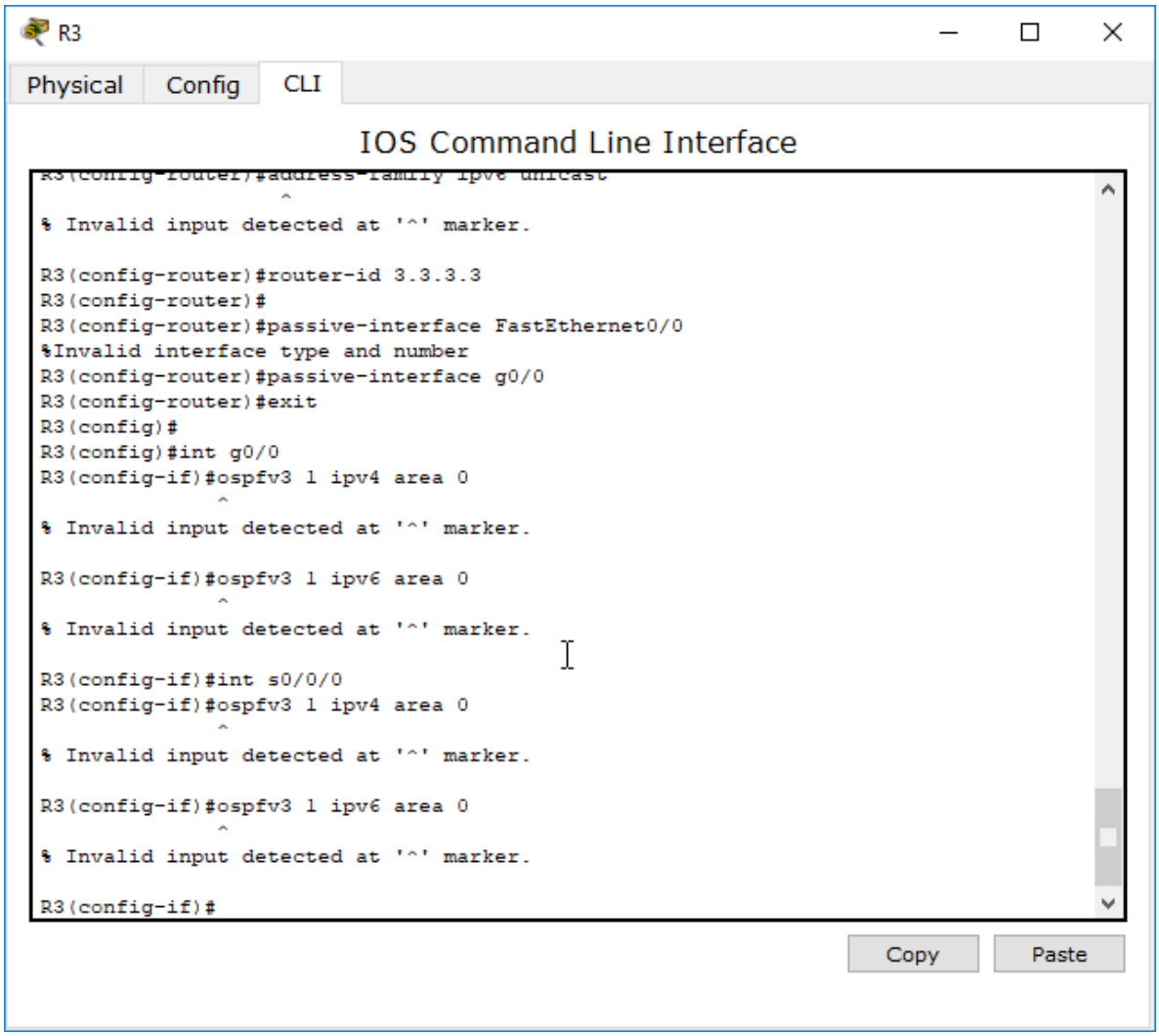


Ilustración 9. configuración interfaz área 0 para R3

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

R2(config-if)#router ospf 1
R2(config-router)#router ospfv3 1
^
% Invalid input detected at '^' marker.
R2(config-router)#address-family ipv4 unicast
^
% Invalid input detected at '^' marker.
R2(config-router)#area 1 stub no-summary

R2(config-router)#exit-address-family
^
% Invalid input detected at '^' marker.
R2(config-router)#address-family ipv6 unicast
^
% Invalid input detected at '^' marker.
R2(config-router)#area 1 stub no-summary
R2(config-router)##exit-address-family

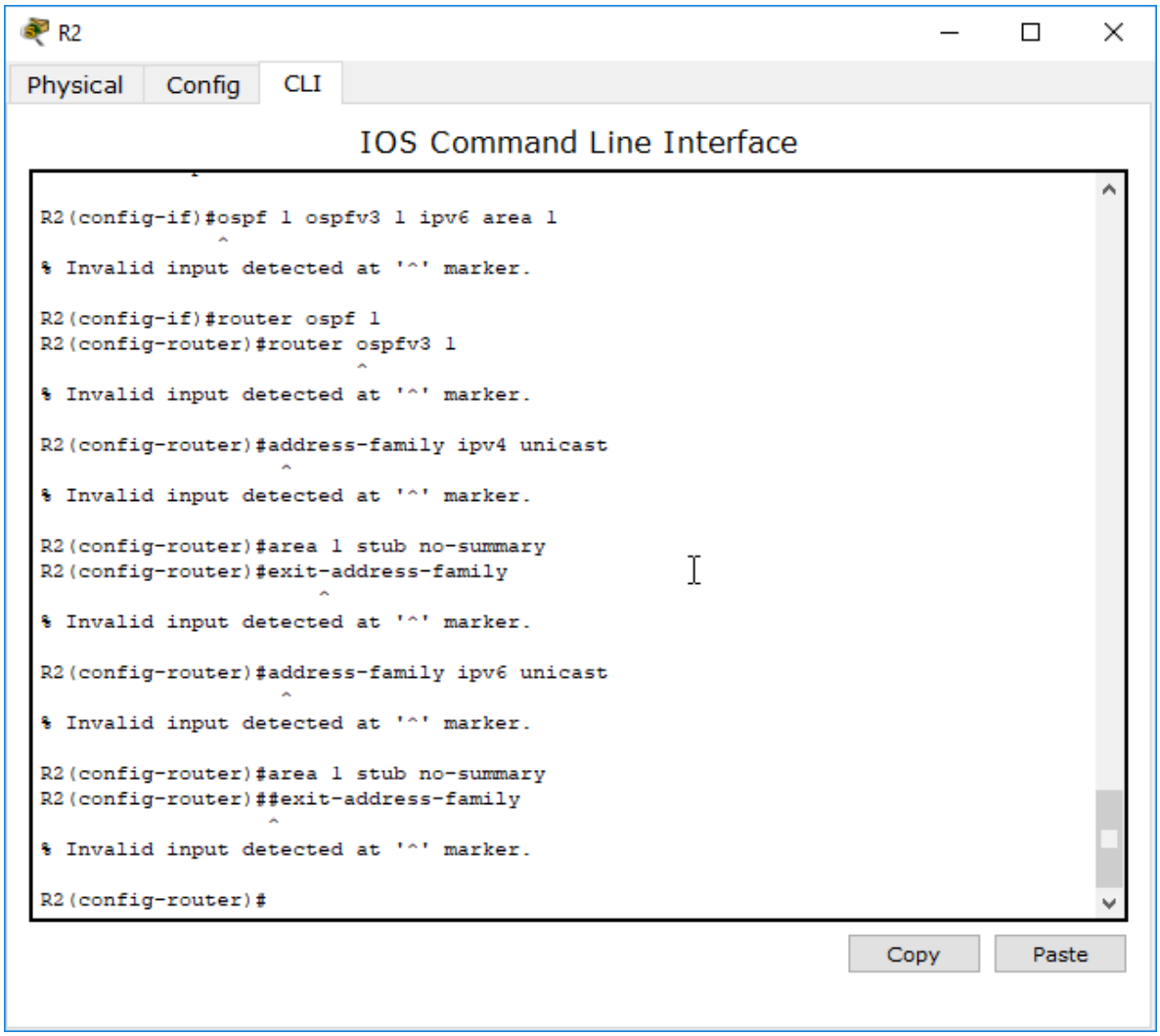


Ilustración 10. Configuración área stubby en R2

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(config)#router ospf 1
R3(config-router)#router ospfv3 1
                  ^
% Invalid input detected at '^' marker.

R3(config-router)#address-family ipv4 unicast
               ^
% Invalid input detected at '^' marker.

R3(config-router)#default-information originate always
                                    ^
% Invalid input detected at '^' marker.

R3(config-router)##exit-address-family
              ^
% Invalid input detected at '^' marker.

R3(config-router)#address-family ipv6 unicast
               ^
% Invalid input detected at '^' marker.

R3(config-router)#default-information originate always
                                    ^
% Invalid input detected at '^' marker.

R3(config-router)#exit-address-family
                ^
% Invalid input detected at '^' marker.
```

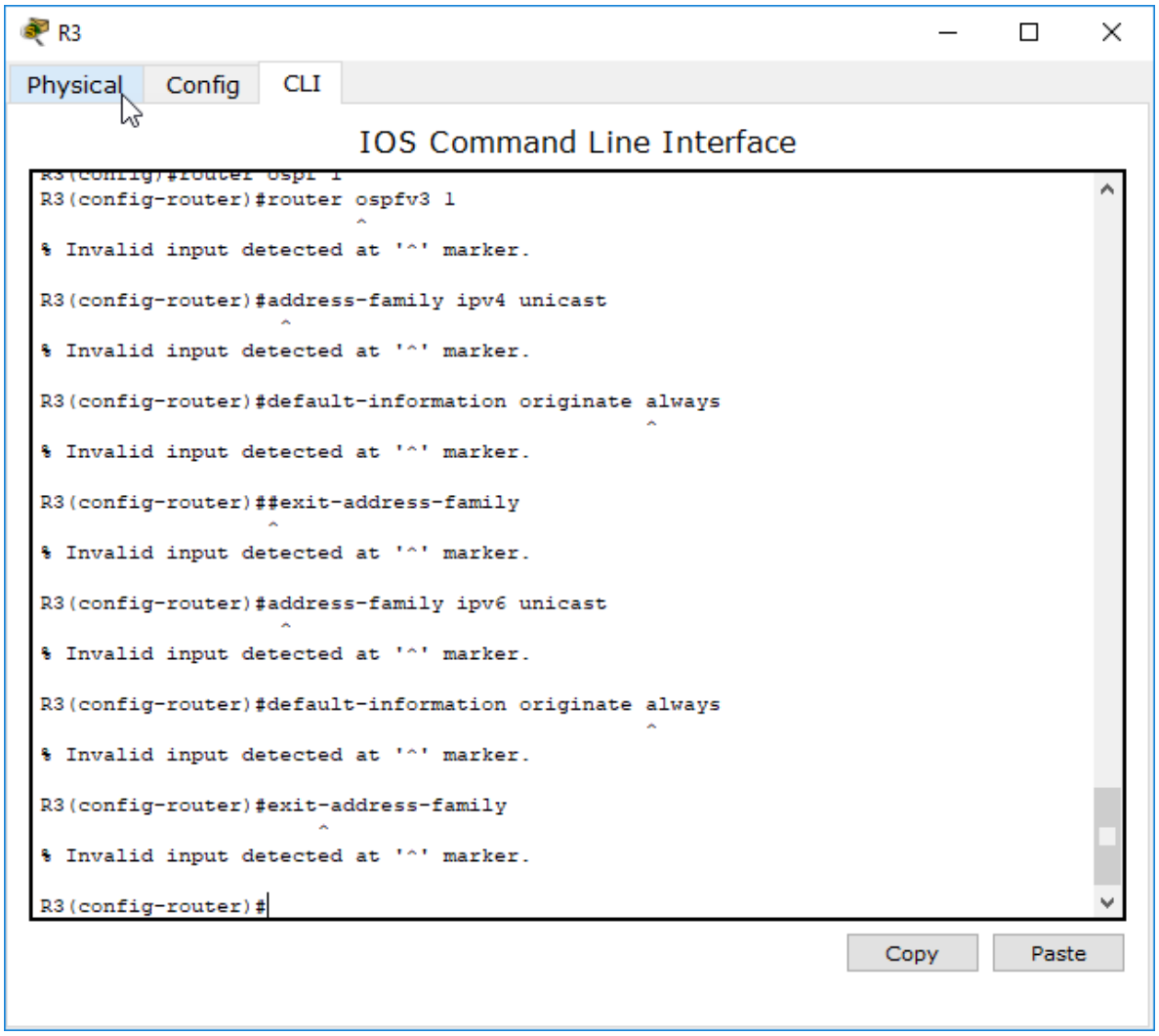


Ilustración 11. Propagación rutas por defecto R3

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.

Se desarrolla punto 8 y 9

R1(config)#router eigrp
^
% Invalid input detected at '^' marker.

```
R1(config)#router eigrp DUAL-STACK
^
% Invalid input detected at '^' marker.
R1(config)#address-family ipv4 unicast autonomous-system 4
^
% Invalid input detected at '^' marker.
R1(config)#af-interface FastEthernet0/0
^
% Invalid input detected at '^' marker.
R1(config)#
R1(config)#passive-interface
^
% Invalid input detected at '^' marker.
R1(config)#exit-af-interface
^
% Invalid input detected at '^' marker.
R1(config)#topology base
^
% Invalid input detected at '^' marker.
R1(config)#exit-af-topology
^
% Invalid input detected at '^' marker.
R1(config)#network 192.168.9.0 0.0.0.3
^
% Invalid input detected at '^' marker.
R1(config)#network 192.168.110.0 0.0.0.3
^
% Invalid input detected at '^' marker.
R1(config)#
R1(config)#eigrp router-id 1.1.1.1
^
% Invalid input detected at '^' marker.
R1(config)#
R1(config)#exit-address-family
^
% Invalid input detected at '^' marker.
R1(config)#address-family ipv6 unicast autonomous-system 6
^
% Invalid input detected at '^' marker.
R1(config)#af-interface g0/0
^
```

% Invalid input detected at '^' marker.
R1(config)#passive-interface
^
% Invalid input detected at '^' marker.
R1(config)#
R1(config)#exit-af-interface
^
% Invalid input detected at '^' marker.
R1(config)#topology base
^
% Invalid input detected at '^' marker.
R1(config)#
R1(config)#exit-af-topology
^
% Invalid input detected at '^' marker.
R1(config)#eigrp router-id 1.1.1.1
^
% Invalid input detected at '^' marker.
R1(config)#exit-address-family
^
% Invalid input detected at '^' marker.

Ilustración 12. Configuración EIGRP en R1

```
R2>en
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router eigrp DUAL-STACK
^
% Invalid input detected at '^' marker.
R2(config)#address-family ipv4 unicast autonomous-system 4
^
% Invalid input detected at '^' marker.
R2(config)#network 192.168.9.0 0.0.0.3
^
% Invalid input detected at '^' marker.
R2(config)#eigrp router-id 2.2.2.2
^
% Invalid input detected at '^' marker.
R2(config)#exit-address-family
^
% Invalid input detected at '^' marker.
R2(config)#address-family ipv6 unicast autonomous-system 6
^
% Invalid input detected at '^' marker.
R2(config)#af-interface FastEthernet0/0
^
% Invalid input detected at '^' marker.
R2(config)#shutdown
^
% Invalid input detected at '^' marker.
R2(config)#exit-af-interface
^
% Invalid input detected at '^' marker.
R2(config)#
R2(config)#af-interface serial1/0
^
% Invalid input detected at '^' marker.
R2(config)#af-interface serial0/0/1
^
% Invalid input detected at '^' marker.
R2(config)#shutdown
```

^
% Invalid input detected at '^' marker.
R2(config)#exit-af-interface
^
% Invalid input detected at '^' marker.
R2(config)#eigrp router-id 2.2.2.2
^
% Invalid input detected at '^' marker.
R2(config)#exit-address-family

Ilustración 13. configuración EIGRP para R2

R2(config)#router eigrp DUAL-STACK
^
% Invalid input detected at '^' marker.
R2(config)#address-family ipv4 unicast autonomous-system 4
^
% Invalid input detected at '^' marker.
R2(config)#topology base
^
% Invalid input detected at '^' marker.
R2(config)#distribute-list R3-to-R1 out
^
% Invalid input detected at '^' marker.

R2(config)#redistribute ospfv3 1 metric 10000 100 255 1 1500
^
% Invalid input detected at '^' marker.
R2(config)#exit-af-topology
^
% Invalid input detected at '^' marker.

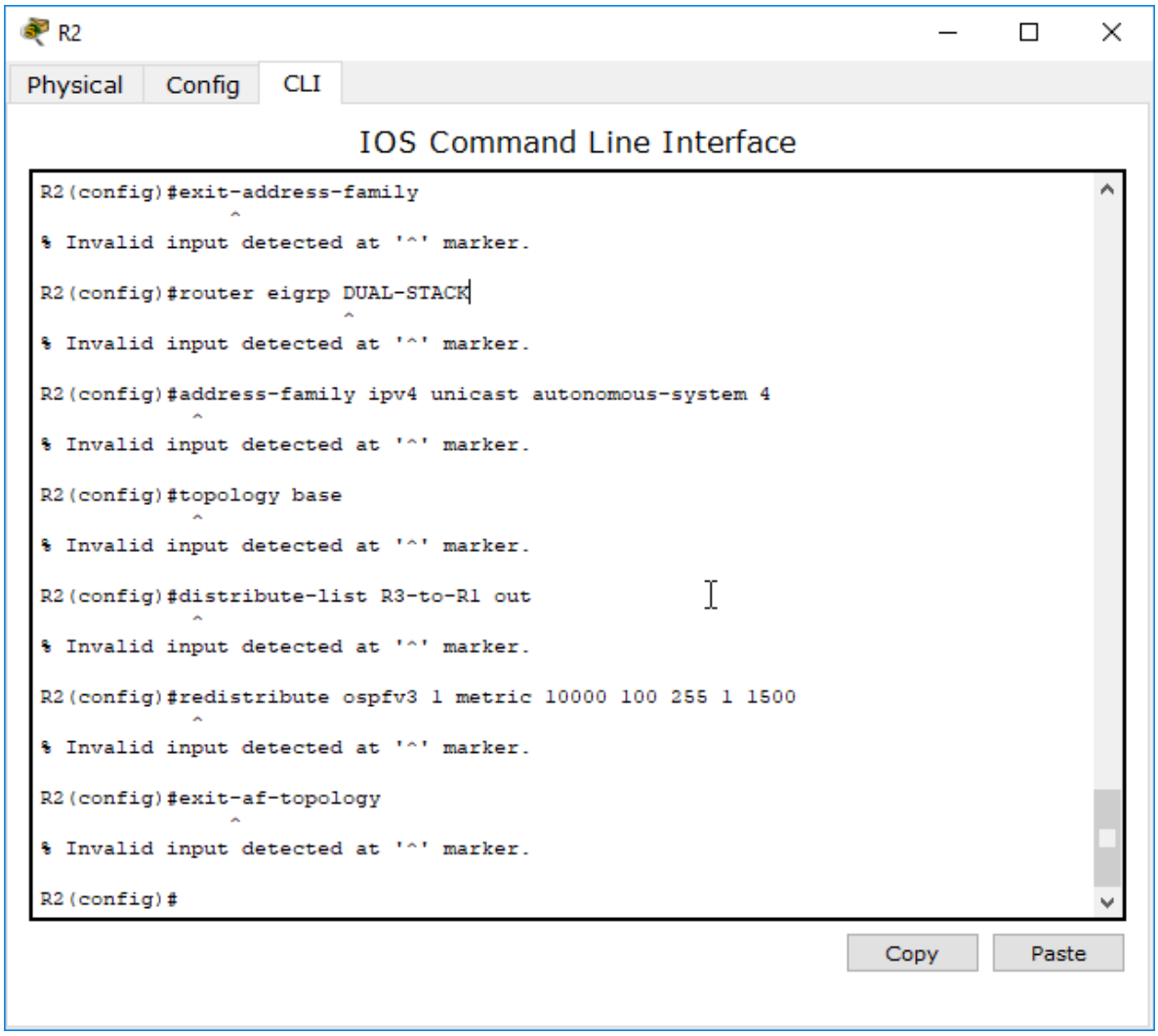


Ilustración 14. Configuración en R2

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
^
% Invalid input detected at '^' marker.
R2(config)#address-family ipv4 unicast autonomous-system 4
^
% Invalid input detected at '^' marker.
R2(config)#topology base
^
% Invalid input detected at '^' marker.
R2(config)#distribute-list R3-to-R1 out
^
% Invalid input detected at '^' marker.
R2(config)#redistribute ospfv3 1 metric 10000 100 255 1 1500
^
% Invalid input detected at '^' marker.
R2(config)#exit-af-topology
^
% Invalid input detected at '^' marker.
R2(config)#address-family ipv6 unicast autonomous-system 6
^
% Invalid input detected at '^' marker.
R2(config)#topology base
^
% Invalid input detected at '^' marker.
R2(config)#redistribute ospf 1 metric 10000 100 255 1 1500
^
% Invalid input detected at '^' marker.
R2(config)#
R2(config)#exit-af-topology
```

