

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

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA - UNAD  
ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA - ECBTI  
INGENIERÍA DE TELECOMUNICACIONES  
DUITAMA - BOYACA  
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Diplomado de opción de grado presentado para optar el  
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INGENIERÍA *DE TELECOMUNICACIONES*  
DUITAMA - BOYACA  
2020

## NOTA DE ACEPTACIÓN

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Firma del Presidente del Jurado

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Firma del Jurado

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Firma del Jurado

Duitama, 29 de Noviembre de 2020

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Primeramente doy Gracias a Dios por permitirme seguir avanzando en mi área profesional ,como persona íntegra y brindarme valores éticos morales en los que cabe resaltar Sabiduría, Disciplina y humildad, de igual manera a todas las personas que hicieron parte de este gran proceso de formación, a mi familia por su incondicional apoyo y a la Universidad Nacional Abierta y a Distancia por la calidad de Enseñanza que aportaron en el desarrollo y aplicación de mi aprendizaje a través de tutores que estuvieron dispuestos a guiar mi aprendizaje de una excelente manera para ser un profesional integro dispuesto a servir a la sociedad.

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## **GLOSARIO**

### **Router**

Es un dispositivo que administra el tráfico de datos que circula en una red de computadoras.

### **Switch**

Es un dispositivo de interconexión de redes informáticas que permite interconectar redes operando en la capa 2 o de nivel de enlace de datos del modelo OSI.

### **Eigrp**

Es un protocolo de encaminamiento de vector distancia, propiedad de Cisco Systems, que ofrece lo mejor de los algoritmos de Vector de distancias.

### **Border Gateway Protocol**

Es un protocolo que opera intercambiando información de rutas y garantiza un camino libre de loops.

### **Red de área local virtual**

Es una red de área local que agrupa un conjunto de equipos de manera lógica y no física.

## RESUMEN

Entender la importancia que juegan las redes es una de las maneras que podemos decir al momento de cursar por medio de las actividades prácticas el diplomado de profundización cisco CCNP, ya que en el mundo tecnológico el cual tiene un muy rápido desarrollo hoy en día en el mundo y donde surgen nuevas tecnologías, los especialistas necesitan actualizar sus habilidades y técnicas para demostrar que están calificados y mantener el ritmo del mundo tecnológico, tanto en el entorno de las telecomunicaciones y la electrónica, para colocar aprueba la habilidad para planificar, implementar, verificar y resolver problemas de redes que surgen en nuestro entorno.

Palabras Clave: CISCO, CCNP, Comutación, Enrutamiento, Redes, Electrónica.

## ABSTRACT

Understanding the importance of networks is one of the ways that we can say when taking the Cisco CCNP in-depth diploma through practical activities, since in the technological world which has a very rapid development today in the world and where new technologies emerge, specialists need to update their skills and techniques to demonstrate that they are qualified and keep pace with the technological world, both in the telecommunications and electronics environment, to place approves the ability to plan, implement, verify and solve network problems that arise in our environment.

Keywords: CISCO, CCNP, Routing, Swicthing, Networking, Electronics.

## **INTRODUCCIÓN**

La prueba de habilidades prácticas es una herramienta de evaluación del Diplomado de profundización de CCNP, con la cual se busca medir las habilidades y competencias que el estudiante logró alcanzar mediante el desarrollo del diplomado y cada una de sus actividades, esta evaluación pondrá a prueba al estudiante mediante la solución de problemas relacionados con redes.

Para el desarrollo de los escenarios se utilizará el software de simulación cisco packet tracer para el diseño de la topología y la configuración de cada uno de los dispositivos, en el primer escenario se realizará la configuración de protocolos EIGRP Y OSPF y se configurarán en los routers según el direccionamiento ip y la verificación de los mismos mediante el comando show ip route.

Para el segundo escenario se realiza una topología de red configurando e interconectando los diferentes dispositivos realizando los diferentes lineamientos de direccionamiento IP, Creación de puertos Etherchannels, creación de Vlans establecidas según el escenario y eligiendo servidor principal a través de la verificación y correcto funcionamiento de los componentes de las Vlans creadas de acuerdo a lo solicitado.

## DESARROLLO

### ESCENARIO 1

Figura 1. Escenario 1

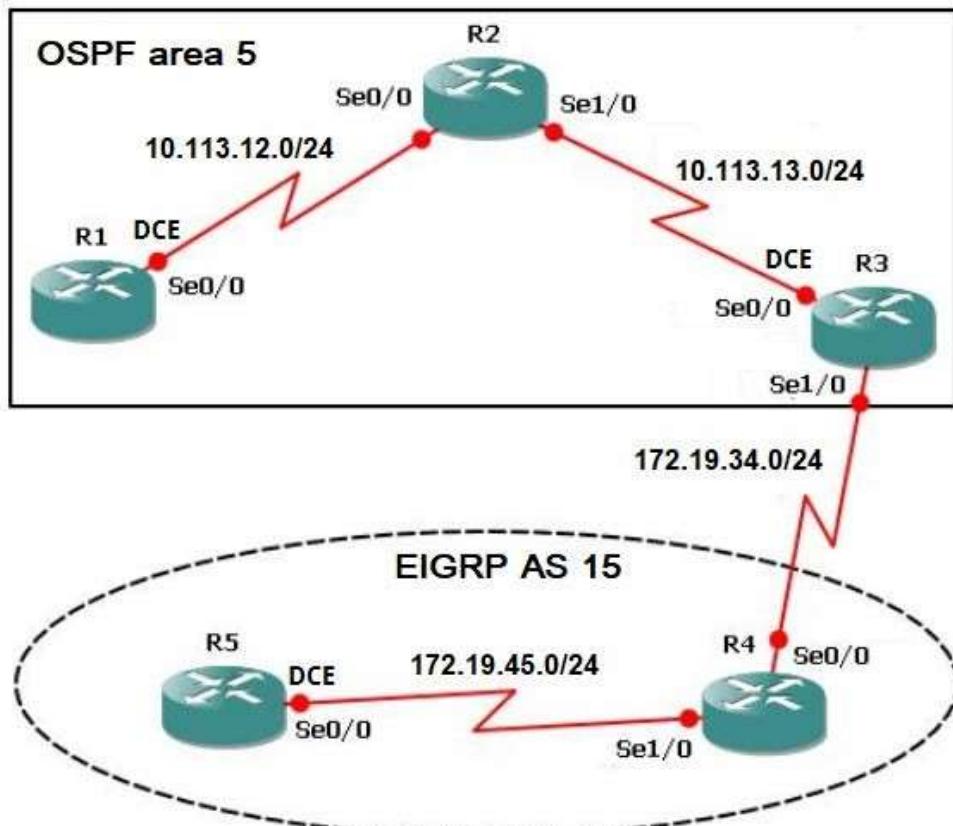
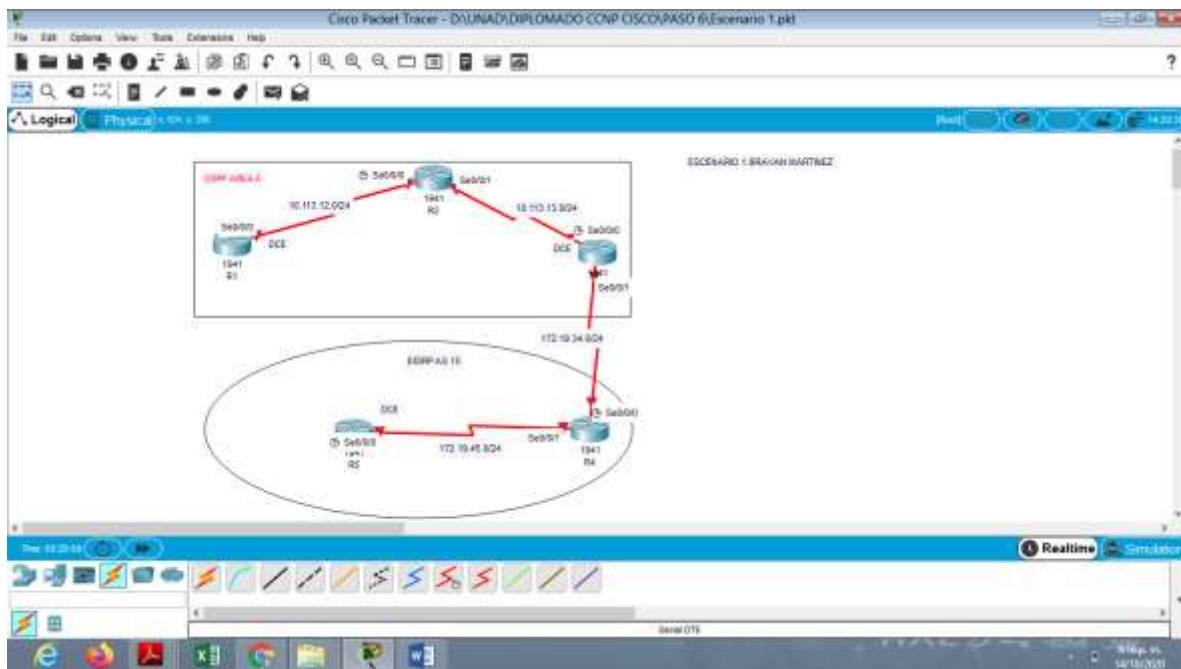


Figura 2. Simulación de escenario 1



**1.1. 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.**

Se procede a configurar cada uno de los enrutadores. 1, 2, 3, 4, 5

Se asignan nombre y protocolos de comunicación mediante EIGRP que fueron asignados.

