

**DIPLOMADO DE PROFUNDIZACION CISCO CCNP
SOLUCIÓN DE DOS ESCENARIOS PRESENTES EN ENTORNOS
CORPORATIVOS BAJO EL USO DE TECNOLOGÍA CISCO**

Diana María Garzón Henao

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA
PROGRAMA DE INGENIERIA DE TELECOMUNICACIONES
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Diana María Garzón Henao

Tutor

John Harold Pérez Calderón

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NOTA DE ACEPTACION

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GLOSARIO

BGP: Border Gateway Protocol: Protocolo usado para intercambiar información entre sistemas autónomos y no autónomos.

EIGRP: Enhanced Interior Gateway Routing Protocol: es un protocolo de encaminamiento de vector distancia, es considerado como protocolo avanzado que se basa en las características normalmente asociadas con los protocolos del estado de enlace.

OSPF: Open Shortest Path First: el OSPF es un protocolo de puerta de enlace interior (IGP) y es normalmente utilizado en grandes redes empresariales. Es un protocolo de enrutamiento de estado de enlace que proporciona convergencia rápida y una escalabilidad excelente.

VLAN: Protocolo para crear redes lógicas, todas independientes dentro de una misma red.

VTP: VLAN Trunking Protocol: Es un protocolo de nivel 2 usado en VLANs para equipos de la marca CISCO y permite administrar las VLANs de todos los equipos desde uno solo.

RESUMEN

En este documento, se busca evidenciar el aprendizaje en clave de las competencias y habilidades adquiridas en el proceso del diplomado de profundización CCNP(Cisco Certified Networking Professional) mediante dos escenarios que se enfocaron en el diseño de la red que en cada escenario caso ésta variará, la conmutación y la escalabilidad; Estas se simularon con el apoyo del software packet tracer; que es un software de propiedad de CISCO, que posibilita vivenciar una experiencia cercana a la realidad a la hora de realizar una implementación de red y sus: componentes, configuraciones, prerrequisitos, topología diseño. Cabe aclarar que los casos utilizados para este proceso de aprendizaje son suposiciones que perfectamente se pueden vivenciar en la cotidianidad de nuestro que hacer como ingenieros; estos casos los nombraremos todo el tiempo como escenarios.

El primer escenario se realizaron configuraciones iniciales y los protocolos de enrutamiento para los routers R1, R2, R3, R4 y R5; se realizaron configuraciones de enrutamiento con los protocolos OSPF y EIGRP

El segundo escenario se debe configurar e interconectar cada uno de los dispositivos acorde con los lineamientos establecidos para el direccionamiento IP, etherchannels, VLANs y demás aspectos; este diseño tiene una redundancia para garantizar que caso de una falla electrónica o desconexión física realice la conmutación a otro switch.

Palabras claves: CISCO, CCNP, conmutación, enrutamiento, redes, electrónica

ABSTRAC

This document seeks to demonstrate the key learning of the competencies and skills acquired in the process of the deepening diploma CCNP (Cisco Certified Networking Professional) through two scenarios that focused on the design of the network that in each scenario or case will vary , switching and scalability; These were simulated with the support of the war packet tracer software; which is a software owned by CISCO, which makes it possible to have an experience close to reality when carrying out a network implementation and its: components, configurations, prerequisites, design topology. It should be clarified that the cases used for this learning process are assumptions that can perfectly be experienced in our daily life as engineers; these cases we will name them all the time as scenarios.

The first scenario was made initial configurations and routing protocols for routers R1, R2, R3, R4, and R5; routing configurations are made with OSPF and EIGRP protocols

The second scenario must be configured and interconnected each of the devices according to the guidelines established for IP addressing, etherchannels, VLANs and other aspects; This design has redundancy to ensure that in the event of an electronic failure or physical disconnection, make the switch to another switch.

Keywords: CISCO, CCNP, switching, routing, networks, electronics

INTRODUCCION

En este proceso de aprendizaje donde me enriquecí en clave de habilidades y competencias en Networking; las cuales evidenciaré en los siguientes dos escenarios; donde se ponen a prueba los conocimientos y habilidades Networking en Cisco como enrutamiento, OSPF, EIGRP, VLAN, VTP, Conectividad, Conmutación, Troubleshooting, entre otros. Cada escenario estará acompañado de los respectivos procesos y documentación correspondientes de la configuración de cada uno de los dispositivos, el registro de los procesos de verificación de conectividad mediante el uso de comandos ping, trace route, show ip route.

Para el primer escenario propuesto, debemos de conocer y aplicar los conceptos de OSPF, EIGRP y el código de programación de configuración de cada router de acuerdo con la funcionalidad de cada uno de ellos.

En ese escenario se plantea el desarrollo de la solución de los posibles problemas que se presentan en el networking, en los protocolos de enrutamiento de la configuración de sistemas avanzados en VLANs y en las medidas de seguridad que se dan en ellas; Esto se soluciona aplicando las siguientes configuraciones LACP y PAgP como modelo de agrupación; además, de los enlaces EthernetChannel y demás configuraciones que aseguren el correcto funcionamiento de la red a configurar.

A continuación, iniciare a evidenciar el proceso en el primer escenario:

Primer Escenario

Teniendo como referencia la siguiente imagen que nos indica una topología de red:

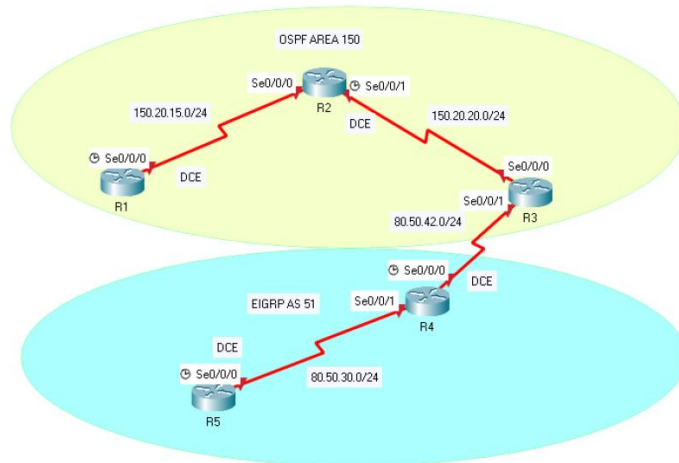


FIGURA 1. Topología de la red

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.

Iniciamos la construcción de la interfaz usando el router 1941

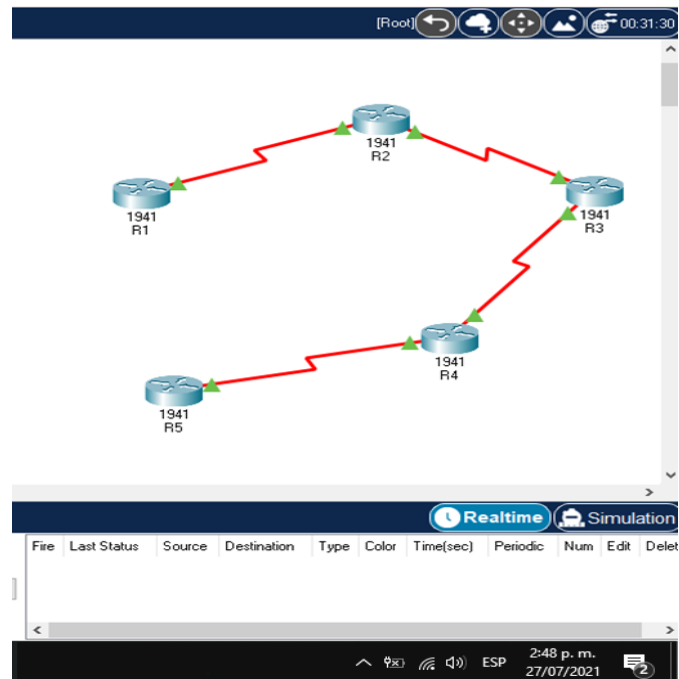
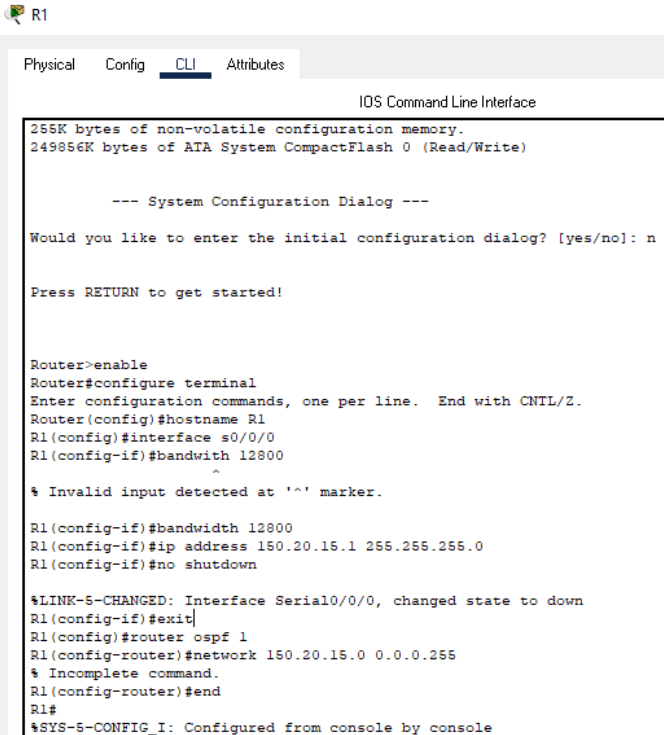


FIGURA 2. Topología Packet Tracer

Y luego procedemos a configurar cada router:

Para R1:

```
Router>enable
Router#configure terminal
Router(config)#hostname R1
R1(config)#interface s0/0/0
R1(config-if)#bandwidth 12800
R1(config-if)#ip address 150.20.15.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#router ospf 1
R1(config-router)#network 150.20.15.0 0.0.0.255
R1(config-router)#end
R1#
```



```
R1
Physical Config CLI Attributes
IOS Command Line Interface
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#interface s0/0/0
R1(config-if)#bandwidth 12800
^
% Invalid input detected at '^' marker.
R1(config-if)#bandwidth 12800
R1(config-if)#ip address 150.20.15.1 255.255.255.0
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 150.20.15.0 0.0.0.255
% Incomplete command.
R1(config-router)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
```

FIGURA 3. Configuración R1

Para R2:

```
Router>enable
Router#configure terminal
Router(config)#hostname R2
R2(config)#interface s0/0/0
R2(config-if)#ip address 150.20.15.2 255.255.255.0
R2(config-if)#no shutdown
```

```

R2(config-if)#exit
R2(config)#interface s0/0/1
R2(config-if)#ip address 150.20.20.1 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#router ospf 1
R2(config-router)#network 150.20.15.0 0.0.0.255 area 150
R2(config-router)#network 150.20.20.0 0.0.0.255 area 150
R2(config-router)#end

```

R2

```

Physical  Config  CLI  Attributes
IOS Command Line Interface
249856K bytes of ATA System CompactFlash 0 (Read/Write)

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#interface s0/0/0
R2(config-if)#ip address 150.20.15.2 255.255.255.0
R2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R2(config-if)#exit
R2(config)#interface s0/0/1
R2(config-if)#ip address 150.20.20.1 255.255.255.0
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 150.20.15.0 0.0.0.255 area 150
R2(config-router)#network 150.20.20.0 0.0.0.255 area 150
R2(config-router)#end
R2#
*SYS-5-CONFIG_I: Configured from console by console

```

FIGURA 4. Configuración R2

Para R3:

```

Router>enable
Router#configure terminal
Router(config)#hostname R3
R3(config)#interface s0/0/0
R3(config-if)#ip address 150.20.20.2 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#interface s0/0/1
R3(config-if)#ip address 80.50.42.1 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#router ospf 1
R3(config-router)#network 150.20.15.0 0.0.0.255 area 150

```

```

R3(config-router)#exit
R3(config)#router eigrp 51
R3(config-router)#network 80.50.30.0 0.0.0.255
R3(config-router)#end
R3#

