

DIPLOMADO DE PROFUNDIZACIÓN CISCO CCNP SOLUCIÓN DE DOS
ESCENARIOS PRESENTES EN ENTORNOS CORPORATIVOS BAJO EL USO DE
LA TECNOLOGÍA CISCO

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA-UNAD
ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA-ECBTI
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POPAYAN CAUCA
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Diplomado de opción de grado presentado para optar el título de INGENIERO DE
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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA-UNAD
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NOTA DE ACEPTACIÓN

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Firma del Jurado

Firma del Jurado

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GLOSARIO

DTP: Todos los switches Cisco, usan un protocolo patentado de punto a punto llamado Protocolo de enlace dinámico (DTP) en puertos troncales para negociar el estado de enlace. DTP negocia el modo operativo de los puertos del conmutador directamente conectados a un puerto troncal y selecciona un protocolo de enlace apropiado. Se recomienda negociar el enlace troncal.

ENRUTAMIENTO: Cuando hablamos de compartir información y de realizar la comunicación entre distintos sistemas tecnológicos, el enrutamiento dinámico es uno de los primeros conceptos que nos vienen a la cabeza. Bajo este proceso una serie de máquinas que se encuentren dentro de una misma red tendrán capacidad para llevar a cabo una comunicación entre ellas de forma permanente.

INTERFACE: Interfaz o interface es el punto de conexión ya sea dos componentes de hardware, dos programas o entre un usuario y un programa.

PROTOCOLO: Descripción formal de formatos de mensaje y de reglas que dos computadoras deben seguir para intercambiar dichos mensajes. Un protocolo puede describir detalles de bajo nivel de las interfaces máquina a máquina o intercambios de alto nivel entre programas de asignación de recursos.

VLAN: Se conoce como Virtual LAN o VLAN a una división de carácter lógico del dominio de Broadcast a nivel de la Capa 2 del modelo OSI. Se trata, por tanto, de una agrupación de un conjunto de dispositivos que pueden mantener comunicación entre sí.

RESÚMEN

El presente documento tiene como objetivo dar a conocer el proceso de enrutamiento, conmutación y desarrollo de dos escenarios propuestos simulando la configuración de redes en locaciones empresariales, el proyecto denominado "SOLUCIÓN DE DOS ESCENARIOS PRESENTES EN ENTORNOS CORPORATIVOS BAJO EL USO DE LA TECNOLOGÍA CISCO" hace parte de la prueba de habilidades prácticas hace diplomado de profundización Cisco Certified Network Professional CCNP,

La propuesta se desarrolla mediante el uso de los protocolos EIGRP, OSPF, PAgP, LACP y uso extendido de VLAN, lo anterior se simula por medio de la herramienta exclusiva de Cisco Packet Tracer.

Palabras clave CISCO, CCNP, Conmutación, enrutamiento, Redes, Electrónica

ABSTRACT

The objective of this document is to present the process of routing, switching and development of two proposed scenarios simulating the configuration of networks in business locations, the project called "SOLUTION OF TWO SCENARIOS PRESENT IN CORPORATE ENVIRONMENTS UNDER THE USE OF CISCO TECHNOLOGY" is part of the practical skills test takes a deepening diploma Cisco Certified Network Professional CCNP,

The proposal is developed through the use of the EIGRP, OSPF, PAgP, LACP protocols and extended use of VLAN, the above is simulated by means of the exclusive Cisco Packet Tracer tool.

Keywords CISCO, CCNP, Switching, routing, Networks, Electronics

INTRODUCCIÓN

Mediante el diplomado de cisco CCNP se busca identificar las competencias y habilidades que se adquirieron a lo largo de este, a su vez se pondrán a prueba los niveles de comprensión y la solución de problemas relacionados con Networking.

En el primer escenario se plantea por medio de los protocolos EIGRP y OSPF, donde se realizan configuraciones en búsqueda de la redistribución de rutas encontrando operatividad y escalabilidad a gran escala.

El segundo escenario se desarrolla dando uso a los protocolos PAgP y LACP, donde podemos denotar que estos se caracterizan por cumplir la función de agregación de puertos de manera automatizada y lógica., podemos puntualizar que mediante el uso de los mismos podremos garantizar un ancho de banda y por ende un óptimo rendimiento mediante la red configurada.

DESCRIPCIÓN DE ESCENARIOS PROPUESTOS PARA LA PRUEBA DE HABILIDADES

1. ESCENARIO 1

Teniendo en la cuenta la siguiente imagen:

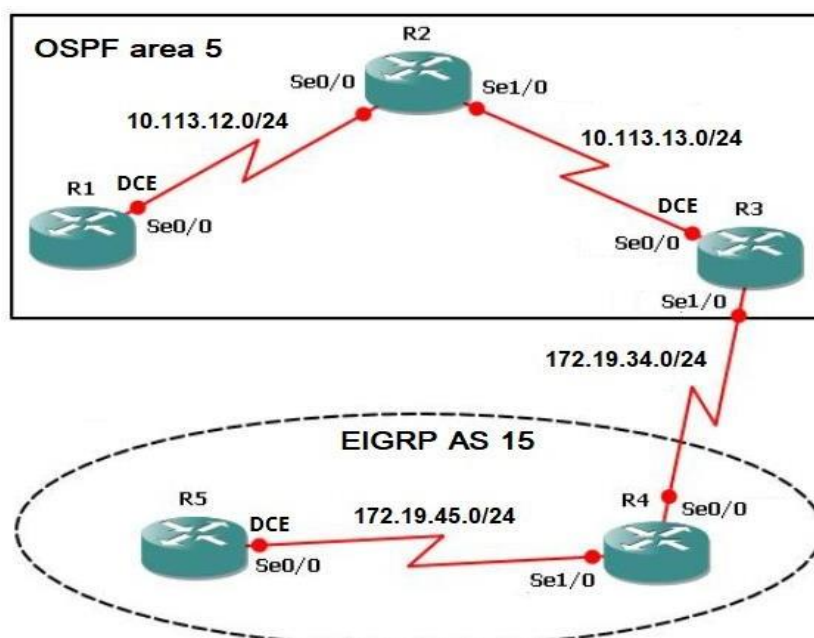


Figura 1. Topología 1

Tabla de Direccionamiento

Dispositivo	Interfaz	Dirección Ip	Mascara de Subred
R1	S0/0/0	10.113.12.1	/24
R2	S0/0/0	10.113.12.2	/24
	S0/0/1	10.113.13.1	/24
R3	S0/0/0	10.113.13.2	/24
	S0/0/1	172.19.34.1	/24

Dispositivo	Interfaz	Dirección Ip	Mascara de Subred
R4	S0/0/0	172.19.34.2	/24
	S0/0/1	172.19.45.1	/24
R5	S0/0/0	172.19.45.2	/24

Tabla 1. Tabla de direccionamiento

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

Realizamos la configuración básica de los 5 routers, basándonos en la tabla de direccionamiento arriba expuesta.

R1

```

Router>enable
Router#config terminal
Router(config)#hostname R1
R1(config)#interface s0/0/0
R1(config-if)#bandwidth 128000
R1(config-if)#ip address 10.113.12.1 255.255.255.0
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#exit
R1(config)#router ospf 1
R1(config-router)#network 10.113.12.0 0.0.0.255 area 5
R1(config-router)#end
R1# copy running-config startup-config
Destination filename [startup-config]?

```

Building configuration...

[OK]

R2

Router>enable

Router#config terminal

Router(config)#hostname R2

R2(config)#interface s0/0/0

R2(config-if)#ip address 10.113.12.2 255.255.255.0

R2(config-if)#no shutdown

R2(config-if)#

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

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

R2#config terminal

R2(config)#interface s0/0/1

R2(config-if)#ip address 10.113.13.1 255.255.255.0

R2(config-if)#no shutdown

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

R2(config-if)#exit

R2(config)#router ospf 1

R2(config-router)#network 10.113.12.0 0.0.0.255 area 5

R2(config-router)#

00:24:56: %OSPF-5-ADJCHG: Process 1, Nbr 10.113.12.1 on Serial0/0/0 from
LOADING to FULL, Loading Done

R2(config-router)#network 10.113.13.0 0.0.0.255 area 5

R2(config-router)#end

R2# copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

R3

Router>enable

Router#config terminal

Router(config)#hostname R3

R3(config)#interface s0/0/0

R3(config-if)#ip address 10.113.13.2 255.255.255.0

R3(config-if)#no shutdown

R3(config-if)#

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

R3(config-if)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

R3(config-if)#exit

R3(config)#interface s0/0/1

R3(config-if)#bandwidth 128000

R3(config-if)#ip address 172.19.34.1 255.255.255.0

R3(config-if)#no shutdown

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

R3(config-if)#exit

R3(config)#router ospf 1

R3(config-router)#network 10.113.13.0 0.0.0.255 area 5

R3(config-router)#

00:32:18: %OSPF-5-ADJCHG: Process 1, Nbr 10.113.13.1 on Serial0/0/0 from
LOADING to FULL, Loading Done

R3(config-router)#exit

R3(config)#router eigrp 15

```
R3(config-router)#network 172.19.34.0 0.0.0.255
R3(config-router)#end
R3# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

R4

```
Router>enable
Router#config terminal
Router(config)#hostname R4
R4(config)#interface serial 0/0/0
R4(config-if)#ip address 172.19.34.2 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
R4(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to
up
R4(config-if)#exit
R4(config)#interface serial 0/0/1
R4(config-if)#ip address 172.19.45.1 255.255.255.0
R4(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R4(config-if)#exit
R4(config)#router eigrp 15
R4(config-router)#network 172.19.34.0 0.0.0.255
R4(config-router)#
```

```
%DUAL-5-NBRCHANGE: IP-EIGRP 15: Neighbor 172.19.34.1 (Serial0/0/0) is up:
new adjacency
R4(config-router)#network 172.19.45.0 0.0.0.255
R4(config-router)#end
R4# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

R5

```
Router>enable
Router#config terminal
Router(config)#hostname R5
R5(config)#interface s0/0/0
R5(config-if)#bandwidth 128000
R5(config-if)#ip address 172.19.45.2 255.255.255.0
R5(config-if)#no shutdown
R5(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to
up
R5(config-if)#exit
R5(config)#router eigrp 15
R5(config-router)#network 172.19.45.0 0.0.0.255
R5(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 15: Neighbor 172.19.45.1 (Serial0/0/0) is up:
new adjacency
R5(config-router)#end
R5# copy running-config startup-config
```

Destination filename [startup-config]?

Building configuration...

[OK]

2. Cree cuatro nuevas interfaces de Loopback en R1 utilizando la asignación de direcciones 10.1.0.0/22 y configure esas interfaces para participar en el área 5 de OSPF.

En la siguiente tabla se muestra la lista de subredes ip 10.1.0.0, con su máscara 255.255.252.0 y sub-mascara 255.255.255.0 que se asignaran al R1, con su respectivo rango de host y broadcast.

RED	RANGO DE HOST	BROADCAST
10.1.0.0/24	10.1.0.1—10.1.0.254	10.1.0.255
10.1.1.0/24	10.1.1.1—10.1.1.254	10.1.1.255
10.1.2.0/24	10.1.2.1—10.1.2.254	10.1.2.255
10.1.3.0/24	10.1.3.1—10.1.3.254	10.1.3.255

Tabla 2. Lista de subredes ip 10.1.0.0

```
R1>enable
```

```
R1#config terminal
```

```
R1(config)#interface Loopback 0
```

```
R1(config-if)#
```

```
%LINK-5-CHANGED: Interface Loopback0, changed state to up
```

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

```
R1(config-if)#ip address 10.1.0.20 255.255.255.0
```

```
R1(config-if)#exit
```

```
R1(config)#interface Loopback 1
```

```
R1(config-if)#
```

```
%LINK-5-CHANGED: Interface Loopback1, changed state to up
```



```

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to
up
R1(config-if)#ip address 10.1.1.20 255.255.255.0
R1(config-if)#exit
R1(config)#interface Loopback 2
R1(config-if)#
%LINK-5-CHANGED: Interface Loopback2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback2, changed state to
up
R1(config-if)#ipaddress 10.1.2.20 255.255.255.0
R1(config-if)#exit
R1(config)#interface Loopback 3
R1(config-if)#
%LINK-5-CHANGED: Interface Loopback3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback3, changed state to
up
R1(config-if)#ip address 10.1.3.20 255.255.255.0
R1(config-router)#exit
R1(config)#router ospf 1
R1(config-router)#network 10.1.0.0 0.0.0.255 area 5
R1(config-router)#network 10.1.1.0 0.0.0.255 area 5
R1(config-router)#network 10.1.2.0 0.0.0.255 area 5
R1(config-router)#network 10.1.3.0 0.0.0.255 area 5
R1(config-router)#end
R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

```

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

Sistema Autónomo EIGRP 15.

En la siguiente tabla se muestra la lista de subredes ip 172.5.0.0, con su máscara 255.255.252.0 y sub-mascara 255.255.255.0 que se asignaran al R5, con su respectivo rango de host y broadcast.

RED	RANGO DE HOST	BROADCAST
172.5.0.0/24	172.5.0.1—172.5.0.254	172.5.0.255
172.5.1.0/24	172.5.1.1—172.5.1.254	172.5.1.255
172.5.2.0/24	172.5.2.1—172.5.2.254	172.5.2.255
172.5.3.0/24	172.5.3.1—172.5.3.254	172.5.3.255

Tabla 3. lista de subredes ip 172.5.0.0

```
R5>enable
```

```
R5#config terminal
```

```
R5(config)#interface Loopback 0
```

```
R5(config-if)#
```

```
%LINK-5-CHANGED: Interface Loopback0, changed state to up
```

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

```
R5(config-if)#ip address 172.5.0.20 255.255.255.0
```

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

```
R5(config)#interface Loopback 1
```

```
R5(config-if)#
```

```
%LINK-5-CHANGED: Interface Loopback1, changed state to up
```

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

```
R5(config-if)#ip address 172.5.1.20 255.255.255.0
```

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

```
R5(config)#interface Loopback 2
```

```
R5(config-if)#
%LINK-5-CHANGED: Interface Loopback2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback2, changed state to
up
R5(config-if)#ip address 172.5.2.20 255.255.255.0
R5(config-if)#exit
R5(config)#interface Loopback 3
R5(config-if)#
%LINK-5-CHANGED: Interface Loopback3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback3, changed state to
up
R5(config-if)#ip address 172.5.3.20 255.255.255.0
R5(config-if)#exit
R5(config)#router eigrp 15
R5(config-router)#network 172.5.0.0 0.0.0.255
R5(config-router)#network 172.5.1.0 0.0.0.255
R5(config-router)#network 172.5.2.0 0.0.0.255
R5(config-router)#network 172.5.3.0 0.0.0.255
R5(config-router)#end
R5#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]
```

4. Analice la tabla de enrutamiento de R3 y verifique que R3 está aprendiendo las nuevas interfaces de Loopback mediante el comando **show ip route**.
Verificación de enrutamiento **OK** por medio del comando **show ip route**.