Se adjunta código y pantallazos con veracidad del código.

### Router R1

```
R1
Router>enable                                     Ingreso a modo privilegiado
Router#config terminal                           Ingreso a modo de configuración
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1                      Asigno nombre al router
R1(config)#
R1(config)#no ip domain-lookup      activamos la traducción de nombres a dirección
R1(config)#line con 0
R1(config-line)#logging synchronous    sincronizamos el ingreso de comandos
R1(config-line)#interface s0/0/0        configuramos la interfaz serial o puerto en R1
R1(config-if)#ip address 10.113.12.0 255.255.255.0 agregamos la dirección ip segu
```

el puerto

Bad mask /24 for address 10.113.12.0

R1(config-if)#no shutdown      levantamos el puerto seleccionado en el router

Figura 3. Configuración asignación direccionamiento R1

```
Press RETURN to get started!

Router>EN
Router#HOSTNAME R1
^
% Invalid input detected at '^' marker.

Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#
R1(config)#no ip domain-lookup
R1(config)#line con 0
R1(config-line)#logging synchronous
R1(config-line)#interface 10.113.12.0 255.255.255.0
^
% Invalid input detected at '^' marker.

R1(config-line)#interface s0/0/0
R1(config-if)#ip address 10.113.12.0 255.255.255.0
Bad mask /24 for address 10.113.12.0
R1(config-if)#no shutdown

*LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#

Ctrl+F6 to exit CLI focus
```

## Router R2

Router>enable

Router#config terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R2

R2(config)#no ip domain lookup

R2(config)#line con 0

R2(config-line)#logging synchronous

R2(config-line)#interface s0/0/0

R2(config-if)#ip address 10.113.12.1 255.255.255.0

R2(config-if)#no shutdown

```
R2(config-if)#interface s0/0/1
R2(config-if)#ip address 10.113.13.1 255.255.255.0
R2(config-if)#no shutdown
```

Figura 4. Configuración asignación direccionamiento R2

```
Router>enable
Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2 (config)#no ip domain lookup
R2 (config)#line con 0
R2 (config-line)#logging synchronous
R2 (config-line)#interface s0/0/0
R2 (config-if)#ip address 10.113.12.1 255.255.255.0
R2 (config-if)#no shutdown

R2 (config-if)#
*LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

R2 (config-if)#
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up

R2 (config-if)#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)#

Ctrl+F6 to exit CLI focus
```

## Router R3

```
Router>enable
Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R3(config)#no ip domain-lookup
R3(config)#line con 0
R3(config-line)#logging synchronous
```

```
R3(config-line)#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)#interface s0/0/1
R3(config-if)#ip address 172.19.34.1 255.255.255.0
R3(config-if)#no shutdown
```

Figura 5. Configuración asignación direccionamiento R3

The screenshot shows a Cisco IOS Command Line Interface (CLI) window titled "R3". The window has tabs for "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area displays the configuration commands entered for Router R3. The output shows the configuration of Serial interfaces s0/0/0 and s0/0/1, including IP addresses and no shutdown commands. It also includes log messages for interface state changes (LINK-5-CHANGED) and protocol state changes (LINEPROTO-5-UPDOWN). At the bottom of the window, there are "Copy" and "Paste" buttons, and a "Top" button.

```
R3(config)#no ip domain-lookup
R3(config)#line con 0
R3(config-line)#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

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

R3(config-if)#exit
R3(config)#no ip domain-lookup
R3(config)#line con 0
R3(config-line)#logging synchronous
R3(config-line)#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)#interface s0/0/1
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)#

Ctrl+F6 to exit CLI focus
```

## Router R4

```
Router>enable
Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R4
```

```

R4(config)#no ip domain-lookup
R4(config)#line con 0
R4(config-line)#logging synchronous
R4(config-line)#interface s0/0/0
R4(config-if)#ip address 172.19.34.2 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#interface s0/0/1
R4(config-if)#ip address 172.19.45.1 255.255.255.0
R4(config-if)#no shutdown

```

Figura 6. Configuración asignación direccionamiento R4

```

Router(config)#hostname R4
%
% Invalid input detected at '^' marker.

Router(config)#hostname R4
R4(config)#no ip domain-lookup
R4(config)#line con 0
R4(config-line)#logging synchronous
R4(config-line)#interface s0/0/0
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)#interface s0/0/1
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)#

```

Ctrl+F6 to exit CLI focus           

Top

Router R5

Router>enable

Router#config terminal

Enter configuration commands, one per line. End with CNTL/Z.

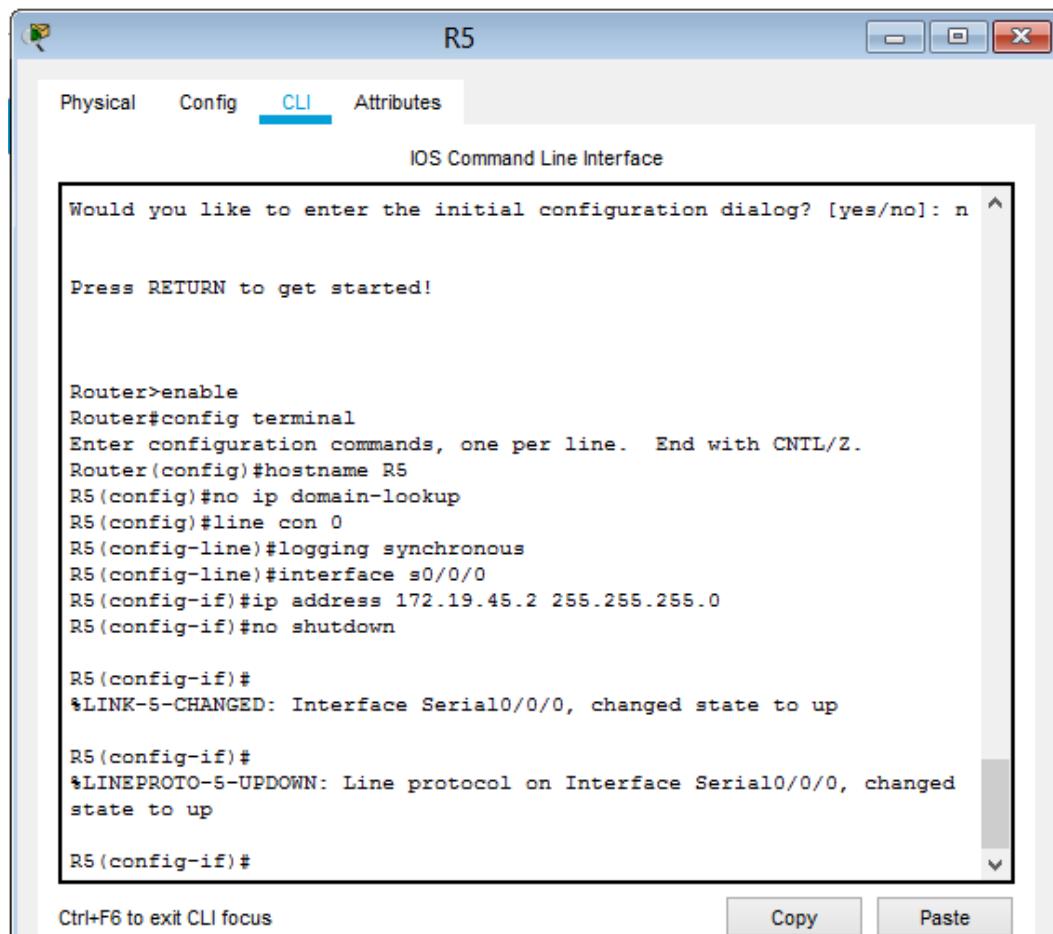
Router(config)#hostname R5

R5(config)#no ip domain-lookup

R5(config)#line con 0

```
R5(config-line)#logging synchronous
R5(config-line)#interface s0/0/0
R5(config-if)#ip address 172.19.45.2 255.255.255.0
R5(config-if)#no shutdown
```