```

```

R3
Physical Config CLI Attributes
IOS Command Line Interface

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#interface s0/0/0
R3(config-if)#ip address 150.20.20.2 255.255.255.0
R3(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial10/0/0, changed state to down
R3(config-if)#exit
R3(config)#interface s0/0/1
R3(config-if)#ip address 80.50.42.1 255.255.255.0
R3(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial10/0/1, changed state to down
R3(config-if)#exit
R3(config)#router ospf 1
R3(config-router)#network 150.20.15.0 0.0.0.255 area 150
R3(config-router)#exit
R3(config)#router eigrp 51
R3(config-router)#network 80.50.30.0 0.0.0.255
R3(config-router)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

```

FIGURA 5. Configuración R3

Para R4:

```

Router>enable
Router#configure terminal
Router(config)#hostname R4
R4(config)#interface s0/0/0
R4(config-if)#ip address 80.50.42.2 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#interface s0/0/1
R4(config-if)#ip address 80.50.30.1 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#exit
R4(config)#router eigrp 51
R4(config-router)#network 80.50.30.0 0.0.0.255
R4(config-router)#network 80.50.42.0 0.0.0.255
R4(config-router)#end
R4#

```

```
R4
Physical Config CLI Attributes
IOS Command Line Interface

Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R4
R4(config)#interface s0/0/0
R4(config-if)#ip address 80.50.42.2 255.255.255.0
R4(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R4(config-if)#interface s0/0/1
R4(config-if)#ip address 80.50.30.1 255.255.255.0
R4(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R4(config-if)#exit
R4(config)#router eigrp 51
R4(config-router)#80.50.30 0.0.0.255
^
% Invalid input detected at '^' marker.

R4(config-router)#80.50.30.0 0.0.0.255
^
% Invalid input detected at '^' marker.

R4(config-router)#network 80.50.30.0 0.0.0.255
R4(config-router)#network 80.50.42.0 0.0.0.255
R4(config-router)#end
R4#
%SYS-5-CONFIG_I: Configured from console by console
```

FIGURA 6. Configuración R4

Para R5:

```
Router>enable
Router#configure terminal
Router(config)#hostname R5
R5(config)#interface s0/0/0
R5(config-if)#bandwidth 12800
R5(config-if)#ip address 80.50.30.2 255.255.255.0
R5(config-if)#no shutdown
R5(config-if)#exit
R5(config)#router eigrp 51
R5(config-router)#network 80.50.30.0 0.0.0.255
R5(config-router)#end
R5#
```



```

R5
Physical Config CLI Attributes
IOS Command Line Interface
Cisco CISCO1941/K9 (revision 1.0) with 491520K/32768K bytes of memory.
Processor board ID FTX152400KS
2 Gigabit Ethernet interfaces
2 Low-speed serial(sync/async) network interface(s)
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R5
R5(config)#interface s0/0/0
R5(config-if)#bandwidth 12800
R5(config-if)#ip address 80.50.30.2 255.255.255.0
R5(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R5(config-if)#exit
R5(config)#router eigrp 51
R5(config-router)#network 80.50.30.0 0.0.0.255
R5(config-router)#end
R5#
%SYS-5-CONFIG_I: Configured from console by console

```

FIGURA 7 Configuración R5

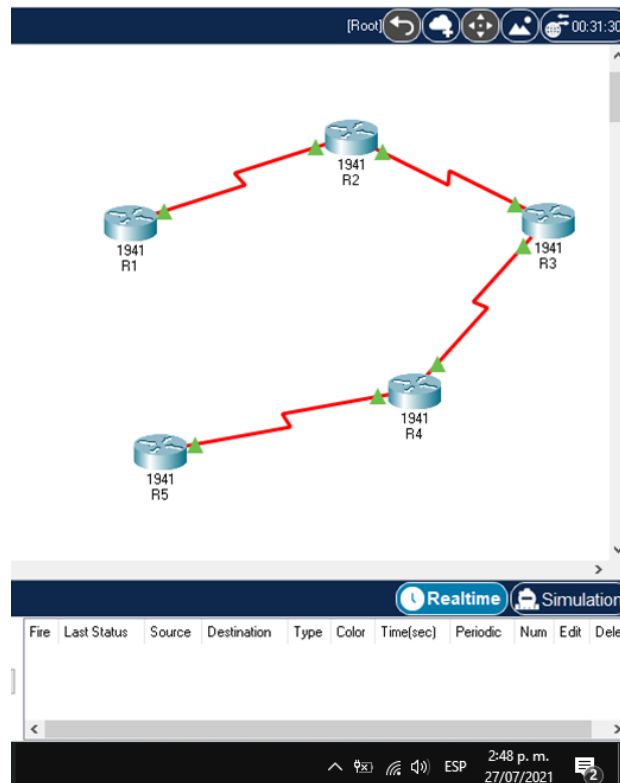
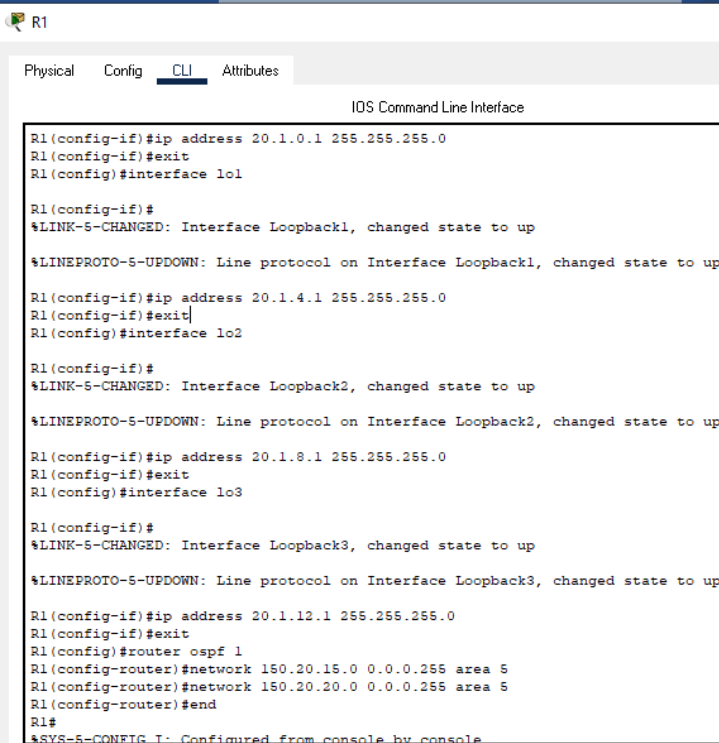


FIGURA 8. Prueba de conectividad

2. Cree cuatro nuevas interfaces de Loopback en R1 utilizando la asignación de direcciones 20.1.0.0/22 y configure esas interfaces para participar en el área 5 de OSPF.

```
R1>enable
R1#configure terminal
R1(config)#interface lo0
R1(config-if)#ip address 20.1.0.1 255.255.255.0
R1(config-if)#exit
R1(config)#interface lo1
R1(config-if)#ip address 20.1.4.1 255.255.255.0
R1(config-if)#exit
R1(config)#interface lo2
R1(config-if)#ip address 20.1.8.1 255.255.255.0
R1(config-if)#exit
R1(config)#interface lo3
R1(config-if)#ip address 20.1.12.1 255.255.255.0
R1(config-if)#exit
R1(config)#router ospf 1
R1(config-router)#network 150.20.15.0 0.0.0.255 area 5
R1(config-router)#network 150.20.20.0 0.0.0.255 area 5
R1(config-router)#end
R1#
```



```
R1
Physical Config CLI Attributes
IOS Command Line Interface
R1(config-if)#ip address 20.1.0.1 255.255.255.0
R1(config-if)#exit
R1(config)#interface lo1
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 20.1.4.1 255.255.255.0
R1(config-if)#exit
R1(config)#interface lo2
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)#ip address 20.1.8.1 255.255.255.0
R1(config-if)#exit
R1(config)#interface lo3
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 20.1.12.1 255.255.255.0
R1(config-if)#exit
R1(config)#router ospf 1
R1(config-router)#network 150.20.15.0 0.0.0.255 area 5
R1(config-router)#network 150.20.20.0 0.0.0.255 area 5
R1(config-router)#end
R1#
%SYS-5-CONFIG I: Configured from console by console
```

FIGURA 9. Loopback en R1

TABLA 1. Loopback IP address

# Loopback	IP address
Loopback 0	20.1.0.1
Loopback 1	20.1.4.1
Loopback 2	20.1.8.1
Loopback 3	20.1.12.1

3. Cree cuatro nuevas interfaces de Loopback en R5 utilizando la asignación de direcciones 180.5.0.0/22 y configure esas interfaces para participar en el Sistema Autónomo EIGRP 51.

```
R5>enable
R5#configure terminal
R5(config)#in lo0
R5(config-if)#ip address 180.5.0.1 255.255.252.0
R5(config-if)#exit
R5(config)#in lo1
R5(config-if)#ip address 180.5.4.1 255.255.252.0
R5(config-if)#exit
R5(config)#in lo2
R5(config-if)#ip address 180.5.8.1 255.255.252.0
R5(config-if)#exit
R5(config)#in lo3
R5(config-if)#ip address 180.5.12.1 255.255.252.0
R5(config-if)#exit
R5(config)#router eigrp 51
R5(config-router)#auto-summary
R5(config-router)#network 180.5.0.0 0.0.3.255
R5(config-router)#network 80.50.30.0 0.0.0.255
R5(config-router)#end
R5#
```

```

R5
Physical Config CLI Attributes
IOS Command Line Interface
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 180.5.4.1 255.255.252.0
R5(config-if)#exit
R5(config)#in lo2
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 180.5.8.1 255.255.252.0
R5(config-if)#exit
R5(config)#in lo3
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 180.5.12.1 255.255.252.0
R5(config-if)#exit
R5(config)#router eigrp 51
R5(config-router)#auto-summary
R5(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 51: Neighbor 80.50.30.1 (Serial0/0/0) resync: summary
configured
R5(config-router)#network 180.5.0.0 0.0.3.255
R5(config-router)#network 80.50.30.0 0.0.0.255
R5(config-router)#end
R5#

```

FIGURA 10. Loopback en R5

TABLA 2. Loopback IP address

# Loopback	IP address
Loopback 0	180.5.0.1
Loopback 1	180.5.4.1
Loopback 2	180.5.8.1
Loopback 3	180.5.12.1

- Analice la tabla de enrutamiento de R3 y verifique que R3 está aprendiendo las nuevas interfaces de Loopback mediante el comando show ip route.

```

R3
-----
Physical Config CLI Attributes
IOS Command Line Interface
256K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

R3>enable
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

  80.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    80.50.42.0/24 is directly connected, Serial0/0/1
L    80.50.42.1/32 is directly connected, Serial0/0/1
 150.20.0.0/16 is variably subnetted, 2 subnets, 2 masks
C    150.20.20.0/24 is directly connected, Serial0/0/0
L    150.20.20.2/32 is directly connected, Serial0/0/0
R3#
  
```

FIGURA 11. Enrutamiento de R3

Podemos observar que efectivamente R3 aprendió las interfaces loopback

- Configure R3 para redistribuir las rutas EIGRP en OSPF usando el costo de 80000 y luego redistribuya las rutas OSPF en EIGRP usando un ancho de banda T1 y 50,000 microsegundos de retardo.

```

R3>enable
R3#configure terminal
R3(config)#router ospf 1
R3(config-router)#redistribute eigrp 51 metric 80000 subnets
R3(config-router)#exit
R3(config)#router eigrp 51
R3(config-router)#redistribute ospf 1 metric 1544 50000 255 1 1500
R3(config-router)#exit
R3(config)#end
R3#
  
```

```

R3
Physical Config CLI Attributes
IOS Command Line Interface

R3 con0 is now available

Press RETURN to get started.

R3>enable
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#redistribute eigrp 51 metric 80000 subnets
R3(config-router)#exit
R3(config)#router eigrp 51
R3(config-router)#redistribute ospf 1 metric 1544 50000 255 1 1500
R3(config-router)#exit
R3(config)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

```

FIGURA 12. Rutas EIGRP en OSPF R3

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

```

R1
Physical Config CLI Attributes
IOS Command Line Interface

%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

R1>enable
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

    20.0.0.0/8 is variably subnetted, 8 subnets, 2 masks
C       20.1.0.0/24 is directly connected, Loopback0
L       20.1.0.1/32 is directly connected, Loopback0
C       20.1.4.0/24 is directly connected, Loopback1
L       20.1.4.1/32 is directly connected, Loopback1
C       20.1.8.0/24 is directly connected, Loopback2
L       20.1.8.1/32 is directly connected, Loopback2
C       20.1.12.0/24 is directly connected, Loopback3
L       20.1.12.1/32 is directly connected, Loopback3
L       150.20.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       150.20.15.0/24 is directly connected, Serial0/0/0
L       150.20.15.1/32 is directly connected, Serial0/0/0

R1#

```

FIGURA 13. Rutas del sistema autónomo R1

```
R5
Physical Config CLI Attributes
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
%DUAL-5-NBRCHANGE: IP-EIGRP S1: Neighbor 80.50.30.1 (Serial0/0/0) is up: new adjacency

R5>enable
R5#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

      80.0.0.0/8 is variably subnetted, 4 subnets, 3 masks
D       80.0.0.0/8 is a summary, 00:06:52, Null0
C       80.50.30.0/24 is directly connected, Serial0/0/0
L       80.50.30.2/32 is directly connected, Serial0/0/0
D       80.50.42.0/24 [90/2681856] via 80.50.30.1, 00:06:51, Serial0/0/0
      180.5.0.0/16 is variably subnetted, 9 subnets, 3 masks
D       180.5.0.0/16 is a summary, 00:06:52, Null0
C       180.5.0.0/22 is directly connected, Loopback0
L       180.5.0.1/32 is directly connected, Loopback0
C       180.5.4.0/22 is directly connected, Loopback1
L       180.5.4.1/32 is directly connected, Loopback1
C       180.5.8.0/22 is directly connected, Loopback2
L       180.5.8.1/32 is directly connected, Loopback2
C       180.5.12.0/22 is directly connected, Loopback3
L       180.5.12.1/32 is directly connected, Loopback3

R5#
R5#
```

FIGURA 14. Rutas del sistema Autónomo R5

Segundo escenario.