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

Gateway of last resort is not set

 10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks
O   10.1.0.20/32 [110/129] via 10.113.13.1, 00:03:03, Serial0/0/0
O   10.1.1.20/32 [110/129] via 10.113.13.1, 00:03:03, Serial0/0/0
O   10.1.2.20/32 [110/129] via 10.113.13.1, 00:03:03, Serial0/0/0
O   10.1.3.20/32 [110/129] via 10.113.13.1, 00:03:03, Serial0/0/0
O   10.113.12.0/24 [110/128] via 10.113.13.1, 00:09:04,
Serial0/0/0
C   10.113.13.0/24 is directly connected, Serial0/0/0
L   10.113.13.2/32 is directly connected, Serial0/0/0
 172.5.0.0/24 is subnetted, 4 subnets
D   172.5.0.0/24 [90/2809856] via 172.19.34.2, 00:00:27,
Serial0/0/1
D   172.5.1.0/24 [90/2809856] via 172.19.34.2, 00:00:22,
Serial0/0/1
D   172.5.2.0/24 [90/2809856] via 172.19.34.2, 00:00:17,
Serial0/0/1
D   172.5.3.0/24 [90/2809856] via 172.19.34.2, 00:00:14,
Serial0/0/1
 172.19.0.0/16 is variably subnetted, 3 subnets, 2 masks
C   172.19.34.0/24 is directly connected, Serial0/0/1
L   172.19.34.1/32 is directly connected, Serial0/0/1
D   172.19.45.0/24 [90/2681856] via 172.19.34.2, 00:06:10,
Serial0/0/1

R3#
```

Figura 2. show ip route R3

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

```
R3>enable
```

```
R3#configure terminal
```

```
R3(config)#router ospf 1
```

```
R3(config-router)#redistribute eigrp 15 metric 50000 subnets
```

```
R3(config)#exit
```

```
R3(config)#router eigrp 15
```

```
R3(config-router)#redistribute ospf 1 metric 1544 20000 255 1 1500
```

```
R3(config-router)#end
```

```
R3#copy running-config startup-config
```

```
Destination filename [startup-config]?
```

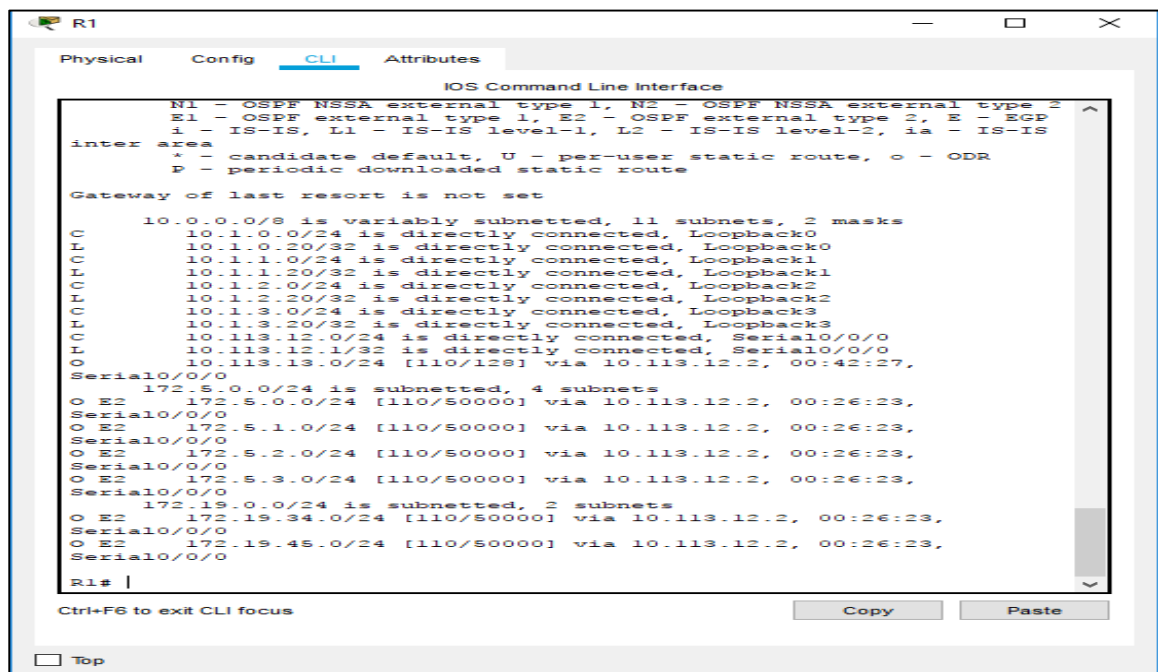
```
Building configuration...
```

```
[OK]
```

6. Verifique en R1 y R5 que las rutas del sistema autónomo opuesto existen en su tabla de enrutamiento mediante el comando **show ip route**.

Según se requiere verificamos las rutas de R1 y R5 usando el comando **show ip route**.

R1

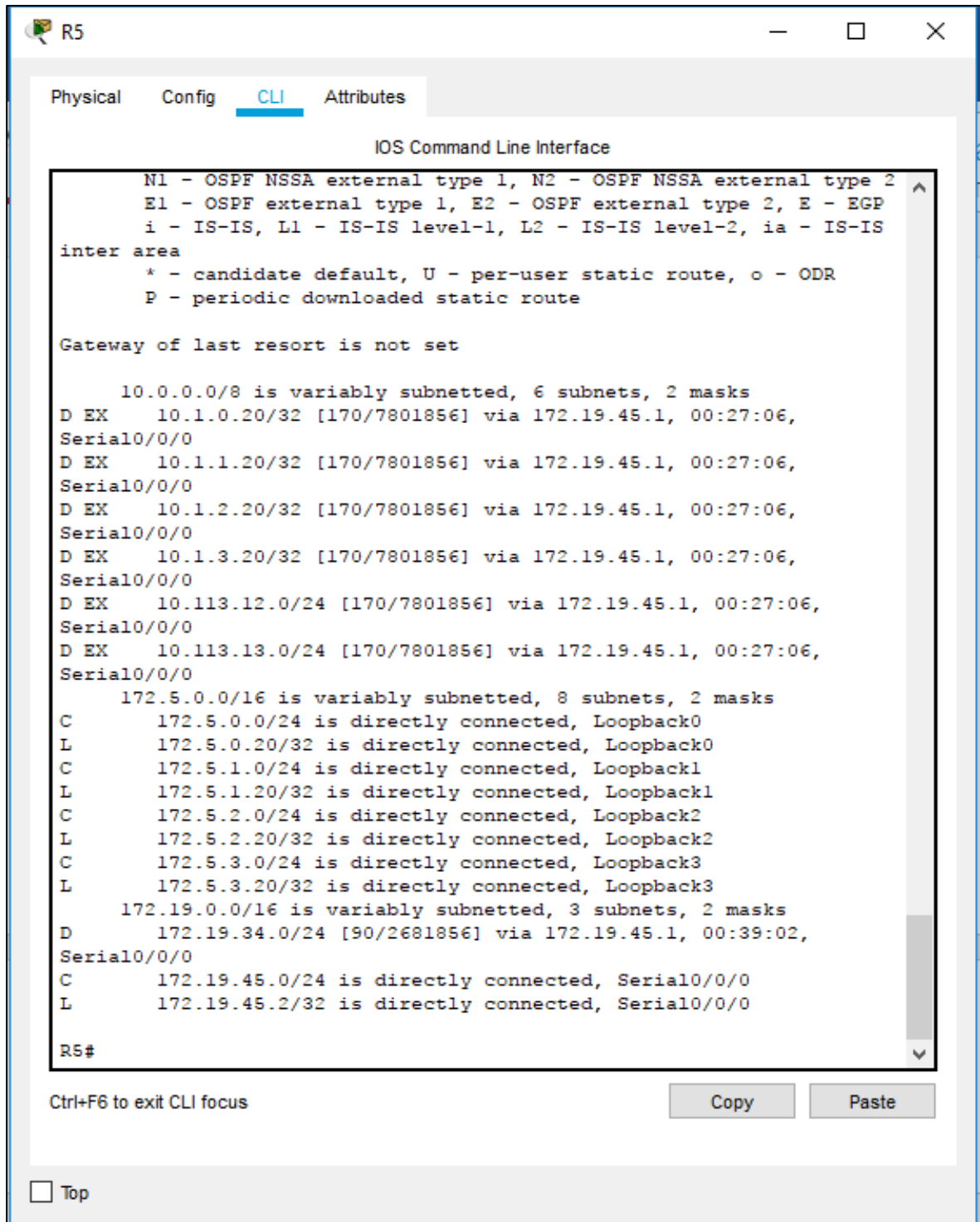


```
R1
Physical Config CLI Attributes
IOS Command Line Interface
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 11 subnets, 2 masks
C 10.1.0.0/24 is directly connected, Loopback0
C 10.1.0.20/32 is directly connected, Loopback0
C 10.1.1.0/24 is directly connected, Loopback1
L 10.1.1.20/32 is directly connected, Loopback1
C 10.1.2.0/24 is directly connected, Loopback2
L 10.1.2.20/32 is directly connected, Loopback2
C 10.1.3.0/24 is directly connected, Loopback3
L 10.1.3.20/32 is directly connected, Loopback3
C 10.113.12.0/24 is directly connected, Serial0/0/0
L 10.113.12.1/32 is directly connected, Serial0/0/0
O 10.113.13.0/24 [110/120] via 10.113.12.2, 00:42:27,
Serial0/0/0
O E2 172.5.0.0/24 is subnetted, 4 subnets
Serial0/0/0 172.5.0.0/24 [110/50000] via 10.113.12.2, 00:26:23,
Serial0/0/0
O E2 172.5.1.0/24 [110/50000] via 10.113.12.2, 00:26:23,
Serial0/0/0
O E2 172.5.2.0/24 [110/50000] via 10.113.12.2, 00:26:23,
Serial0/0/0
O E2 172.5.3.0/24 [110/50000] via 10.113.12.2, 00:26:23,
Serial0/0/0
O E2 172.19.0.0/24 is subnetted, 2 subnets
Serial0/0/0 172.19.34.0/24 [110/50000] via 10.113.12.2, 00:26:23,
Serial0/0/0
O E2 172.19.45.0/24 [110/50000] via 10.113.12.2, 00:26:23,
Serial0/0/0
R1# |
Ctrl+F6 to exit CLI focus Copy Paste
```

Figura 3. show ip route R1

R5



```
IOS Command Line Interface

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

  10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
D EX   10.1.0.20/32 [170/7801856] via 172.19.45.1, 00:27:06,
Serial0/0/0
D EX   10.1.1.20/32 [170/7801856] via 172.19.45.1, 00:27:06,
Serial0/0/0
D EX   10.1.2.20/32 [170/7801856] via 172.19.45.1, 00:27:06,
Serial0/0/0
D EX   10.1.3.20/32 [170/7801856] via 172.19.45.1, 00:27:06,
Serial0/0/0
D EX   10.113.12.0/24 [170/7801856] via 172.19.45.1, 00:27:06,
Serial0/0/0
D EX   10.113.13.0/24 [170/7801856] via 172.19.45.1, 00:27:06,
Serial0/0/0
  172.5.0.0/16 is variably subnetted, 8 subnets, 2 masks
C      172.5.0.0/24 is directly connected, Loopback0
L      172.5.0.20/32 is directly connected, Loopback0
C      172.5.1.0/24 is directly connected, Loopback1
L      172.5.1.20/32 is directly connected, Loopback1
C      172.5.2.0/24 is directly connected, Loopback2
L      172.5.2.20/32 is directly connected, Loopback2
C      172.5.3.0/24 is directly connected, Loopback3
L      172.5.3.20/32 is directly connected, Loopback3
  172.19.0.0/16 is variably subnetted, 3 subnets, 2 masks
D      172.19.34.0/24 [90/2681856] via 172.19.45.1, 00:39:02,
Serial0/0/0
C      172.19.45.0/24 is directly connected, Serial0/0/0
L      172.19.45.2/32 is directly connected, Serial0/0/0

R5#
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

Figura 4. show ip route R5

2. ESCENARIO 2

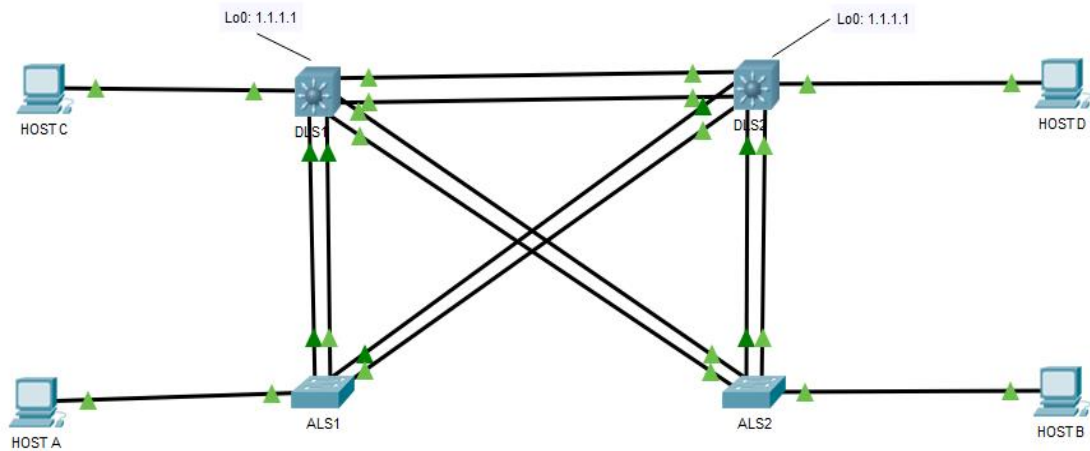


Figura 5. Topología 2

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

- a. Apagar todas las interfaces en cada switch.