Figura 7. Configuración asignación direccionamiento R5

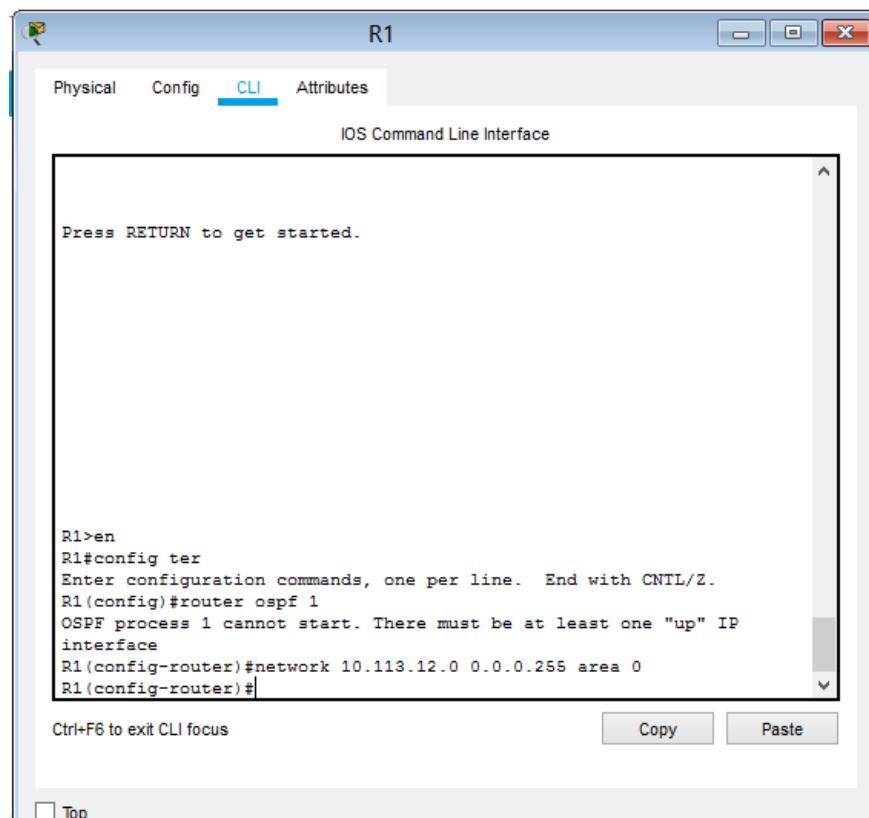


Configuración de protocolo de enrutamiento OSPF entre R1, R2 y R3

### Router R1

```
R1>enable
R1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
OSPF process 1 cannot start. There must be at least one "up" IP interface
R1(config-router)#network 10.113.12.0 0.0.0.255 area 0
```

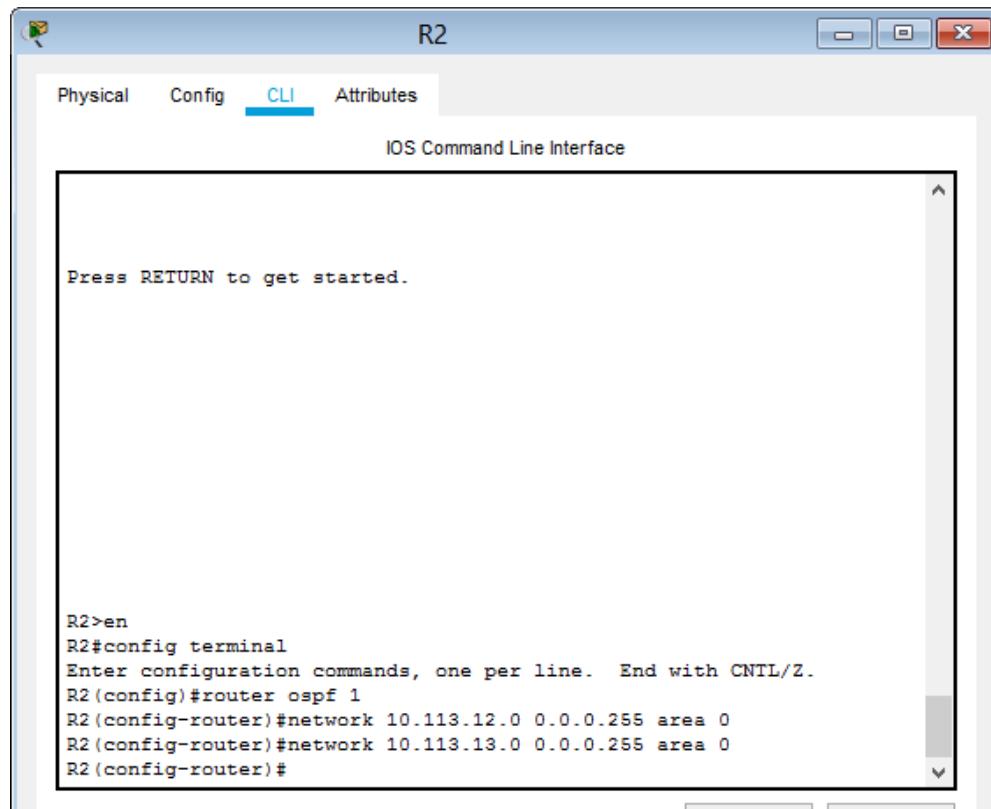
Figura 8. Configuración protocolo OSPF R1



### Router R2

```
R2>en  
R2#config terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
R2(config)#router ospf 1  
R2(config-router)#network 10.113.12.0 0.0.0.255 area 0  
R2(config-router)#network 10.113.13.0 0.0.0.255 area 0  
R2(config-router)#
```

Figura 9. Configuración protocolo OSPF R2



### Router R3

```
R3>en
R3#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#network 10.113.13.0 0.0.0.255 area 0
R3(config-router)#exit
R3(config)#router eigrp 10
R3(config-router)#network 172.19.34.0
```

Figura 10. Configuración protocolo OSPF R3

```
R3>en
R3#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#network 10.113.13.0 0.0.0.255 area 0
R3(config-router)#exit
R3(config)#
01:23:55: %OSPF-5-ADJCHG: Process 1, Nbr 10.113.13.1 on Serial0/0/0
from LOADING to FULL, Loading Done

R3(config)#router eigrp 10
R3(config-router)#network 172.19.34.0
R3(config-router)#

Ctrl+F6 to exit CLI focus
```

**1.2 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.**

Creación de las interfaces Loopback en Router 1 y configuración de participación en area 5 OSPF

Figura 11. Configuración y creación de Interfaces Loopback en router R1

```
$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 10.1.3.2 255.255.255.0
R1(config-if)#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 10.1.4.2 255.255.255.0
R1(config-if)#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)#ip address 10.1.5.2 255.255.255.0
R1(config-if)#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 10.1.6.2 255.255.255.0
R1(config-if)#exit
```

Figura 12. Configuración y creación de Interfaces Loopback en router R1 y direccionamiento ip de las redes involucradas en área 5 con protocolo OSPF.

```
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 10.1.4.2 255.255.255.0
R1(config-if)#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)#ip address 10.1.5.2 255.255.255.0
R1(config-if)#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 10.1.6.2 255.255.255.0
R1(config-if)#interface loopback 4

R1(config-if)#
$LINK-5-CHANGED: Interface Loopback4, changed state to up
$LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up
R1(config-if)#ip address 10.1.6.1 255.255.255.0
R1(config-if)#exit
R1(config)#router ospf 1
R1(config-router)#network 10.0.3.0 0.0.0.255 area 5
R1(config-router)#network 10.0.4.0 0.0.0.255 area 5
R1(config-router)#network 10.0.5.0 0.0.0.255 area 5
R1(config-router)#network 10.0.6.0 0.0.0.255 area 5
R1(config-router)#[
```

```

R1>EN
R1#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface loopback 0
R1(config-if)#ip address 10.1.3.2 255.255.255.0
R1(config-if)#interface loopback 1
R1(config-if)#ip address 10.1.4.2 255.255.255.0
R1(config-if)#interface loopback 2
R1(config-if)#ip address 10.1.5.2 255.255.255.0
R1(config-if)#interface loopback 3
R1(config-if)#ip address 10.1.6.2 255.255.255.0
R1(config-if)#exit
R1(config)#router ospf 1
R1(config-router)#network 10.0.3.0 0.0.0.255 area 5
R1(config-router)#network 10.0.4.0 0.0.0.255 area 5
R1(config-router)#network 10.0.5.0 0.0.0.255 area 5
R1(config-router)#network 10.0.6.0 0.0.0.255 area 5