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.

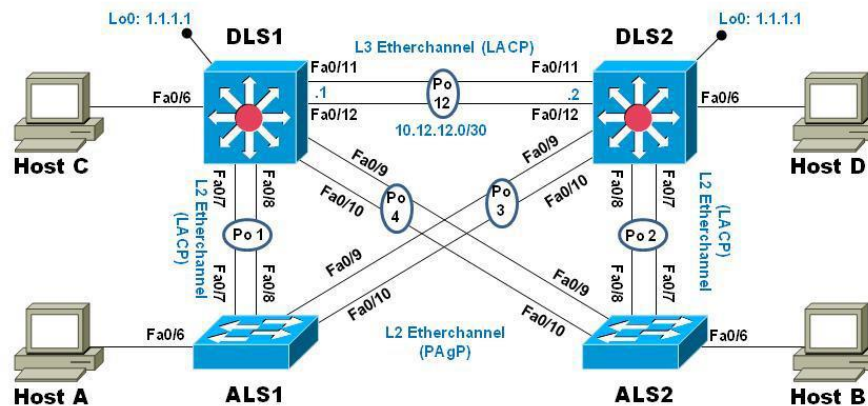


FIGURA 15. Topología de la red

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

- Apagar todas las interfaces en cada switch
Replicamos el siguiente código en DLS1, DLS2, ALS1 y ALS2

```
Switch>enable  
Switch#configure terminal  
Switch(config)#int ran f0/1-24, g0/1-2  
Switch(config-if-range)#shutdown
```

```
Multilayer Switch0  
Physical Config CLI Attributes  
IOS Command Line Interface  
%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
```

FIGURA 16. Código Interfaces apagadas

Verificamos que todas las interfaces estén apagadas

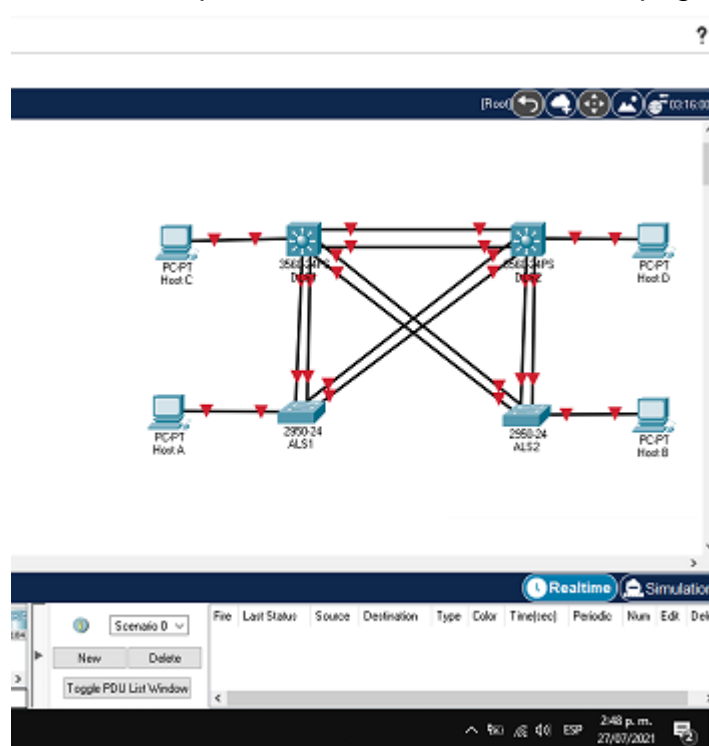


FIGURA 17. Interfaces apagadas

- b. Asignar un nombre a cada switch acorde con el escenario establecido.
Para DLS1

```
Switch#enable  
Switch#configure terminal  
Switch(config)#hostname DLS1  
DLS1(config)#
```

```
Para DLS2  
Switch#enable  
Switch#configure terminal  
Switch(config)#hostname DLS2  
DLS2(config)#
```

```
Para ALS1  
Switch#enable  
Switch#configure terminal  
Switch(config)#hostname ALS1  
ALS1(config)#
```

```
Para ALS2  
Switch#enable
```

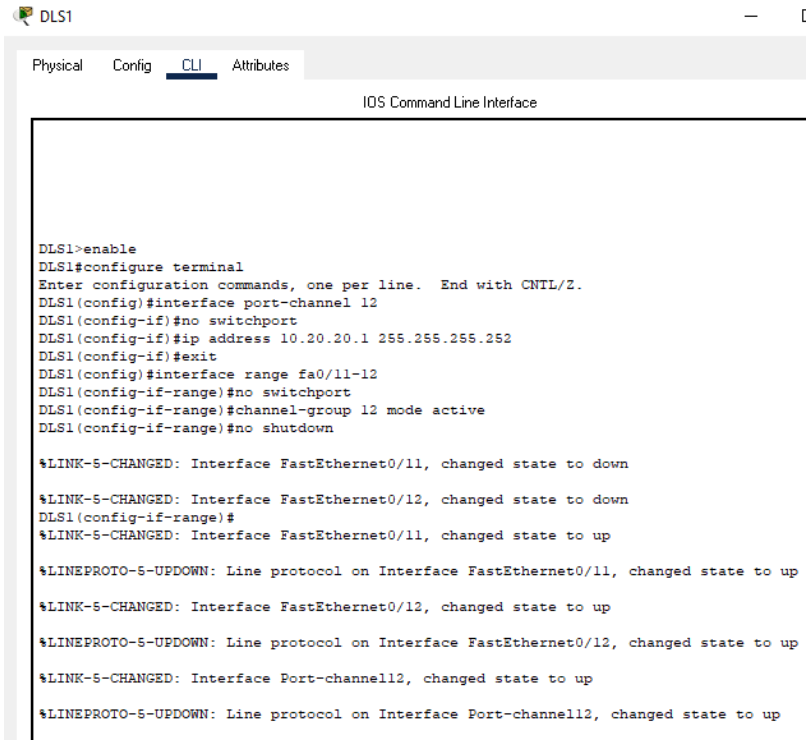
```
Switch#configure terminal
Switch(config)#hostname ALS2
ALS2(config)#
```

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 10.20.20.1/30 y para DLS2 utilizará 10.20.20.2/30.

Para DLS1

```
DLS1>enable
DLS1#configure terminal
DLS1(config)#interface port-channel 12
DLS1(config-if)#no switchport
DLS1(config-if)#ip address 10.20.20.1 255.255.255.252
DLS1(config-if)#exit
DLS1(config)#interface range fa0/11-12
DLS1(config-if-range)#no switchport
DLS1(config-if-range)#channel-group 12 mode active
DLS1(config-if-range)#no shutdown
DLS1(config-if-range)#exit
```



```
DLS1
Physical Config CLI Attributes
IOS Command Line Interface

DLS1>enable
DLS1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#interface port-channel 12
DLS1(config-if)#no switchport
DLS1(config-if)#ip address 10.20.20.1 255.255.255.252
DLS1(config-if)#exit
DLS1(config)#interface range fa0/11-12
DLS1(config-if-range)#no switchport
DLS1(config-if-range)#channel-group 12 mode active
DLS1(config-if-range)#no shutdown

%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to down
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to down
DLS1(config-if-range)#
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/11, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/12, changed state to up
%LINK-5-CHANGED: Interface Port-channell2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channell2, changed state to up
```

FIGURA 18. conexión entre DLS1 y DLS2 usando LACP en DLS1

```

Para DLS2
DLS2>enable
DLS2#configure terminal
DLS2(config)#interface port-channel 12
DLS2(config-if)#no switchport
DLS2(config-if)#ip address 10.20.20.1 255.255.255.252
DLS2(config-if)#exit
DLS2(config)#interface ran fa0/11-12
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
Physical Config CLI Attributes
IOS Command Line Interface

DLS2>enable
DLS2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#interface port-channel 12
DLS2(config-if)#no switchport
% Incomplete command.
DLS2(config-if)#ip address 10.20.20.2 255.255.255.252
DLS2(config-if)#exit
DLS2(config)#interface ran fa0/11-12
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)#
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/11, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/12, changed state to up
%LINK-5-CHANGED: Interface Port-channel12, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel12, changed state to up

```

FIGURA 19. conexión entre DLS1 y DLS2 usando LACP en DLS2

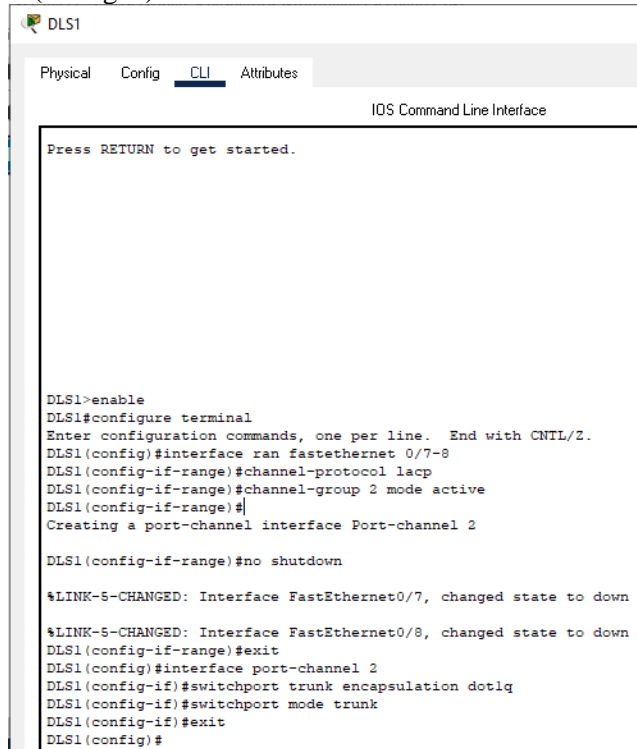
2. Los Port-channels en las interfaces Fa0/7 y Fa0/8 utilizarán LACP.

```

Para DLS1
DLS1>enable
DLS1#configure terminal
DLS1(config)#interface ran fastethernet 0/7-8
DLS1(config-if-range)#channel-protocol lacp
DLS1(config-if-range)#channel-group 2 mode active
DLS1(config-if-range)#
DLS1(config-if-range)#no shutdown
DLS1(config-if-range)#exit
DLS1(config)#interface port-channel 2
DLS1(config-if)#switchport trunk encapsulation dot1q