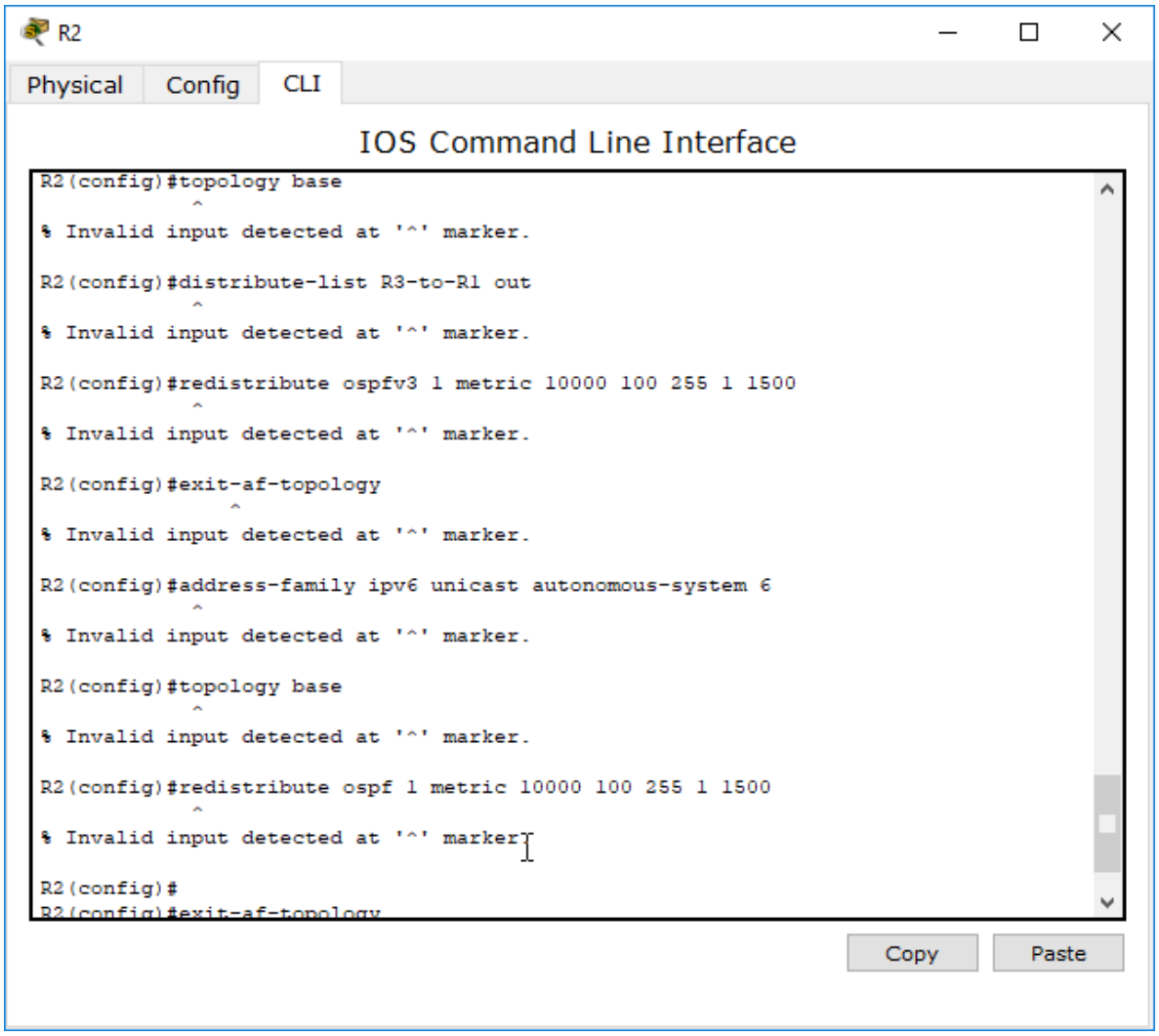


Ilustración 15. Redistribución mutua entre OSPF y EIGRP para IPv4 e IPV6 R2

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 acce
R2(config-router)#ip access-list standard Re-to-R1
R2(config-std-nacl)#ip access-list standard R3-to-R1
R2(config-std-nacl)#remark ACL to filter 192.168.3.0/24
R2(config-std-nacl)#deny 192.168.3.0 0.0.0.255
R2(config-std-nacl)#permit any
R2(config-std-nacl)#address-family ipv4 unicast
```

```
^
% Invalid input detected at '^' marker.
R2(config-std-nacl)#redistribute eigrp 4
^
% Invalid input detected at '^' marker.
R2(config-std-nacl)#address-family ipv6 unicast
^
% Invalid input detected at '^' marker.
R2(config-std-nacl)#
R2(config-std-nacl)#redistribute eigrp 6
^
% Invalid input detected at '^' marker.
R2(config-std-nacl)#exit-address-family
^
% Invalid input detected at '^' marker.
R2(config-std-nacl)#
```

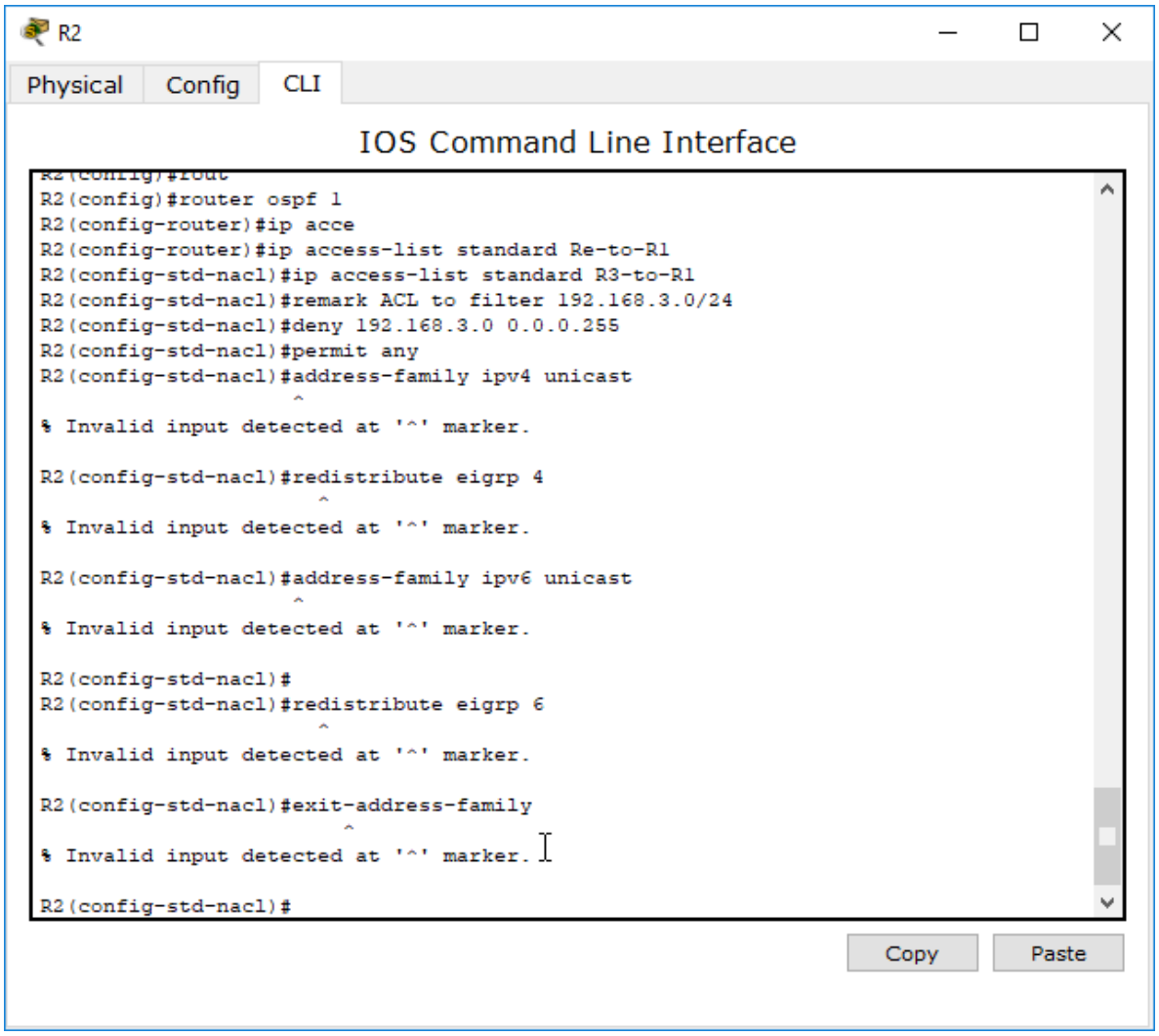


Ilustración 16. Publicidad de ruta 192.168.3.0/24 a R1 mediante lista de distribución y acl en R2

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

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

```
R1>en
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console

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

Gateway of last resort is not set

     192.168.110.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.110.0/24 is directly connected, Serial0/0/0
L       192.168.110.1/32 is directly connected, Serial0/0/0
R1#
```

Ilustración 17. Comando show ip route en R1

```
R1#show ipv6 route
IPv6 Routing Table - 3 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
       O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       D - EIGRP, EX - EIGRP external
C   2001:DB8:ACAD:110::/64 [0/0]
     via Serial0/0/0, directly connected
L   2001:DB8:ACAD:110::1/128 [0/0]
     via Serial0/0/0, receive
L   FF00::/8 [0/0]
     via Null0, receive
R1#
```

Ilustración 18. Comando show ipV6 route en R1

```
     via Null0, receive
R1#show ip eigrp neighbors
R1#
```

Ilustración 19. comando show ip eigrp neighbors R1

```
R1#show ip eigrp neighbors
R1#show ipv6 eigrp neighbors
R1#
```

Ilustración 20. Comando show ipv6 neighbors R1

Packet tracer no soporta estos comandos para su configuración, igualmente se realiza la configuración solicitada

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

Gateway of last resort is not set

     192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, Serial0/0/0
L       192.168.2.1/32 is directly connected, Serial0/0/0
R2#
```

Ilustración 21. Comando Show ip route para R2

```
R2#show ipv6 route
IPv6 Routing Table - 3 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
       O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       D - EIGRP, EX - EIGRP external
C   2001:DB8:ACAD:B::/64 [0/0]
     via Serial0/0/0, directly connected
L   2001:DB8:ACAD:B::1/128 [0/0]
     via Serial0/0/0, receive
L   FF00::/8 [0/0]
     via Null0, receive
R2#
```

Ilustración 22. Comando show ipv6 route para R2

```
R2#show ip eigrp neighbors
R2#show ipv6 eigrp neighbors
R2#
```

Ilustración 23. Comando show ip-ipv6 neighbors R2

Packet tracer no soporta estos comandos para su configuración, igualmente se realiza la configuración solicitada

```
R2#show ipv6 ospf
```

Ilustración 24. Comando show ipv6 ospf R2

```
R2#show ipv6 ospf database
R2#
```

Ilustración 25. Comando show ipv6 ospf database

```
R3#show ipv6 route
IPv6 Routing Table - 3 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
       O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       D - EIGRP, EX - EIGRP external
C   2001:DB8:ACAD:C::/64 [0/0]
     via GigabitEthernet0/0, directly connected
L   2001:DB8:ACAD:C::1/128 [0/0]
     via GigabitEthernet0/0, receive
L   FF00::/8 [0/0]
     via Null0, receive
R3#
```

Ilustración 26. comando show ipv6 route R3

```
R3#show ipv6 ospf
R3#
```

Ilustración 27. comando show ipv6 route R3

```
R3#show ipv6 ospf data
R3#show ipv6 ospf database
R3#
```