```

**1.3 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.**

Creación de interfaces loopback en Router 5

Figura 13. Configuración y creación de Interfaces Loopback en router R5

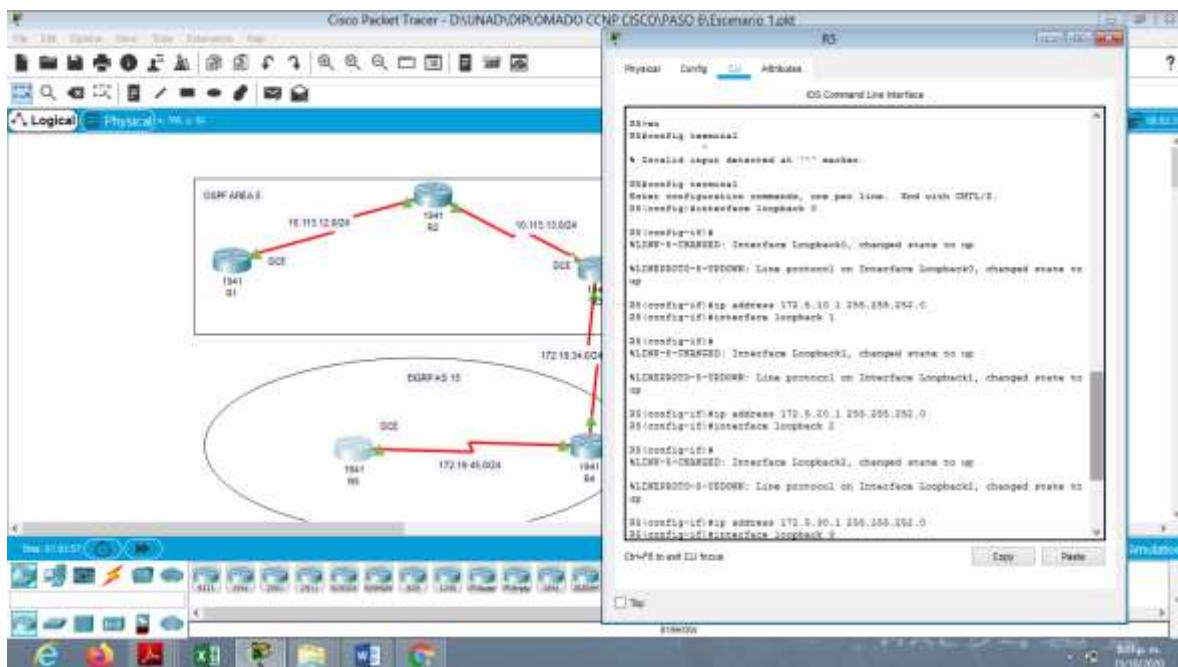
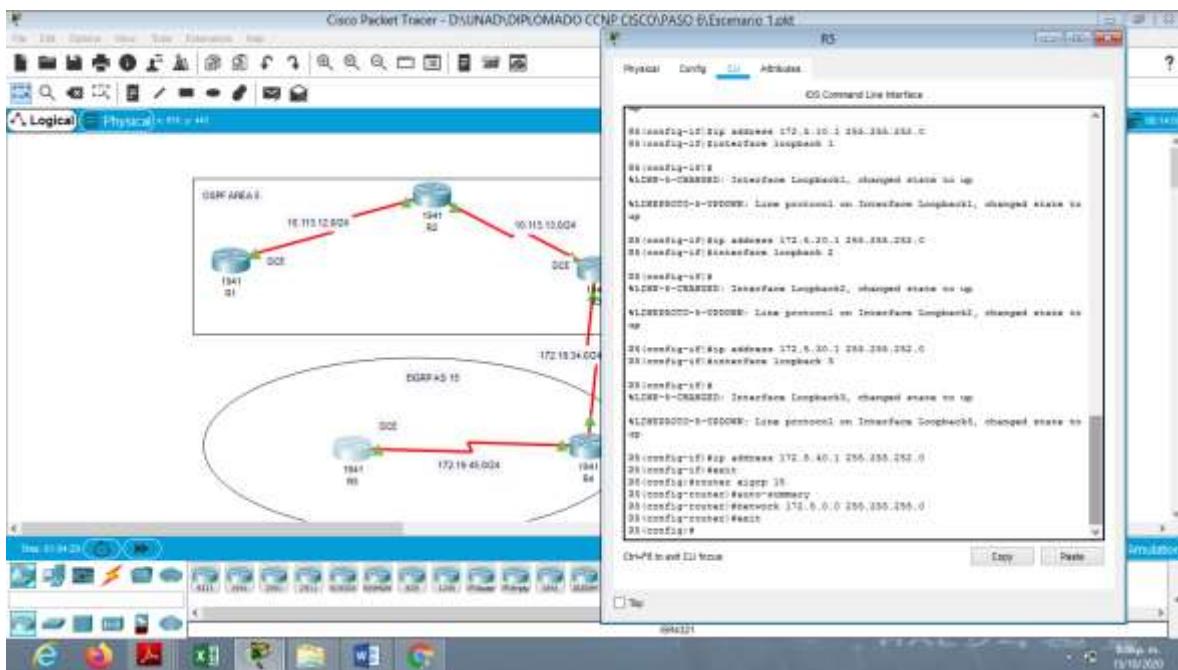


Figura 14. Configuración y creación de Interfaces Loopback en router R5 y direccionamiento ip de las redes involucradas en área 15 con protocolo EIGRP.



R5>en

R5#config terminal

Enter configuration commands, one per line. End with CNTL/Z.

R5(config)#interface loopback 0

R5(config-if)#ip address 172.5.20.1 255.255.252.0

R5(config-if)#interface loopback 2

R5(config-if)#ip address 172.5.30.1 255.255.252.0

R5(config-if)#interface loopback 3

R5(config-if)#ip address 172.5.40.1 255.255.252.0

R5(config-if)#exit

R5(config)#router eigrp 15

R5(config-router)#auto-summary

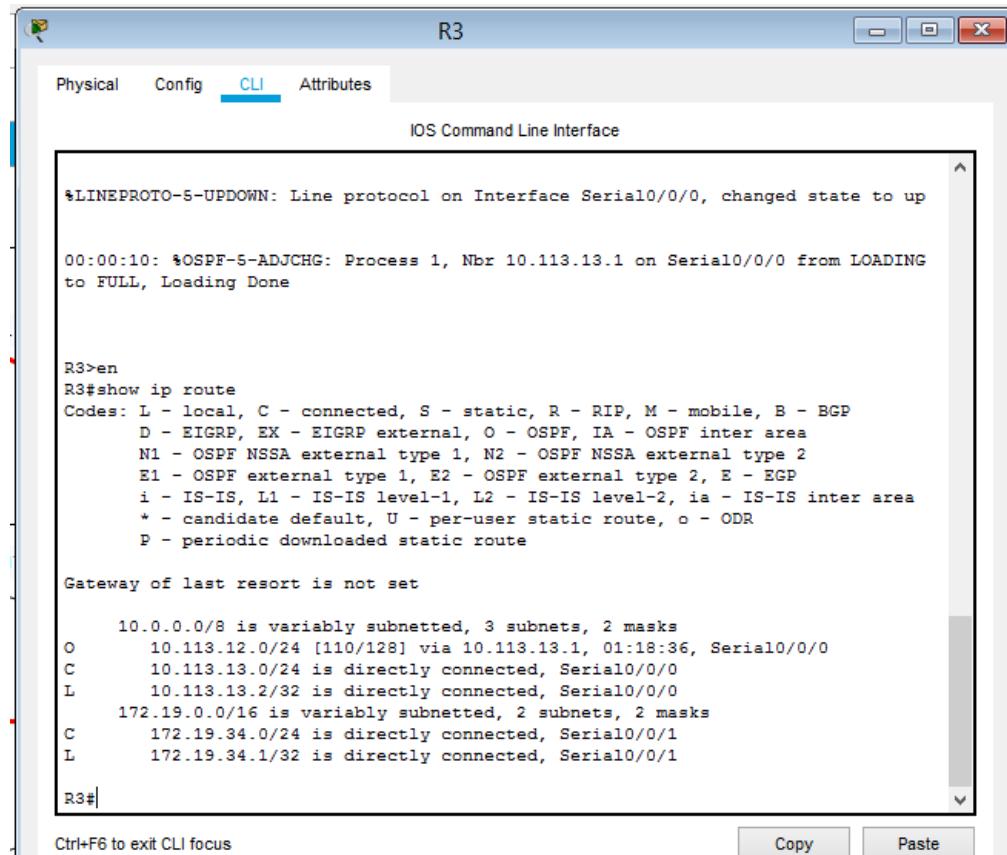
R5(config-router)#network 172.5.0.0 255.255.255.0

R5(config-router)#exit

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

En la tabla de enrutamiento del router 3 se evidencia que está aprendiendo de las nuevas interfaces loopback.

Figura 15. Verificación de tabla de enrutamiento interfaces creadas loopback en R3.



The screenshot shows a Windows application window titled "R3" running the Cisco IOS Command Line Interface (CLI). The window has tabs at the top: "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is a status bar with the text "IOS Command Line Interface". The main area of the window displays the output of several CLI commands:

```
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
00:00:10: *OSPF-5-ADJCHG: Process 1, Nbr 10.113.13.1 on Serial0/0/0 from LOADING to FULL, Loading Done

R3>en
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, 3 subnets, 2 masks
O   10.113.12.0/24 [110/128] via 10.113.13.1, 01:18:36, 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
    172.19.0.0/16 is variably subnetted, 2 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

R3#
```

At the bottom of the window, there is a status bar with the text "Ctrl+F6 to exit CLI focus" and two buttons: "Copy" and "Paste".

### 1.5 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.

Configuración de rutas eigrp en ospf costo 50000 y restribución de rutas ospf en eigrp.

Figura 16 Configuración rutas EIGRP y OSPF con retardos.

```
R3>en
R3#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router eigrp 15
R3(config-router)#redistribute ospf 1 metric 50000 100 255 1 1500
^
% Invalid input detected at '^' marker.

R3(config-router)#redistribute ospf 1 metric 50000 100 255 1 1500
R3(config-router)#exit
R3(config)#router ospf 1
R3(config-router)#log-adjacency-changes
R3(config-router)#redistribute eigrp 15 subnets
R3(config-router)#exit
R3(config)#router eigrp 15
R3(config-router)#redistribute ospf 1 metric 1544000 22000 255 1 1500
R3(config-router)#exit
R3(config)#
```

```
R3>en
R3#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router eigrp 15
R3(config-router)#redistribute ospf 1 metric 50000 100 255 1 1500
R3(config-router)#exit
R3(config)#router ospf 1
R3(config-router)#log-adjacency-changes
R3(config-router)#redistribute eigrp 15 subnets
R3(config-router)#exit
R3(config)#router eigrp 15
R3(config-router)#redistribute ospf 1 metric 1544000 22000 255 1 1500
R3(config-router)#exit
R3(config)#
```

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

Tabla de enrutamiento router 5

Figura 17.Tabla de enruteamiento Router R5

R5>en  
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  
  
172.5.0.0/16 is variably subnetted, 8 subnets, 2 masks  
C 172.5.8.0/22 is directly connected, Loopback0  
L 172.5.10.1/32 is directly connected, Loopback0  
C 172.5.20.0/22 is directly connected, Loopback1  
L 172.5.20.1/32 is directly connected, Loopback1  
C 172.5.28.0/22 is directly connected, Loopback2  
L 172.5.30.1/32 is directly connected, Loopback2  
C 172.5.40.0/22 is directly connected, Loopback3  
L 172.5.40.1/32 is directly connected, Loopback3  
172.19.0.0/16 is variably subnetted, 2 subnets, 2 masks  
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#