Para la realización del primer punto de la práctica, se usa el comando “shutdown”, el cual apaga todas las interfaces en el rango establecido.

```
Switch>enable
Switch#configure terminal
Switch(config)#interface range fastEthernet 0/1-24
Switch(config-if-range)#shutdown
Switch(config-if-range)#exit
Switch(config)#interface range gigabitEthernet 0/1-2
Switch(config-if-range)#shutdown
Switch(config-if-range)#exit
Switch(config)#exit
```

- b. Asignar un nombre a cada switch acorde con el escenario establecido.

Se ingresa al modo de configuración global en cada switch y se establece cada nombre con el comando **“hostname”**.

```
Switch>enable
```

```
Switch#configure terminal
```

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

```
DLS1(config)#end
```

```
Switch>enable
```

```
Switch#configure terminal
```

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

```
DLS2(config)#end
```

```
Switch>enable
```

```
Switch#configure terminal
```

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

```
ALS2(config)#end
```

```
Switch>enable
```

```
Switch#configure terminal
```

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

```
ALS1(config)#end
```

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.

Se usa "EtherChannel" para la agrupación lógica de varios enlaces físicos Ethernet, para ser tratada como un único enlace. además, se utiliza "LACP" (Link Aggregation Control Protocol) en modo activo para que negocie con otros puertos y en capa 3 para tener similitud a un enrutador.

DSL1

```
DLS1>enable
```

```
DLS1#configure terminal
```

```
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 fastEthernet 0/11-12
```

```
DLS1(config-if-range)#no switchport
```

```
DLS1(config-if-range)#channel-group 12 mode active
```

```
DLS1(config-if-range)#no shutdown
```

```
DLS1(config-if-range)#exit
```

```
DLS1(config)#end
```

DSL2

```
DLS2>enable
```

```
DLS2#configure terminal
```

```
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 fastEthernet 0/11-12
```

```
DLS2(config-if-range)#no switchport
```

```
DLS2(config-if-range)#channel-group 12 mode active
```

```
DLS2(config-if-range)#no shutdown
```

```
DLS2(config-if-range)#exit
```

```
DLS2(config)#end
```

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

Se usa el comando “switchport trunk encapsulation dot1q”, de esa manera, la interfaz tendrá una encapsulación IEEE 801.1Q.

Por otro lado, con el comando “show interface fastEthernet 0/x-x switchport” se comprobó que los switches denominados DLS1 y DLS2 soportan la encapsulación do1tq, pero el resto de switches ALS1 y ALS2 no es posible debido a su versión.

DSL1

```
DLS1>enable
```

```
DLS1#configure terminal
```

```
DLS1(config)#interface range fastEthernet 0/7-8
```

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

DLS1(config)#exit

DLS2

DLS2>enable

DLS2#configure terminal

DLS2(config)#interface range fastEthernet 0/7-8

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(config-if-range)#exit

DLS2(config)#exit

ALS1

ALS1>enable

ALS1#configure terminal

ALS1(config)#interface range fastEthernet 0/7-8

ALS1(config-if-range)#switchport mode trunk

ALS1(config-if-range)#channel-group 1 mode active

ALS1(config-if-range)#no shutdown

ALS1(config-if-range)#exit

ALS1(config)#exit

ALS2

ALS2>enable

```
ALS2#configure terminal
```

```
ALS2(config)#interface range fastEthernet 0/7-8
```

```
ALS2(config-if-range)#switchport mode trunk
```

```
ALS2(config-if-range)#channel-group 2 mode active
```

```
ALS2(config-if-range)#no shutdown
```

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

```
ALS2(config)#exit
```

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

Se hace el mismo procedimiento anterior, pero con “PAgP” (Port Aggregation Protocol), el cual negocia cuales son los puertos que deben ponerse activos. Además, se establece en modo “desirable” para que negocie el estado cuando reciba el paquete “PAgP” e inicie negociaciones con otros puertos.

DSL1

```
DLS1>enable
```

```
DLS1#configure terminal
```

```
DLS1(config)#interface range fastEthernet 0/9-10
```

```
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)#no shutdown
```

```
DLS1(config-if-range)#exit
```

```
DLS1(config)#exit
```

DLS2

DLS2>enable

DLS2#configure terminal

DLS2(config)#interface range fastEthernet 0/9-10

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)#no shutdown

DLS2(config-if-range)#exit

DLS2(config)#exit

ALS1

ALS1>enable

ALS1#configure terminal

ALS1(config)#interface range fastEthernet 0/9-10

ALS1(config-if-range)#switchport mode trunk

ALS1(config-if-range)#channel-group 3 mode desirable

ALS1(config-if-range)#no shutdown

ALS1(config-if-range)#exit

ALS1(config)#exit

ALS2

```
ALS2>enable
```

```
ALS2#configure terminal
```

```
ALS2(config)#interface range fastEthernet 0/9-10
```

```
ALS2(config-if-range)#switchport mode trunk
```

```
ALS2(config-if-range)#channel-group 4 mode desirable
```

```
ALS2(config-if-range)#no shutdown
```

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

```
ALS2(config)#exit
```

- 4) puertos troncales serán asignados a la VLAN 500 como la VLAN nativa.

Se define una VLAN nativa que está asignada a un puerto troncal 802.1Q, el cual admite el tráfico que llega de muchas VLAN (tráfico etiquetado) como también el tráfico que no llega de una VLAN (tráfico no etiquetado). El puerto de enlace troncal 802.1Q coloca el tráfico no etiquetado en la VLAN nativa. En la práctica, la VLAN nativa sera la VLAN 500. También, se usa la interfaz etherchannel de canal del puerto creadas anteriormente.

DLS1

```
DLS1>enable
```

```
DLS1#configure terminal
```

```
DLS1(config)#interface Po1
```

```
DLS1(config-if)#switchport trunk native vlan 500
```

```
DLS1(config-if)#exit
```

```
DLS1(config)#interface Po4
DLS1(config-if)#switchport trunk native vlan 500
DLS1(config-if)#exit
DLS1(config)#exit
```

DLS2 DLS2>enable

```
DLS2#configure terminal
DLS2(config)#interface Po2
DLS2(config-if)#switchport trunk native vlan 500
DLS2(config-if)#exit
DLS2(config)#interface Po3
DLS2(config-if)#switchport trunk native vlan 500
DLS2(config-if)#exit
DLS2(config)#exit
```

ALS1

```
ALS1>enable
ALS1#configure terminal
ALS1(config)#interface Po1
ALS1(config-if)#switchport trunk native vlan 500
ALS1(config-if)#exit
ALS1(config)#interface Po3
ALS1(config-if)#switchport trunk native vlan 500
ALS1(config-if)#exit
```

```
ALS1(config)#exit
```

ALS2

```
ALS2>enable
```

```
ALS2#configure terminal
```

```
ALS2(config)#interface Po2
```

```
ALS2(config-if)#switchport trunk native vlan 500
```

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

```
ALS2(config)#interface Po4
```

```
ALS2(config-if)#switchport trunk native vlan 500
```

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

```
ALS2(config)#exit
```

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

- 1) Utilizar el nombre de dominio CISCO con la contraseña ccnp321
- 2) Configurar DLS1 como servidor principal para las VLAN.
- 3) Configurar ALS1 y ALS2 como clientes VTP.

Se define el protocolo "VTP" (VLAN Trunking Protocol) en la versión 2, ya que la versión de Packet tracer no soporta la versión 3.

El protocolo "VTP", se usa para la configuración de las diferentes VLAN dentro de un dominio VTP en un rango de 1 a 1005 para la versión 2.

El switch DLS1 al ser configurado en modo servidor, tendrá la capacidad de crear, modificar y suprimir VLAN que afectan a todo el dominio VTP. Por otro lado, los switches ALS1 y ALS2 serán configurados en modo cliente, los cuales no pueden crear, cambiar ni suprimir VLAN

DLS1

DLS1>enable

DLS1#configure terminal

DLS1(config)#vtp domain CISCO

Changing VTP domain name from NULL to CISCO

DLS1(config)#vtp password ccnp321

Setting device VLAN database password to ccnp321

DLS1(config)#vtp version 2

DLS1(config)#vtp mode server

Device mode already VTP SERVER.

DLS1(config)#exit

ALS1

ALS1>enable

ALS1#configure terminal

ALS1(config)#vtp domain CISCO

Domain name already set to CISCO.

ALS1(config)#vtp password ccnp321

Setting device VLAN database password to ccnp321

ALS1(config)#vtp version 2

ALS1(config)#vtp mode client

Setting device to VTP CLIENT mode.

ALS1(config)#exit

ALS2

ALS2>enable

ALS2#configure terminal

ALS2(config)#vtp domain CISCO

Domain name already set to CISCO.

ALS2(config)#vtp password ccnp321

Setting device VLAN database password to ccnp321

ALS2(config)#vtp version 2

ALS2(config)#vtp mode client

Setting device to VTP CLIENT mode.

ALS2(config)#exit

e. Configurar en el servidor principal las siguientes VLAN:

Número de VLAN	Nombre de VLAN	Número de VLAN	Nombre de VLAN
500	NATIVA	434	PROVEEDORES
12	ADMON	123	SEGUROS
234	CLIENTES	1010	VENTAS
1111	MULTIMEDIA	3456	PERSONAL

Anotación: Para la buena realización de la práctica, no se tiene en cuenta el último dígito de las VLAN, ya que no es soportado por la versión 2 "VTP".

DLS1>enable

DLS1#configure terminal

```
DLS1(config)#vlan 500
DLS1(config-vlan)#name NATIVA
DLS1(config-vlan)#vlan 12
DLS1(config-vlan)#name ADMON
DLS1(config-vlan)#vlan 234
DLS1(config-vlan)#name CLIENTES
DLS1(config)#vlan 111
DLS1(config-vlan)#name MULTIMEDIA
DLS1(config-vlan)#vlan 434
DLS1(config-vlan)#name PROVEDORES
DLS1(config-vlan)#vlan 123
DLS1(config-vlan)#name SEGUROS
DLS1(config)#vlan 101
DLS1(config-vlan)#name VENTAS
DLS1(config)#vlan 345
DLS1(config-vlan)#name PERSONAL
DLS1(config-vlan)#exit
DLS1(config)#exit
```

f. En DLS1, suspender la VLAN 434.

Por medio del comando "state suspend", se procede a suspender las VLAN, pero para la versión con la cual se realiza la práctica no es soportado el comando.

```
DLS1>enable
```

```
DLS1#configure terminal
```

```
DLS1(config)#vlan 434
```

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

```
% Invalid input detected at '^' marker.
```

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

El Switch DLS2, será configurado en modo transparente, por lo cual, no crea avisos VTP ni sincroniza su configuración de VLAN, con la información recibida desde otro switch del dominio de administración.

```
DLS2>enable
```

```
DLS2#configure terminal
```

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

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

```
DLS2(config)#exit
```

```
DLS2(config)#vlan 500
```

```
DLS2(config-vlan)#name NATIVA
```

```
DLS2(config-vlan)#vlan 12
```

```
DLS2(config-vlan)#name ADMON
```

```
DLS2(config-vlan)#vlan 234
```

```
DLS2(config-vlan)#name CLIENTES
```

```
DLS2(config-vlan)#vlan 111
```

```
DLS2(config-vlan)#name MULTIMEDIA
DLS2(config-vlan)#vlan 434
DLS2(config-vlan)#name PROVEDORES
DLS2(config-vlan)#vlan 123
DLS2(config-vlan)#name SEGUROS
DLS2(config-vlan)#vlan 101
DLS2(config-vlan)#name VENTAS
DLS2(config-vlan)#vlan 345
DLS2(config-vlan)#name PERSONAL
DLS2(config-vlan)#exit
DLS2(config)#exit
```

h. Suspender VLAN 434 en DLS2.

Por medio del comando “state suspend”, se procede a suspender las VLAN, pero para la versión con la cual se realiza la práctica no es soportado el comando.

```
DLS2>enable
```

```
DLS2#configure terminal
```

```
DLS2(config)#vlan 434
```

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

```
% Invalid input detected at '^' marker.
```

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

Se usa el comando “switchport allowed vlan except”, el cual especifica todas las VLAN que se agreguen a la lista actual, pero excepto la VLAN especificada, en este caso será la 567.

```
DLS2>enable
```

```
DLS2#configure terminal
```

```
DLS2(config)#vlan 567
```

```
DLS2(config-vlan)#name PRODUCCION
```

```
DLS2(config-vlan)#exit
```

```
DLS2(config)#interface port-channel 2
```

```
DLS2(config-if)#switchport trunk allowed vlan except 567
```

```
DLS2(config-if)#exit
```

```
DLS2(config)#interface port-channel 3
```

```
DLS2(config-if)#switchport trunk allowed vlan except 567
```

```
DLS2(config-if)#exit
```

```
DLS2(config)#exit
```

- j. Configurar DLS1 como Spanning tree root para las VLAN 1, 12, 434, 500, 1010, 1111 y 3456 y como raíz secundaria para las VLAN 123 y 234.

Se usa el protocolo “STP” (Spanning Tree Protocol), para gestionar la presencia de bucles en topologías de red debido a la existencia de enlaces redundantes. El protocolo permite a los dispositivos de interconexión activar o desactivar automáticamente los enlaces de conexión, de forma que se garantice la eliminación de bucles.

```
DLS1>enable
```

```
DLS1#configure terminal
```

```
DLS1(config)#spanning-tree vlan 1,12,434,500,101,111,345 root primary
```

```
DLS1(config)#spanning-tree vlan 123,234 root secondary
```

```
DLS1(config)#exit
```

- k. Configurar DLS2 como Spanning tree root para las VLAN 123 y 234 y como una raíz secundaria para las VLAN 12, 434, 500, 1010, 1111 y 3456.
Se hace el mismo proceso anterior, pero en forma inversa para que sean compatibles los comandos entre los dos switches.

```
DLS2>enable
```

```
DLS2#configure terminal
```

```
DLS2(config)#spanning-tree vlan 123,234 root primary
```

```
DLS2(config)#spanning-tree vlan 12,434,500,101,111,345 root secondary
```

```
DLS2(config)#exit
```

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

En esta parte de la práctica, se debe tener en cuenta que la VLAN 567 no se permite para los otros switches según requerimientos de la práctica.