```

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



The screenshot shows a terminal window titled 'DLS1' with tabs for 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, and the text 'IOS Command Line Interface' is displayed. The terminal output shows the following sequence of commands and responses:

```
Press RETURN to get started.

DLS1>enable
DLS1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#interface range fastethernet 0/7-8
DLS1(config-if-range)#channel-protocol lacp
DLS1(config-if-range)#channel-group 2 mode active
DLS1(config-if-range)#
Creating a port-channel interface Port-channel 2

DLS1(config-if-range)#no shutdown

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

%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to down
DLS1(config-if-range)#exit
DLS1(config)#interface port-channel 2
DLS1(config-if)#switchport trunk encapsulation dot1q
DLS1(config-if)#switchport mode trunk
DLS1(config-if)#exit
DLS1(config)#
```

FIGURA 20. Port-channels en DLS1

Para DLS2

```
DLS2>enable
DLS2#configure terminal
DLS2(config)#interface range fastethernet 0/7-8
DLS2(config-if-range)#channel-protocol lacp
DLS2(config-if-range)#channel-group 2 mode active
DLS2(config-if-range)#
DLS2(config-if-range)#no shutdown
DLS2(config-if-range)#exit
DLS2(config)#interface port-channel 2
DLS2(config-if)#switchport trunk encapsulation dot1q
DLS2(config-if)#switchport mode trunk
DLS2(config-if)#exit
```

```
DLS2
Physical Config CLI Attributes
IOS Command Line Interface

DLS2>enable
DLS2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#interface range fastethernet 0/7-8
DLS2(config-if-range)#channel-protocol lacp
DLS2(config-if-range)#channel-group 2 mode active
DLS2(config-if-range)#
Creating a port-channel interface Port-channel 2

DLS2(config-if-range)#no shutdown

%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to down
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to down
DLS2(config-if-range)#exit
DLS2(config)#channel interface port-channe 2
^
% Invalid input detected at '^' marker.

DLS2(config)#channel interface port-channel 2
^
% Invalid input detected at '^' marker.

DLS2(config)#interface port-channel 2
DLS2(config-if)#switchport trunk encapsulation dot1q
DLS2(config-if)#switchport mode trunk
DLS2(config-if)#exit
DLS2(config)#
```

FIGURA 21. Port-channels en DLS2

Para ALS1

```
ALS1>enable
ALS1#configure terminal
ALS1(config)#interface range fastethernet 0/7-8
ALS1(config-if-range)#channel-protocol lacp
ALS1(config-if-range)#channel-group 2 mode active
ALS1(config-if-range)#no shutdown
ALS1(config-if-range)#exit
ALS1(config)#interface port-channel 2
ALS1(config-if)#switchport mode trunk
ALS1(config-if)#exit
```



```
ALS1
Physical Config CLI Attributes
IOS Command Line Interface
ALS1(config)#interface range fastEthernet 0/7-8
ALS1(config-if-range)#channel-protocol lacp
ALS1(config-if-range)#channel-group 2 mode active
ALS1(config-if-range)#
Creating a port-channel interface Port-channel 2
ALS1(config-if-range)#no shutdown

ALS1(config-if-range)#
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/7, changed st
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8, changed st
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/7, changed st
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/7, changed st
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8, changed st
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8, changed st
%LINK-5-CHANGED: Interface Port-channel2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel2, changed st
ALS1(config-if-range)#exit
ALS1(config)#interface port-channel 2
ALS1(config-if)#switchport mode trunk
ALS1(config-if)#exit
ALS1(config)#
```

FIGURA 22. Port-channels en ALS1

Para ALS2

ALS2>enable

ALS2#configure terminal

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

ALS2(config-if-range)#channel-protocol lacp

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

ALS2(config-if-range)#no shutdown

ALS2(config-if-range)#exit

ALS2(config)#interface port-channel 2

ALS2(config-if)#switchport mode trunk

ALS2(config-if)#exit

```
ALS2
Physical Config CLI Attributes
IOS Command Line Interface
ALS2(config)#interface range fastethernet 0/7-8
ALS2(config-if-range)#channel-protocol lacp
ALS2(config-if-range)#channel-group 2 mode active
ALS2(config-if-range)#
Creating a port-channel interface Port-channel 2
ALS2(config-if-range)#no shutdown

ALS2(config-if-range)#
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to u
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to u
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/
%LINK-5-CHANGED: Interface Port-channel2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel2,
ALS2(config-if-range)#exit
ALS2(config)#interface port-channel 2
ALS2(config-if)#switchport mode trunk
ALS2(config-if)#exit
ALS2(config)#
```

FIGURA 23. Port-channels en ALS2

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

Para DLS1

DLS1>enable

DLS1#configure terminal

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)#no shutdown

```
DLS1>enable
DLS1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#int ran fa0/9-10
DLS1(config-if-range)#switchport trunk encapsulation dot1q
DLS1(config-if-range)#switchport mode trunk
DLS1(config-if-range)#channel-group 4 mode desirable
DLS1(config-if-range)#
Creating a port-channel interface Port-channel 4

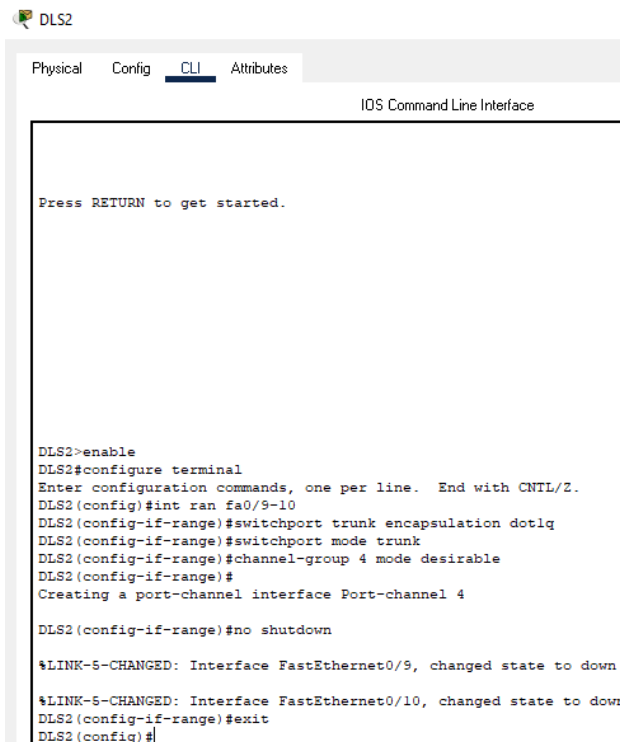
DLS1(config-if-range)#no shutdown

%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to down
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to down
DLS1(config-if-range)#exit
DLS1(config)#
```

FIGURA 24. PAgP en DLS1

Para DLS2

```
DLS2>enable
DLS2#configure terminal
DLS2(config)#int ran fa0/9-10
DLS2(config-if-range)#switchport trunk encapsulation dot1q
DLS2(config-if-range)#switchport mode trunk
DLS2(config-if-range)#channel-group 4 mode desirable
DLS2(config-if-range)#no shutdown
```

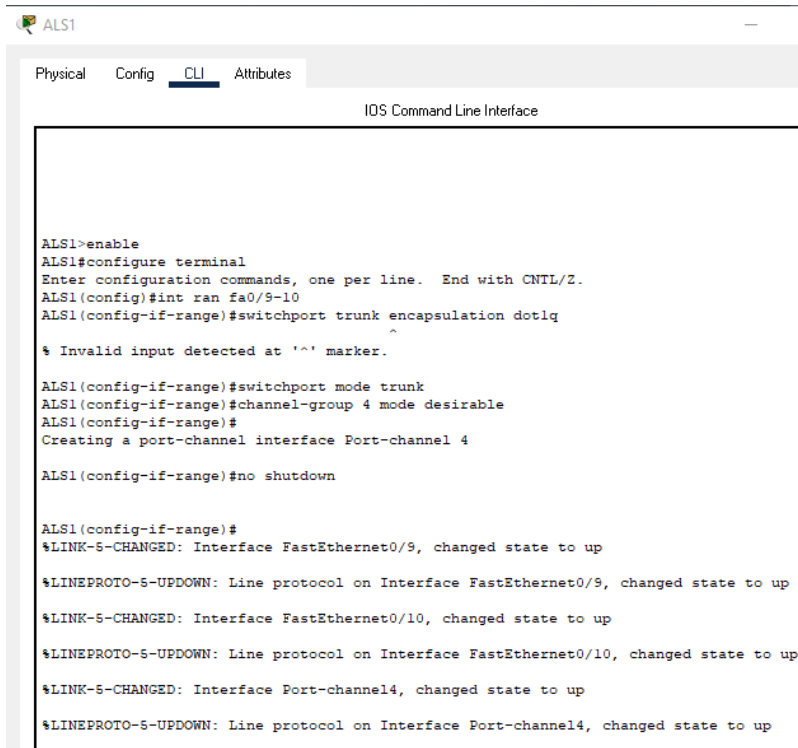



The screenshot shows a network device CLI window titled "DLS2" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The text inside the window reads: "Press RETURN to get started." followed by a series of configuration commands: "DLS2>enable", "DLS2#configure terminal", "DLS2 (config)#int ran fa0/9-10", "DLS2 (config-if-range)#switchport trunk encapsulation dot1q", "DLS2 (config-if-range)#switchport mode trunk", "DLS2 (config-if-range)#channel-group 4 mode desirable", "DLS2 (config-if-range)#", "Creating a port-channel interface Port-channel 4", "DLS2 (config-if-range)#no shutdown", "%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to down", "%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to down", "DLS2 (config-if-range)#exit", and "DLS2 (config)#".

FIGURA 25. PAgP en DSL2

Para ALS1

```
ALS1>enable
ALS1#configure terminal
ALS1(config)#int ran fa0/9-10
ALS1(config-if-range)#switchport mode trunk
ALS1(config-if-range)#channel-group 4 mode desirable
ALS1(config-if-range)#no shutdown
```



```
ALS1>enable
ALS1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
ALS1(config)#int ran 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 4 mode desirable
ALS1(config-if-range)#
Creating a port-channel interface Port-channel 4

ALS1(config-if-range)#no shutdown

ALS1(config-if-range)#
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/9, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10, changed state to up
%LINK-5-CHANGED: Interface Port-channel4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel4, changed state to up
```

FIGURA 26. PAgP en ASL1

Para ALS2

```
ALS2>enable
ALS2#configure terminal
ALS2(config)#int ran fa0/9-10
ALS2(config-if-range)#switchport mode trunk
ALS2(config-if-range)#channel-group 4 mode desirable
ALS2(config-if-range)#no shutdown
```

```
ALS2>enable
ALS2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
ALS2(config)#int ran fa0/9-10
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

ALS2(config-if-range)#no shutdown

ALS2(config-if-range)#
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/9, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10, changed state to up
%LINK-5-CHANGED: Interface Port-channel4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel4, changed state to up
```

FIGURA 27. PAgP en ALS2

4. Todos los puertos troncales serán asignados a la VLAN 500 como la VLAN nativa.

```
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)#
```

The screenshot shows the CLI interface for a device named DLS1. The interface has tabs for Physical, Config, CLI (selected), and Attributes. The title bar reads "IOS Command Line Interface". The main area contains the following text:

```
DLS1 con0 is now available

Press RETURN to get started.

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

FIGURA 28. Puertos troncales VLAN 500 en DLS1

Para 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)#
```

The screenshot shows a terminal 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 includes the following text:

```
DLS2 con0 is now available

Press RETURN to get started.

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

FIGURA 29. Puertos troncales VLAN 500 en DLS2

Para 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 Po4
ALS1 (config-if)#switchport trunk native vlan 500
ALS1 (config-if)#
```

The screenshot shows the CLI interface for device ALS1. The tabs at the top are Physical, Config, CLI (selected), and Attributes. The title is 'IOS Command Line Interface'. The output shows the device is ready for configuration. The user enters 'enable' to reach the privileged EXEC mode, then 'configure terminal' to enter global configuration mode. They then configure two ports: Po1 and Po4, setting them as trunk ports with native VLAN 500.

```
ALS1 con0 is now available

Press RETURN to get started.

ALS1>enable
ALS1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
ALS1(config)#interface Po1
ALS1(config-if)#switchport trunk native vlan 500
ALS1(config-if)#exit
ALS1(config)#interface Po4
ALS1(config-if)#switchport trunk native vlan 500
ALS1(config-if)#exit
ALS1(config)#
```

FIGURA 30. Puertos troncales VLAN 500 en ALS1

Para 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 Po3
ALS2(config-if)#switchport trunk native vlan 500
ALS2(config-if)#
```

```

ALS2 Port-channel12 (500).
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered c
DLS2 Port-channel2 (500).