Ilustración 28. comando show ipv6 ospf database

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

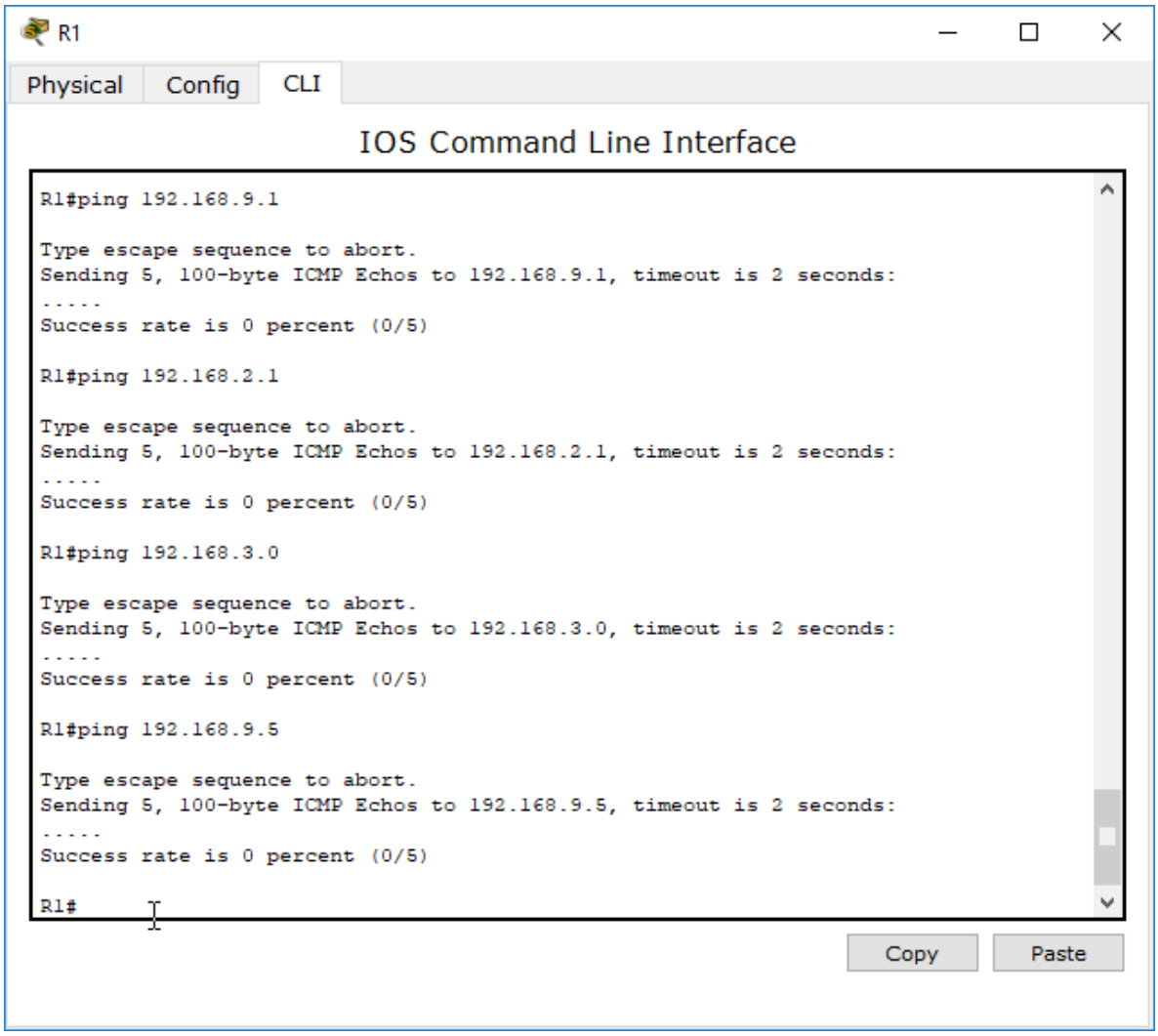


Ilustración 29. comando ping ipv4 e ipv6 desde R1

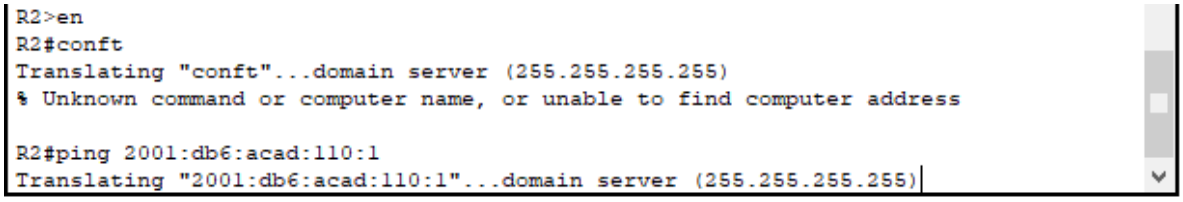


Ilustración 30. ping ipv6 desde R2

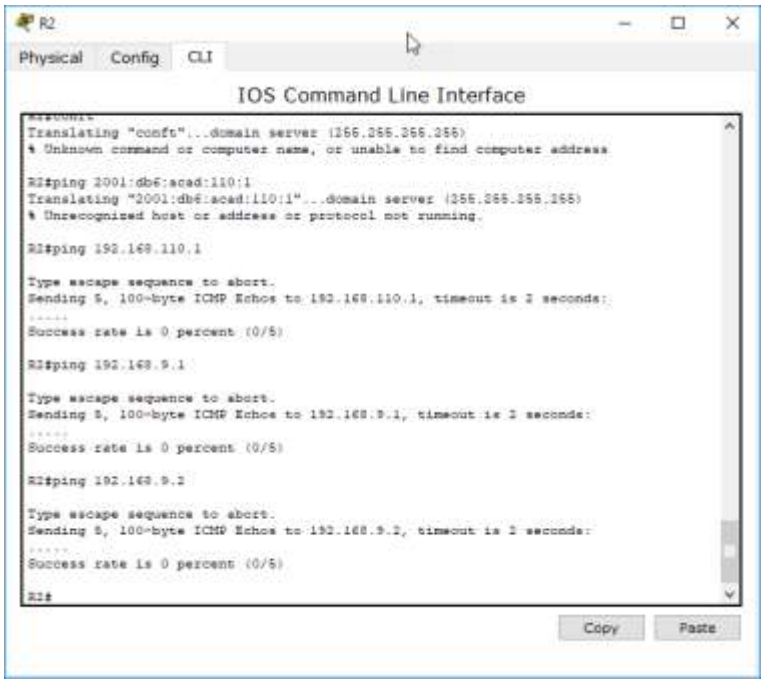


Ilustración 31. ping ipv4 en R2

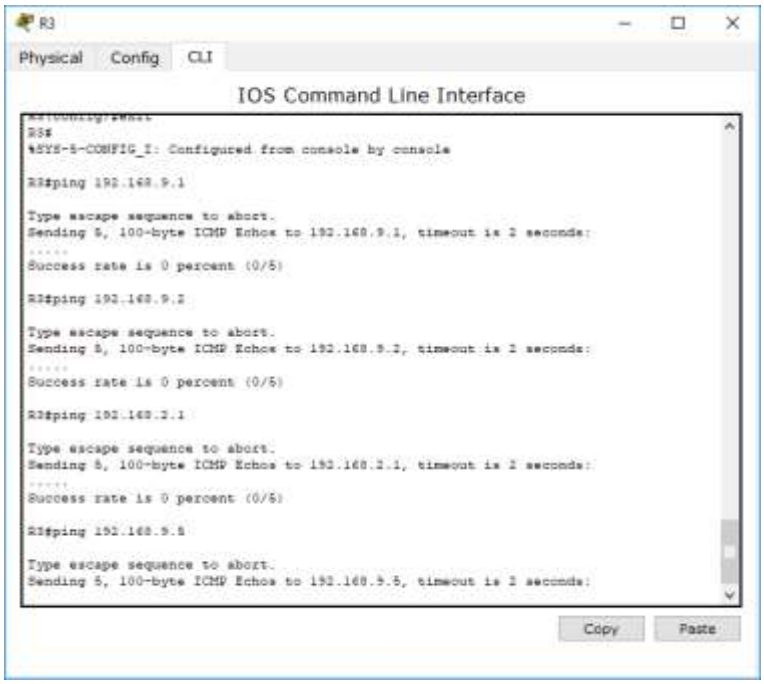


Ilustración 32. Ping ipv4 desde R3

```
R3#ping 2001:db8:acad:90::1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:db8:acad:90::1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

R3#ping 2001:db8:acad:90::2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:db8:acad:90::2, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

R3#
```

Ilustración 33. Ping ipv6 desde R3

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

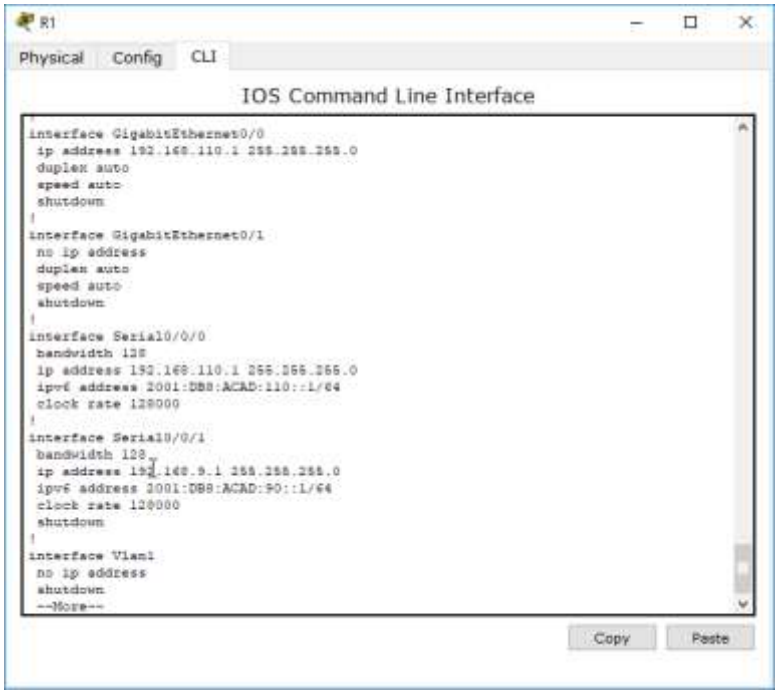


Ilustración 34. comando show running-config en R1

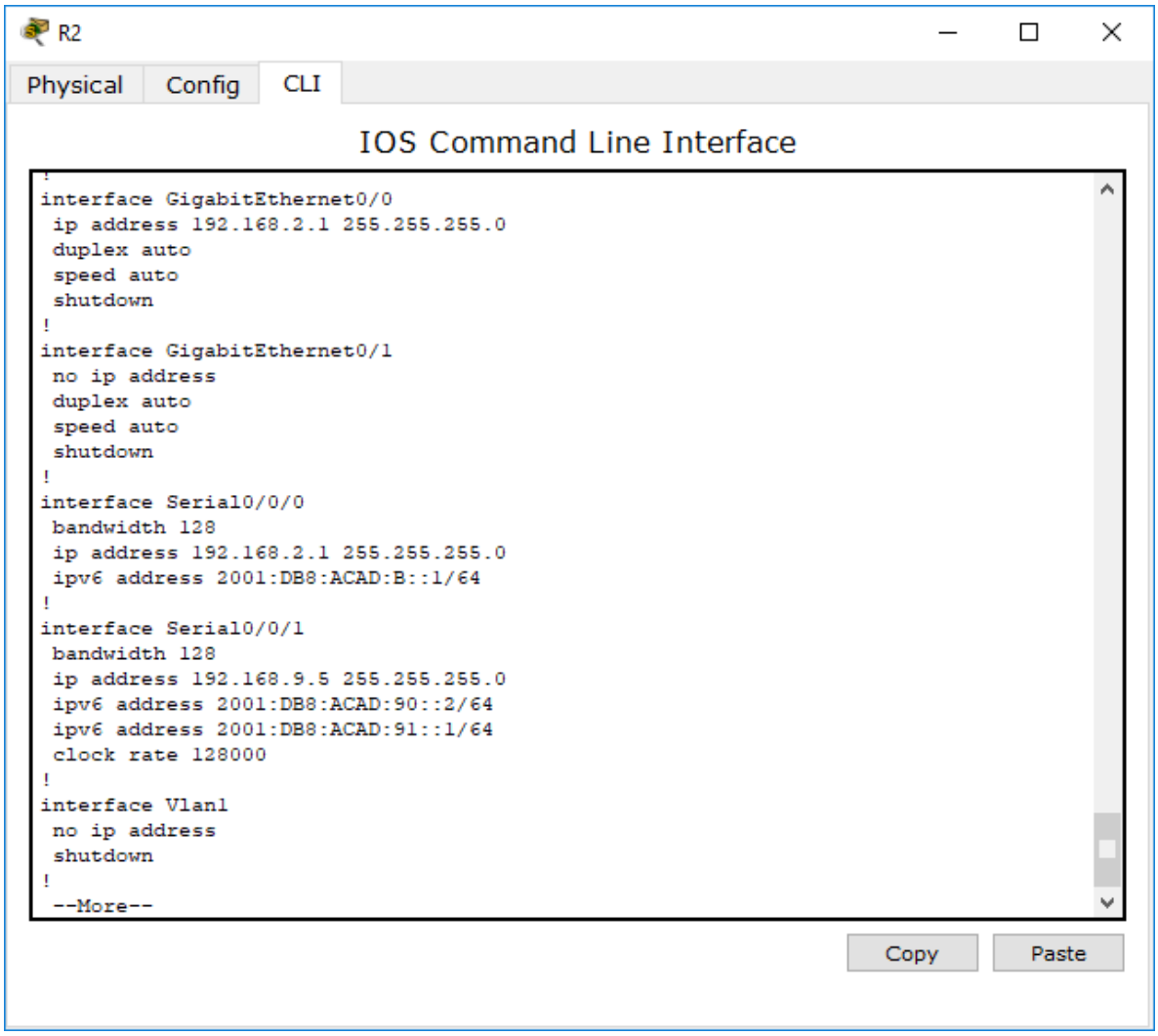


Ilustración 35. comando show running-config R2

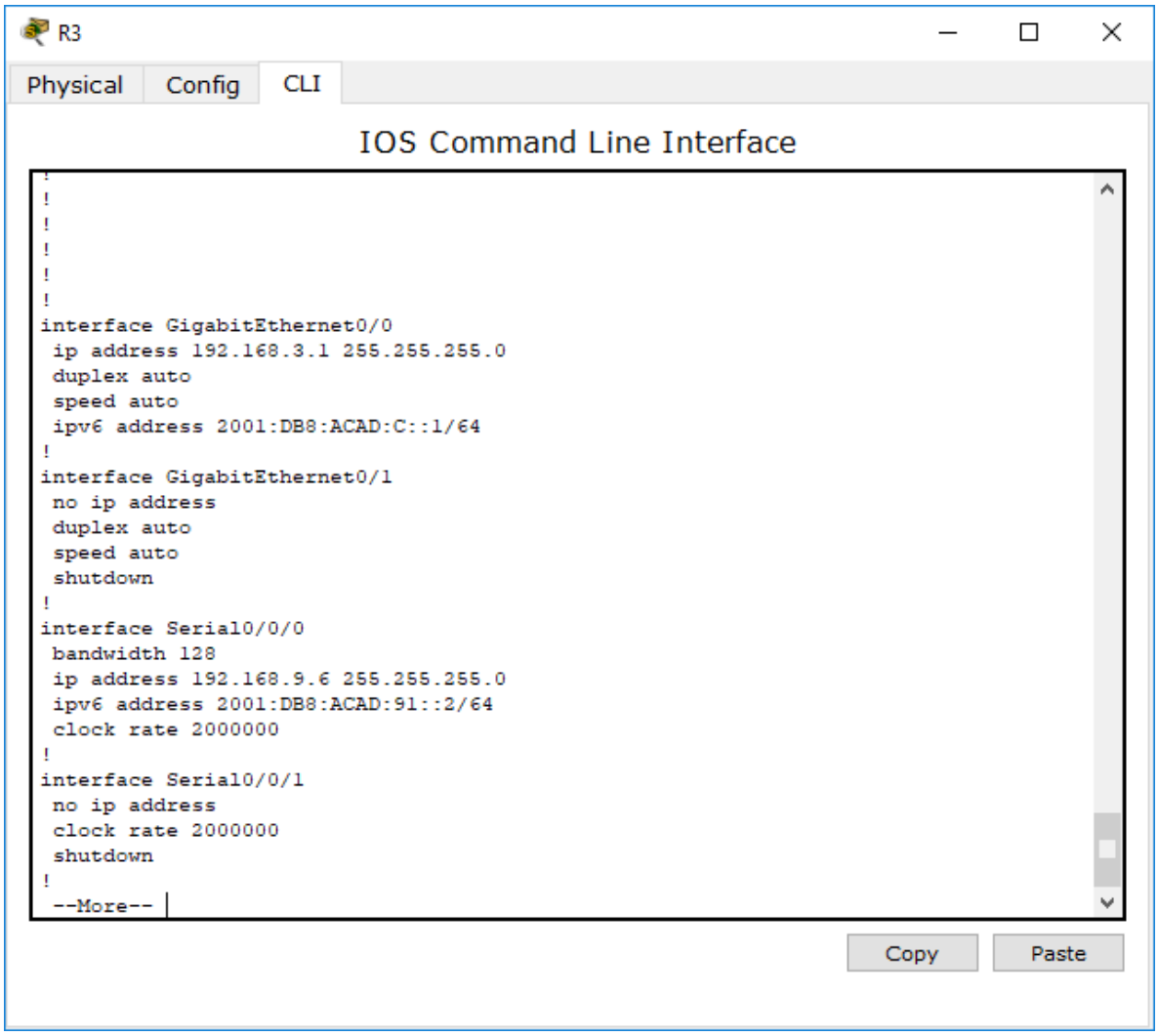


Ilustración 36. Comando Show running-config R3

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

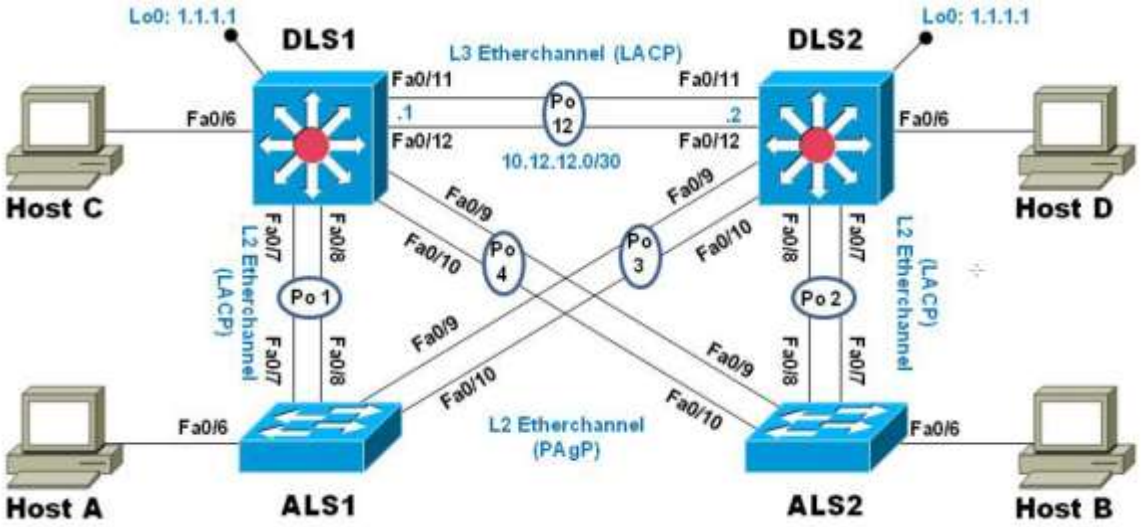


Ilustración 37. Topología de red escenario 2

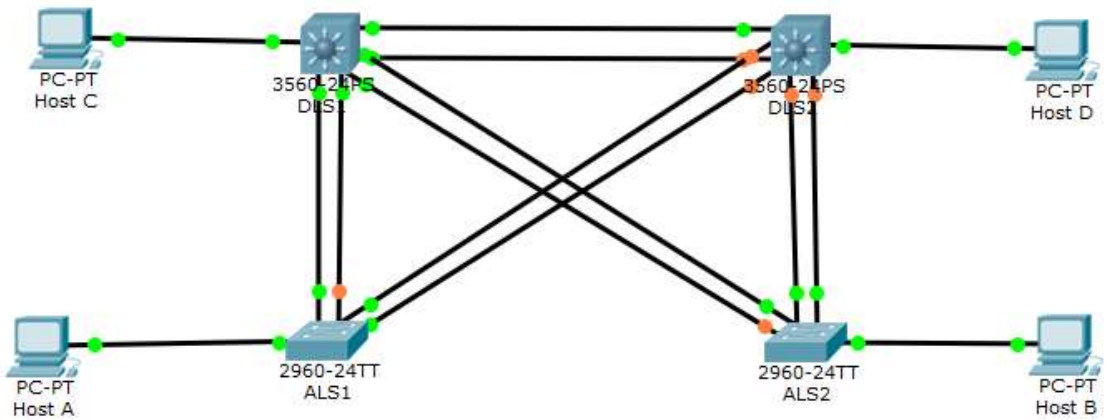


Ilustración 38. topología implementada en packet tracer

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

a. Apagar todas las interfaces en cada switch.

```
Switch>EN
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int
Switch(config)#interface range fas
Switch(config)#interface range fastEthernet 0/1-24, gi
Switch(config)#interface range fastEthernet 0/1-24, gigabitEthernet 0/1-2
Switch(config-if-range)#shut

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively
down

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively
down

%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to administratively
down

%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively
down

%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively
down

%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to
administratively down

%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to
administratively down

%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to
administratively down
```

%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to administratively down

%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down

%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down
Switch(config-if-range)#
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to down