DLS1

```
DLS1>enable
```

```
DLS1#configure terminal
```

```
DLS1(config)#interface port-channel 1
```

```
DLS1(config-if)#switchport trunk native vlan 500
```

```
DLS1(config-if)#switchport trunk encapsulation dot1q
```

```
DLS1(config-if)#switchport mode trunk
```

```
DLS1(config-if)#exit
DLS1(config)#interface port-channel 4
DLS1(config-if)#switchport trunk native vlan 500
DLS1(config-if)#switchport trunk encapsulation dot1q
DLS1(config-if)#switchport mode trunk
DLS1(config-if)#exit
DLS1(config)#interface port-channel 2
DLS1(config-if)#no switchport
DLS1(config-if)#exit
DLS1(config)#interface range fastEthernet 0/7-10
DLS1(config-if-range)#switchport trunk native vlan 500
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)#exit
DLS1(config)#exit
```

DLS2

```
DLS2>enable
DLS2#configure terminal
DLS2(config)#interface range fastEthernet 0/7-10
DLS2(config-if-range)#switchport trunk native vlan 500
DLS2(config-if-range)#switchport trunk allowed vlan 1-566-1005
```



```
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)#exit
```

```
DLS2(config)#exit
```

ALS1

```
ALS1>enable
```

```
ALS1#configure terminal
```

```
ALS1(config)#interface range fastEthernet 0/7-10
```

```
ALS1(config-if-range)#switchport trunk native vlan 500
```

```
ALS1(config-if-range)#switchport mode trunk
```

```
ALS1(config-if-range)#exit
```

```
ALS1(config)#exit
```

ALS2

```
ALS2>enable
```

```
ALS2#configure terminal
```

```
ALS2(config)#interface port-channel 2
```

```
ALS2(config-if)#switchport trunk native vlan 500
```

```
ALS2(config-if)#switchport mode trunk
```

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

```
ALS2(config)#interface port-channel 4
```

```
ALS2(config-if)#switchport trunk native vlan 500
```

```

ALS2(config-if)#switchport mode trunk
ALS2(config-if)#exit
ALS2(config)#interface range fastEthernet 0/7-8
ALS2(config-if-range)#switchport trunk native vlan 500
ALS2(config-if-range)#switchport mode trunk
ALS2(config-if-range)#channel-group 2 mode active
ALS2(config-if-range)#exit
ALS2(config)#interface range fastEthernet 0/9-10
ALS2(config-if-range)#switchport trunk native vlan 500
ALS2(config-if-range)#switchport mode trunk
ALS2(config-if-range)#channel-group 4 mode desirable
ALS2(config-if-range)#exit
ALS2(config)#exit

```

- 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		

DLS1

```
DLS1>enable
DLS1#configure terminal
DLS1(config)#interface fastEthernet 0/6
DLS1(config-if)#switchport mode access
DLS1(config-if)#switchport access vlan 345
DLS1(config-if)#no shutdown
DLS1(config-if)#exit
DLS1(config)#interface fastEthernet 0/15
DLS1(config-if)#switchport mode access
DLS1(config-if)#switchport access vlan 111
DLS1(config-if)#exit
DLS1(config)#exit
```

DLS2

```
DLS2>enable
DLS2#configure terminal
DLS2(config)#interface fastEthernet 0/6
DLS2(config-if)#switchport mode access
DLS2(config-if)#switchport access vlan 12
DLS2(config-if)#switchport access vlan 101
DLS2(config-if)#no shutdown
DLS2(config-if)#exit
```

```
DLS2(config)#interface fastEthernet 0/15
DLS2(config-if)#switchport mode access
DLS2(config-if)#switchport access vlan 111
DLS2(config-if)#exit
DLS2(config)#interface range fastEthernet 0/16-18
DLS2(config-if)#switchport mode access
DLS2(config-if)#switchport access vlan 567
DLS2(config)#exit
```

ALS1

```
ALS1>enable
ALS1#configure terminal
ALS1(config)#interface fastEthernet 0/6
ALS1(config-if)#switchport mode access
ALS1(config-if)#switchport access vlan 123
ALS1(config-if)#switchport access vlan 101
ALS1(config-if)#no shutdown
ALS1(config-if)#exit
ALS1(config)#interface fastEthernet 0/15
ALS1(config-if)#switchport mode access
ALS1(config-if)#switchport access vlan 111
ALS1(config-if)#exit
ALS1(config)#exit
```

ALS2

ALS2>enable

ALS2#configure terminal

ALS2(config)#interface fastEthernet 0/6

ALS2(config-if)#switchport mode access

ALS2(config-if)#switchport access vlan 234

ALS2(config-if)#no shutdown

ALS2(config-if)#exit

ALS2(config)#interface fastEthernet 0/15

ALS2(config-if)#switchport mode access

ALS2(config-if)#switchport access vlan 111

ALS2(config-if)#exit

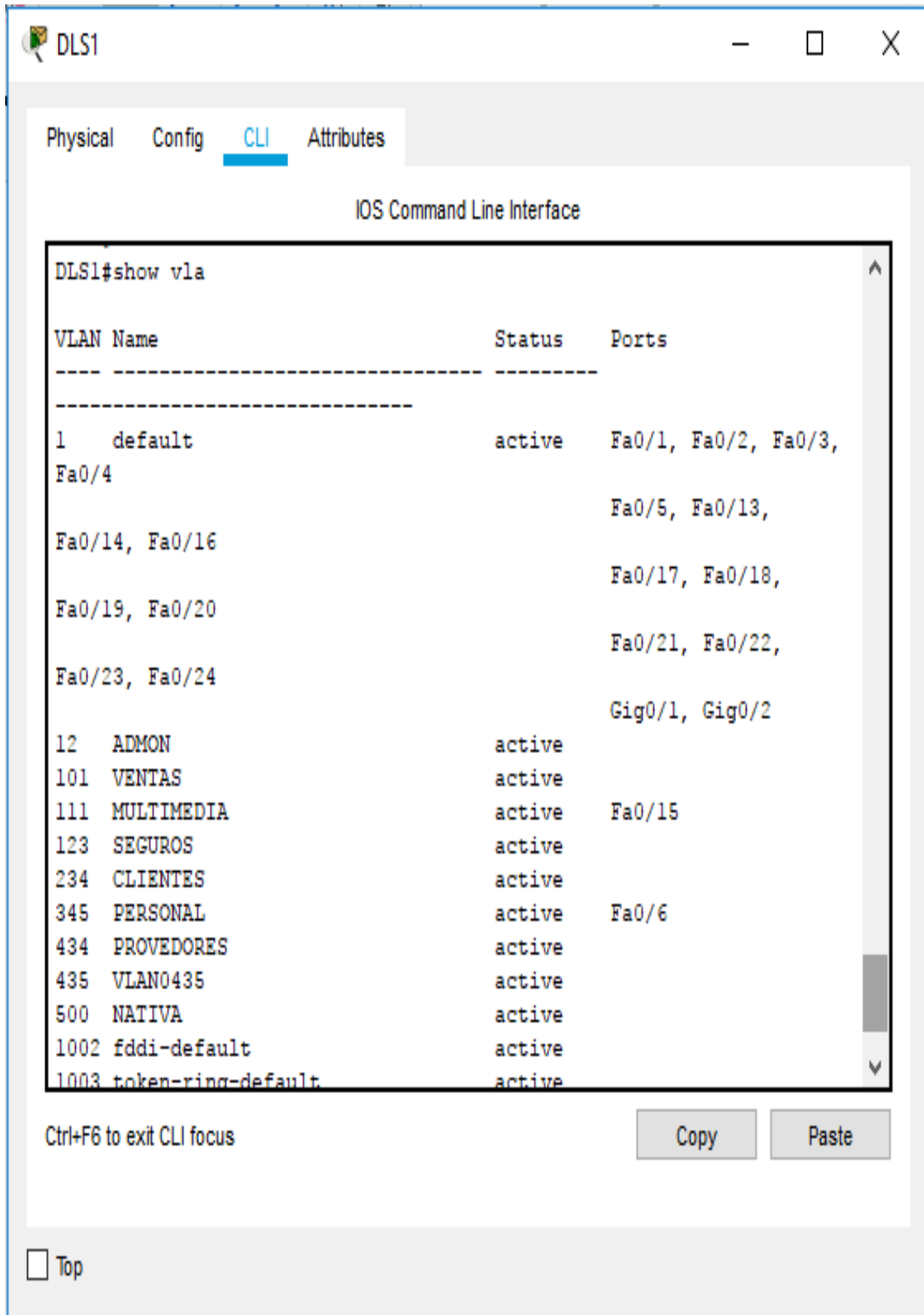
ALS2(config)#exit

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.

Verificación VLAN OK

DLS1



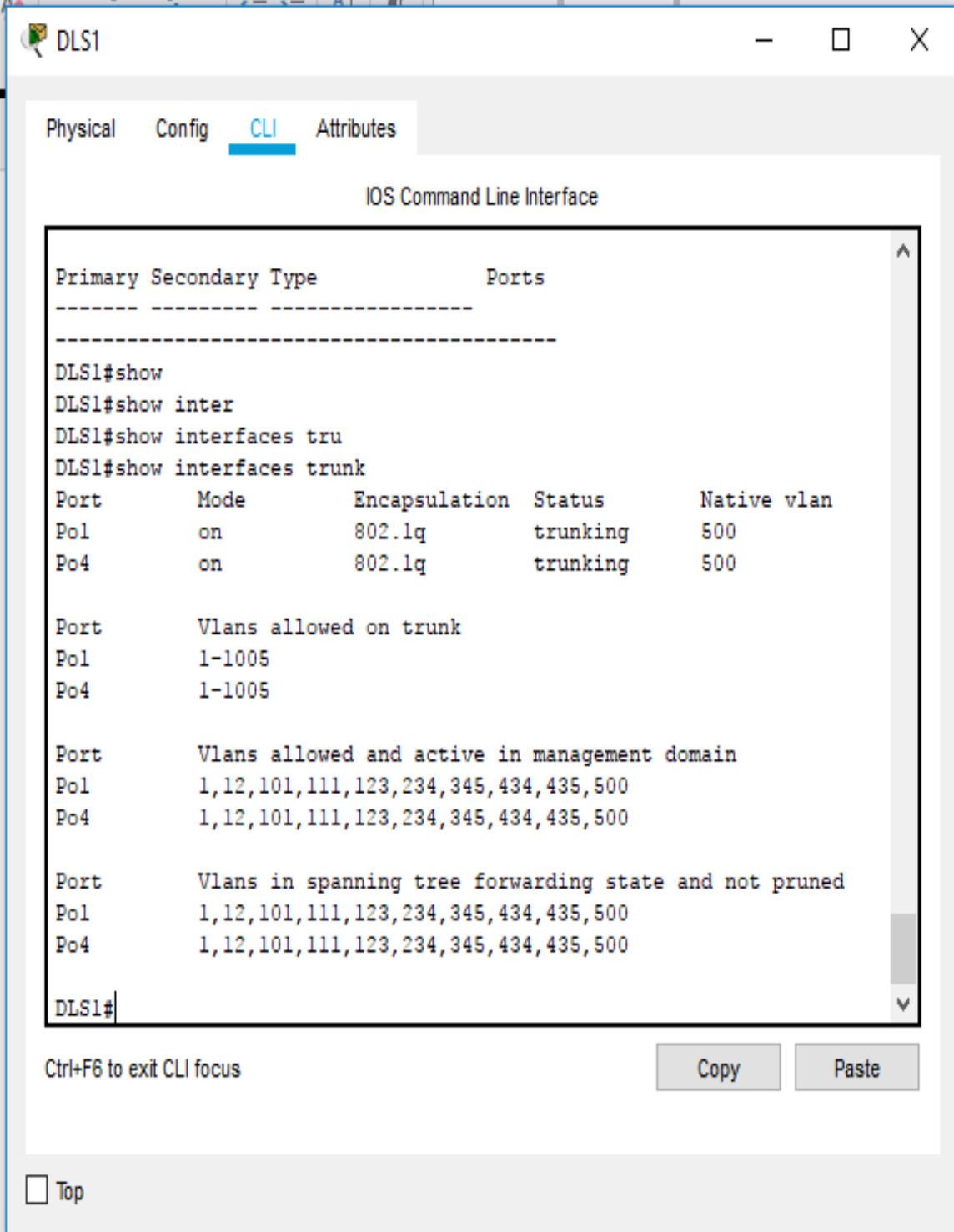
The screenshot shows a window titled 'DLS1' with a tabbed interface. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The command 'DLS1#show vla' has been entered, resulting in the following output:

VLAN Name	Status	Ports
1 default	active	Fa0/1, Fa0/2, Fa0/3, Fa0/4, Fa0/5, Fa0/13, Fa0/14, Fa0/16, Fa0/17, Fa0/18, Fa0/19, Fa0/20, Fa0/21, Fa0/22, Fa0/23, Fa0/24, Gig0/1, Gig0/2
12 ADMON	active	
101 VENTAS	active	
111 MULTIMEDIA	active	Fa0/15
123 SEGUROS	active	
234 CLIENTES	active	
345 PERSONAL	active	Fa0/6
434 PROVEDORES	active	
435 VLAN0435	active	
500 NATIVA	active	
1002 fddi-default	active	
1003 token-ring-default	active	

Below the output, there is a prompt 'Ctrl+F6 to exit CLI focus' and two buttons: 'Copy' and 'Paste'. At the bottom left, there is a 'Top' button.