ALS2(config)#INTERFACE p02
ALS2(config-if)#INTERFACE
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered c
DLS1 FastEthernet0/9 (500).

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered c
with DLS1 FastEthernet0/9 (500).

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered c
DLS1 FastEthernet0/10 (500).

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered c
with DLS1 FastEthernet0/10 (500).

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered c
DLS1 Port-channel4 (500).

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered c
with DLS1 Port-channel4 (500).

^
% Invalid input detected at '^' marker.

ALS2(config-if)#exit
ALS2(config)#interface Po2
ALS2(config-if)#switchport trunk native vlan 500
ALS2(config-if)#exit
ALS2(config)#interface Po3
ALS2(config-if)#switchport trunk native vlan 500
ALS2(config-if)#exit
ALS2(config)#

```

FIGURA 31. Puertos troncales VLAN 500 en ALS2

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

Nota:

Esta configuración que se pide realizar en el programa Packet tracer, no es posible ya que no soporta la versión 3; mediante el comando “show vtp status” se evidencia que es compatible con la versión 2 de VTP por lo que se ejecuta en la versión 2.

1. Utilizar el nombre de dominio CISCO con la contraseña ccnp321


```

DLS1>enable
DLS1#configure terminal
DLS1(config)#vtp domain CISCO
DLS1(config)#vtp pass ccnp321
DLS1(config)#vtp version 2

```

```
DLS1
Physical Config CLI Attributes
IOS Command Line Interface

DLS1 con0 is now available

Press RETURN to get started.

DLS1>enable
DLS1#configure terminal
^
% Invalid input detected at '^' marker.

DLS1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z
DLS1(config)#vtp domain CISCO
Changing VTP domain name from NULL to CISCO
DLS1(config)#vtp pass ccnp321
Setting device VLAN database password to ccnp321
DLS1(config)#
```

FIGURA 32. Configuración dominio CISCO y contraseña

```
DLS2
Physical Config CLI Attributes
IOS Command Line Interface

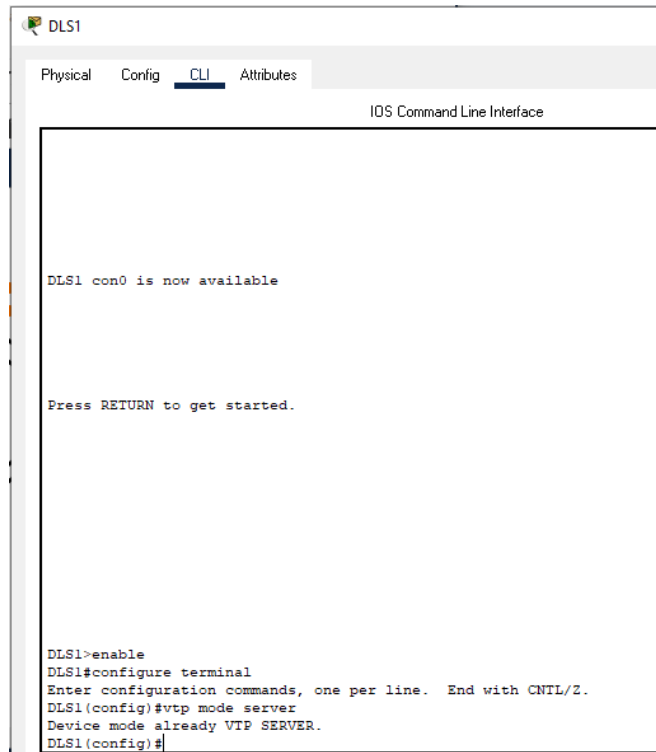
DLS2 con0 is now available

Press RETURN to get started.

DLS2>enable
DLS2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#vtp domain CISCO
Changing VTP domain name from NULL to CISCO
DLS2(config)#vtp pass ccnp321
Setting device VLAN database password to ccnp321
DLS2(config)#
```

FIGURA 33. DLS1 como servidor principal

2. Configurar DLS1 como servidor principal para las VLAN.



```
DLS1
Physical Config CLI Attributes
IOS Command Line Interface

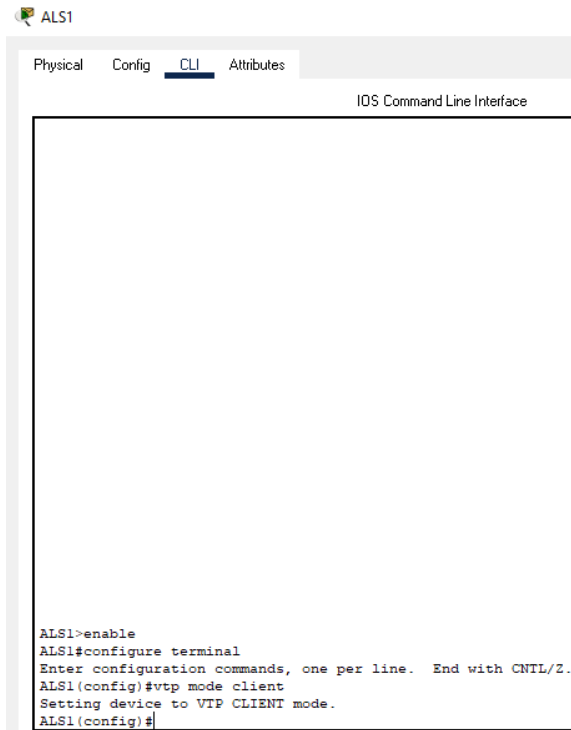
DLS1 con0 is now available

Press RETURN to get started.

DLS1>enable
DLS1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#vtp mode server
Device mode already VTP SERVER.
DLS1(config)#
```

FIGURA 34. DLS1 como servidor principal

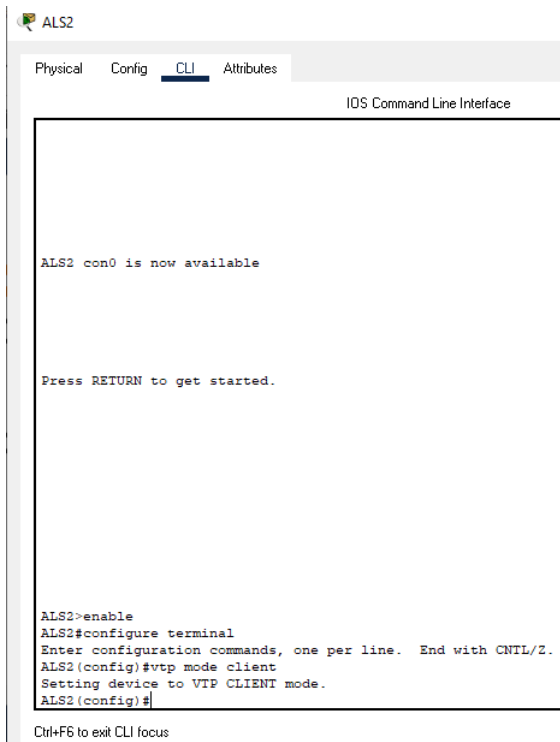
3. Configurar ALS1 y ALS2 como clientes VTP.



```
ALS1
Physical Config CLI Attributes
IOS Command Line Interface

ALS1>enable
ALS1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
ALS1(config)#vtp mode client
Setting device to VTP CLIENT mode.
ALS1(config)#
```

FIGURA 35. ALS1 como cliente VTP



```
ALS2
Physical Config CLI Attributes
IOS Command Line Interface

ALS2 con0 is now available

Press RETURN to get started.

ALS2>enable
ALS2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
ALS2(config)#vtp mode client
Setting device to VTP CLIENT mode.
ALS2(config)#
```

Ctrl+F6 to exit CLI focus

FIGURA 36. ALS2 como cliente VTP

e. Configurar en el servidor principal las siguientes VLAN:

Tabla 3. VLAN

Número de VLAN	Nombre de VLAN	Número de VLAN	Nombre de VLAN
600	NATIVA	420	PROVEEDORES
15	ADMON	100	SEGUROS
240	CLIENTES	105	VENTAS
111	MULTIMEDIA	355	PERSONAL

Aplicamos el código en DSL 1

```
DLS1(config)#VLAN 600
DLS1(config-vlan)#NAME NATIVA
DLS1(config-vlan)#VLAN 15
DLS1(config-vlan)#NAME ADMON
DLS1(config-vlan)#VLAN 240
DLS1(config-vlan)#NAME CLIENTES
DLS1(config-vlan)#VLAN 420
DLS1(config-vlan)#NAME PROVEEDORES
DLS1(config)#VLAN 600
DLS1(config-vlan)#NAME NATIVA
DLS1(config-vlan)#VLAN 15
DLS1(config-vlan)#NAME ADMON
DLS1(config-vlan)#VLAN 240
DLS1(config-vlan)#NAME CLIENTES
DLS1(config-vlan)#VLAN 420
DLS1(config-vlan)#NAME PROVEEDORES
```

Nota:

El switch elegido (3560), en las VLAN se identifican con un ID entre 1 y 1005, para las VLAN entre 1006 y 4094, las cuales son de rango extendido que se usan para redes Token Ring; por lo cual ajustamos las VLAN para que sean de rango ordinario, por lo tanto; MULTIMEDIA VLAN 111, VENTAS VLAN 105, PERSONAL VLAN 355

f. En DLS1, suspender la VLAN 420.

Usamos el siguiente código en DSL1

```
DLS1(config)#vlan 420
DLS1(config-vlan)#no vlan 420
DLS1(config)#
```

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

Usamos el código

```
DLS2(config)#vtp mode transparent
DLS2(config)#VLAN 600
DLS2(config-vlan)#NAME NATIVA
DLS2(config-vlan)#VLAN 15
DLS2(config-vlan)#NAME ADMON
DLS2(config-vlan)#VLAN 240
DLS2(config-vlan)#NAME CLIENTES
DLS2(config-vlan)#VLAN 111
DLS2(config-vlan)#NAME MULTIMEDIA
DLS2(config-vlan)#VLAN 420
DLS2(config-vlan)#NAME PROVEEDORES
DLS2(config-vlan)#VLAN 100
DLS2(config-vlan)#NAME SEGUROS
DLS2(config-vlan)#VLAN 105
DLS2(config-vlan)#NAME VENTAS
DLS2(config-vlan)#VLAN 355
DLS2(config-vlan)#NAME PERSONAL
```

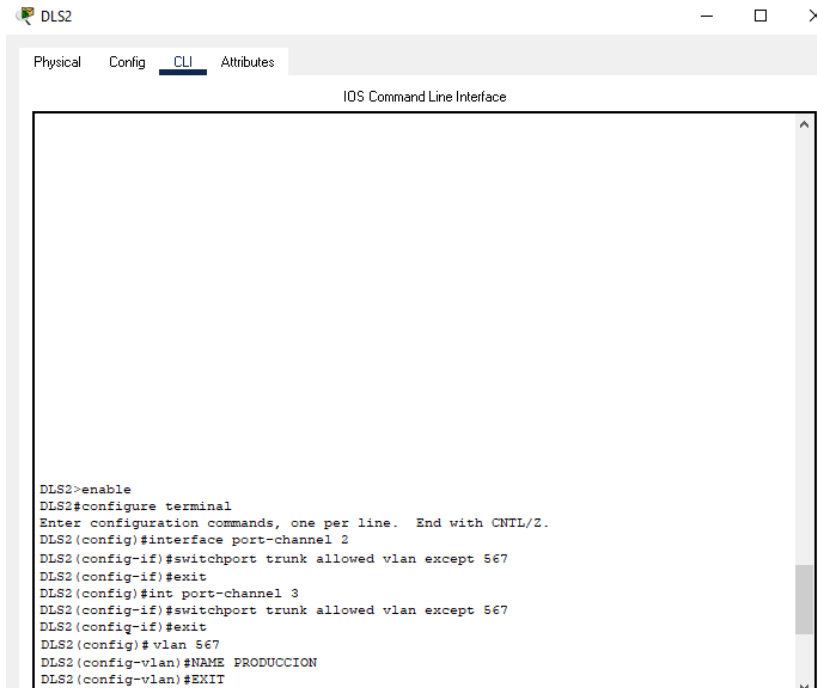
h. Suspende VLAN 420 en DLS2.

Usamos el siguiente código en DLS2

```
DLS1(config)#vlan 420
DLS2(config-vlan)#no vlan 420
DLS2(config)#
```

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.