Figura 18. Tabla de enruteamiento Router R1

R1>en  
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  
  
10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks  
C 10.1.3.0/24 is directly connected, Loopback0  
L 10.1.3.2/32 is directly connected, Loopback0  
C 10.1.4.0/24 is directly connected, Loopback1  
L 10.1.4.2/32 is directly connected, Loopback1  
C 10.1.5.0/24 is directly connected, Loopback2  
L 10.1.5.2/32 is directly connected, Loopback2  
C 10.1.6.0/24 is directly connected, Loopback3  
L 10.1.6.2/32 is directly connected, Loopback3  
  
R1#

## ESCENARIO 2

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

Figura 19. Escenario 2  
Topología de red

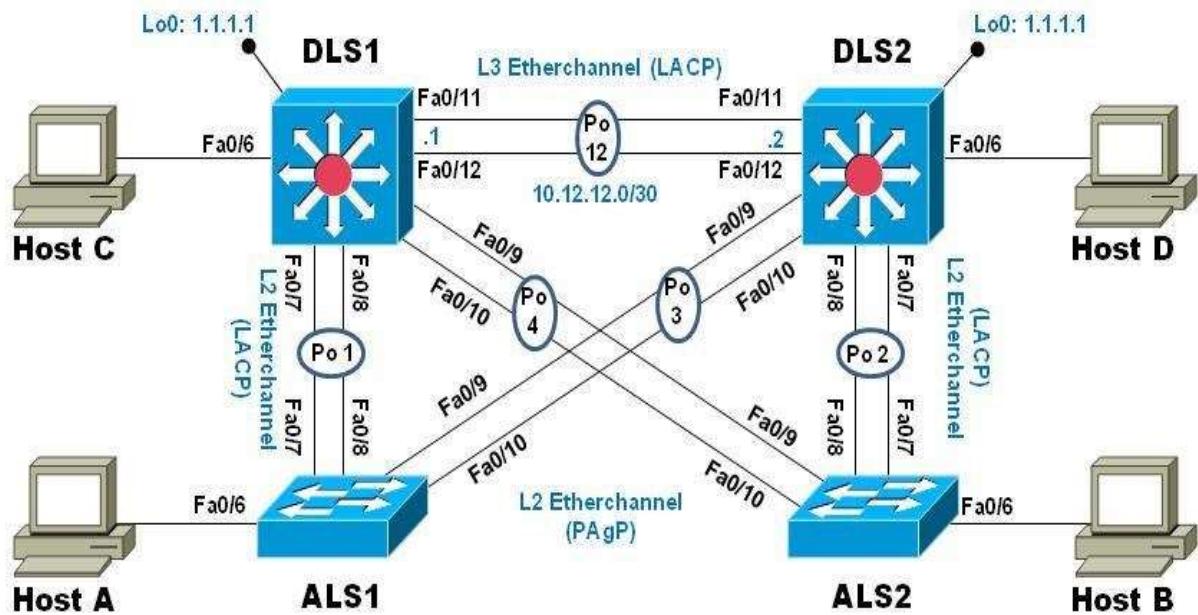
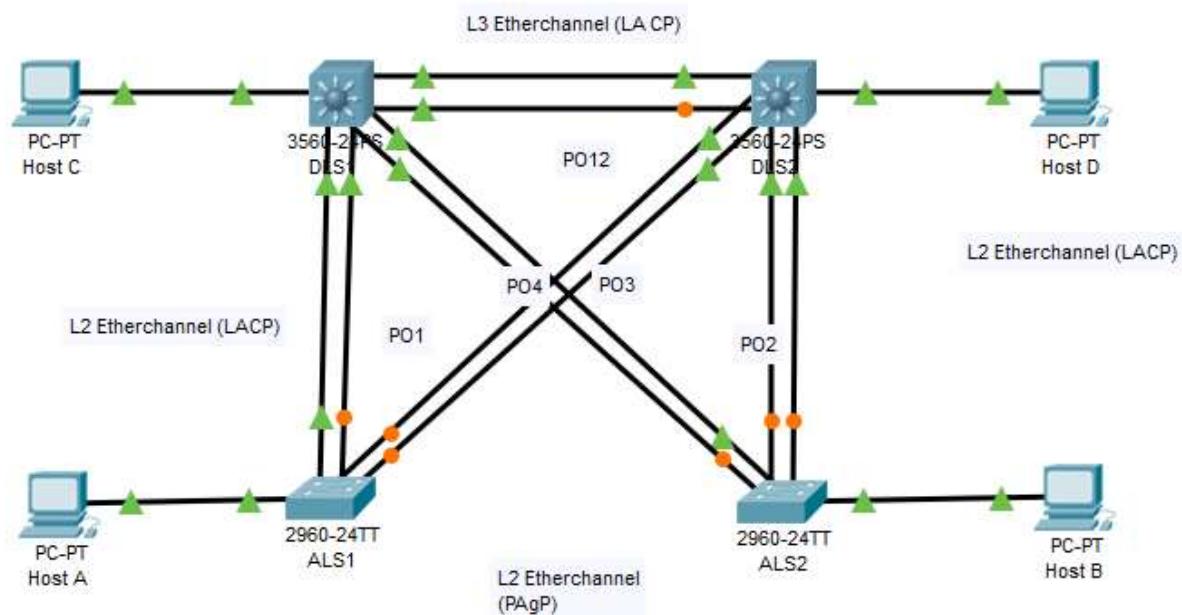


Figura 20. Simulación de Escenario 2



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

- Apagar todas las interfaces en cada switch.

Figura 21. Apagar todas las Interfaces de cada Switch.

The screenshot shows the Cisco IOS CLI interface for a device named 'DLS1'. The 'CLI' tab is selected. The command entered was 'no shutdown' in global configuration mode, followed by 'exit' to return to privileged EXEC mode. The output shows the state change of all five FastEthernet interfaces from 'administratively down' to 'down' due to the no shutdown command.

```
Switch>en
Password:
Switch#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname DLS1
DLS1(config)#int range f0/1-24, g0/1-2
DLS1(config-if-range)#
DLS1(config-if-range)#no shutdown
DLS1(config-if-range)#shutdown

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

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

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

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

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

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

Figura 22. Asignacion de nombre Switch DLS1.

The screenshot shows the Cisco IOS CLI interface for a device named 'DLS1'. The 'CLI' tab is selected. The command entered was 'hostname DLS1' in global configuration mode, followed by 'exit' to return to privileged EXEC mode. The output shows the successful configuration of the switch's hostname.

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/7, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8, changed state to up
%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 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 FastEthernet0/13, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/13, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/14, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/15, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/16, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/17, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/18, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/19, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/20, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/21, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/22, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/23, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/24, changed state to up

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

```

Figura 23. Asignacion de nombre Switch DLS2.

```
IOS Command Line Interface

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

*LINK-5-CHANGED: Interface FastEthernet0/8, changed state to up

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

*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

Switch>en
Switch#config ter
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#Hostname DLS2
DLS2(config)#

Ctrl+F6 to exit CLI focus
```

Figura 24. Asignacion de nombre Switch ALS1.

```
IOS Command Line Interface

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

*LINK-5-CHANGED: Interface FastEthernet0/8, changed state to up

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

*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

Switch>EN
Switch#config ter
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname ALS1
ALS1(config)#

Ctrl+F6 to exit CLI focus
```

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

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

## DLS1

```
DLS1#config ter
DLS1(config)#int fa0/11
DLS1(config-if)#channel-group 1 mode active
DLS1(config-if)#no shutdown
DLS1(config-if)#description conexion Sw DLS2 port Fa0/11
DLS1(config-if)#int fa0/12
DLS1(config-if)#channel-group 1 mode active
DLS1(config-if)#no shutdown
DLS1(config-if)#description Conexion Sw DIS2 Port F0/12
DLS1(config-if)#int port-channel 1
DLS1(config-if)#no switchport
DLS1(config-if)#ip address 10.12.12.1 255.255.255.252
DLS1(config-if)#description channel group 1 ports 11-12
DLS1(config-if)#no shutdown
DLS1(config-if)#exit
DLS1(config)#exit
```