Figura 6. Show vlan DLS1

DLS1



The screenshot shows a network device window titled "DLS1" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The terminal output shows the following commands and their results:

```
DLS1#show
DLS1#show inter
DLS1#show interfaces tru
DLS1#show interfaces trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Po1	on	802.1q	trunking	500
Po4	on	802.1q	trunking	500

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

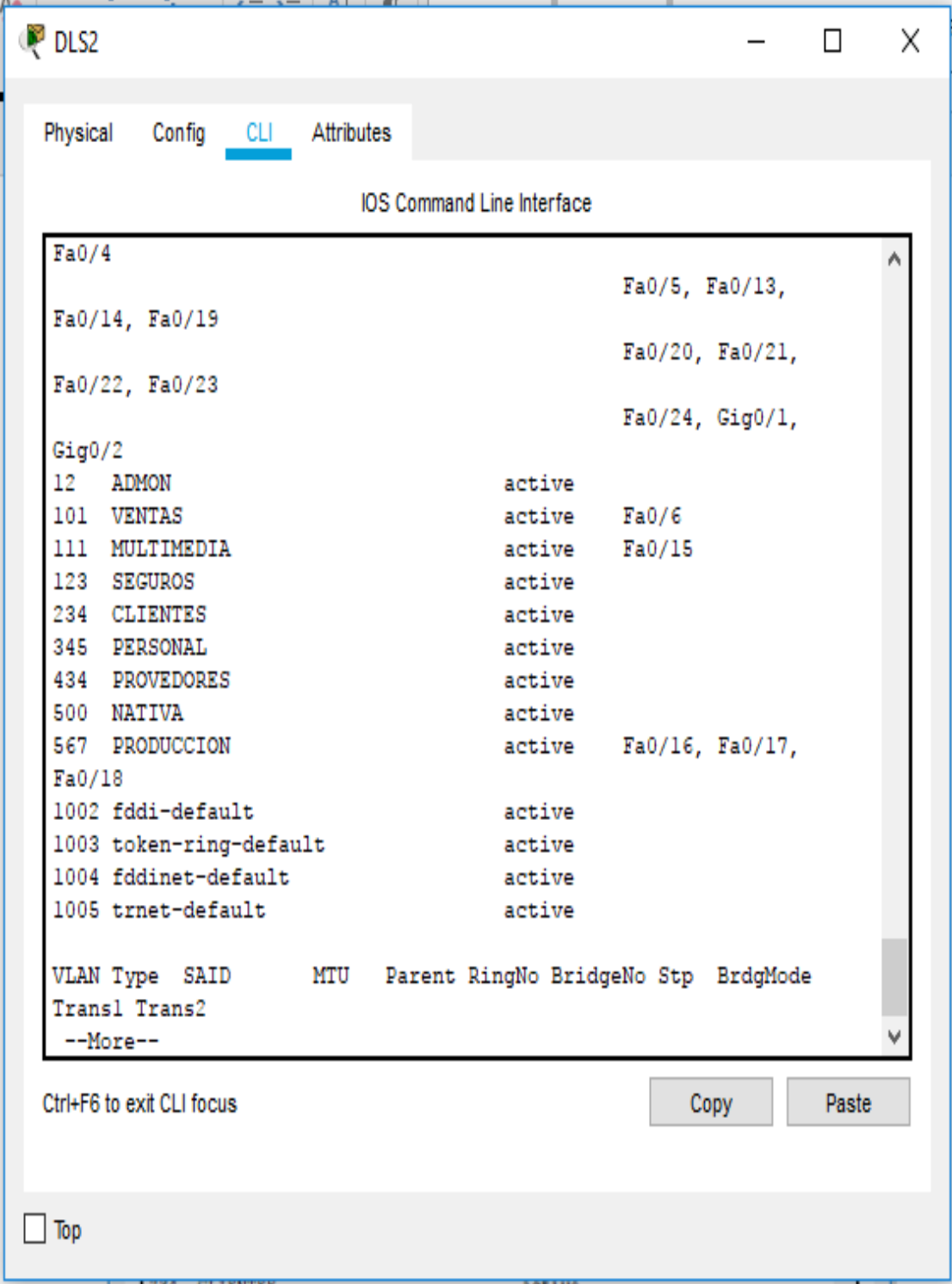
Port	Vlans allowed and active in management domain
Po1	1, 12, 101, 111, 123, 234, 345, 434, 435, 500
Po4	1, 12, 101, 111, 123, 234, 345, 434, 435, 500

Port	Vlans in spanning tree forwarding state and not pruned
Po1	1, 12, 101, 111, 123, 234, 345, 434, 435, 500
Po4	1, 12, 101, 111, 123, 234, 345, 434, 435, 500

The terminal ends with "DLS1#" and a cursor. Below the terminal window, there is a "Ctrl+F6 to exit CLI focus" message and "Copy" and "Paste" buttons. At the bottom left, there is a "Top" button.

Figure 7. Show interface trunk DLS1

DLS2



Physical Config **CLI** Attributes

IOS Command Line Interface

```
Fa0/4
Fa0/14, Fa0/19
Fa0/22, Fa0/23
Gig0/2
12  ADMON          active
101 VENTAS          active Fa0/6
111 MULTIMEDIA    active Fa0/15
123 SEGUROS       active
234 CLIENTES      active
345 PERSONAL      active
434 PROVEDORES    active
500 NATIVA        active
567 PRODUCCION    active Fa0/16, Fa0/17,
Fa0/18
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--
```

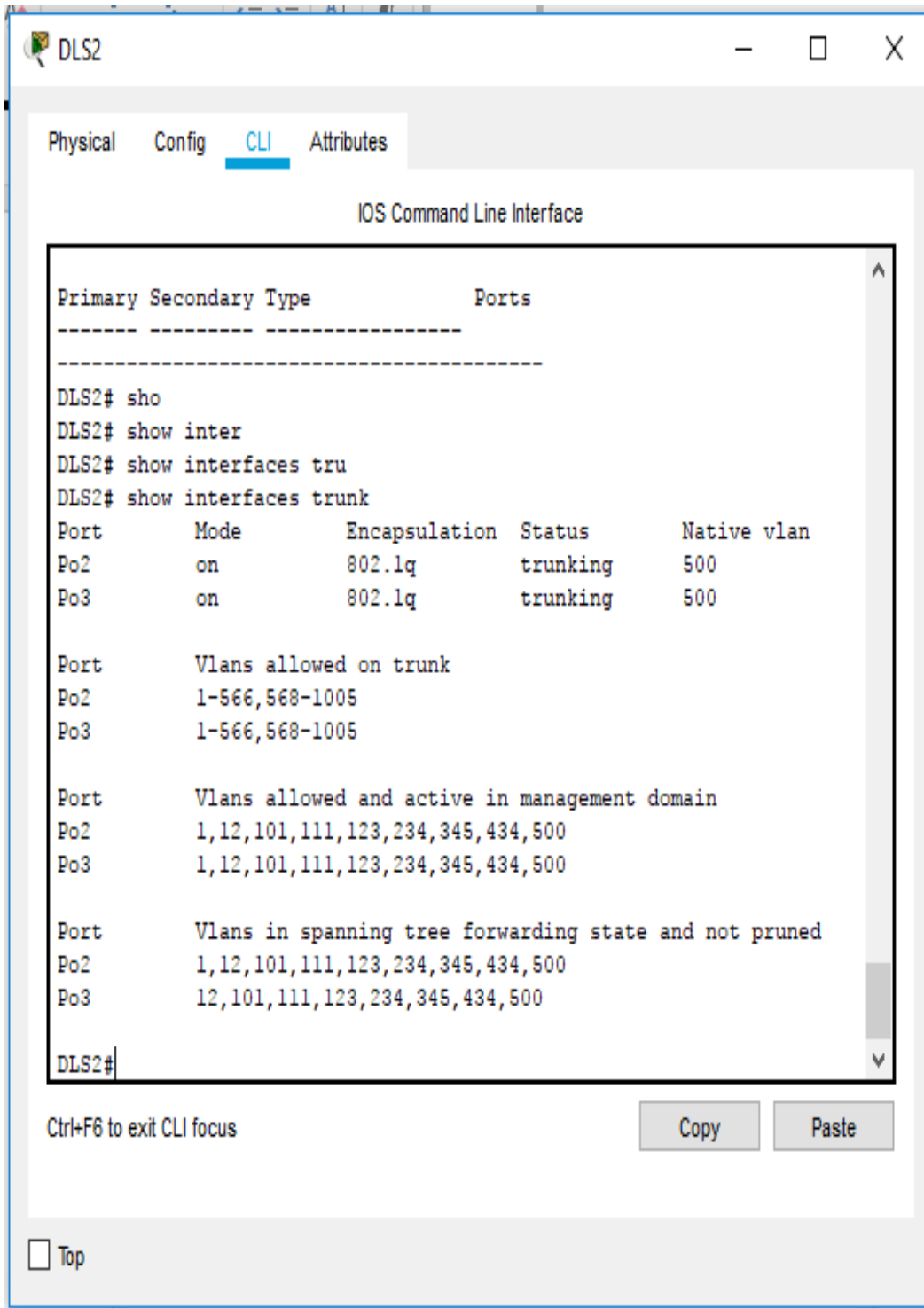
Ctrl+F6 to exit CLI focus

Copy Paste

Top

Figura 8. Show vlan DLS2

DLS2



The screenshot shows a network device window titled "DLS2" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The terminal output shows the following commands and their results:

```
DLS2# sho
DLS2# show inter
DLS2# show interfaces tru
DLS2# show interfaces trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Po2	on	802.1q	trunking	500
Po3	on	802.1q	trunking	500

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

Port	Vlans allowed and active in management domain
Po2	1,12,101,111,123,234,345,434,500
Po3	1,12,101,111,123,234,345,434,500

Port	Vlans in spanning tree forwarding state and not pruned
Po2	1,12,101,111,123,234,345,434,500
Po3	12,101,111,123,234,345,434,500

The terminal ends with "DLS2#" and a cursor. Below the terminal window, there is a "Ctrl+F6 to exit CLI focus" message and "Copy" and "Paste" buttons. At the bottom left, there is a "Top" button.

Figura 9. Show interface trunk DLS2

ALS1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
1 default active Fa0/1, Fa0/2, Fa0/3, Fa0/4, Fa0/5, Fa0/11, Fa0/12, Fa0/13, Fa0/14, Fa0/16, Fa0/17, Fa0/18, Fa0/19, Fa0/20, Fa0/21, Fa0/22, Fa0/23, Fa0/24, Gig0/1, Gig0/2
12 ADMON active
101 VENTAS active Fa0/6
111 MULTIMEDIA active Fa0/15
123 SEGUROS active
234 CLIENTES active
345 PERSONAL active
434 PROVEDORES active
435 VLAN0435 active
500 NATIVA active
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
--More--
```

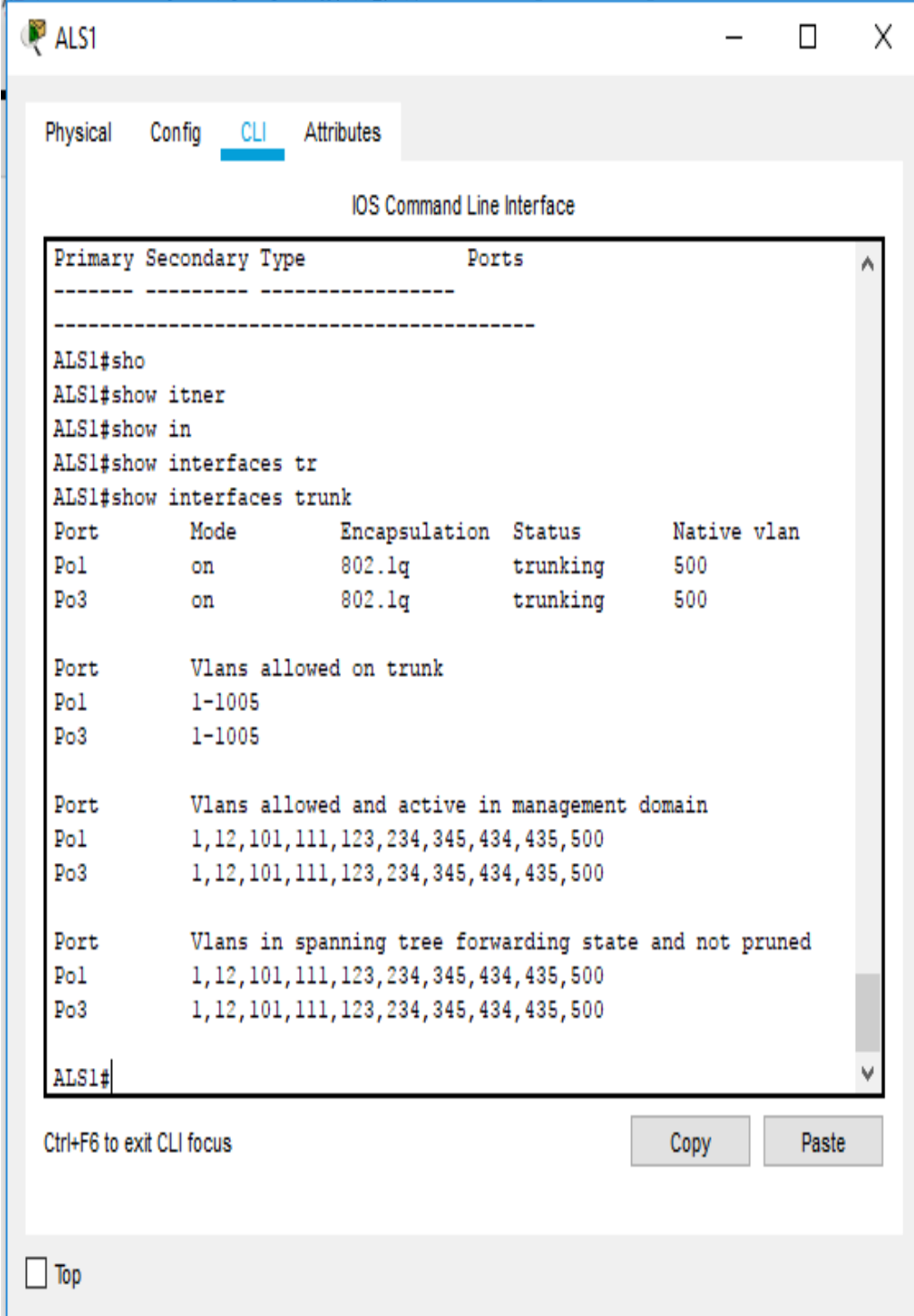
Ctrl+F6 to exit CLI focus

Copy Paste

Top

Figura 10. Show vlan ALS1

ALS1



The screenshot shows a web-based interface for the ALS1 device. The 'CLI' tab is selected, displaying the 'IOS Command Line Interface'. The output of the 'show interfaces trunk' command is shown, including a table of trunk ports and their configurations.