%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/7, changed state to down

%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8, changed state to down

%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/9, changed state to down

%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10, changed state to down

%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/11, changed state to down

%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/12, changed state to down

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

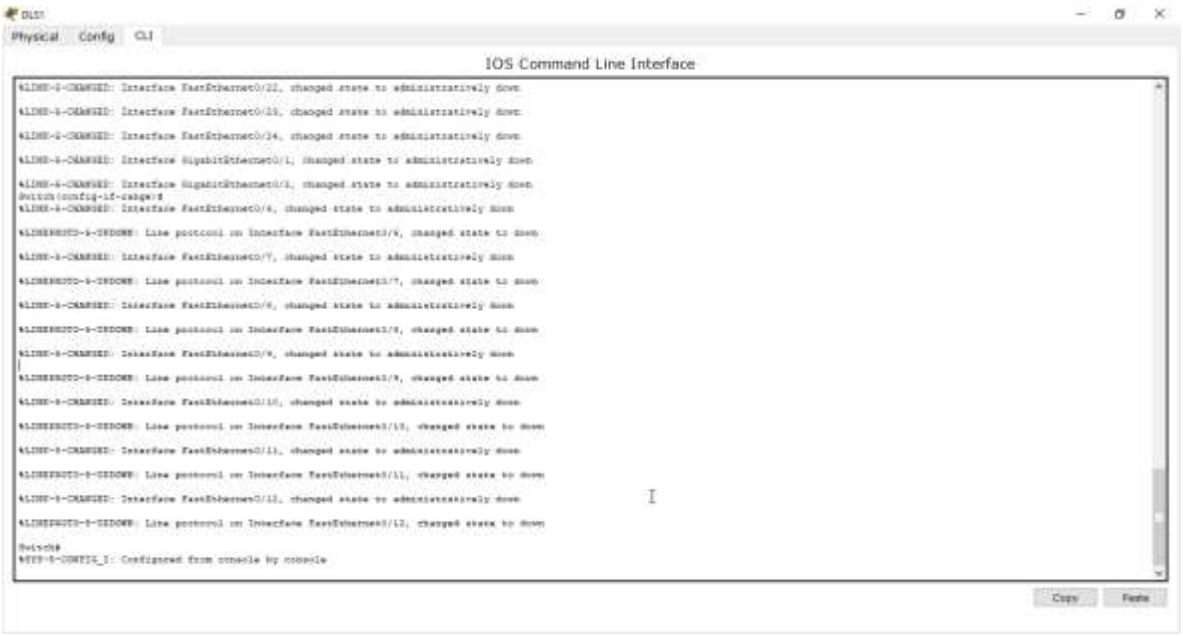


Ilustración 39. apagado de todas las interfaces en dls1

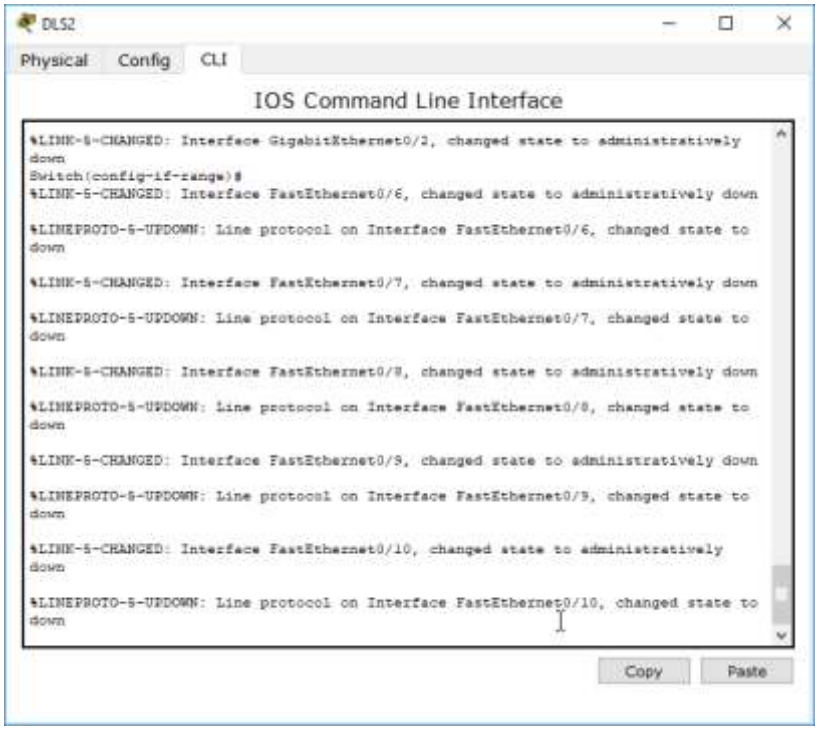


Ilustración 40. apagado de interfaces en DLS2

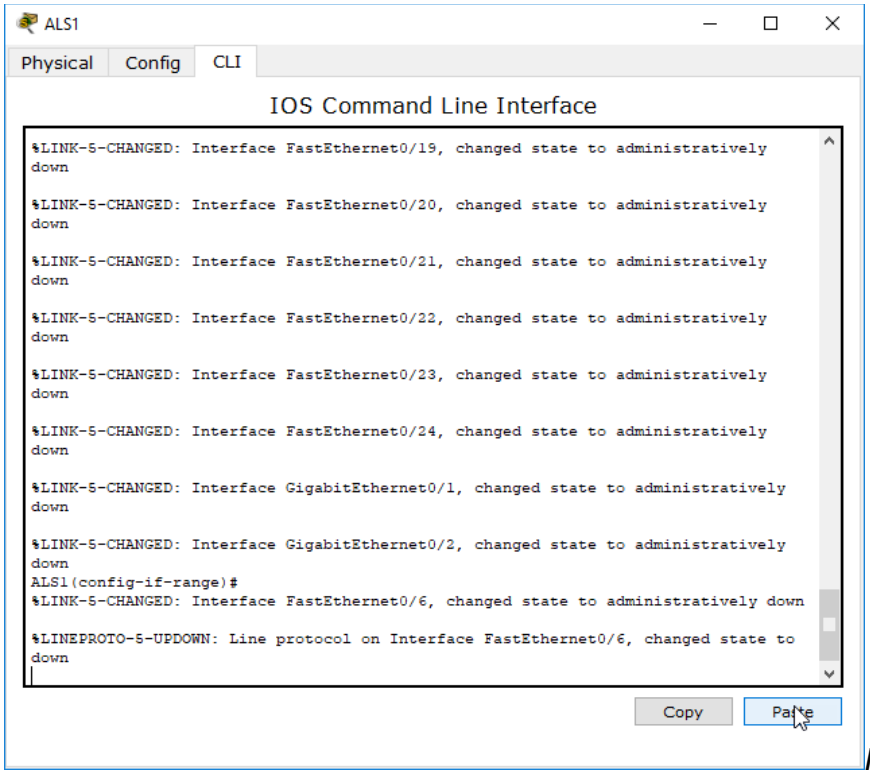


Ilustración 41. Apagado de interfaces en ALS1

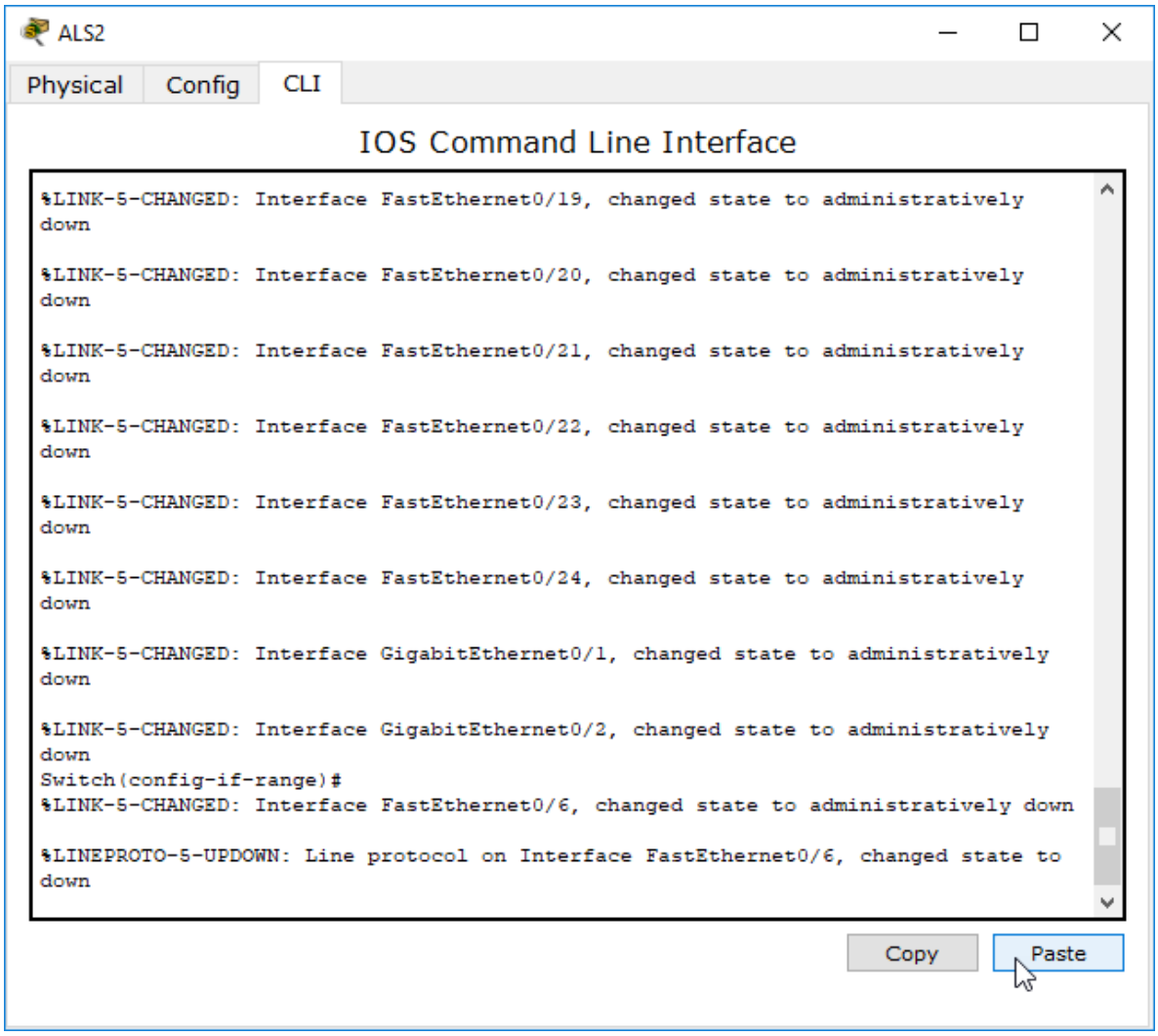


Ilustración 42. apagado de interfaces en ALS2

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

DLS1>en
DLS1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#hos
DLS1(config)#hostname DLS1

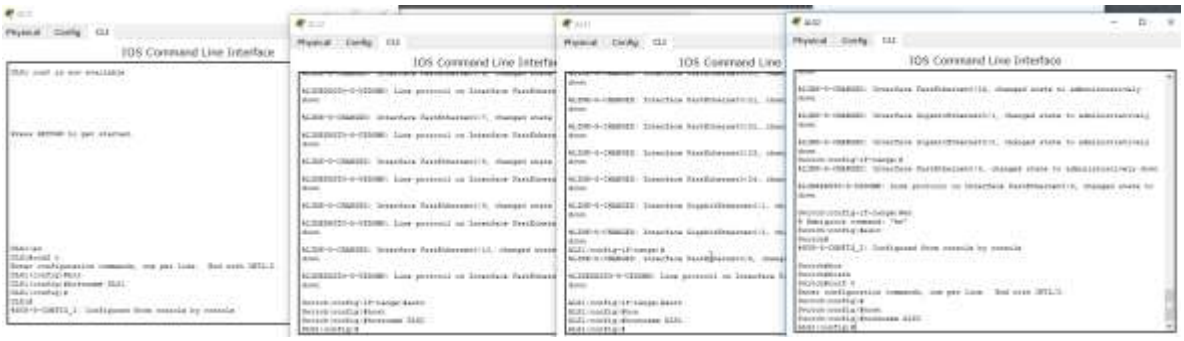


Ilustración 43. Asignación de nombres a cada switch

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.

Para esto, primero creamos el portchannel capa 3 y después lo asignamos a las interfaces, en este caso solo se hace para DLS1 y DLS2

```
DLS1#
DLS1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#int
DLS1(config)#interface por
DLS1(config)#interface port-channel 12
DLS1(config-if)#no sh
DLS1(config-if)#no sw
DLS1(config-if)#no switchport
DLS1(config-if)#ip address 10.12.12.1 255.255.255.252
DLS1(config-if)#exit
DLS1(config)#int ra
DLS1(config)#int range fa0/11-12
DLS1(config-if-range)#no sw
DLS1(config-if-range)#no switchport
DLS1(config-if-range)#chan
DLS1(config-if-range)#channel-group 12 mode active
DLS1(config-if-range)#exit
DLS1(config)#
```

```
DLS2(config)#interface port-channel 12
```

DLS2(config-if)#no sw
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 sw
DLS2(config-if-range)#channel-group 12 mode active
DLS2(config-if-range)#exit
DLS2(config)#
DLS2#
%SYS-5-CONFIG_I: Configured from console by console

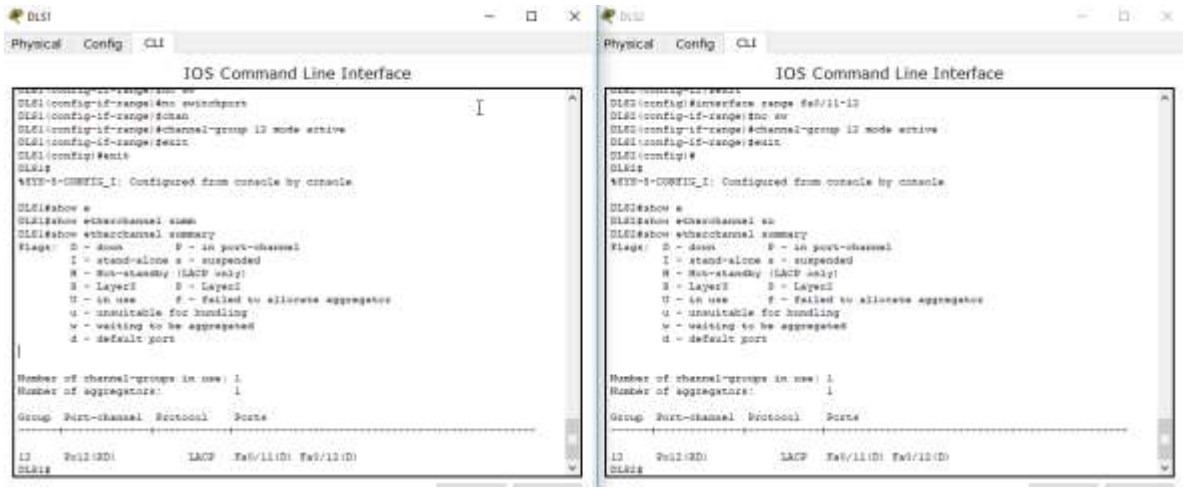


Ilustración 44. validación comando show EtherChannel summary en DLS1 y DLS2

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

DLS1#
DLS1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#int ran
DLS1(config)#int range fa0/7-8
DLS1(config-if-range)#sw
DLS1(config-if-range)#switchport trun
DLS1(config-if-range)#switchport trunk en
DLS1(config-if-range)#switchport trunk encapsulation dot1q
DLS1(config-if-range)#sw
DLS1(config-if-range)#switchport mo

DLS1(config-if-range)#switchport mode tr
DLS1(config-if-range)#switchport mode trunk
DLS1(config-if-range)#chann
DLS1(config-if-range)#channel-gr
DLS1(config-if-range)#channel-group 1 mode ac
DLS1(config-if-range)#channel-group 1 mode active
DLS1(config-if-range)#
Creating a port-channel interface Port-channel 1
no shut
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to down
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to down
DLS1(config-if-range)#

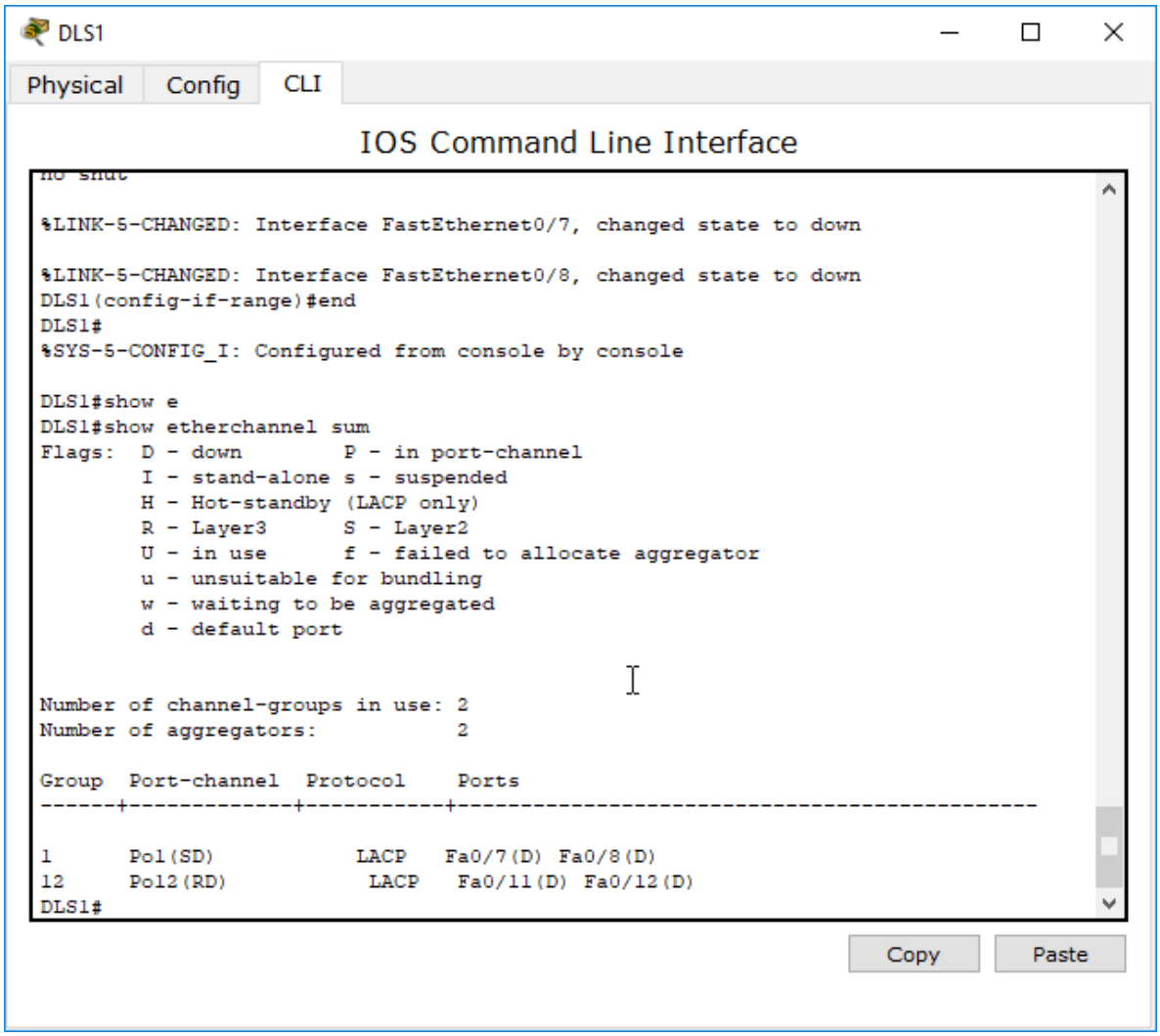


Ilustración 45. Port channel 1 en DLS1

```
ALS1(config)#int ra
ALS1(config)#int range fa0/7-8
ALS1(config-if-range)#sw
ALS1(config-if-range)#switchport tr
ALS1(config-if-range)#switchport trunk en
ALS1(config-if-range)#switchport trunk enca
ALS1(config-if-range)#switchport trunk encapsulation dot1q
^
% Invalid input detected at '^' marker.
ALS1(config-if-range)#switchport mode trunk
ALS1(config-if-range)#channel-group 1 mode active
ALS1(config-if-range)#
Creating a port-channel interface Port-channel 1

ALS1(config-if-range)#no shut
```