Figura 25. Asignacion direccionamiento IP Eherchannel en DLS1

```
DLS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#int fa0/11
DLS1(config-if)#channel-group 1 mode active
DLS1(config-if)#
%LINKPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/11, changed state to down
%LINKPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/11, changed state to up
DLS1(config-if)#no shutdown
%
% Invalid input detected at '##' marker.

DLS1(config-if)#no shutdown
DLS1(config-if)#description conexion Sw DLS2 port Fa0/11
DLS1(config-if)#int fa0/12
DLS1(config-if)#channel-group 1 mode active
DLS1(config-if)#
%LINKPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/12, changed state to down
%LINKPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/12, changed state to up

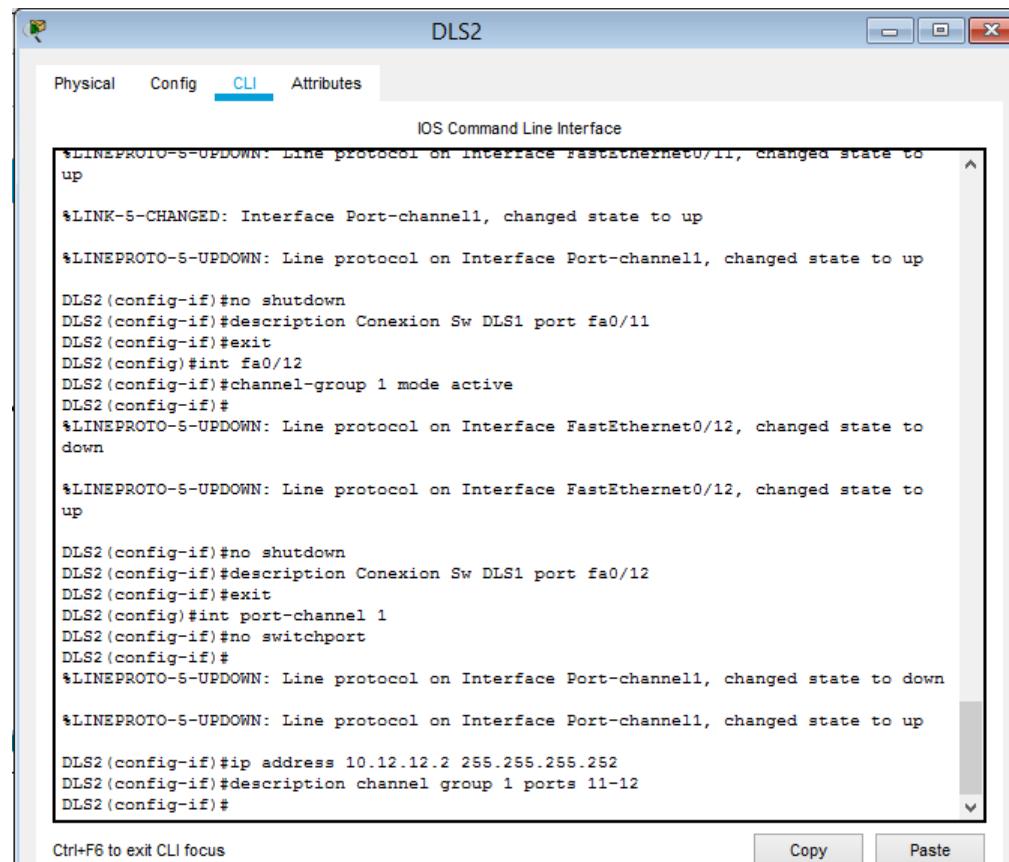
DLS1(config-if)#no shutdown
DLS1(config-if)#description Conexion Sw DIS2 Port F0/12
DLS1(config-if)#int port-channel 1
DLS1(config-if)#no switchport
DLS1(config-if)#ip address 10.12.12.1 255.255.255.252
DLS1(config-if)#description channel group 1 ports 11-12
DLS1(config-if)#no shutdown
DLS1(config-if)#exit
DLS1#
%SYS-5-CONFIG_I: Configured from console by console

Ctrl-F6 to exit CLI focus
```

## DLS2

```
DLS2>EN
DLS2#config ter
DLS2(config)#int fa0/11
DLS2(config-if)#channel-group 1 mode active
DLS2(config-if)#no shutdown
DLS2(config-if)#description Conexion Sw DLS1 port fa0/11
DLS2(config-if)#exit
DLS2(config)#int fa0/12
DLS2(config-if)#channel-group 1 mode active
DLS2(config-if)#
DLS2(config-if)#no shutdown
DLS2(config-if)#description Conexion Sw DLS1 port fa0/12
DLS2(config-if)#exit
DLS2(config)#int port-channel 1
DLS2(config-if)#no switchport
DLS2(config-if)#
DLS2(config-if)#ip address 10.12.12.2 255.255.255.252
DLS2(config-if)#description channel group 1 ports 11-12
DLS2(config-if)#+
```

Figura 26. Asignacion direccionamiento IP Etherchannel en DLS2



The screenshot shows the Cisco IOS Command Line Interface (CLI) window titled "DLS2". The window has tabs for "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area displays the configuration commands entered by the user. The terminal window also shows system messages like interface state changes (e.g., %LINK-5-CHANGED: Interface Port-channel1, changed state to up). At the bottom of the window, there are "Copy" and "Paste" buttons.

```
%LINEPROTO-5-UPDOWN: Line protocol on interface FastEthernet0/11, changed state to up
%LINK-5-CHANGED: Interface Port-channel1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to up
DLS2(config-if)#no shutdown
DLS2(config-if)#description Conexion Sw DLS1 port fa0/11
DLS2(config-if)#exit
DLS2(config)#int fa0/12
DLS2(config-if)#channel-group 1 mode active
DLS2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/12, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/12, changed state to up
DLS2(config-if)#no shutdown
DLS2(config-if)#description Conexion Sw DLS1 port fa0/12
DLS2(config-if)#exit
DLS2(config)#int port-channel 1
DLS2(config-if)#no switchport
DLS2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to up
DLS2(config-if)#ip address 10.12.12.2 255.255.255.252
DLS2(config-if)#description channel group 1 ports 11-12
DLS2(config-if)#+
```

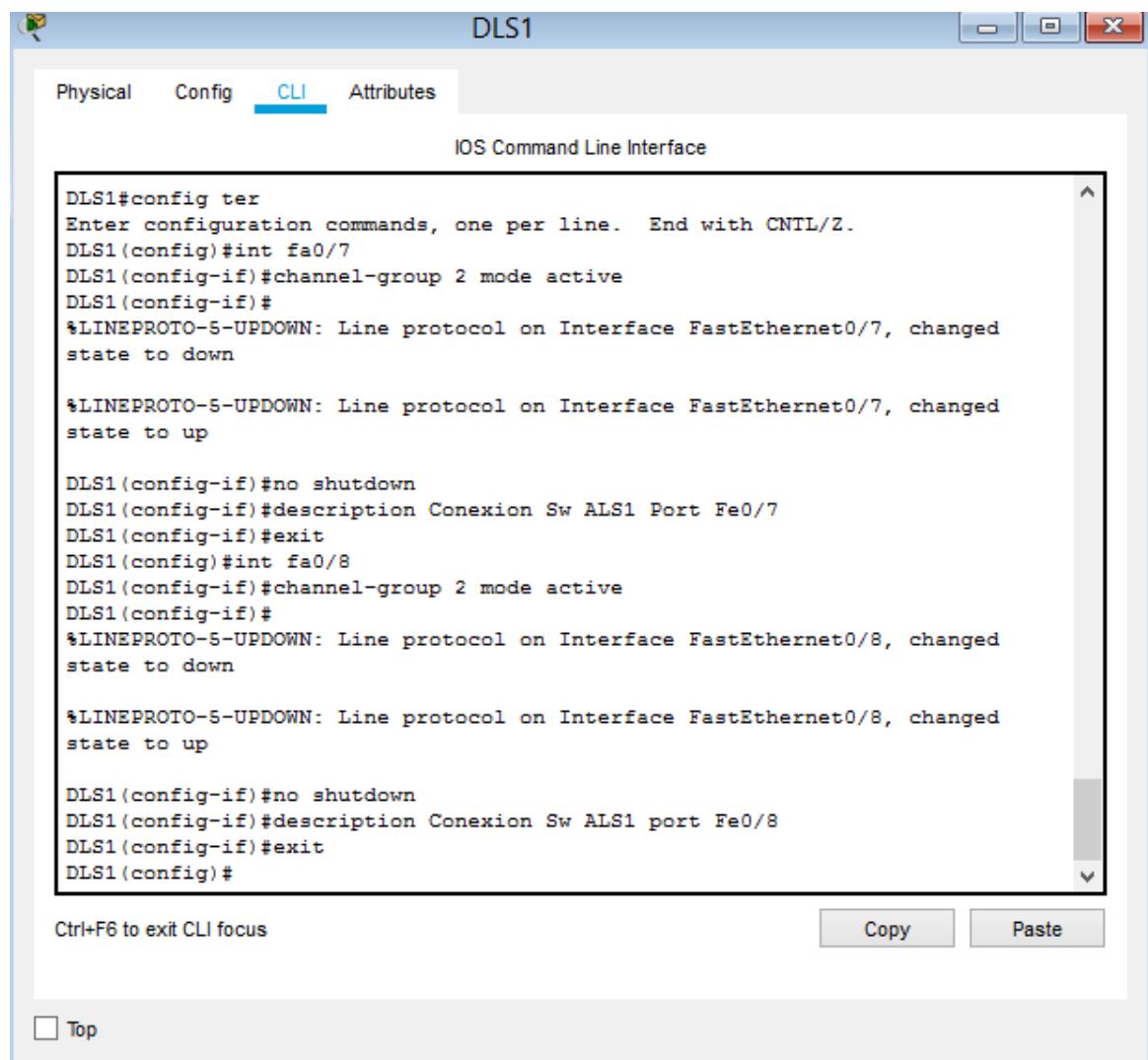
2) Los Port-channels en las interfaces Fa0/7 y Fa0/8 utilizarán LACP.

### DLS1

```
DLS1#config ter
DLS1(config)#int fa0/7
DLS1(config-if)#channel-group 2 mode active
DLS1(config-if)#no shutdown
DLS1(config-if)#description Conexion Sw ALS1 Port Fe0/7
DLS1(config-if)#exit
DLS1(config)#int fa0/8
DLS1(config-if)#channel-group 2 mode active
DLS1(config-if)#no shutdown
DLS1(config-if)#description Conexion Sw ALS1 port Fe0/8
DLS1(config-if)#exit
DLS1(config)#

```

Figura 27. Asignacion LACP Interfaces Fa0/7 y Fa0/8 DLS1.