```
DLS2>enable
DLS2#configure terminal
DLS2(config)#interface port-channel 2
DLS2(config-if)#switchport trunk allowed vlan except 567
DLS2(config-if)#exit
DLS2(config)#int port-channel 3
DLS2(config-if)#switchport trunk allowed vlan except 567
DLS2(config-if)#exit
DLS2(config)#vlan 567
DLS2(config-vlan)#NAME PRODUCCION
DLS2(config-vlan)#EXIT
DLS2(config)#
```



```
DLS2>enable
DLS2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#interface port-channel 2
DLS2(config-if)#switchport trunk allowed vlan except 567
DLS2(config-if)#exit
DLS2(config)#int port-channel 3
DLS2(config-if)#switchport trunk allowed vlan except 567
DLS2(config-if)#exit
DLS2(config)#vlan 567
DLS2(config-vlan)#NAME PRODUCCION
DLS2(config-vlan)#EXIT
```

FIGURA 37. Creación VLAN 567

j. Configurar DLS1 como Spanning tree root para las VLANs 1, 12, 420, 600, 1050, 1112 y 3550 y como raíz secundaria para las VLAN 100 y 240.

Usamos el siguiente código

```
DLS1>enable
DLS1#configure terminal
DLS1(config)#spanning-tree vlan 1,12,420,600,105,111,355 root primary
DLS1(config)#spanning-tree vlan 100,240 root secondary
```

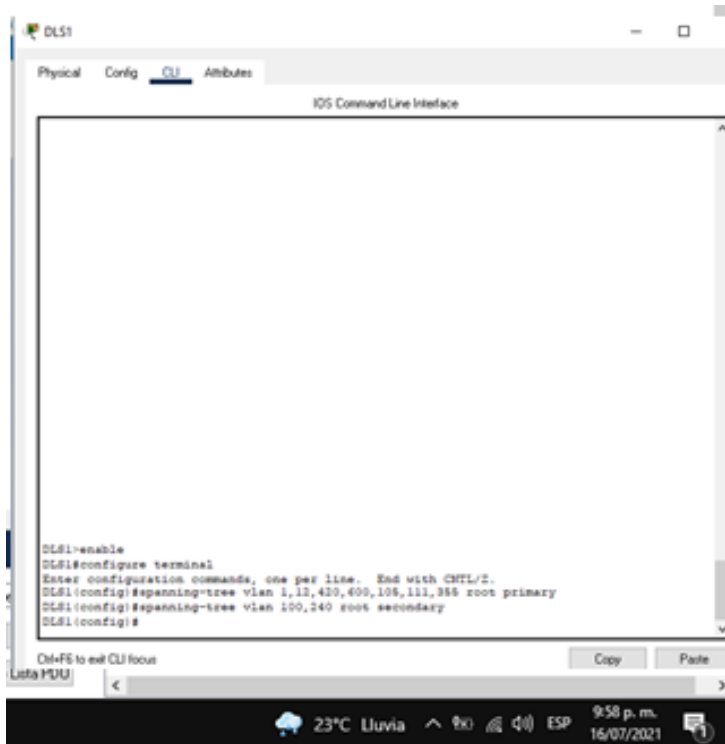


FIGURA 38. DLS1 como Spanning tree root

k. Configurar DLS2 como Spanning tree root para las VLAN 100 y 240 y como una raíz secundaria para las VLAN 15, 420, 600, 1050, 11112 y 3550.

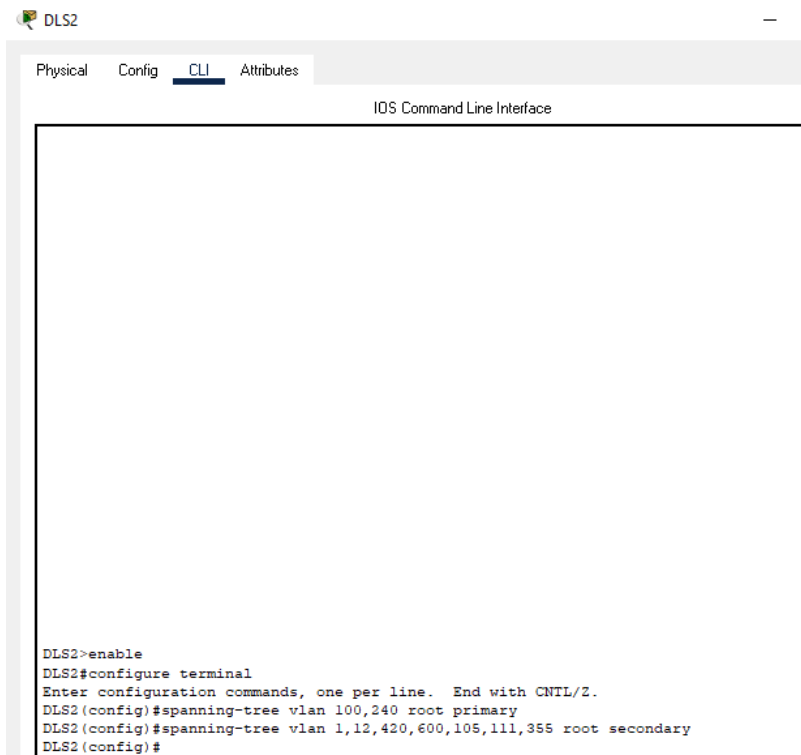
Aplicamos el siguiente código

```
DLS2#configure terminal
```

```
DLS2(config)#spanning-tree vlan 100,240 root primary
```

```
DLS2(config)#spanning-tree vlan 1,12,420,600,105,111,355 root secondary
```

```
DLS2(config)#
```



The image shows a screenshot of a network switch's CLI interface. At the top, there are tabs for 'Physical', 'Config', 'CLI', and 'Attributes', with 'CLI' selected. Below the tabs, the text 'IOS Command Line Interface' is displayed. The main area of the window contains the following text:

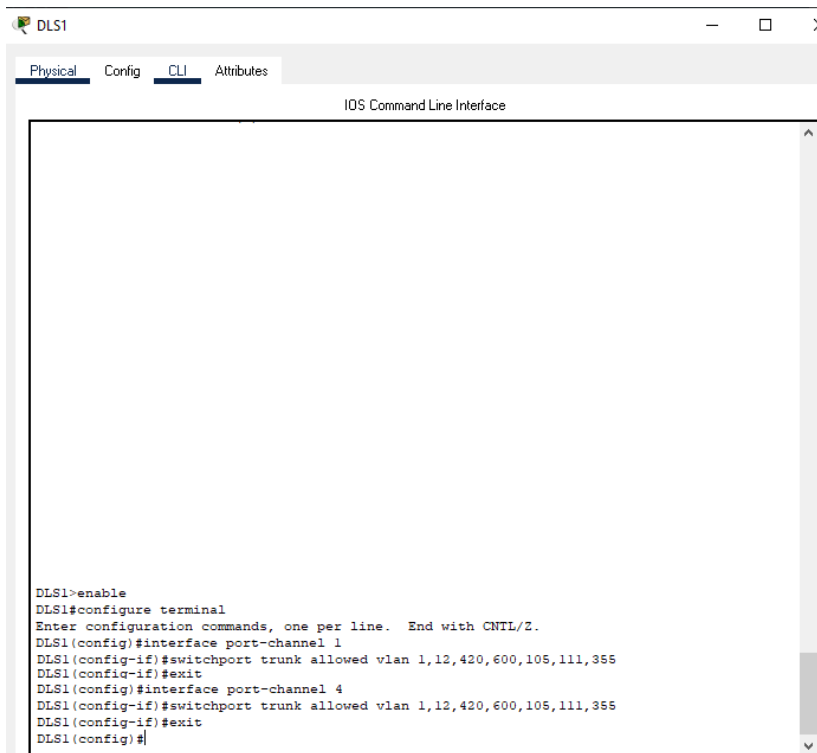
```
DLS2>enable
DLS2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#spanning-tree vlan 100,240 root primary
DLS2(config)#spanning-tree vlan 1,12,420,600,105,111,355 root secondary
DLS2(config)#
```

FIGURA 39. DLS2 como Spanning tree root

I. 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.

Aplicamos el siguiente código

```
DLS1>enable
DLS1#configure terminal
DLS1(config)#interface port-channel 1
DLS1(config-if)#switchport trunk allowed vlan 1,12,420,600,105,111,355
DLS1(config-if)#exit
DLS1(config)#interface port-channel 4
DLS1(config-if)#switchport trunk allowed vlan 1,12,420,600,105,111,355
DLS1(config-if)#exit
```



```
DLS1>enable
DLS1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#interface port-channel 1
DLS1(config-if)#switchport trunk allowed vlan 1,12,420,600,105,111,355
DLS1(config-if)#exit
DLS1(config)#interface port-channel 4
DLS1(config-if)#switchport trunk allowed vlan 1,12,420,600,105,111,355
DLS1(config-if)#exit
DLS1(config)#
```

FIGURA 40. configuración de puertos troncales DLS1

Para DLS2

```
DLS2>enable
```

```
DLS2#configure terminal
```

```
DLS2(config)#interface port-channel 1
```

```
DLS2(config-if)#switchport trunk allowed vlan 1,12,420,600,105,111,355
```

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

```
DLS2(config)#interface port-channel 4
```

```
DLS2(config-if)#switchport trunk allowed vlan 1,12,420,600,105,111,355
```

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



```

DLS2>enable
DLS2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#interface port-channel 1
DLS2(config-if)#switchport trunk allowed vlan 1,12,420,600,105,111,355
DLS2(config-if)#exit
DLS2(config)#interface port-channel 4
DLS2(config-if)#switchport trunk allowed vlan 1,12,420,600,105,111,355
DLS2(config-if)#
DLS2(config-if)#exit
DLS2(config)#

```

FIGURA 41. configuración de puertos troncales DLS2

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

Tabla 4. Puertos de accesos.

Interfaz	DLS1	DLS2	ALS1	ALS2
Interfaz Fa0/6	3550	15, 1050	100, 1050	240
Interfaz Fa0/15	1112	1112	1112	1112
Interfaces F0 /16-18		567		

Aplicamos el siguiente código para DLS1

```

DLS1>enable
DLS1#configure terminal
DLS1(config)#interface f0/6
DLS1(config-if)#switchport mode acces
DLS1(config-if)#switchport Access vlan 355
DLS1(config-if)#no shutdown
DLS1(config-if)#interface f0/15

```