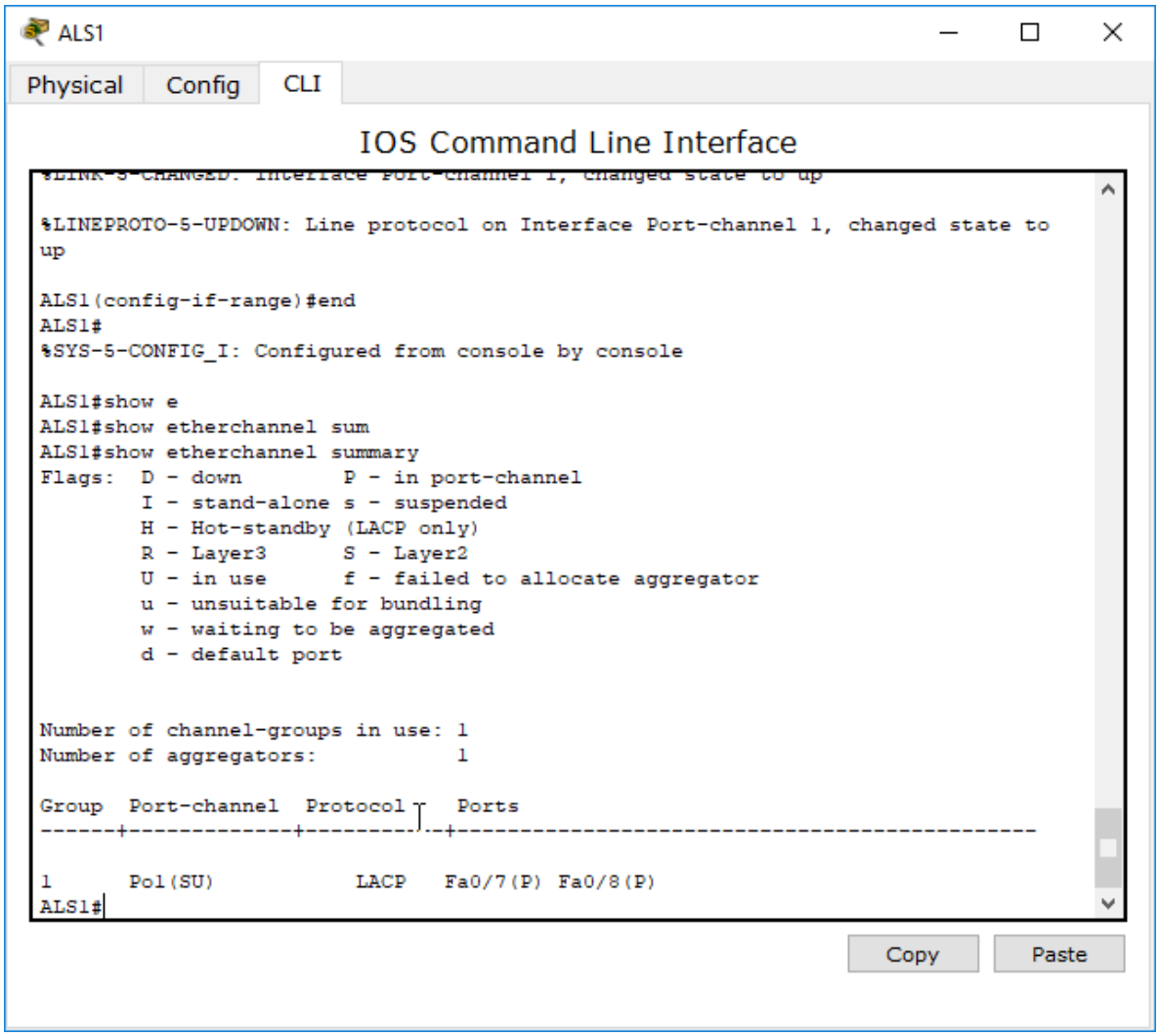


Ilustración 46. Port channel 1 en ALS1

DLS2(config)#int ran
DLS2(config)#int range fa0/7-8
DLS2(config-if-range)#sw
DLS2(config-if-range)#switchport tru
DLS2(config-if-range)#switchport trunk en
DLS2(config-if-range)#switchport trunk encapsulation dot1q
DLS2(config-if-range)#sw
DLS2(config-if-range)#switchport mod
DLS2(config-if-range)#switchport mode tr
DLS2(config-if-range)#switchport mode trunk
DLS2(config-if-range)#channel-group 2 mode active

DLS2(config-if-range)#
Creating a port-channel interface Port-channel 2
no shut

%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to down

%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to down
DLS2(config-if-range)#

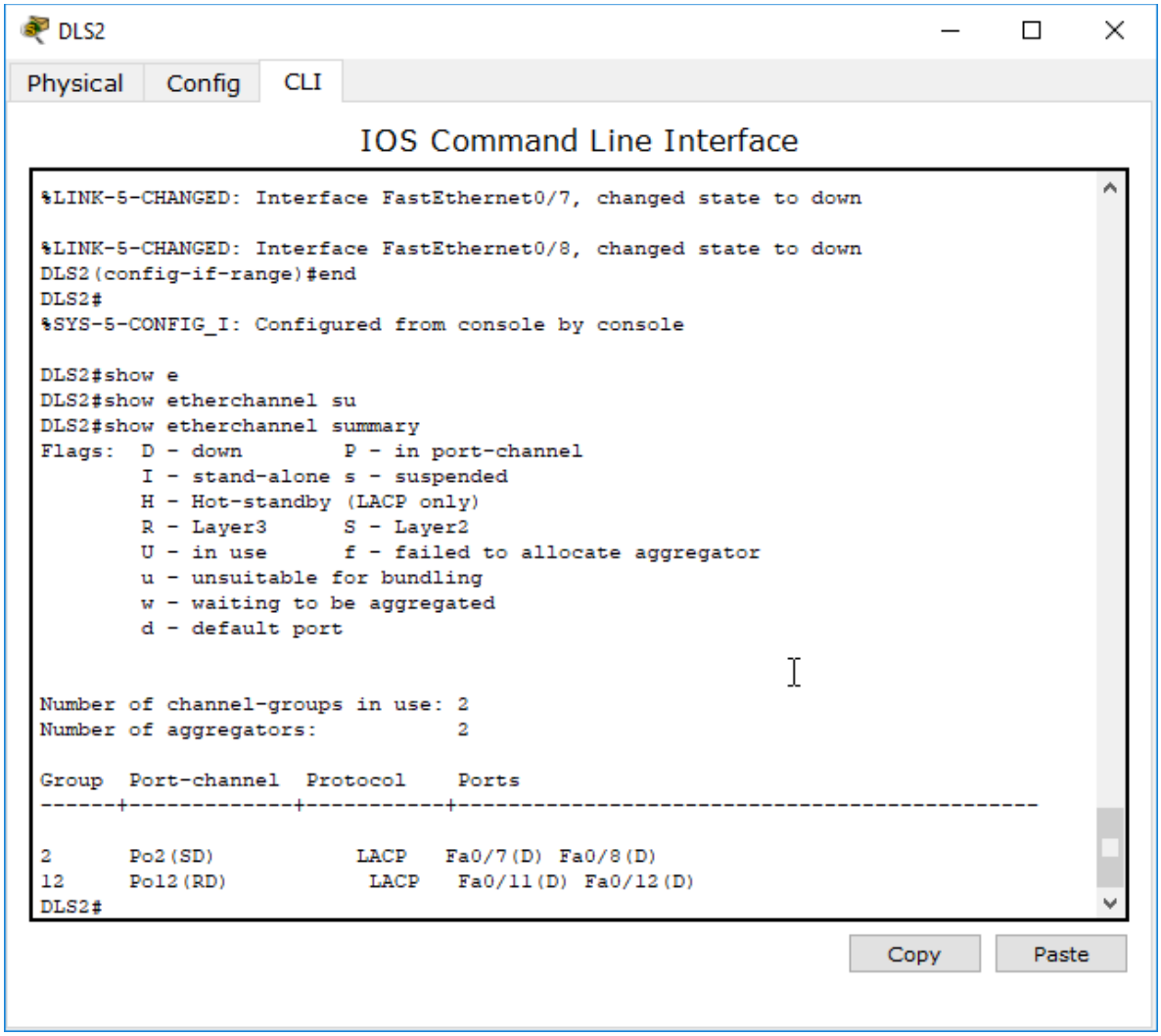


Ilustración 47. Port channel 2 en DLS2

ALS2>en
ALS2#conf t

```
Enter configuration commands, one per line. End with CNTL/Z.
ALS2(config)#int ra
ALS2(config)#int range fa0/7-8
ALS2(config-if-range)#switchport trunk encapsulation dot1q
^
% Invalid input detected at '^' marker.
ALS2(config-if-range)#sw
ALS2(config-if-range)#switchport mode tru
ALS2(config-if-range)#switchport mode trunk
ALS2(config-if-range)#channel-group 2 mode active
ALS2(config-if-range)#
Creating a port-channel interface Port-channel 2
no shu
ALS2(config-if-range)#no shutdown


ALS2(config-if-range)#
```

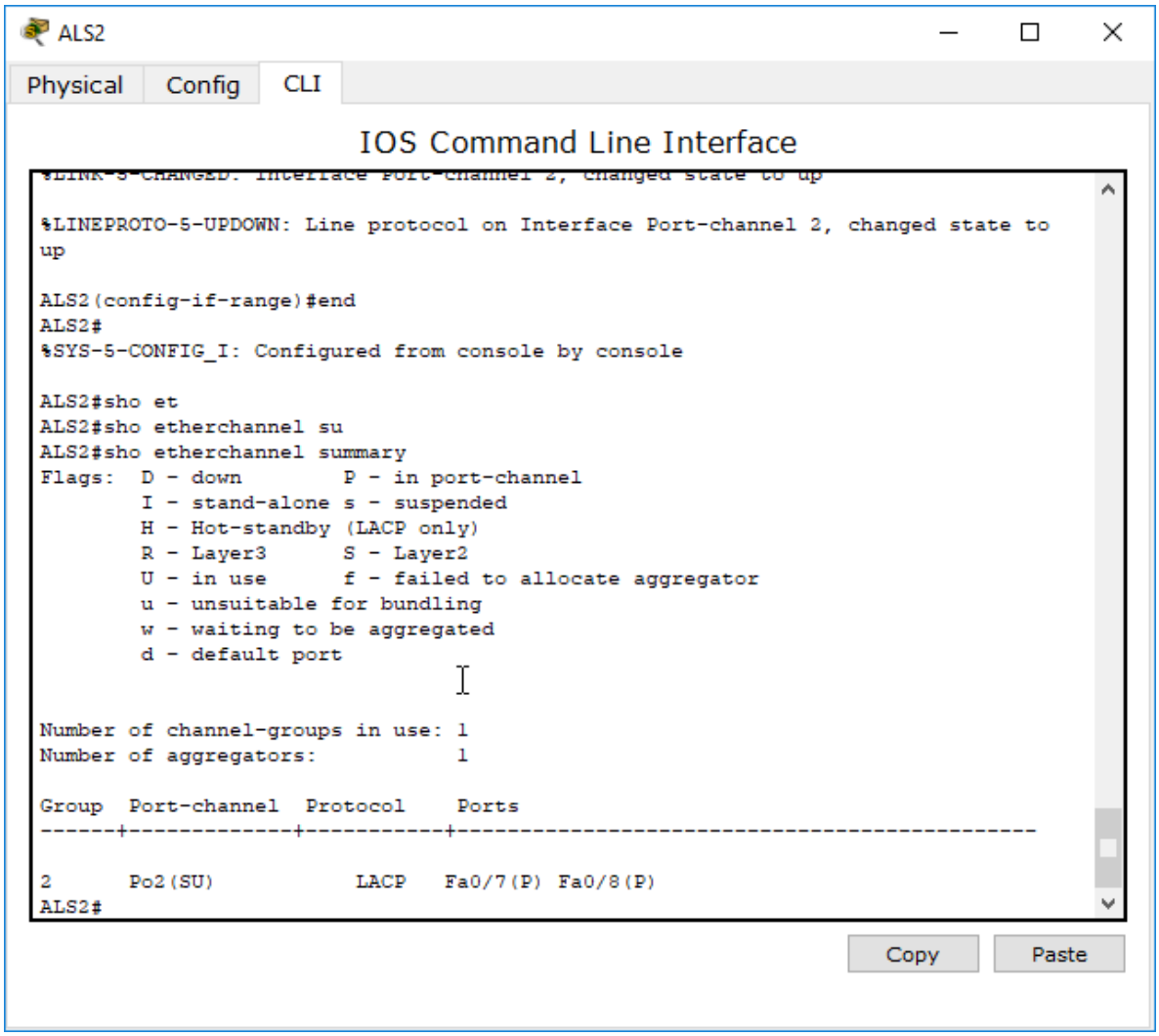


Ilustración 48. Port channel 2 en ALS2

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

DLS1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#int ra
DLS1(config)#int range 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
DLS1(config-if-range)#
Creating a port-channel interface Port-channel 4

no shut

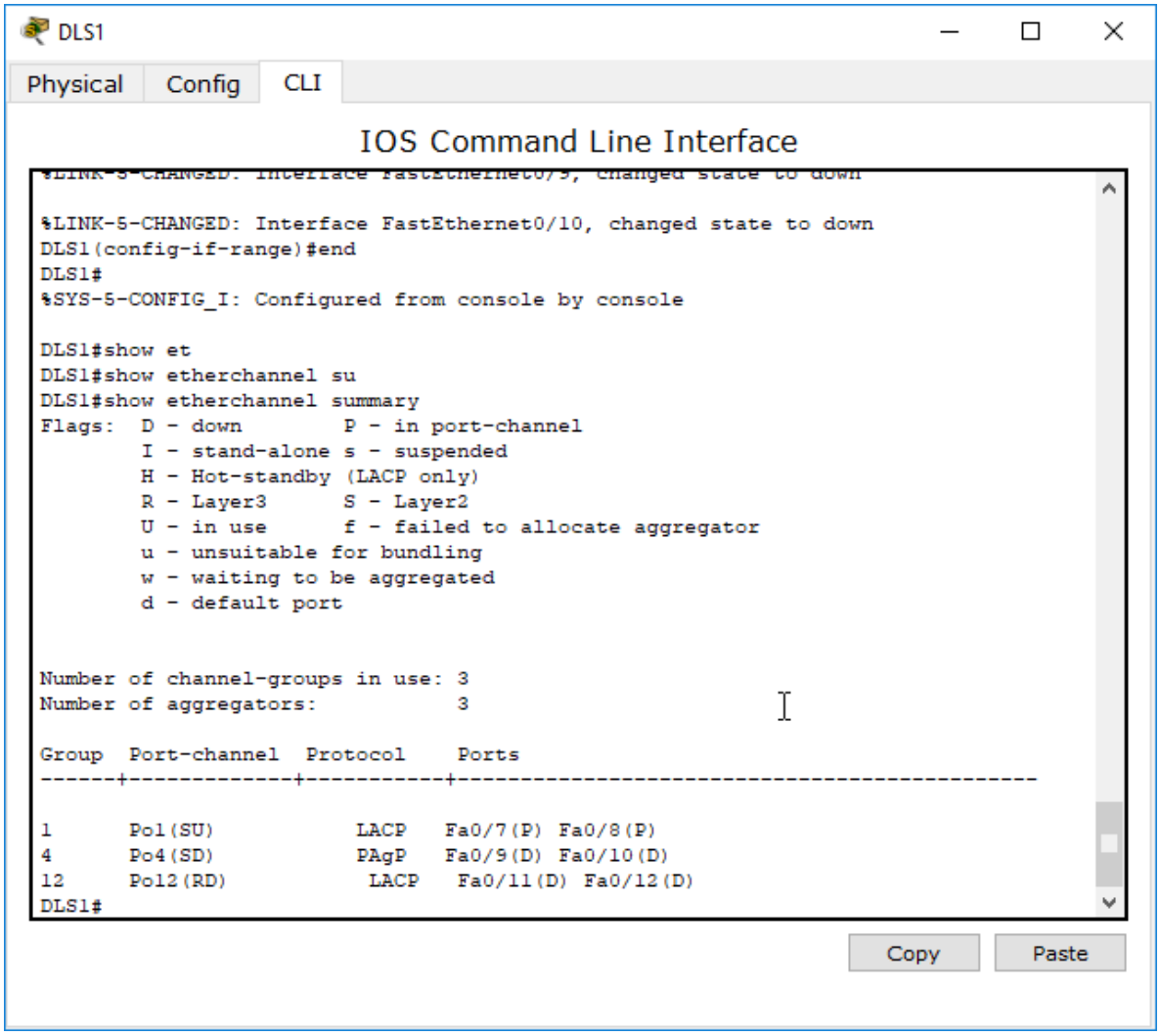


Ilustración 49. Port channel 4 en DLS1

ALS2(config)#int ra
ALS2(config)#int range fa0/9-10
ALS2(config-if-range)#switchport trunk encapsulation dot1q
^
% Invalid input detected at '^' marker.
ALS2(config-if-range)#swi
ALS2(config-if-range)#switchport mode tru
ALS2(config-if-range)#switchport mode trunk
ALS2(config-if-range)#channel-group 4 mode desirable
ALS2(config-if-range)#