The screenshot shows a Windows application window titled "DLS1". The window has tabs at the top: "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains the following configuration commands:

```
DLS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#int fa0/7
DLS1(config-if)#channel-group 2 mode active
DLS1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/7, changed
state to down

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

DLS1(config-if)#no shutdown
DLS1(config-if)#description Conexion Sw ALS1 Port Fe0/7
DLS1(config-if)#exit
DLS1(config)#int fa0/8
DLS1(config-if)#channel-group 2 mode active
DLS1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8, changed
state to down

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

DLS1(config-if)#no shutdown
DLS1(config-if)#description Conexion Sw ALS1 port Fe0/8
DLS1(config-if)#exit
DLS1(config)#

```

At the bottom left of the window, there is a note: "Ctrl+F6 to exit CLI focus". On the right side, there are "Copy" and "Paste" buttons. At the very bottom, there is a checkbox labeled "Top".

## DLS2

```
DLS2>EN
DLS2#CONFIG TER
DLS2(config-if)#channel-group 2 mode active
DLS2(config-if)#no shutdown
DLS2(config-if)#description Conexion Sw ALS2 port Fe0/7
DLS2(config-if)#exit
DLS2(config)#int fa0/8
DLS2(config-if)#channel-group 2 mode active
DLS2(config-if)#no shutdown
DLS2(config-if)#description Conexion Sw AIS2 Port Fe0/8
DLS2(config-if)#exit
```

Figura 28. Asignacion LACP Interfaces Fa0/7 y Fa0/8 DLS2

The screenshot shows a Cisco IOS CLI interface titled 'DLS2'. The window has tabs for 'Physical', 'Config', 'CLI' (which is selected), and 'Attributes'. The main area displays the following configuration commands:

```
DLS2(config-if)#channel-group 2 mode active
DLS2(config-if)#
Creating a port-channel interface Port-channel 2

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

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

DLS2(config-if)#no shutdown
DLS2(config-if)#description Conexion Sw ALS2 port Fe0/7
DLS2(config-if)#exit
DLS2(config)#int fa0/8
DLS2(config-if)#channel-group 2 mode active
DLS2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8,
changed state to down

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

DLS2(config-if)#no shutdown
DLS2(config-if)#description Conexion Sw AIS2 Port Fe0/8
DLS2(config-if)#exit
```

At the bottom of the window, there are buttons for 'Copy' and 'Paste', and a checkbox labeled 'Top'.

### **ALS1**

```
ALS1>en
ALS1#config ter
ALS1(config)#int fa0/7
ALS1(config-if)#channel-group 2 mode active
ALS1(config-if)#no shutdown
ALS1(config-if)#description Conexion Sw DLS1 Port Fe0/7
ALS1(config-if)#exit
ALS1(config)#int Fa0/8
ALS1(config-if)#channel-group 2 mode active
ALS1(config-if)#no shutdown
ALS1(config-if)#description Conexion Sw DLS1 port fe0/8
```

### **ALS2**

```
ALS2(config)#interface fa0/7
ALS2(config-if)#channel-group2 mode active
ALS2(config-if)#channel-group 2 mode active
ALS2(config-if)#
ALS2(config-if)#no shutdown
ALS2(config-if)#description Conexion Sw DLS2 Port Fe0/7
ALS2(config-if)#exit
ALS2(config)#int fa0/8
ALS2(config-if)#channel-group 2 mode active
ALS2(config-if)#no shutdown
ALS2(config-if)#description Conexion Sw DLS2 Port Fe0/8
ALS2(config-if)#exit
```

Figura 29. Asignacion LACP Interfaces Fa0/7 y Fa0/8 ALS2

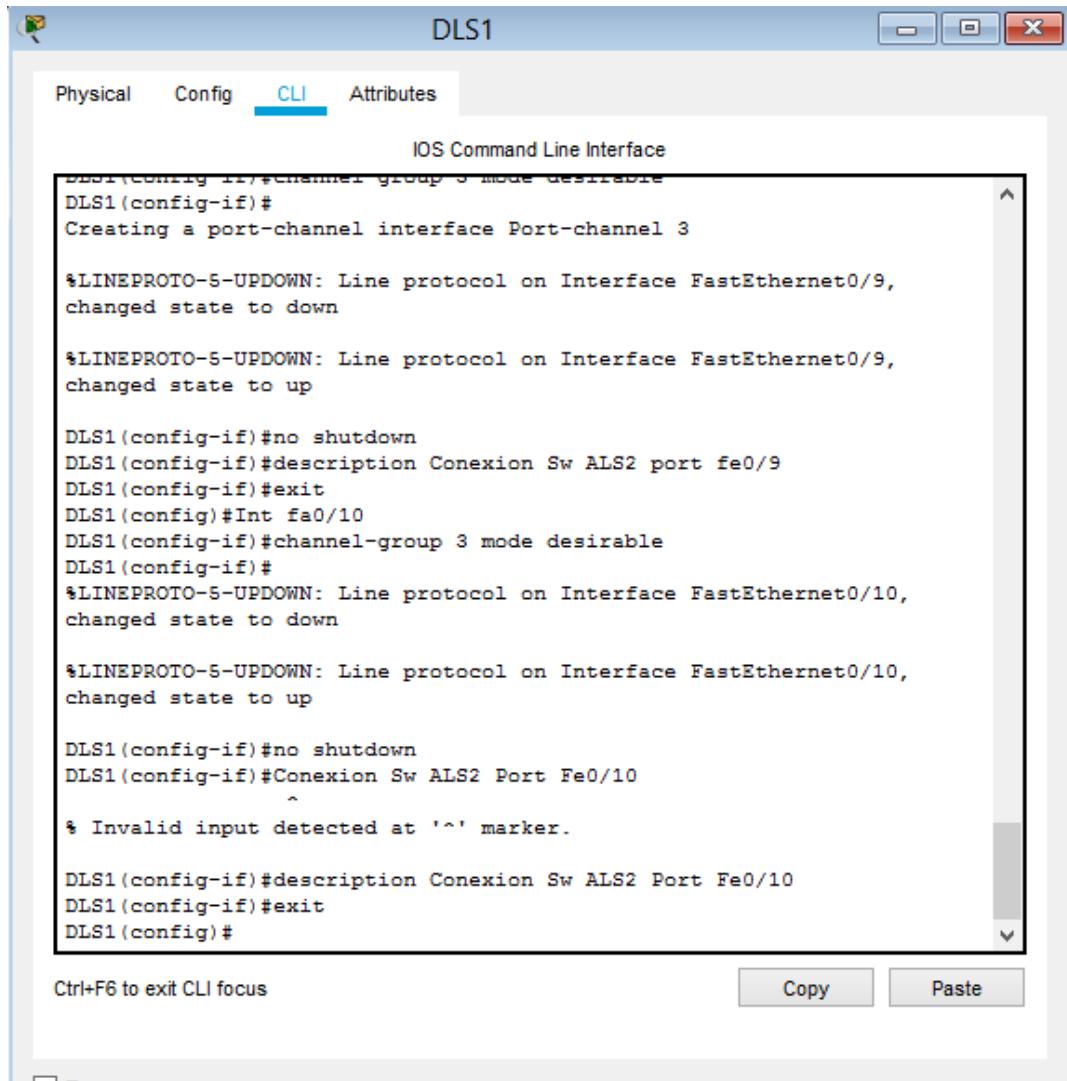
```
Creating a port-channel interface Port-channel 2
%LINKPROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/7,
changed state to down
%LINKPROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/7,
changed state to up
%LINK-S-CHANGED: Interface Port-channel2, changed state to up
%LINKPROTO-S-UPDOWN: Line protocol on Interface Port-channel2,
changed state to up
ALS2(config-if) no shutdown
ALS2(config-if) #description Conexion Sw DLS2 Port Fe0/7
ALS2(config-if) #exit
ALS2(config)#int fa0/8
ALS2(config-if)#channel-group 2 mode active
ALS2(config-if) #
%LINKPROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/8,
changed state to down
%LINKPROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/8,
changed state to up
ALS2(config-if) no shutdown
ALS2(config-if) #description Conexion Sw DLS2 Port Fe0/8
ALS2(config-if) #exit
ALS2(config)#
ALS2#
%SYS-S-CONFIG_I: Configured from console by console
```

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

### DLS1

```
DLS1(config)#int fa0/9
DLS1(config-if)#channel-group 3 mode desirable
DLS1(config-if)#no shutdown
DLS1(config-if)#description Conexion Sw ALS2 port fe0/9
DLS1(config-if)#exit
DLS1(config)#Int fa0/10
DLS1(config-if)#channel-group 3 mode desirable
DLS1(config-if)#
DLS1(config-if)#no shutdown
DLS1(config-if)#description Conexion Sw ALS2 Port Fe0/10
DLS1(config-if)#exit
```

Figura 30. Asignacion PAgP Interfaces Fa0/9 y Fa0/10 DLS1



The screenshot shows a Windows Command Line Interface window titled "DLS1". The window has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" being the active tab. The main area displays the IOS Command Line Interface (CLI) output:

```
IOS Command Line Interface
DLS1(config-if)#channel-group 3 mode desirable
DLS1(config-if)#
Creating a port-channel interface Port-channel 3

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

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

DLS1(config-if)#no shutdown
DLS1(config-if)#description Conexion Sw ALS2 port fe0/9
DLS1(config-if)#exit
DLS1(config)#Int fa0/10
DLS1(config-if)#channel-group 3 mode desirable
DLS1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10,
changed state to down

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

DLS1(config-if)#no shutdown
DLS1(config-if)#description Conexion Sw ALS2 Port Fe0/10
^
% Invalid input detected at '^' marker.

DLS1(config-if)#exit
DLS1(config)#
Ctrl+F6 to exit CLI focus
```

At the bottom right of the window are "Copy" and "Paste" buttons.