```
ALS1#sho
ALS1#show itner
ALS1#show in
ALS1#show interfaces tr
ALS1#show interfaces trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Po1	on	802.1q	trunking	500
Po3	on	802.1q	trunking	500

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

Port	Vlans allowed and active in management domain
Po1	1,12,101,111,123,234,345,434,435,500
Po3	1,12,101,111,123,234,345,434,435,500

Port	Vlans in spanning tree forwarding state and not pruned
Po1	1,12,101,111,123,234,345,434,435,500
Po3	1,12,101,111,123,234,345,434,435,500

ALS1#

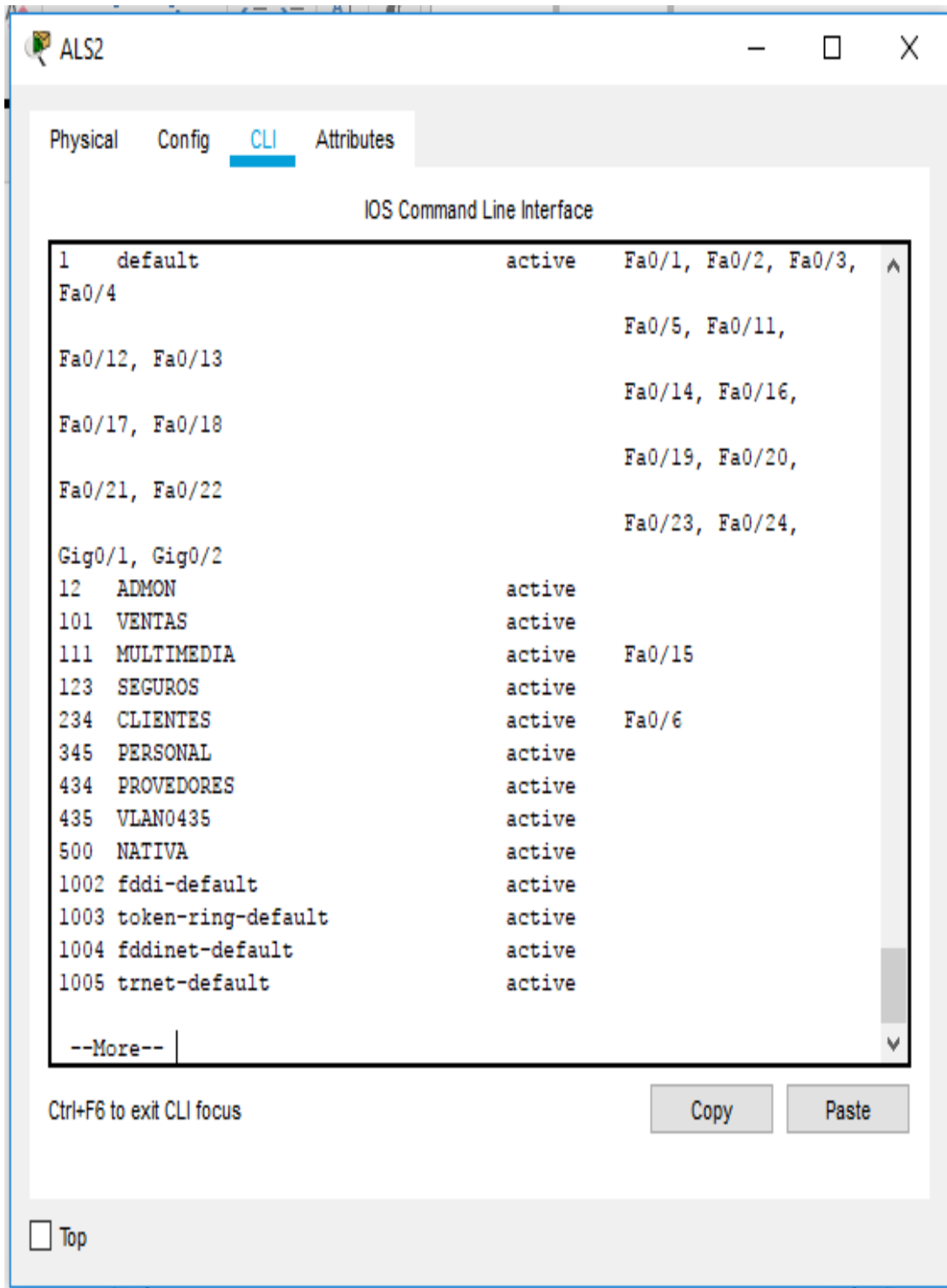
Ctrl+F6 to exit CLI focus

Copy Paste

Top

Figura 11. Show interface trunk ALS1

ALS2



The screenshot shows a window titled 'ALS2' with a tabbed interface. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The output of a 'show vlan' command is shown in a scrollable text area. The output lists various VLANs and their associated interfaces. At the bottom of the window, there are 'Copy' and 'Paste' buttons, and a 'Top' button.

```
1    default          active  Fa0/1, Fa0/2, Fa0/3,
Fa0/4
                                Fa0/5, Fa0/11,
Fa0/12, Fa0/13
                                Fa0/14, Fa0/16,
Fa0/17, Fa0/18
                                Fa0/19, Fa0/20,
Fa0/21, Fa0/22
                                Fa0/23, Fa0/24,
Gig0/1, Gig0/2
12   ADMON           active
101  VENTAS          active
111  MULTIMEDIA     active  Fa0/15
123  SEGUROS        active
234  CLIENTES       active  Fa0/6
345  PERSONAL       active
434  PROVEDORES     active
435  VLAN0435       active
500  NATIVA         active
1002 fddi-default    active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default  active

--More--
```

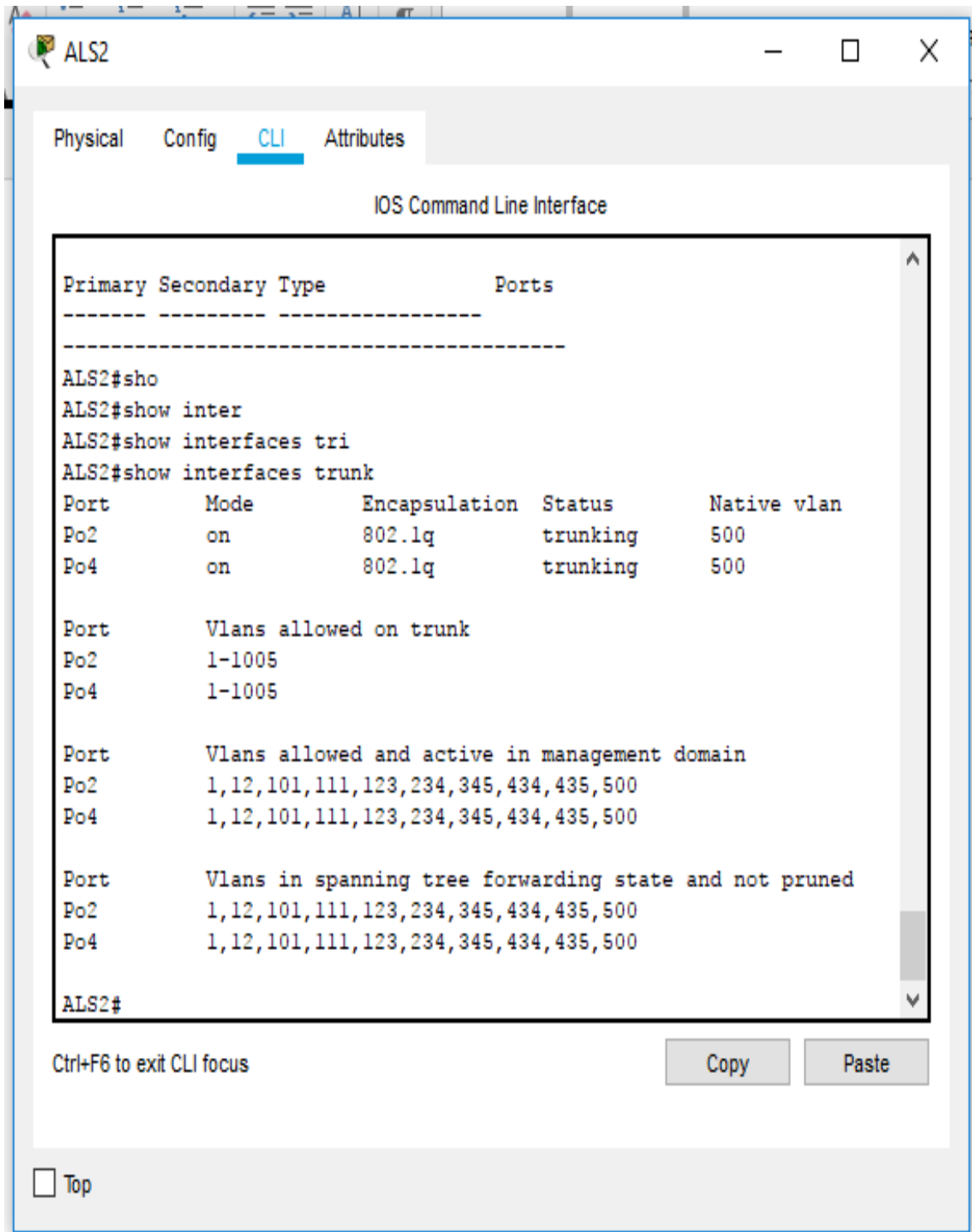
Ctrl+F6 to exit CLI focus

Copy Paste

Top

Figura 12. Show vlan ALS2

ALS2



The screenshot shows a window titled 'ALS2' with tabs for 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The interface shows the output of several commands: 'show', 'show inter', 'show interfaces tri', and 'show interfaces trunk'. The output includes a table of trunk configurations for Po2 and Po4, showing mode, encapsulation, status, and native VLAN. It also lists the VLANs allowed on the trunk, the VLANs allowed and active in the management domain, and the VLANs in the spanning tree forwarding state and not pruned.

```
ALS2#sho
ALS2#show inter
ALS2#show interfaces tri
ALS2#show interfaces trunk
Port      Mode      Encapsulation  Status      Native vlan
Po2       on        802.1q         trunking    500
Po4       on        802.1q         trunking    500

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, 435, 500
Po4       1, 12, 101, 111, 123, 234, 345, 434, 435, 500

Port      Vlans in spanning tree forwarding state and not pruned
Po2       1, 12, 101, 111, 123, 234, 345, 434, 435, 500
Po4       1, 12, 101, 111, 123, 234, 345, 434, 435, 500

ALS2#
```

Ctrl+F6 to exit CLI focus

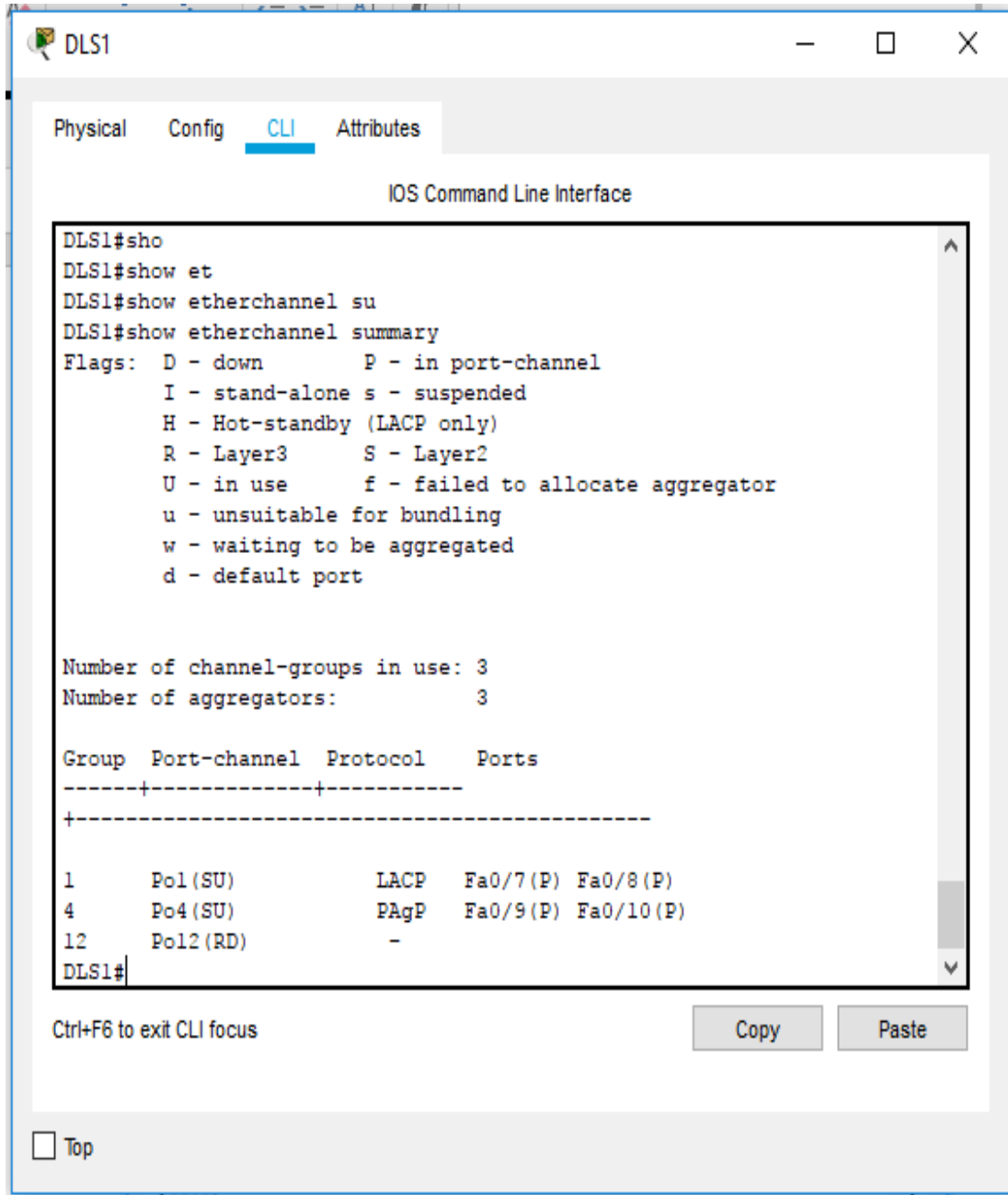
Copy Paste

Top

Figura 13. Show interface trunk ALS2

- b. Verificar que el EtherChannel entre DLS1 y ALS1 está configurado correctamente
- Por medio del uso del comando **etherchannel summary** verificamos el EtherChannel **OK** de DLS1 y ALS1.