Creating a port-channel interface Port-channel 4
no shut

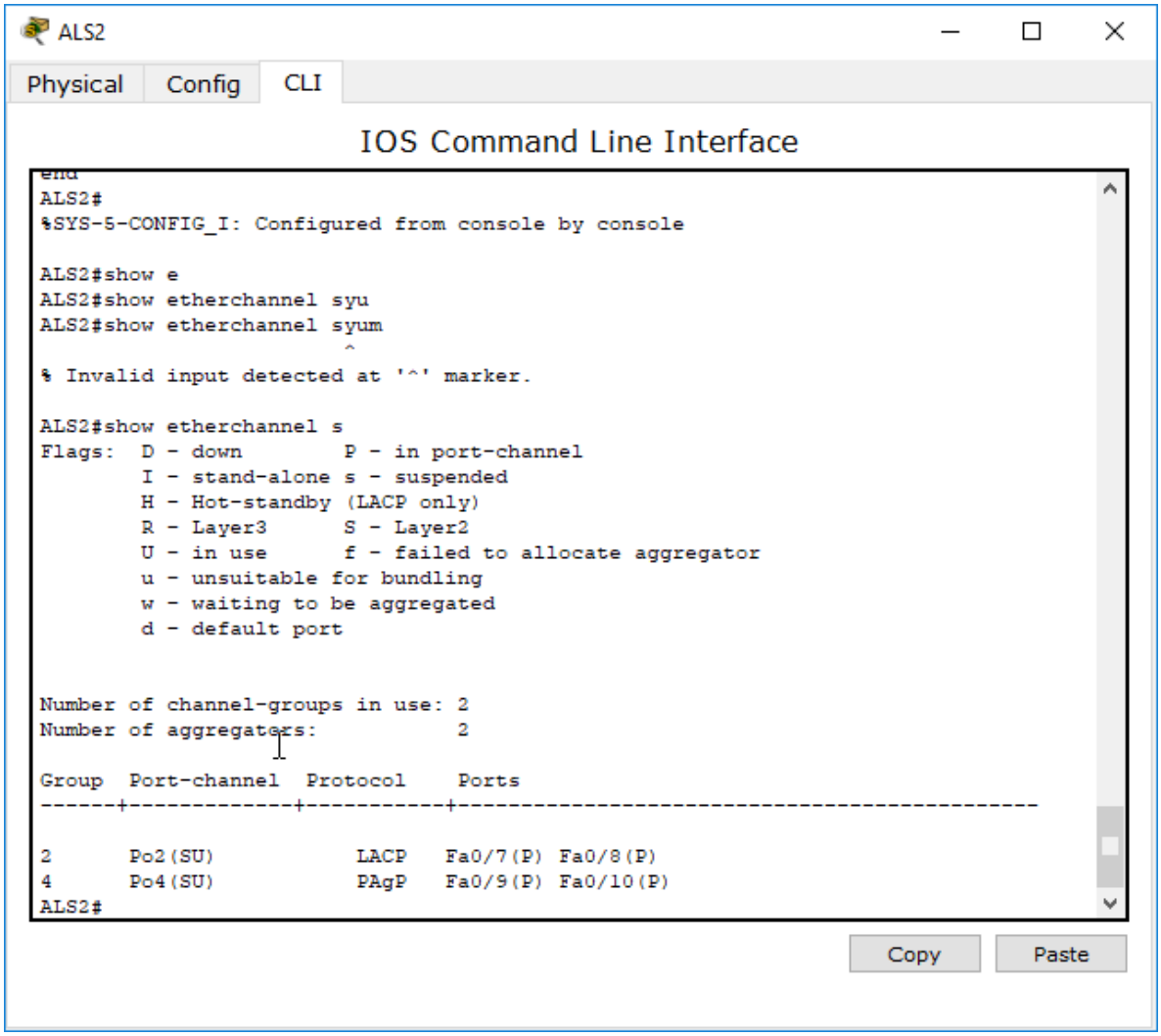


Ilustración 50. Port channel 4 en ALS2

DLS2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#int ra
DLS2(config)#int range 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
DLS2(config-if-range)#

Creating a port-channel interface Port-channel 3
no shut

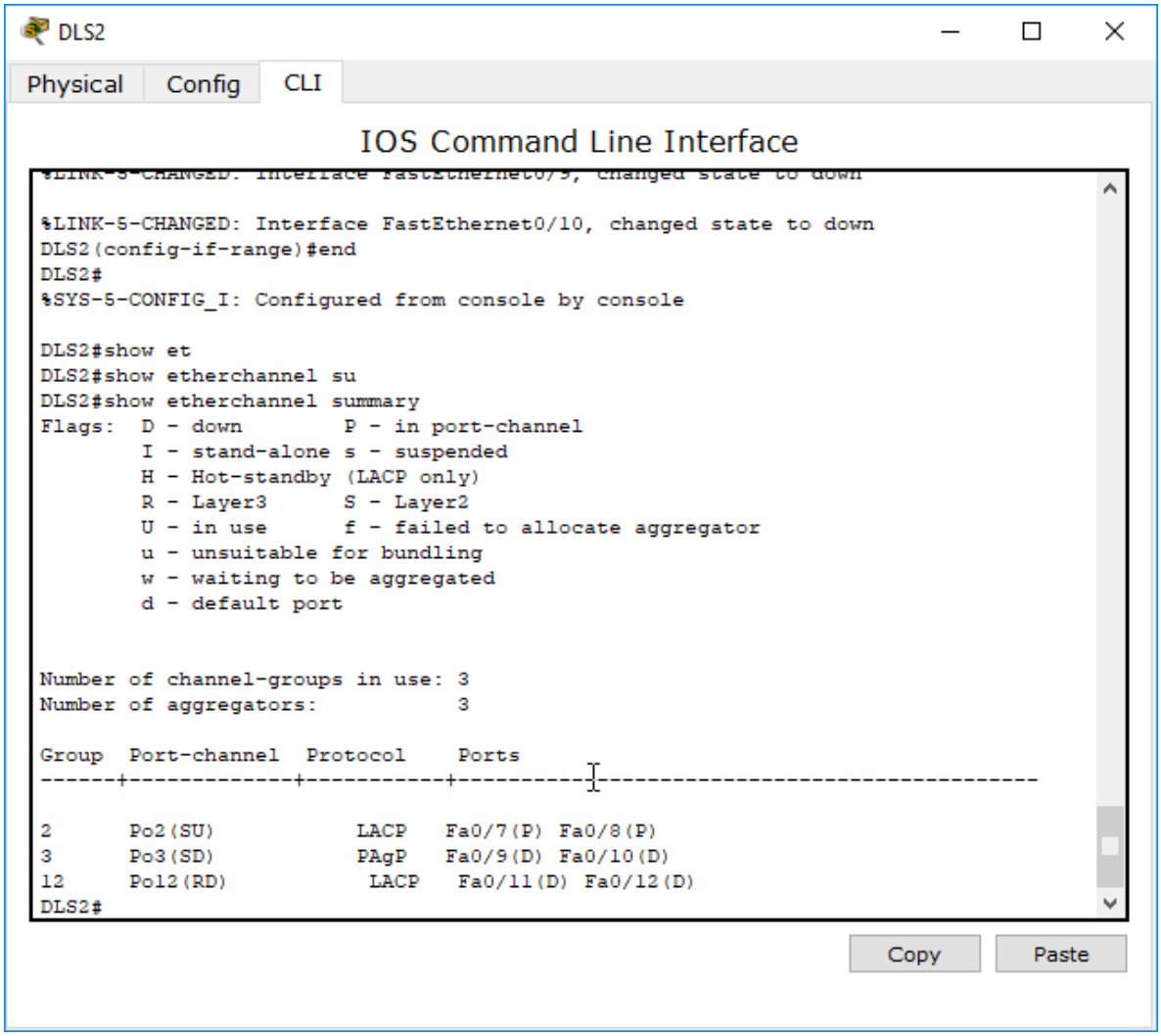


Ilustración 51. Port channel 3 en DLS2

ALS1(config)#int ra
ALS1(config)#int range fa0/9-10
ALS1(config-if-range)# switchport trunk encapsulation dot1q
^
% Invalid input detected at '^' marker.
ALS1(config-if-range)#switchport mode trunk
ALS1(config-if-range)#channel-group 3 mode desirable

ALS1(config-if-range)#
Creating a port-channel interface Port-channel 3
no shut

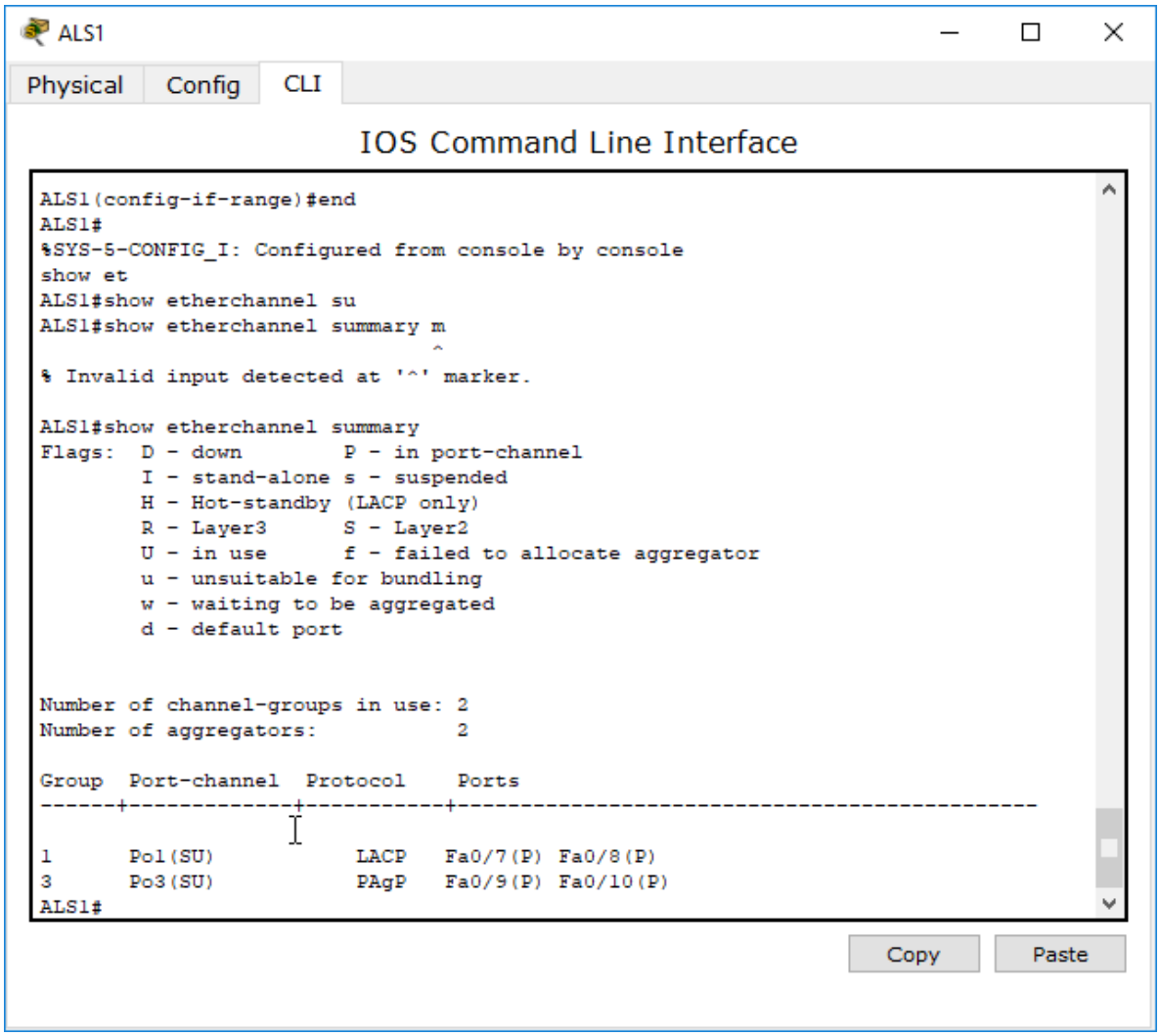


Ilustración 52. Port channel 3 en ALS1

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

con el siguiente comando validamos los puertos actuales
DLS1#show interfaces trunk

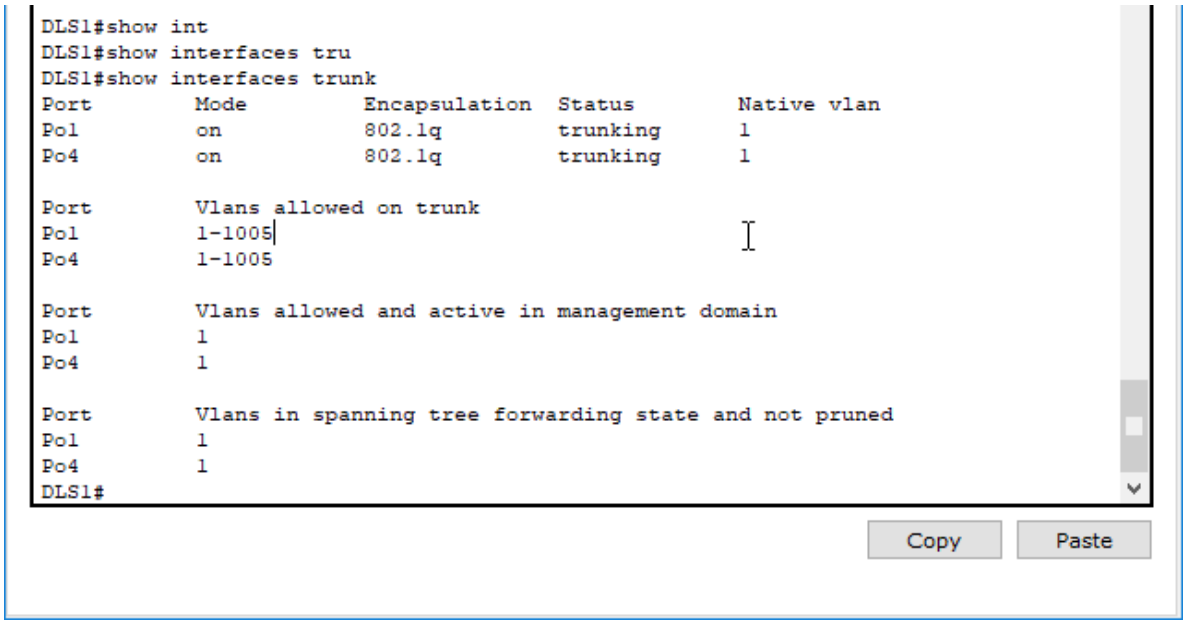


Ilustración 53. verificación puertos DLS1

DLS1(config)#interface Po1
DLS1(config-if)#sw
DLS1(config-if)#switchport tru
DLS1(config-if)#switchport trunk nat
DLS1(config-if)#switchport trunk native vl
DLS1(config-if)#switchport trunk native vlan 800
DLS1(config-if)#exit
DLS1(config)#i
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Port-channel 1 (800), with ALS1 FastEthernet0/7 (1).

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Port-channel 1 (800), with ALS1 FastEthernet0/8 (1).

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Port-channel 1 (800), with ALS1 Port-channel 1 (1).
DLS1(config)#int Po4
DLS1(config-if)#switchport trunk native vlan 800
DLS1(config-if)#exit
DLS1(config)#

```
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Port-channel 4
(800), with ALS2 Port-channel 4 (1).
end
DLS1#
%SYS-5-CONFIG_I: Configured from console by console
show int
DLS1#show interfaces tr
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
DLS1#
```

Ilustración 54. configuración vlan 800 como nativa DlS1

DLS2(config)#int Po2
DLS2(config-if)#swi
DLS2(config-if)#switchport tu
DLS2(config-if)#switchport t
DLS2(config-if)#switchport trunk na
DLS2(config-if)#switchport trunk native v
DLS2(config-if)#switchport trunk native vlan 800
DLS2(config-if)#exit
DLS2(config)#int Po3
DLS2(config-if)#switchport trunk native vlan 800
DLS2(config-if)#exit

```
DLS2#show interfaces tr
DLS2#show interfaces 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         1-1005
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         none
DLS2#
```

Ilustración 55. configuración vlan 800 nativa en DLS2

ALS1(config)#int Po1
ALS1(config-if)#
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Port-channel 3 (1), with DLS2 FastEthernet0/9 (800).

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Port-channel 3 (1), with DLS2 FastEthernet0/10 (800).

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Port-channel 3 (1), with DLS2 Port-channel 3 (800).
sw
ALS1(config-if)#switchport tr
ALS1(config-if)#switchport trunk na
ALS1(config-if)#switchport trunk native v
ALS1(config-if)#switchport trunk native vlan 800
ALS1(config-if)#exit
ALS1(config)#int Po3
ALS1(config-if)#switchport trunk native vlan 800

```
ALS1#show int
ALS1#show interfaces tr
ALS1#show interfaces 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
ALS1#
```

Ilustración 56. configuración vlan 800 nativa ALS1

ALS2(config)#int
ALS2(config)#interface Po2
ALS2(config-if)#sw
ALS2(config-if)#switchport tu
ALS2(config-if)#switchport t
ALS2(config-if)#switchport trunk na
ALS2(config-if)#switchport trunk native vl
ALS2(config-if)#switchport trunk native vlan 800
ALS2(config-if)#exit
ALS2(config)#interface Po4
ALS2(config-if)#switchport trunk native vlan 800

```
ALS2#show in
ALS2#show interfaces tr
ALS2#show interfaces 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
ALS2#
```

Ilustración 57. configuración vlan 800 nativa ALS2

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

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

```
DLS1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#vtp d
DLS1(config)#vtp domain UNAD
Changing VTP domain name from NULL to UNAD
DLS1(config)#vtp pass
DLS1(config)#vtp password cisco123
Setting device VLAN database password to cisco123
DLS1(config)#vtp ve
DLS1(config)#vtp version 2
DLS1(config)#
```

```
DLS1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
DLS1(config)#vtp d
DLS1(config)#vtp domain UNAD
Changing VTP domain name from NULL to UNAD
DLS1(config)#vtp pass
DLS1(config)#vtp password cisco123
Setting device VLAN database password to cisco123
DLS1(config)#vtp ve
DLS1(config)#vtp version 2
DLS1(config)#
```

Ilustración 58. Configuración DLS1 para utilizar VTP versión 2

```
ALS1#conf t
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)#
```

Ilustración 59. Configuración ALS1 para utilizar VTP versión 2

```
ALS2>en
ALS2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ALS2(config)#vtp do
ALS2(config)#vtp domain UNAD
Domain name already set to UNAD.
ALS2(config)#vtp pass
ALS2(config)#vtp password cisco123
Setting device VLAN database password to cisco123
ALS2(config)#vtp vers
ALS2(config)#vtp version 2
ALS2(config)#
```

Ilustración 60. Configuración ALS2 para utilizar VTP versión 2

2) Configurar DLS1 como servidor principal para las VLAN.

DLS1>en
DLS1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#vtp mode ser
DLS1(config)#vtp mode server
Device mode already VTP SERVER.
DLS1(config)#

```
DLS1>en
DLS1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
DLS1(config)#vtp mode ser
DLS1(config)#vtp mode server
Device mode already VTP SERVER.
DLS1(config)#
```

Ilustración 61. Comando Vtp Status DLS1

3) Configurar ALS1 y ALS2 como clientes VTP.

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

ALS2(config)#
ALS2(config)#vtp mode client
Setting device to VTP CLIENT mode.

```
ALS1#show vt
ALS1#show vtp st
ALS1#show vtp status
VTP Version                     : 2
Configuration Revision          : 3
Maximum VLANs supported locally : 255
Number of existing VLANs        : 5
VTP Operating Mode              : Client
VTP Domain Name                 : UNAD
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Enabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0xEF 0x3A 0xE1 0xDA 0x
Configuration last modified by 0.0.0.0 at 3-1-93 01:13:1
```

```
ALS2#show vtp st
ALS2#show vtp status
VTP Version                     : 2
Configuration Revision          : 3
Maximum VLANs supported locally : 255
Number of existing VLANs        : 5
VTP Operating Mode              : Client
VTP Domain Name                 : UNAD
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Enabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0xEF 0x3A 0xE1 0xDA 0xCE 0xCA 0x40 0xTE
Configuration last modified by 0.0.0.0 at 3-1-93 01:13:19
ALS2#
```

Ilustración 62. Validación cliente Vtp status ALS1 y 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	1010	VOZ
1111	VIDEONET	3456	ADMINISTRACIÓN

Tabla 1. Configuración VLAN servidor

En este caso, el escenario solicitado fue simulado en Cisco Packet tracer 7.1.1 usando la imagen “C3560 Boot Loader (C3560-HBOOT-M) Versión 12.2(25r)SEC,” pero el switch no nos permite configurar mayor rango a 1005, ya que no soporta vlan extendidas por lo que se toman otras vlan para continuar con el escenario.