```
DLS1(config-if)#switchport mode Access
DLS1(config-if)#switchport Access vlan 111
DLS1(config-if)#no shutdown
```

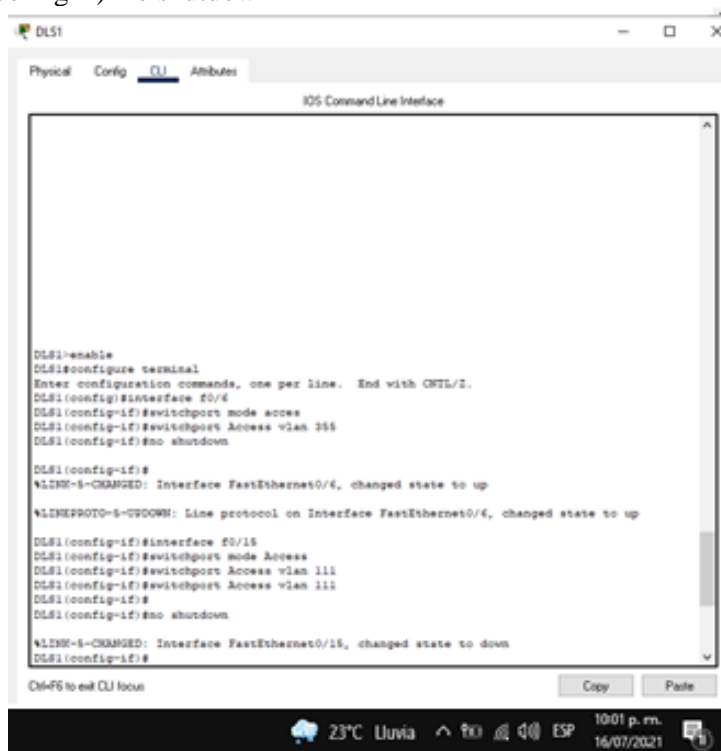
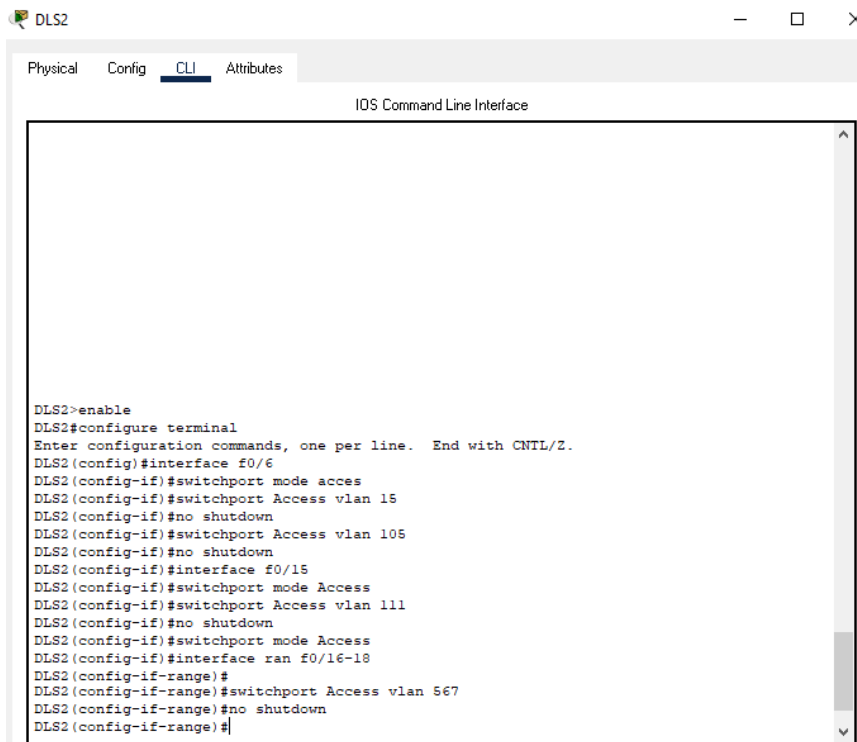


FIGURA 42. configuración de interfaces para DLS1

Aplicamos el siguiente código para DLS2

```
DLS2>enable
DLS2#configure terminal
DLS2(config)#interface f0/6
DLS2(config-if)#switchport mode access
DLS2(config-if)#switchport Access vlan 15
DLS2(config-if)#no shutdown
DLS2(config-if)#switchport Access vlan 105
DLS2(config-if)#no shutdown
DLS2(config-if)#interface f0/15
DLS2(config-if)#switchport mode Access
DLS2(config-if)#switchport Access vlan 111
DLS2(config-if)#no shutdown
DLS2(config-if)#switchport mode Access
DLS2(config-if)#interface ran f0/16-18
DLS2(config-if)#switchport Access vlan 567
DLS2(config-if)#no shutdown
```

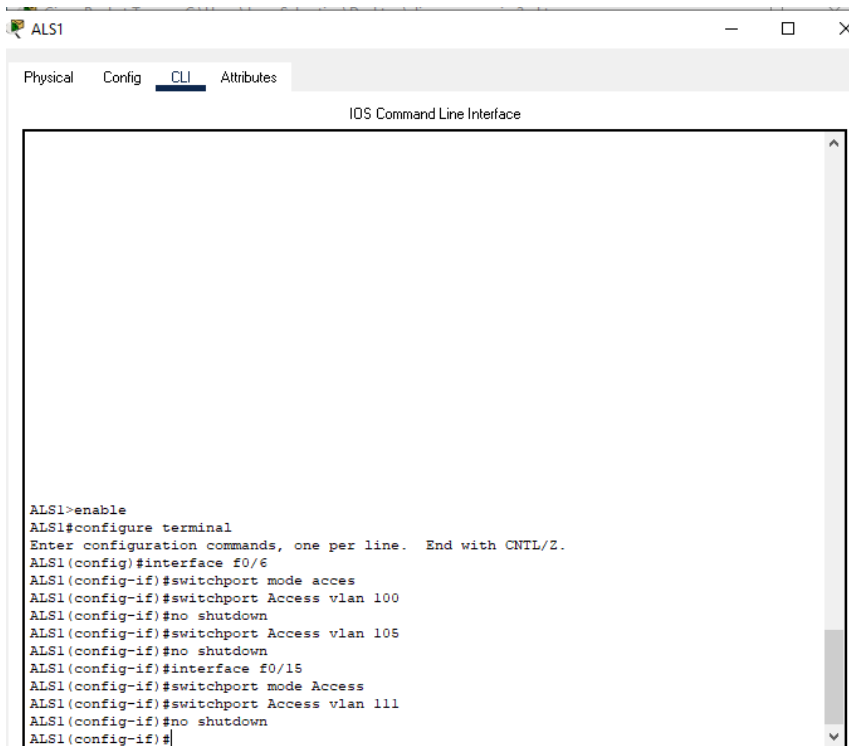
A screenshot of a network device's CLI window. The window title is 'DLS2' and it has tabs for 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, showing the 'IOS Command Line Interface'. The terminal text shows the following commands and their outputs:

```
DLS2>enable
DLS2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
DLS2(config)#interface f0/6
DLS2(config-if)#switchport mode acces
DLS2(config-if)#switchport Access vlan 15
DLS2(config-if)#no shutdown
DLS2(config-if)#switchport Access vlan 105
DLS2(config-if)#no shutdown
DLS2(config-if)#interface f0/15
DLS2(config-if)#switchport mode Access
DLS2(config-if)#switchport Access vlan 111
DLS2(config-if)#no shutdown
DLS2(config-if)#switchport mode Access
DLS2(config-if)#interface ran f0/16-18
DLS2(config-if-range)#
DLS2(config-if-range)#switchport Access vlan 567
DLS2(config-if-range)#no shutdown
DLS2(config-if-range)#
```

FIGURA 43. configuración de interfaces para DLS2

Aplicamos el siguiente código para ALS1

```
ALS1>enable
ALS1#configure terminal
ALS1(config)#interface f0/6
ALS1(config-if)#switchport mode acces
ALS1(config-if)#switchport Access vlan 100
ALS1(config-if)#no shutdown
ALS1(config-if)#switchport Access vlan 105
ALS1(config-if)#no shutdown
ALS1(config-if)#interface f0/15
ALS1(config-if)#switchport mode Access
ALS1(config-if)#switchport Access vlan 111
ALS1(config-if)#no shutdown
```



```
ALS1>enable
ALS1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
ALS1(config)#interface f0/6
ALS1(config-if)#switchport mode acces
ALS1(config-if)#switchport Access vlan 100
ALS1(config-if)#no shutdown
ALS1(config-if)#switchport Access vlan 105
ALS1(config-if)#no shutdown
ALS1(config-if)#interface f0/15
ALS1(config-if)#switchport mode Access
ALS1(config-if)#switchport Access vlan 111
ALS1(config-if)#no shutdown
ALS1(config-if)#
```

FIGURA 44. configuración de interfaces para ALS1

Para ALS2

```
ALS2>enable
ALS2#configure terminal
ALS2(config)#interface f0/6
ALS2(config-if)#switchport mode acces
ALS2(config-if)#switchport Access vlan 240
ALS2(config-if)#no shutdown
ALS2(config-if)#interface f0/15
ALS2(config-if)#switchport mode Access
ALS2(config-if)#switchport Access vlan 111
ALS2(config-if)#no shutdown
```

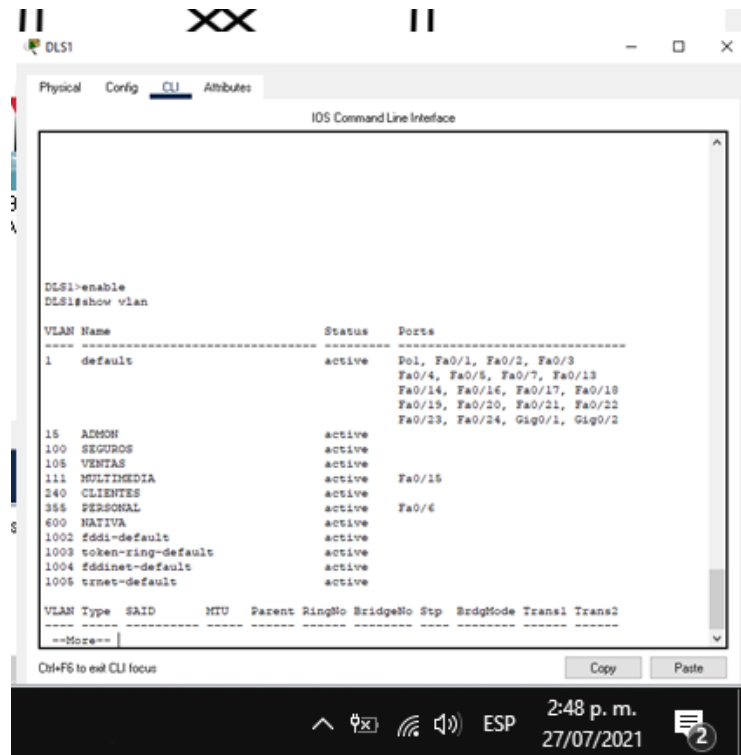


FIGURA 45. configuración de interfaces para ALS2

Parte 2.

Conectividad de red de prueba y las opciones configuradas.

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

```

DLS1>enable
DLS1#show vlan

VLAN Name                Status    Ports
-----
1    default                 active    Po1, Fa0/1, Fa0/2, Fa0/3
                                           Fa0/4, Fa0/5, Fa0/7, 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

15   ADMON                   active
100  SEGUROS                  active
105  VENTAS                   active
111  MULTIMEDIA               active    Fa0/15
240  CLIENTES                 active
355  PERSONAL                 active    Fa0/6
600  NATIVA                   active
1002 fddi-default             active
1003 token-ring-default      active
1004 fddinet-default         active
1005 trnet-default          active

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

```

FIGURA 46. Verificación de VLAN para DLS1

```

DLS2>enable
DLS2#show vlan

VLAN Name                Status    Ports
-----
1    default                 active    Po1, Po3, Fa0/1, Fa0/2
                                           Fa0/3, Fa0/4, Fa0/5, Fa0/13
                                           Fa0/14, Fa0/19, Fa0/20, Fa0/21
                                           Fa0/22, Fa0/23, Fa0/24, Gig0/1
                                           Gig0/2

12   VLAN0012                 active
15   ADMON                    active
100  SEGUROS                  active
101  VLAN0101                 active
105  VENTAS                   active    Fa0/6
111  MULTIMEDIA               active    Fa0/15
240  CLIENTES                 active
355  PERSONAL                 active
420  PROVEEDORES              active
567  PRODUCCION               active    Fa0/16, Fa0/17, Fa0/18
600  NATIVA                   active
1002 fddi-default             active
1003 token-ring-default      active
1004 fddinet-default         active

--More--

```

FIGURA 47. Verificación de VLAN para DLS2

```

ALS1
Physical Config CLI Attributes
IOS Command Line Interface

ALS1>enable
ALS1#show vlan

VLAN Name                Status   Ports
-----
1    default                active   Po1, 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

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
-----
1    enet    100001   1500   -       -       -     -       0       0
1002 fddi   101002   1500   -       -       -     -       0       0
1003 tr    101003   1500   -       -       -     -       0       0
1004 fdnet 101004   1500   -       -       -     ieee   0       0
1005 trnet 101005   1500   -       -       -     ibm    0       0

Ctrl+F6 to exit CLI focus
Copy Paste

```

FIGURA 48. Verificación de VLAN para ALS1

```

ALS2
Physical Config CLI Attributes
IOS Command Line Interface

ALS2>enable
ALS2#show vlan

VLAN Name                Status   Ports
-----
1    default                active   Po3, 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

1002 fddi-default         active
1003 token-ring-default   active
1004 fddinet-default      active
1005 trnet-default        active