DLS1



```
DLS1#sho
DLS1#show et
DLS1#show etherchannel su
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(RD)          -
DLS1#
```

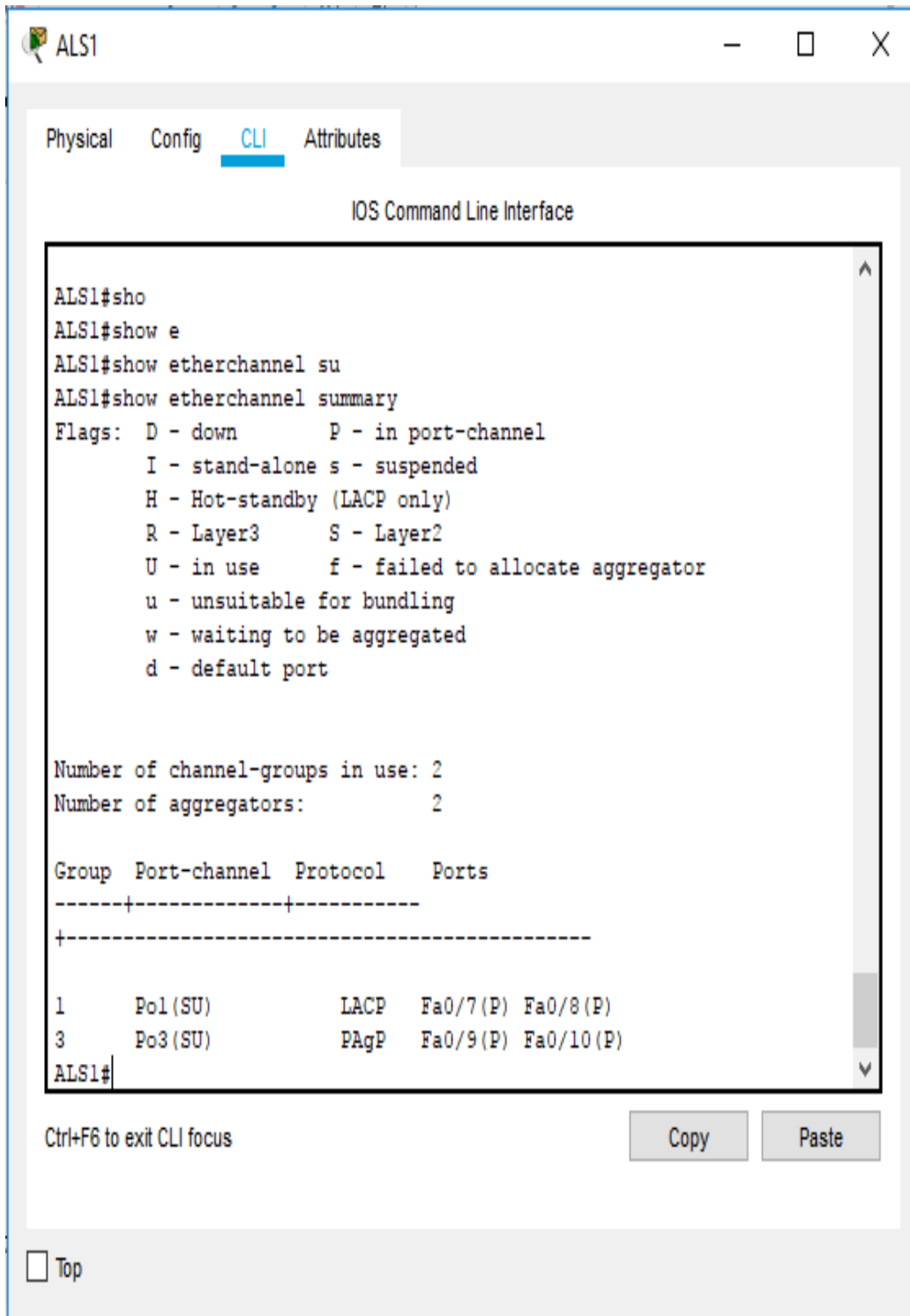
Ctrl+F6 to exit CLI focus

Copy Paste

Top

Figura 14. show etherchannel summary DLS1

ALS1



The screenshot shows a terminal window titled 'ALS1' with tabs for 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The user has entered the command 'show etherchannel summary', and the output is as follows:

```
ALS1#sho
ALS1#show e
ALS1#show etherchannel su
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#
```

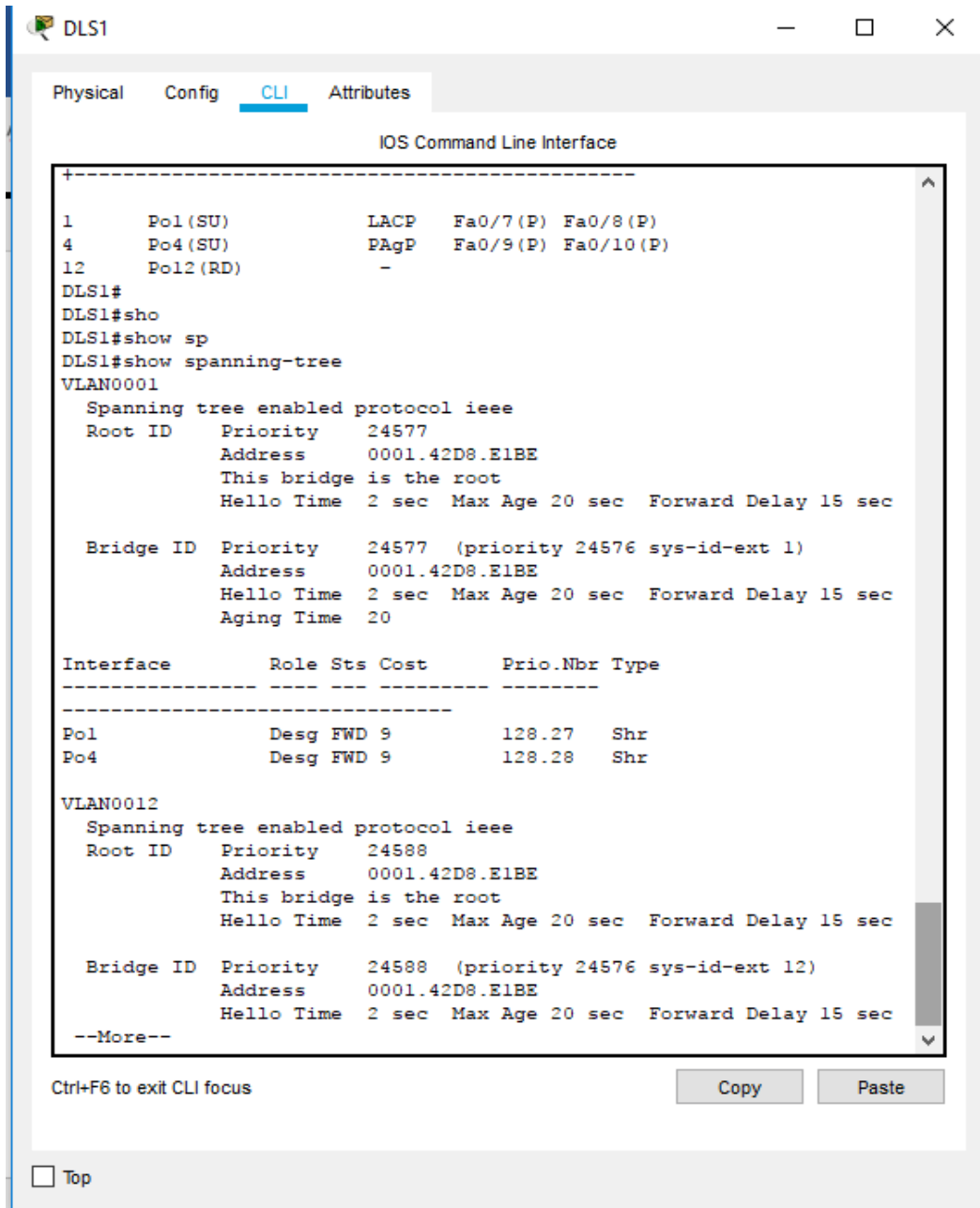
At the bottom of the terminal window, there is a prompt 'Ctrl+F6 to exit CLI focus' and two buttons: 'Copy' and 'Paste'. A 'Top' button is also visible at the bottom left of the window frame.

Figure 15. show etherchannel summary ALS1

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

Verificación OK **show spanning tree** entre DLS1 o DLS2

DLS1



The screenshot shows the CLI interface of a switch named DLS1. The 'CLI' tab is active. The output of the 'show spanning-tree' command is displayed, showing details for VLAN0001 and VLAN0012. Both VLANs are using IEEE Spanning Tree Protocol with a root bridge ID of 24577 (VLAN0001) and 24588 (VLAN0012). The bridge ID for both is 24577 (VLAN0001) and 24588 (VLAN0012). The bridge address is 0001.42D8.E1BE for both. The hello time is 2 seconds, max age is 20 seconds, and forward delay is 15 seconds. The interfaces Po1 and Po4 are shown as Designated Forwarders (Desg FWD) with a cost of 9. The interface Po1 has a priority of 128.27 and Po4 has a priority of 128.28. The output is truncated with '--More--' at the bottom.

```
IOS Command Line Interface
+-----+
1      Po1(SU)          LACP   Fa0/7(P) Fa0/8(P)
4      Po4(SU)          PAgP   Fa0/9(P) Fa0/10(P)
12     Po12(RD)         -
DLS1#
DLS1#sho
DLS1#show sp
DLS1#show spanning-tree
VLAN0001
Spanning tree enabled protocol ieee
Root ID    Priority    24577
           Address    0001.42D8.E1BE
           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    0001.42D8.E1BE
           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        128.27  Shr
Po4        Desg FWD 9        128.28  Shr

VLAN0012
Spanning tree enabled protocol ieee
Root ID    Priority    24588
           Address    0001.42D8.E1BE
           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    0001.42D8.E1BE
           Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
--More--
```

Figura 16. show spanning tree DLS 1 VLAN 0001_VLAN 0012

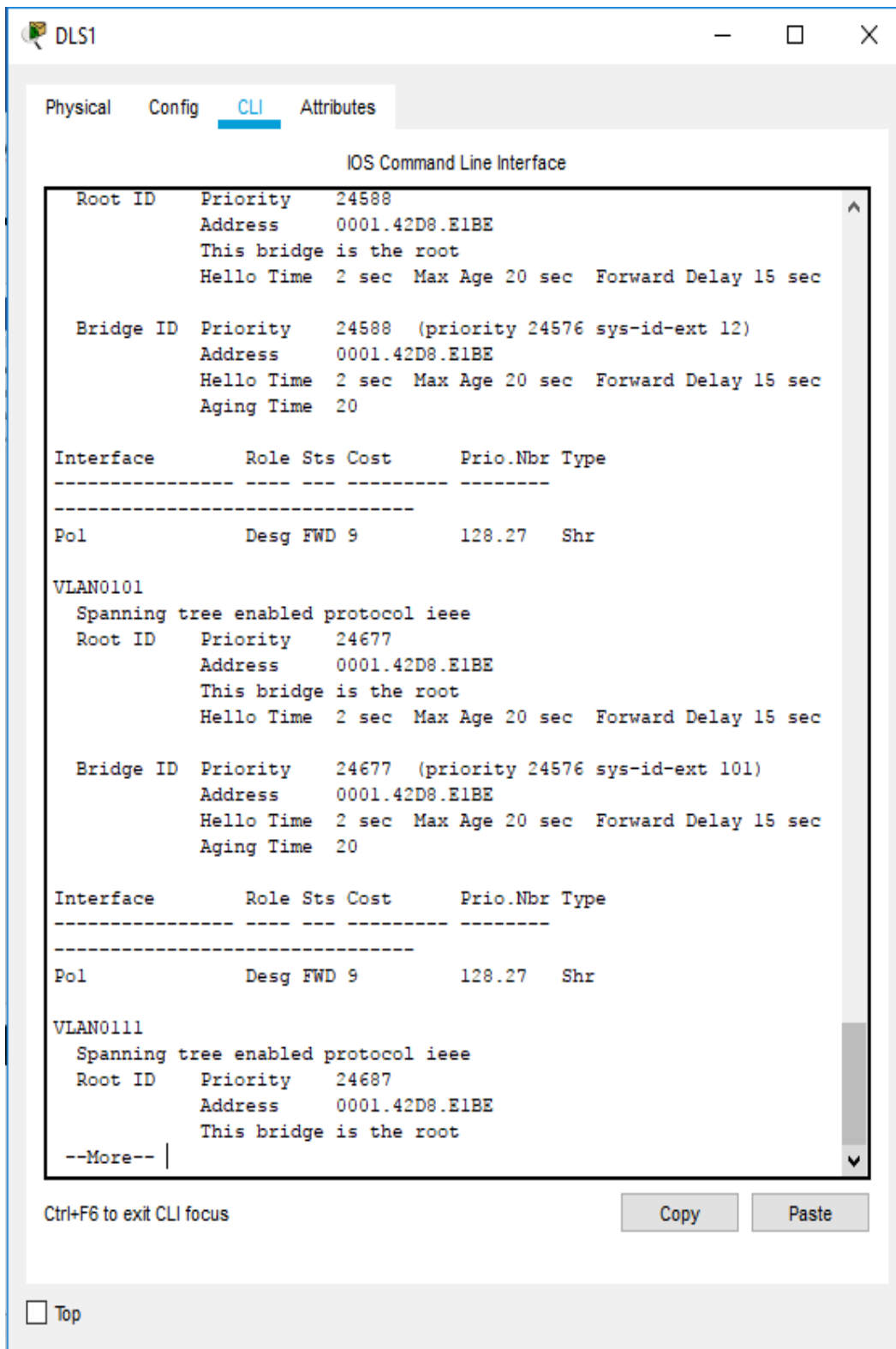


Figura 17. show spanning tree DLS1 VLAN 101_VLAN 111

DLS1

The screenshot shows a CLI window titled "DLS1" with tabs for Physical, Config, CLI, and Attributes. The CLI window displays the output of a spanning tree command. It shows two VLANs: VLAN0111 and VLAN0123. For each VLAN, it lists the root ID, priority, address, and other parameters. It also shows a table of interfaces with their roles, statuses, costs, priorities, and numbers.

```
IOS Command Line Interface

Pol          Desg FWD 9          128.27  Shr

VLAN0111
Spanning tree enabled protocol ieee
Root ID      Priority    24687
Address     0001.42D8.E1BE
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     0001.42D8.E1BE
Hello Time  2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time  20

Interface    Role Sts Cost      Prio.Nbr Type
-----
Pol          Desg FWD 9          128.27  Shr

VLAN0123
Spanning tree enabled protocol ieee
Root ID      Priority    24699
Address     00D0.5898.C2C4
Cost        18
Port        27 (Port-channell)
Hello Time  2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID    Priority    28795 (priority 28672 sys-id-ext 123)
Address     0001.42D8.E1BE
Hello Time  2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time  20

Interface    Role Sts Cost      Prio.Nbr Type
-----
Pol          Root FWD 9          128.27  Shr

--More--
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

Figura 18. show spanning tree DLS1 VLAN 111_VLAN 123

DLS1

The screenshot shows the CLI interface of a switch named DLS1. The 'CLI' tab is active, displaying the output of a 'show spanning tree' command. The output is organized into sections for each VLAN.

VLAN0234

```
Spanning tree enabled protocol ieee
Root ID    Priority    28795
           Address    0001.42D8.E1BE
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time 20

Bridge ID  Priority    28795 (priority 28672 sys-id-ext 123)
           Address    0001.42D8.E1BE
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time 20

Interface  Role Sts Cost      Prio.Nbr Type
-----
Po1        Root FWD 9         128.27  Shr
```

VLAN0345

```
Spanning tree enabled protocol ieee
Root ID    Priority    24921
           Address    0001.42D8.E1BE
           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    0001.42D8.E1BE
```

At the bottom of the CLI window, there is a 'Ctrl+F6 to exit CLI focus' message, 'Copy' and 'Paste' buttons, and a 'Top' button.

Figura 19. show spanning tree DLS1 VLAN 0234_VLAN 0345

DLS1

The screenshot shows the CLI of a switch named DLS1. The 'CLI' tab is active, displaying the output of a 'show spanning tree' command. The output is divided into three sections: the main bridge information, VLAN0434 details, and VLAN0435 details. Each section includes a table of interface roles and costs.