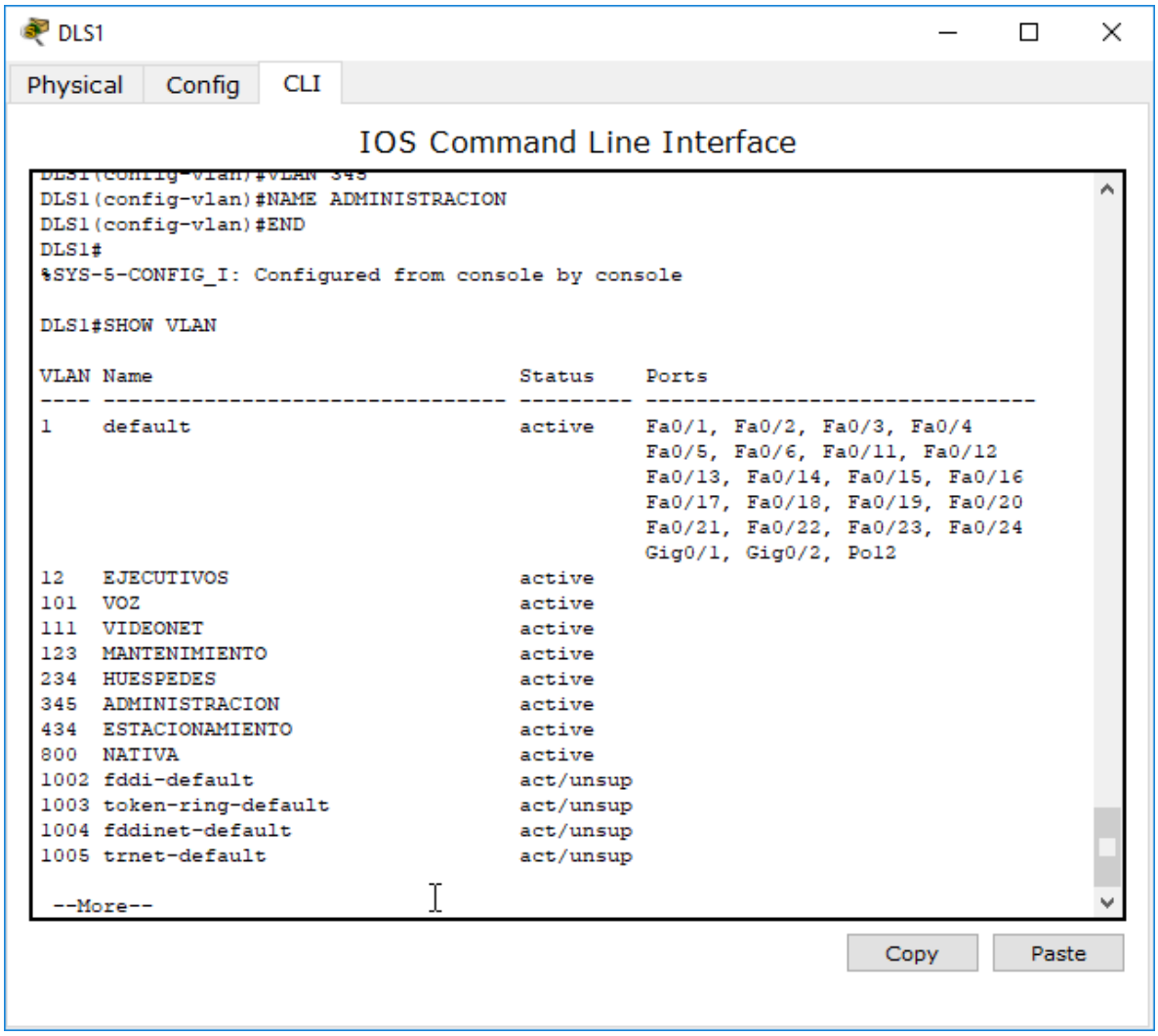


Ilustración 63. validación VLANs solicitadas

f. En DLS1, suspender la VLAN 434.

DLS1#CONF T
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#VLAN 434
DLS1(config-vlan)#STA
DLS1(config-vlan)#sta
DLS1(config-vlan)#state suspend

En esta versión de packet tracer no es posible suspender la vlan

```
DLS1#
DLS1#CONF T
Enter configuration commands, one per line.  End with CNTL/Z.
DLS1(config)#VLAN 434
DLS1(config-vlan)#STA
DLS1(config-vlan)#sta
DLS1(config-vlan)#state suspend
                  ^
% Invalid input detected at '^' marker.
```

Ilustración 64. Suspensión vlan 434

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

```
DLS2(config)#vtp mode
DLS2(config)#vtp mode tran
DLS2(config)#vtp mode transparent
Setting device to VTP TRANSPARENT mode.
DLS2(config)#vtp ver
DLS2(config)#vtp version 2
DLS2(config)#
```

```
DLS2(config)#vtp mode
DLS2(config)#vtp mode tran
DLS2(config)#vtp mode transparent
Setting device to VTP TRANSPARENT mode.
DLS2(config)#vtp ver
DLS2(config)#vtp version 2
```

Ilustración 65.Habilitación vtp mode transparent

h. Suspender VLAN 434 en DLS2.

```
DLS2(config)#vlan 434

DLS2(config-vlan)#state susp

DLS2(config-vlan)#state susp
                   ^

% Invalid input detected at '^' marker.

DLS2(config-vlan)#
```

```
DLS2(config)#vlan 434
DLS2(config-vlan)#state susp
DLS2(config-vlan)#state susp
                   ^
% Invalid input detected at '^' marker.

DLS2(config-vlan)#
```

Ilustración 66. suspensión vlan 434

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

DLS2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#vlan 567
DLS2(config-vlan)#name CONTABILIDAD
DLS2(config-vlan)#int por
DLS2(config-vlan)#int port-c
DLS2(config-vlan)#exit
DLS2(config)#int por
DLS2(config)#int port-channel 2
DLS2(config-if)#swi
DLS2(config-if)#switchport tru
DLS2(config-if)#switchport trunk allowed vlan exce
DLS2(config-if)#switchport trunk allowed vlan except 567
DLS2(config-if)#int port-channel 3
DLS2(config-if)#switchport trunk allowed vlan except 567

```
DLS2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
DLS2(config)#vlan 567
DLS2(config-vlan)#name CONTABILIDAD
DLS2(config-vlan)#int por
DLS2(config-vlan)#int port-c
DLS2(config-vlan)#exit
DLS2(config)#int por
DLS2(config)#int port-channel 2
DLS2(config-if)#swi
DLS2(config-if)#switchport tru
DLS2(config-if)#switchport trunk allowed vlan exce
DLS2(config-if)#switchport trunk allowed vlan except 567
DLS2(config-if)#int port-channel 3
DLS2(config-if)#switchport trunk allowed vlan except 567
DLS2(config-if)#
```

Ilustración 67. Creación de vlan 567 y negación de paso

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

DLS1>en
DLS1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#spanning-tree vlan 1,12,434,800,101,111,345 root primary
DLS1(config)#spanning-tree vlan 123,234 root secondary

```
DLS1>en
DLS1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
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)#
```

Ilustración 68. configuración Spanning-tree en DLS1

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(config)#

```
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)#
DLS2#
%SYS-5-CONFIG_I: Configured from console by console
```

Ilustración 69. configuración Spanning-tree en DLS2

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.

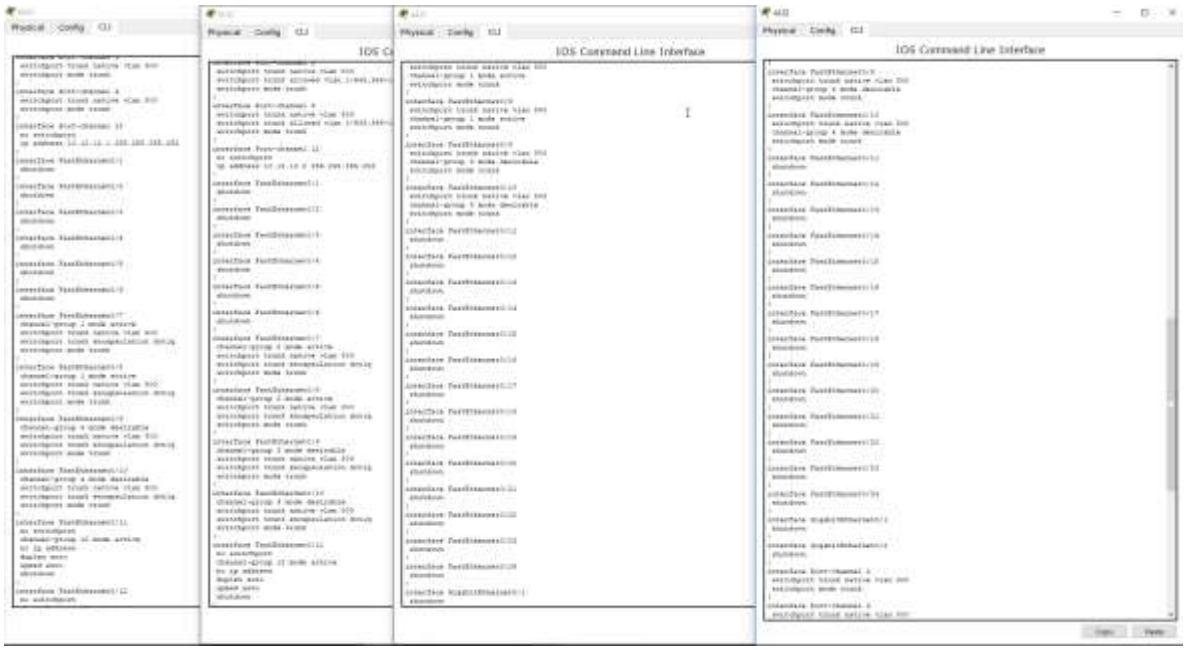


Ilustración 70. validación de trunk ports

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		

Tabla 2. Configuración puertos de acceso VLANs

DLS1(config)#int fa0/6
DLS1(config-if)#sw
DLS1(config-if)#switchport mode
DLS1(config-if)#switchport mode acc
DLS1(config-if)#switchport mode access
DLS1(config-if)#swi
DLS1(config-if)#switchport mode acc
DLS1(config-if)#switchport mode access vl
DLS1(config-if)#switchport access vlan 345

DLS1(config-if)#sp
DLS1(config-if)#spannin
DLS1(config-if)#spanning-tree port
DLS1(config-if)#spanning-tree portfast
%Warning: portfast should only be enabled on ports connected to a single host. Connecting hubs, concentrators, switches, bridges, etc... to this interface when portfast is enabled, can cause temporary bridging loops. Use with CAUTION

%Portfast has been configured on FastEthernet0/6 but will only have effect when the interface is in a non-trunking mode.
DLS1(config-if)#no shut

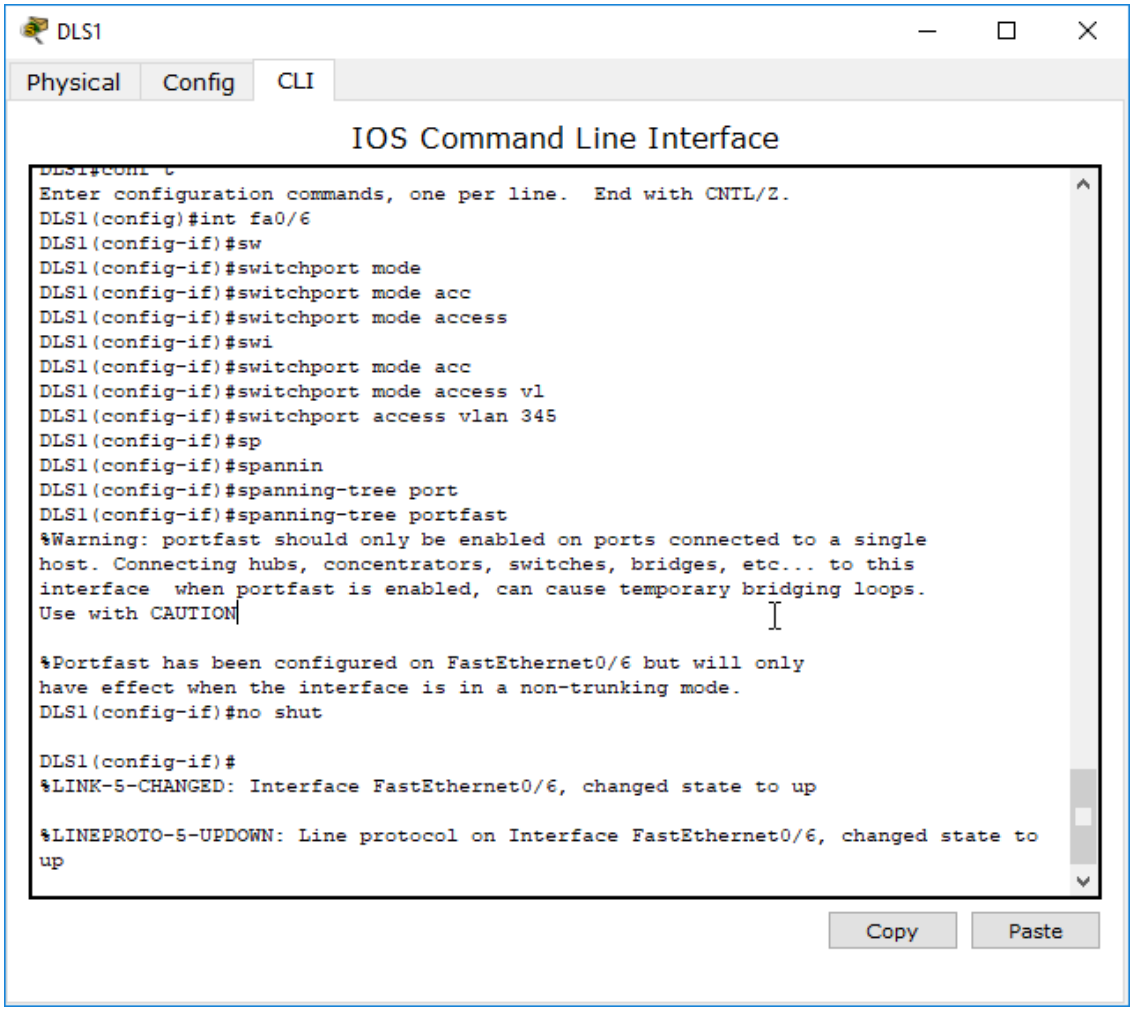


Ilustración 71. configuración puertos de acceso

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

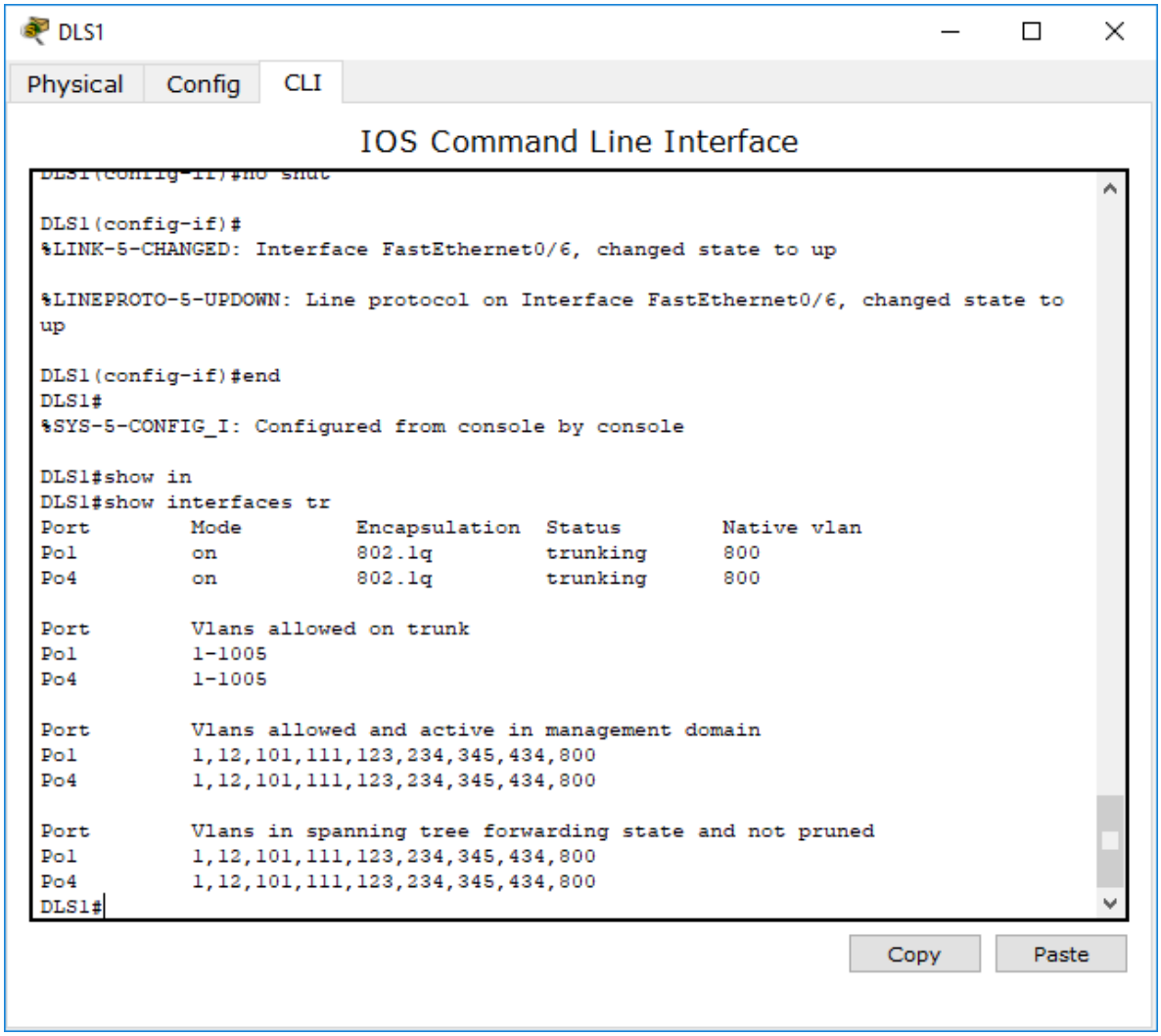


Ilustración 72. Verificación vlan e interfaz trunk en DLS1

```
DLS2#show interfa
DLS2#show interfaces tr
DLS2#show interfaces 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         1,434,800
Po3         1,434,800

Port        Vlans in spanning tree forwarding state and not pruned
Po2         1,434,800
Po3         none
DLS2#
```