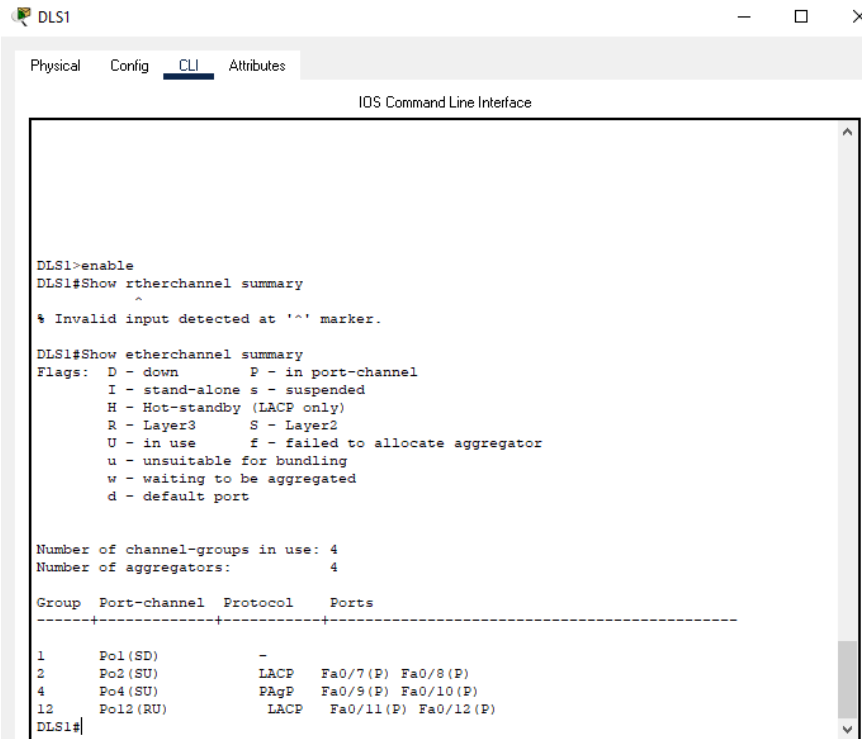
VLAN Type  SAID      MTU   Parent  RingNo BridgeNo  Stp   BrdgMode Trans1 Trans2
-----
1    enet    100001   1500   -       -       -     -       0       0
1002 fddi   101002   1500   -       -       -     -       0       0
1003 tr    101003   1500   -       -       -     -       0       0
1004 fdnet 101004   1500   -       -       -     ieee   0       0
1005 trnet 101005   1500   -       -       -     ibm    0       0

VLAN Type  SAID      MTU   Parent  RingNo BridgeNo  Stp   BrdgMode Trans1 Trans2
--More--
Ctrl+F6 to exit CLI focus
Copy Paste

```

FIGURA 49. Verificación de VLAN para ALS2

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



```
DLS1>enable
DLS1#Show rtherchannel summary
^
% Invalid input detected at '^' marker.
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: 4
Number of aggregators:          4

Group  Port-channel  Protocol    Ports
-----+-----+-----+-----
1      Po1 (SD)         -           -
2      Po2 (SU)         LACP       Fa0/7 (P) Fa0/8 (P)
4      Po4 (SU)         PAgP       Fa0/9 (P) Fa0/10 (P)
12     Po12 (RU)        LACP       Fa0/11 (P) Fa0/12 (P)
DLS1#
```

FIGURA 50. EtherChannel en DLS1


```

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

Number of channel-groups in use: 5
Number of aggregators:          5

Group  Port-channel  Protocol    Ports
-----+-----+-----+-----
1      Po1 (SD)         -           -
2      Po2 (SU)         LACP        Fa0/7 (P) Fa0/8 (P)
3      Po3 (SD)         -           -
4      Po4 (SU)         PAgP        Fa0/9 (P) Fa0/10 (P)
12     Po12 (RU)        LACP        Fa0/11 (P) Fa0/12 (P)
DLS2#

```

Ctrl+F6 to exit CLI focus

FIGURA 51. EtherChannel en DLS2

```

ALS1>enable
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: 3
Number of aggregators:          3

Group  Port-channel  Protocol    Ports
-----+-----+-----+-----
1      Po1 (SD)         -           -
2      Po2 (SU)         LACP        Fa0/7 (P) Fa0/8 (P)
4      Po4 (SU)         PAgP        Fa0/9 (P) Fa0/10 (P)
ALS1#

```

FIGURA 52. EtherChannel en ALS1

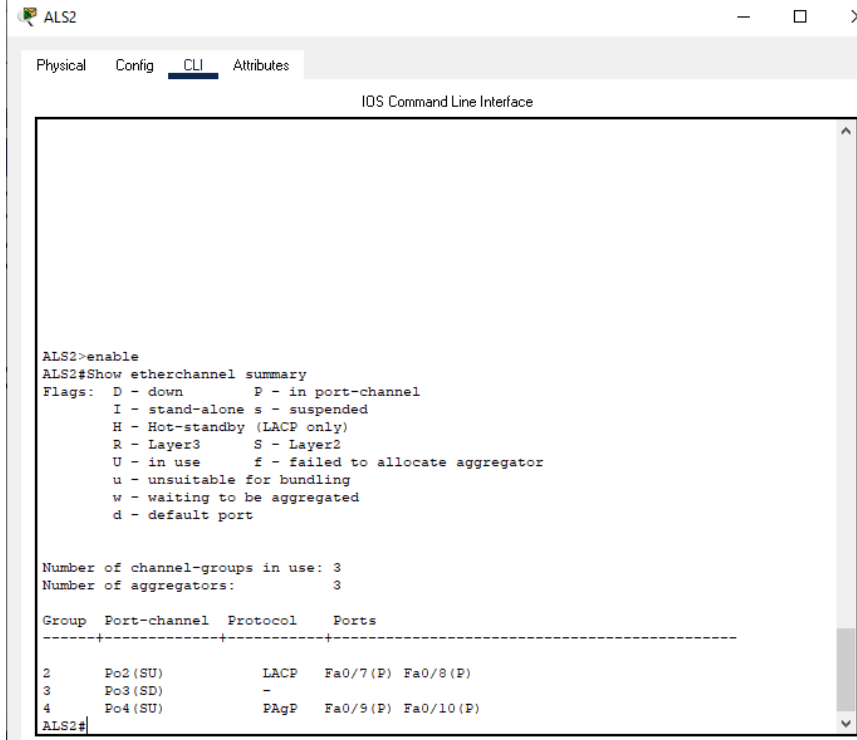
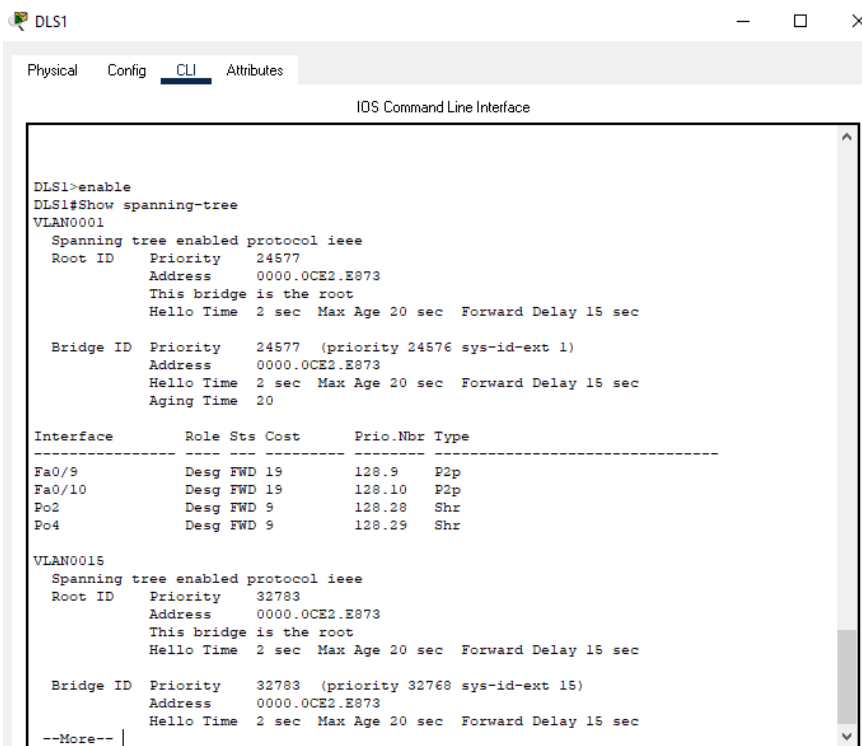


FIGURA 53. EtherChannel en ALS2

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



```
DLS1>enable
DLS1#Show spanning-tree
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    24577
            Address    0000.0CE2.E873
            This bridge is the root
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

  Bridge ID  Priority    24577 (priority 24576 sys-id-ext 1)
            Address    0000.0CE2.E873
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
            Aging Time 20

Interface   Role Sts Cost      Prio.Nbr Type
-----
Fa0/9       Desg FWD 19       128.9   F2p
Fa0/10      Desg FWD 19       128.10  F2p
Po2         Desg FWD 9        128.28  Shr
Po4         Desg FWD 9        128.29  Shr

VLAN0015
  Spanning tree enabled protocol ieee
  Root ID    Priority    32783
            Address    0000.0CE2.E873
            This bridge is the root
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

  Bridge ID  Priority    32783 (priority 32768 sys-id-ext 15)
            Address    0000.0CE2.E873
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
--More--
```

FIGURA 54. configuración de Spanning tree en DLS1

DLS2

Physical Config **CLI** Attributes

IOS Command Line Interface

```

DLS2>enable
DLS2#Show spanning-tree
VLAN0001
Spanning tree enabled protocol ieee
Root ID Priority 24577
Address 0000.0CE2.E873
Cost 18
Port 29(Port-channel4)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 28673 (priority 28672 sys-id-ext 1)
Address 00D0.97BE.E154
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20

Interface Role Sts Cost Prio.Nbr Type
-----
Fa0/9 Desg FWD 19 128.9 P2p
Fa0/10 Desg FWD 19 128.10 P2p
Po4 Root FWD 9 128.29 Shr
Po2 Altn BLK 9 128.28 Shr

VLAN0012
Spanning tree enabled protocol ieee
Root ID Priority 28684
Address 00D0.97BE.E154
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 28684 (priority 28672 sys-id-ext 12)
Address 00D0.97BE.E154
--More--

```

FIGURA 55. configuración de Spanning tree en DLS2

CONCLUSIONES

En este proceso que evidencie para dar cuenta de las habilidades y competencias adquiridas en Diplomado CCNP; mi intención fue reflejar como durante el primer escenario o momento de aprendizaje; logre reforzar conocimientos adquiridos durante la realización de los laboratorios de cada una de las unidades; Cabe aclarar que estas unidades fueron además evaluadas en la plataforma netacad, proceso evaluativo que cumplir a cabalidad.

En este diplomado se nos permitió comprobar de manera práctica el protocolo OSPF (Open Shortest Path First) que permiten que los paquetes de comunicación busquen siempre la ruta más eficiente, para la transmisión de información; lo cual permite que las redes sean redundantes y más estables; aprendizaje que resalto pues eran una de mis falencias al momento inicial del proceso del diplomado y que hoy ya interiorice para mi que hacer laboral.

Un aspecto importante y que se reforzo constantemente dentro del diplomado, fue sobre la redistribución de un protocolo a través del otro. Un ejemplo es que para redistribuir las rutas EIGRP (Enhanced Interior Gateway Routing Protocol) en OSPF (Open Shortest Path First); se realizó la asignación de un costo de 80000 y luego redistribuya las rutas OSPF en EIGRP usando un ancho de banda T1 y 20,000 microsegundos de retardo, también se realizó la configuración inicial de los dispositivos, la asignación del direccionamiento en las interfaces seriales según con el escenario propuesto.

En esta línea en el segundo escenario; los conocimientos previos son sumamente importantes a la hora de ejecutar el código de configuración, de lo contrario puede presentarse muchos errores, situación que se materializa en repetir el código varias veces.

Se logró interiorizar los usos que pueden llegar a tener el código de configuración y los protocolos para las VTP; luego se pudo aprovechar para actualizar las VLAN a las VLAN solicitadas y así crear configuraciones especiales para cada cliente, estableciendo VLANs a cada uno de ellos, situación que va mejorando la administración, la seguridad y la estabilidad de los procesos.

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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). EIGRP Implementation. Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide CCNP ROUTE 300-101. Recuperado de <https://1drv.ms/b/s!AmIJYei-NT1IlnMfy2rhPZHwEoWx>