```
IOS Command Line Interface

Root ID    Priority    24921
Address    0001.42D8.E1BE
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    0001.42D8.E1BE
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20

Interface      Role Sts Cost      Prio.Nbr Type
-----
Fa0/6          Desg FWD 19        128.6   P2p
Pol            Desg FWD 9         128.27  Shr

VLAN0434
Spanning tree enabled protocol ieee
Root ID    Priority    25010
Address    0001.42D8.E1BE
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    0001.42D8.E1BE
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20

Interface      Role Sts Cost      Prio.Nbr Type
-----
Pol            Desg FWD 9         128.27  Shr

VLAN0435
Spanning tree enabled protocol ieee
Root ID    Priority    33203
Address    0001.42D8.E1BE
--More--
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

Figura 20. show spanning tree DLS1 VLAN 0434_VLAN 0435

DLS1

The screenshot shows the CLI interface of a switch named DLS1. The 'CLI' tab is active, displaying the output of the 'show spanning-tree' command for VLAN 500. The output is divided into two sections: one for the main bridge (VLAN 500) and one for the root bridge (VLAN 500). The main bridge section shows that DLS1 is the root of the spanning tree for VLAN 500, with a priority of 33203 and a MAC address of 0001.42D8.E1BE. The root bridge section shows that the root bridge has a priority of 25076 and a MAC address of 0001.42D8.E1BE. Below each section is a table of interfaces and their roles in the spanning tree.

```
IOS Command Line Interface

Root ID    Priority    33203
Address    0001.42D8.E1BE
This bridge is the root
Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority    33203 (priority 32768 sys-id-ext 435)
Address    0001.42D8.E1BE
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
Po1            Desg FWD 9         128.27   Shr
Po4            Desg FWD 9         128.28   Shr

VLAN0500
Spanning tree enabled protocol ieee
Root ID    Priority    25076
Address    0001.42D8.E1BE
This bridge is the root
Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority    25076 (priority 24576 sys-id-ext 500)
Address    0001.42D8.E1BE
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         128.27   Shr

DLS1#
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

Figura 21. show spanning tree DLS1 VLAN 500

DLS2

The screenshot shows the CLI interface of a switch named DLS2. The 'CLI' tab is active. The user has entered the following commands: `ena`, `enable`, `sho`, `show sp`, and `show spanning-tree`. The output displays the spanning tree configuration for two VLANs: VLAN0001 and VLAN0012. For each VLAN, it shows the spanning tree protocol (IEEE), root ID, priority, address, cost, port, and hello time. A table also shows the role and status of interfaces Po2 and Po3 for each VLAN.

```
DLS2>ena
DLS2>enable
DLS2#sho
DLS2#show sp
DLS2#show spanning-tree
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    24577
            Address    0001.42D8.E1BE
            Cost      18
            Port      27(Port-channel2)
            Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
            Address    00D0.5898.C2C4
            Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
            Aging Time 20

Interface          Role Sts Cost      Prio.Nbr Type
-----
-----
Po2                 Root FWD 9         128.27  Shr
Po3                 Altn BLK 9         128.28  Shr

VLAN0012
  Spanning tree enabled protocol ieee
  Root ID    Priority    24588
            Address    0001.42D8.E1BE
            Cost      18
            Port      28(Port-channel3)
            Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    28684  (priority 28672 sys-id-ext 12)
  --More-- |
```

Ctrl+F6 to exit CLI focus Copy Paste

Top

Figura 22. show spanning tree DLS2 VLAN 001_VLAN 0012

DLS2

The screenshot shows the CLI interface of a switch named DLS2. The 'CLI' tab is active, displaying the output of the 'show spanning tree' command. The output is organized into sections for different VLANs.

VLAN0101

```
Cost 18
Port 28 (Port-channel3)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 28684 (priority 28672 sys-id-ext 12)
Address 00D0.5898.C2C4
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20
```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Po2	Desg	FWD	9	128.27	Shr
Po3	Root	FWD	9	128.28	Shr

VLAN0101

```
Spanning tree enabled protocol ieee
Root ID Priority 24677
Address 0001.42D8.E1BE
Cost 18
Port 28 (Port-channel3)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 28773 (priority 28672 sys-id-ext 101)
Address 00D0.5898.C2C4
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20
```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/6	Desg	FWD	19	128.6	P2p
Po2	Desg	FWD	9	128.27	Shr
Po3	Root	FWD	9	128.28	Shr

VLAN0111

```
Spanning tree enabled protocol ieee
--More--
```

At the bottom of the CLI window, there is a prompt 'Ctrl+F6 to exit CLI focus' and buttons for 'Copy' and 'Paste'. A 'Top' button is also visible at the bottom left of the window.

Figura 23. show spanning tree DLS2 VLAN 101_VLAN 0111

DLS2

The screenshot shows the CLI interface of a switch named DLS2. The 'CLI' tab is active, displaying the output of a 'show spanning tree' command. The output is divided into sections for different VLANs and interfaces.

IOS Command Line Interface

```
-----  
-----  
Fa0/6          Desg FWD 19          128.6    P2p  
Po2            Desg FWD 9           128.27   Shr  
Po3            Root FWD 9           128.28   Shr  
  
VLAN0111  
Spanning tree enabled protocol ieee  
Root ID        Priority    24687  
Address        0001.42D8.E1BE  
Cost           18  
Port           28 (Port-channel3)  
Hello Time     2 sec    Max Age 20 sec    Forward Delay 15 sec  
  
Bridge ID      Priority    28783 (priority 28672 sys-id-ext 111)  
Address        00D0.5898.C2C4  
Hello Time     2 sec    Max Age 20 sec    Forward Delay 15 sec  
Aging Time     20  
  
Interface      Role Sts Cost          Prio.Nbr Type  
-----  
-----  
Po2            Desg FWD 9           128.27   Shr  
Po3            Root FWD 9           128.28   Shr  
  
VLAN0123  
Spanning tree enabled protocol ieee  
Root ID        Priority    24699  
Address        00D0.5898.C2C4  
This bridge is the root  
Hello Time     2 sec    Max Age 20 sec    Forward Delay 15 sec  
  
Bridge ID      Priority    24699 (priority 24576 sys-id-ext 123)  
Address        00D0.5898.C2C4  
Hello Time     2 sec    Max Age 20 sec    Forward Delay 15 sec  
Aging Time     20  
  
--More--
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

Figura 24. show spanning tree DLS2 VLAN 0111_VLAN 0123

DLS2

The screenshot shows the CLI interface of a switch named DLS2. The 'CLI' tab is active, displaying the output of the 'show spanning-tree' command. The output is organized into sections for different VLANs. For each VLAN, it shows the bridge ID, priority, MAC address, and STP parameters (Hello Time, Max Age, Forward Delay, Aging Time). It also lists the interfaces connected to the VLAN, their roles, and their STP costs.

```
IOS Command Line Interface

      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 24699 (priority 24576 sys-id-ext 123)
Address 00D0.5898.C2C4
      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
      Aging Time 20

Interface      Role Sts Cost      Prio.Nbr Type
-----
Po2            Desg FWD 9         128.27  Shr
Po3            Desg FWD 9         128.28  Shr

VLAN0234
Spanning tree enabled protocol ieee
Root ID Priority 24810
Address 00D0.5898.C2C4
This bridge is the root
      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 24810 (priority 24576 sys-id-ext 234)
Address 00D0.5898.C2C4
      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
      Aging Time 20

Interface      Role Sts Cost      Prio.Nbr Type
-----
Po2            Desg FWD 9         128.27  Shr
Po3            Desg FWD 9         128.28  Shr

VLAN0345
Spanning tree enabled protocol ieee
Root ID Priority 24921
Address 0001.42D8.E1BE
Cost 18
Port 28 (Port-channel3)

--More--
```

Ctrl+F6 to exit CLI focus Copy Paste

Top

Figura 25.show spanning tree DLS2 VLAN 0111_VLAN 0234

DLS2

The screenshot shows the CLI interface of a switch named DLS2. The 'CLI' tab is selected, and the 'show spanning tree' command has been executed. The output is displayed in a scrollable window. At the bottom of the window, there are 'Copy' and 'Paste' buttons, and a 'Ctrl+F6 to exit CLI focus' message. A 'Top' button is also visible at the bottom left of the window.

```
Spanning tree enabled protocol ieee
Root ID    Priority    24921
           Address    0001.42D8.E1BE
           Cost      18
           Port      28 (Port-channel3)
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority    29017 (priority 28672 sys-id-ext 345)
           Address    00D0.5898.C2C4
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time 20

Interface  Role Sts Cost      Prio.Nbr Type
-----
Po2        Desg FWD 9         128.27 Shr
Po3        Root FWD 9         128.28 Shr

VLAN0434
Spanning tree enabled protocol ieee
Root ID    Priority    25010
           Address    0001.42D8.E1BE
           Cost      18
           Port      28 (Port-channel3)
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority    29106 (priority 28672 sys-id-ext 434)
           Address    00D0.5898.C2C4
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time 20

Interface  Role Sts Cost      Prio.Nbr Type
-----
Po2        Desg FWD 9         128.27 Shr
Po3        Root FWD 9         128.28 Shr

--More--
```

Figura 26. show spanning tree DLS2 VLAN 0111_VLAN 0434

DLS2

The screenshot shows the CLI interface of a switch named DLS2. The 'CLI' tab is selected. The output of the 'show spanning tree' command is displayed, showing details for VLAN 0500 and VLAN 0567. The output includes interface roles, costs, and bridge IDs.

```
IOS Command Line Interface

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

Interface      Role Sts Cost      Prio.Nbr Type
-----
Po2            Desg FWD 9         128.27 Shr
Po3            Root FWD 9         128.28 Shr

VLAN0500
Spanning tree enabled protocol ieee
Root ID      Priority    25076
Address      0001.42D8.E1BE
Cost         18
Port         28 (Port-channel3)
Hello Time   2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID    Priority    29172 (priority 28672 sys-id-ext 500)
Address      00D0.5898.C2C4
Hello Time   2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time   20

Interface      Role Sts Cost      Prio.Nbr Type
-----
Po2            Desg FWD 9         128.27 Shr
Po3            Root FWD 9         128.28 Shr

VLAN0567
Spanning tree enabled protocol ieee
Root ID      Priority    33335
Address      00D0.5898.C2C4
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      00D0.5898.C2C4

--More--
```

Ctrl+F6 to exit CLI focus Copy Paste

Top

Figura 27. . show spanning tree DLS2 VLAN 0500_VLAN 0567

DLS2

The screenshot shows the CLI output for the spanning tree on DLS2. It is divided into two sections, one for the root bridge and one for a secondary bridge.

Root Bridge (Priority 29172):

- Cost: 18
- Port: 28 (Port-channel3)
- Hello Time: 2 sec, Max Age: 20 sec, Forward Delay: 15 sec
- Bridge ID: 29172 (priority 28672 sys-id-ext 500)
- Address: 00D0.5898.C2C4
- Hello Time: 2 sec, Max Age: 20 sec, Forward Delay: 15 sec
- Aging Time: 20

Interface	Role	Sts	Cost	Prio.	Nbr	Type
Po2	Desg	FWD	9	128.27		Shr
Po3	Root	FWD	9	128.28		Shr

Secondary Bridge (Priority 33335):

- Spanning tree enabled protocol ieee
- Root ID: 33335
- Address: 00D0.5898.C2C4
- This bridge is the root
- Hello Time: 2 sec, Max Age: 20 sec, Forward Delay: 15 sec
- Bridge ID: 33335 (priority 32768 sys-id-ext 567)
- Address: 00D0.5898.C2C4
- 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
Fa0/10	Desg	FWD	19	128.10		P2p
Fa0/8	Desg	FWD	19	128.8		P2p
Fa0/9	Desg	FWD	19	128.9		P2p
Po2	Desg	FWD	9	128.27		Shr
Po3	Desg	FWD	9	128.28		Shr

DLS2#

Ctrl+F6 to exit CLI focus

Copy Paste

Top

Figura 28. show spanning tree DLS2 VLAN 0567

CONCLUSIONES

Las actividades desarrolladas o escenarios propuestos en el componente práctico del diplomado CCNP, busca la recopilación de los temas vistos durante el desarrollo del mismo, donde cada estudiante priorizará su aprendizaje en temas como protocolos de enrutamiento EIGRP, OSPF, PAgP, LACP.

Las topología propuestas en el presente proyecto, pueden verse reflejada en las labores y entorno profesional de la vida cotidiana, lo cual envuelve no solo el componente evaluativo si no también el entorno laboral.

El protocolo LACP va a la vanguardia al ser compatible con un gran porcentaje de proveedores al contrario de PAgP que por restricción de propiedad, su uso es exclusivo de Cisco.

Haciendo uso del protocolo LACP garantizamos el buen uso y aprovechamiento del ancho de banda por medio de la agrupación de los puertos necesarios.

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