Ilustración 73. Verificación vlan e interfaz en DLS2

```
ALS1#sho
ALS1#show  int
ALS1#show  interfaces 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         1,12,101,111,123,234,345,434,800
Po3         1,12,101,111,123,234,345,434,800

Port        Vlans in spanning tree forwarding state and not pruned
Po1         1,12,101,111,123,234,345,434,800
Po3         1,12,101,111,123,234,345,434,800
ALS1#
```

Ilustración 74. Verificación vlan e interfaz en ALS1

```
ALS2#show int
ALS2#show interfaces trun
ALS2#show interfaces 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         1,12,101,111,123,234,345,434,800
Po4         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
Po4         1,12,101,111,123,234,345,434,800
ALS2#
```

Ilustración 75. Verificación vlan e interfaz en ALS2

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

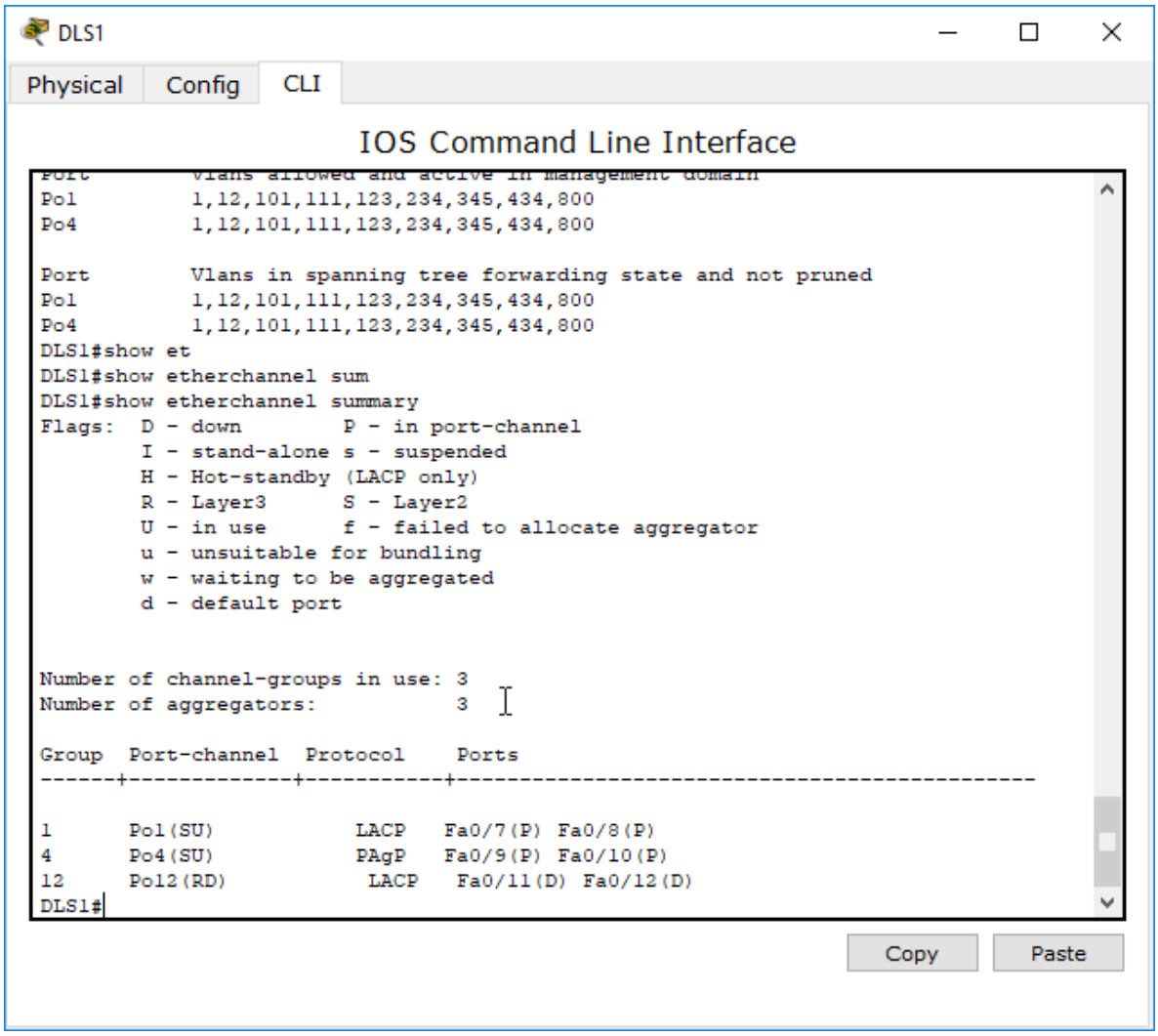


Ilustración 76. Verificación EtherChannel DLS1

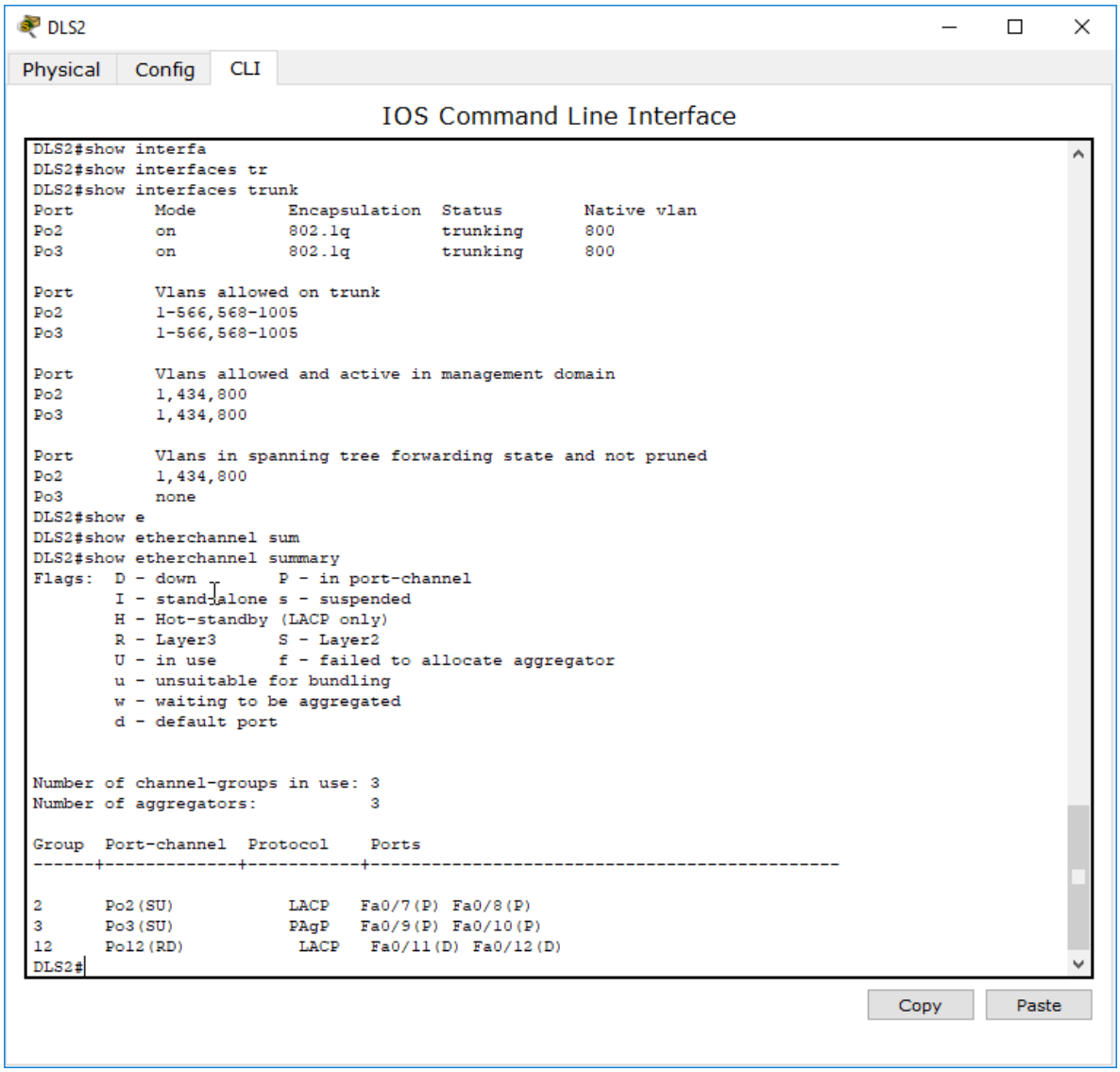
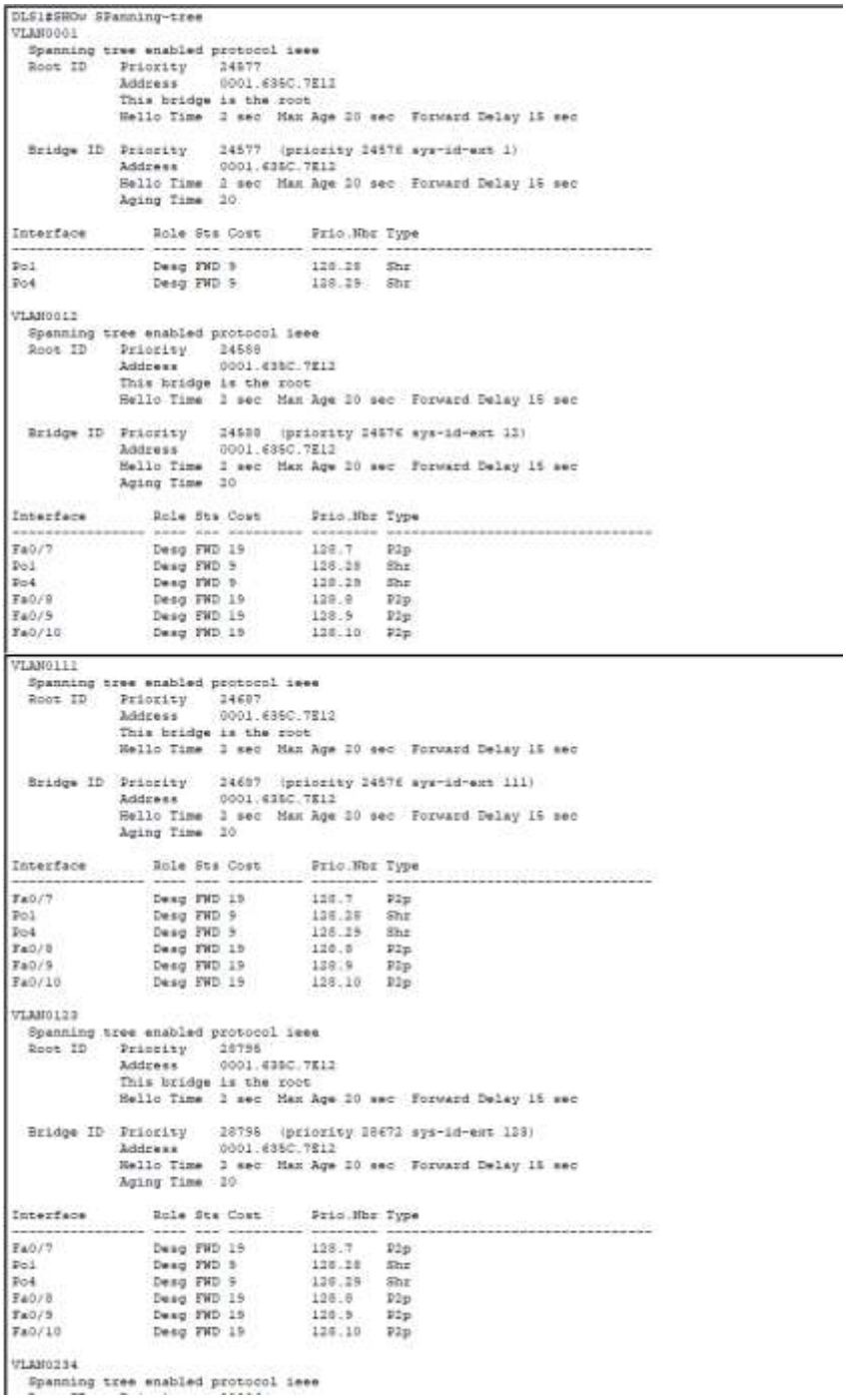


Ilustración 77. Verificación etherchannels DLS2

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



```
DLS1#SHOw SPanning-tree
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    24577
             Address     0001.635C.7E12
             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     0001.635C.7E12
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

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

VLAN0012
  Spanning tree enabled protocol ieee
  Root ID    Priority    24588
             Address     0001.635C.7E12
             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     0001.635C.7E12
             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
Po1              Desg FWD 9         128.28   Shr
Po4              Desg FWD 9         128.29   Shr
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p
VLAN0111
  Spanning tree enabled protocol ieee
  Root ID    Priority    24687
             Address     0001.635C.7E12
             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     0001.635C.7E12
             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
Po1              Desg FWD 9         128.28   Shr
Po4              Desg FWD 9         128.29   Shr
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p

VLAN0123
  Spanning tree enabled protocol ieee
  Root ID    Priority    28795
             Address     0001.635C.7E12
             This bridge is the root
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    28795  (priority 28672 sys-id-ext 123)
             Address     0001.635C.7E12
             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
Po1              Desg FWD 9         128.28   Shr
Po4              Desg FWD 9         128.29   Shr
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p

VLAN0234
  Spanning tree enabled protocol ieee
```

Ilustración 78. Verificación Spanning-tree DLS1

```
VLAN0234
  Spanning tree enabled protocol ieee
  Root ID     Priority    28906
              Address     0001.635C.7E12
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    28906  (priority 28672 sys-id-ext 234)
              Address     0001.635C.7E12
              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
Po1              Desg FWD 9         128.28   Shr
Po4              Desg FWD 9         128.29   Shr
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p

VLAN0345
  Spanning tree enabled protocol ieee
  Root ID     Priority    24921
              Address     0001.635C.7E12
              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     0001.635C.7E12
              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
Po1              Desg FWD 9         128.28   Shr
Po4              Desg FWD 9         128.29   Shr
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p
Fa0/6            Desg FWD 19        128.6    P2p

VLAN0434
  Spanning tree enabled protocol ieee
  Root ID     Priority    25010
              Address     0001.635C.7E12
              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     0001.635C.7E12
              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
Po1              Desg FWD 9         128.28   Shr
Po4              Desg FWD 9         128.29   Shr
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p

VLAN0800
  Spanning tree enabled protocol ieee
  Root ID     Priority    25376
              Address     0001.635C.7E12
              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     0001.635C.7E12
              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
Po1              Desg FWD 9         128.28   Shr
Po4              Desg FWD 9         128.29   Shr
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/10           Desg FWD 19        128.10   P2p
```

Ilustración 79. Verificación Spanning-tree en DLS1

```
DLS2#show spanning-tree
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID     Priority    24577
              Address     0001.636C.7E12
              Cost        18
              Port        28(Port-channel 2)
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    28673  (priority 28672 sys-id-ext 1)
              Address     0040.0B74.EE59
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Po3              Altn BLK 9         128.29   Shr
Po2              Root FWD 5         128.28   Shr

VLAN0434
  Spanning tree enabled protocol ieee
  Root ID     Priority    25010
              Address     0001.636C.7E12
              Cost        18
              Port        28(Port-channel 2)
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    29106  (priority 28672 sys-id-ext 434)
              Address     0040.0B74.EE59
              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
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/10           Desg FWD 19        128.10   P2p
Po3              Altn BLK 9         128.29   Shr
Po2              Root FWD 5         128.28   Shr

VLAN0567
  Spanning tree enabled protocol ieee
  Root ID     Priority    33335
              Address     0040.0B74.EE59
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    33335  (priority 32768 sys-id-ext 567)
              Address     0040.0B74.EE59
              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
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/10           Desg FWD 19        128.10   P2p
Po3              Desg FWD 9         128.29   Shr
Po2              Desg FWD 9         128.28   Shr

VLAN0800
  Spanning tree enabled protocol ieee
  Root ID     Priority    25376
              Address     0001.636C.7E12
              Cost        18
              Port        28(Port-channel 2)
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    29472  (priority 28672 sys-id-ext 800)
              Address     0040.0B74.EE59
              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
Fa0/9            Desg FWD 19        128.9    P2p
Fa0/8            Desg FWD 19        128.8    P2p
Fa0/10           Desg FWD 19        128.10   P2p
Po3              Altn BLK 9         128.29   Shr
Po2              Root FWD 9         128.28   Shr
```

Ilustración 80. Verificación Spanning-tree en DLS2

CONCLUSIONES

Se realiza la configuración del escenario 1 mediante la aplicación de configuraciones OSPF y EIGRP a los protocolos IPv4 e IPv6.

Se aplican los conocimientos adquiridos a lo largo del Diplomado de profundización CISCO CCNP y los módulos CCNA estudiados a lo largo de la carrera actual.

Se configuran Switches con parámetros EtherChannel, VTP y portchannel en el escenario 2.

Se desarrolla la prueba de habilidades requerida para grado del Diplomado de profundización en curso.

REFERENCIAS BIBLIOGRAFICAS

Teare, D., Vachon B., Graziani, R. (2015). CISCO Press (Ed). Implementing a Border Gateway Protocol (BGP) Solution for ISP Connectivity. Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide CCNP ROUTE 300-101. Recuperado de https://1drv.ms/b/s!AmIJYei-NT1IlnMfy2rhPZHwEoWx

Teare, D., Vachon B., Graziani, R. (2015). CISCO Press (Ed). OSPF Implementation. Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide CCNP ROUTE 300-101. Recuperado de https://1drv.ms/b/s!AmIJYei-NT1IlnMfy2rhPZHwEoWx

Teare, D., Vachon B., Graziani, R. (2015). CISCO Press (Ed). EIGRP Implementation. Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide CCNP ROUTE 300-101. Recuperado de https://1drv.ms/b/s!AmIJYei-NT1IlnMfy2rhPZHwEoWx

Teare, D., Vachon B., Graziani, R. (2015). CISCO Press (Ed). Manipulating Routing Updates. Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide CCNP ROUTE 300-101. Recuperado de https://1drv.ms/b/s!AmIJYei-NT1IlnMfy2rhPZHwEoWx

Teare, D., Vachon B., Graziani, R. (2015). CISCO Press (Ed). Implementing Routing Facilities for Branch Offices and Mobile Workers. Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide CCNP ROUTE 300-101. Recuperado de https://1drv.ms/b/s!AmIJYei-NT1IlnMfy2rhPZHwEoWx

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

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

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