## DLS2

```
DLS2(config)#int fa0/9
DLS2(config-if)#channel-group 3 mode desirable
DLS2(config-if)#no shutdown
DLS2(config-if)#description Conexion Sw ALS1 port fe0/9
DLS2(config-if)#exit
DLS2(config)#Int fa0/10
DLS2(config-if)#channel-group 3 mode desirable
DLS2(config-if)#no shutdown
DLS2(config-if)#description Conexion Sw ALS1 Port Fe0/10
DLS2(config-if)#exit
```

Figura 31. Asignacion PAgP Interfaces Fa0/9 y Fa0/10 DLS2

The screenshot shows a Windows application window titled "DLS2". The window has tabs at the top: "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains the following CLI session output:

```
DLS2 (config-if)#
Creating a port-channel interface Port-channel 3

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

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

DLS2 (config-if)#no shutdown
DLS2 (config-if)#description Conexion Sw ALS1 Port Fe0/9
DLS2 (config-if)#exit
DLS2(config)#int fa0/10
DLS2(config-if)#channel-group 3 mode desirable
DLS2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10,
changed state to down

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

DLS2 (config-if)#no shutdown
DLS2 (config-if)#description Conexion Sw ALS1 Port Fe0/10
DLS2 (config-if)#exit
DLS2(config)#

```

At the bottom of the window, there are buttons for "Copy" and "Paste". A status message "Ctrl+F6 to exit CLI focus" is displayed. There is also a "Top" button with a checkbox.

## ALS1

```
ALS1#config ter
ALS1(config)#int fa0/9
ALS1(config-if)#channel-group 3 mode desirable
ALS1(config-if)#no shutdown
ALS1(config-if)#description Conexion Sw DLS2 Port Fe0/9
ALS1(config-if)#exit
ALS1(config)#int fa0/10
ALS1(config-if)#channel-group 3 mode desirable
ALS1(config-if)#no shutdown
ALS1(config-if)#description Conexion Sw DLS2 Port Fe0/10
ALS1(config-if)#exit
ALS1(config)#
```

Figura 32. Asignacion PAgP Interfaces Fa0/9 y Fa0/10 ALS1

The screenshot shows a Windows application window titled "ALS1". The window has a tab bar with "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main text area contains the following CLI session:

```
ALS1>en
ALS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
ALS1(config)#int fa0/9
ALS1(config-if)#channel-group 3 mode desirable
ALS1(config-if)#
Creating a port-channel interface Port-channel 3

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

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

*LINK-5-CHANGED: Interface Port-channel3, changed state to up

*LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel3, changed state to up

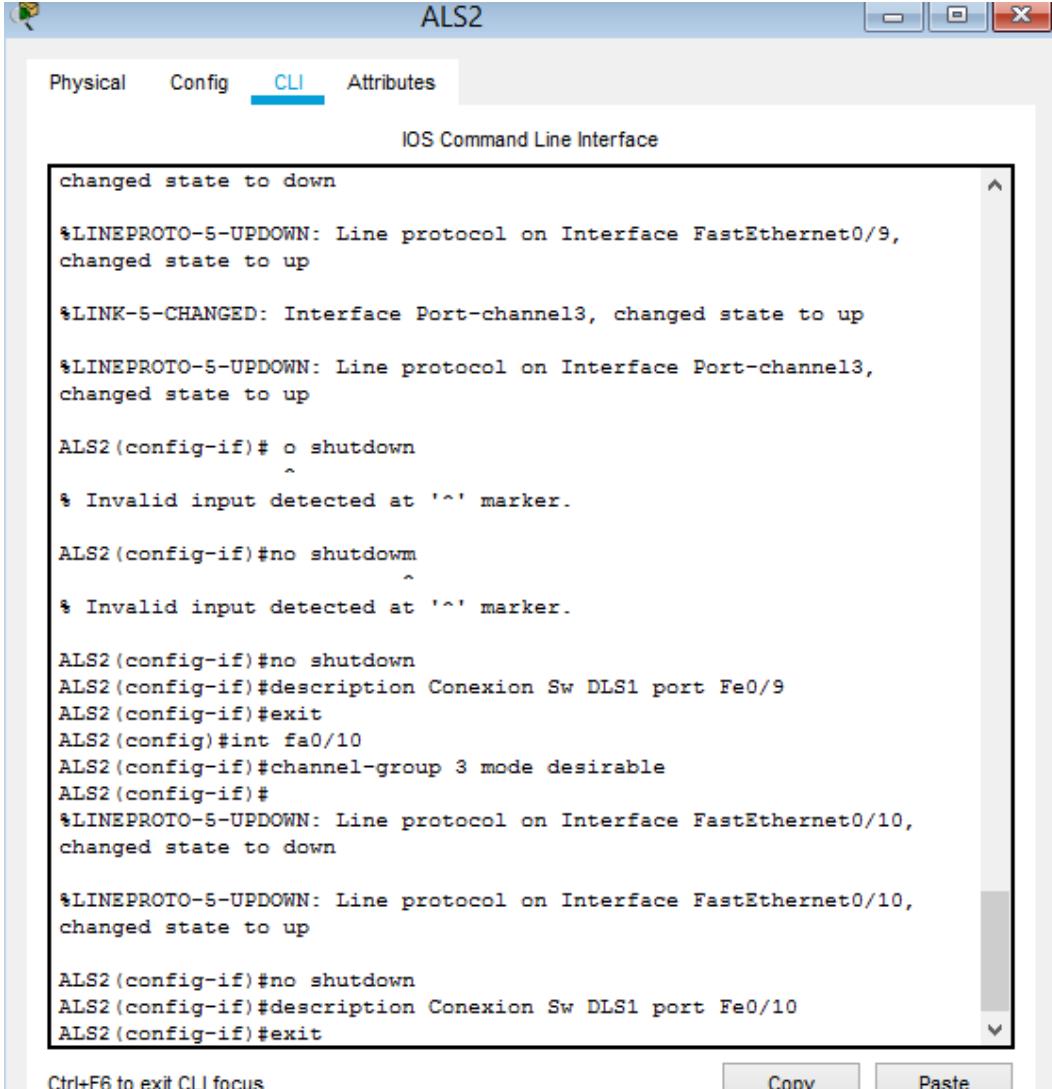
ALS1(config-if)#no shutdown
ALS1(config-if)#description Conexion Sw DLS2 Port Fe0/9
ALS1(config-if)#exit
ALS1(config)#int fa0/10
ALS1(config-if)#channel-group 3 mode desirable|
ALS1(config-if)#
*LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10, changed state to
down
```

At the bottom of the text area, it says "Ctrl+F6 to exit CLI focus". To the right of the text area are two buttons: "Copy" and "Paste".

## ALS2

```
ALS2#config ter
ALS2(config)#int fa0/9
ALS2(config-if)#channel-group 3 mode desirable
ALS2(config-if)#no shutdown
ALS2(config-if)#description Conexion Sw DLS1 Port Fe0/9
ALS2(config-if)#exit
ALS2(config)#int fa0/10
ALS2(config-if)#channel-group 3 mode desirable
ALS2(config-if)#no shutdown
ALS2(config-if)#description Conexion Sw DLS1 Port Fe0/10
ALS2(config-if)#exit
ALS2(config)#
```

Figura 33. Asignacion PAgP Interfaces Fa0/9 y Fa0/10 ALS1



The screenshot shows a Windows-style application window titled "ALS2". The window has tabs at the top: "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains the following CLI session output:

```
changed state to down

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

%LINK-5-CHANGED: Interface Port-channel3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel3,
changed state to up

ALS2(config-if)# o shutdown
^
% Invalid input detected at '^' marker.

ALS2(config-if)#no shutdown
^
% Invalid input detected at '^' marker.

ALS2(config-if)#no shutdown
ALS2(config-if)#description Conexion Sw DLS1 port Fe0/9
ALS2(config-if)#exit
ALS2(config)#int fa0/10
ALS2(config-if)#channel-group 3 mode desirable
ALS2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10,
changed state to down

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

ALS2(config-if)#no shutdown
ALS2(config-if)#description Conexion Sw DLS1 port Fe0/10
ALS2(config-if)#exit
```

At the bottom of the window, there are buttons for "Copy" and "Paste". A status bar at the bottom left says "Ctrl+F6 to exit CLI focus".

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

### DLS1

```
DLS1>en
DLS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#vlan 500
DLS1(config-vlan)#name NATIVA
DLS1(config-vlan)#Int range fa0/7-12
DLS1(config-if-range)#switchport trunk native vlan 500
DLS1(config-if-range)#exit
```

Figura 34. Asignacion Vlan 500 a Puertos Troncales Switch DLS1.

The screenshot shows a Windows-style application window titled "DLS1". The window has tabs at the top: "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area of the window is a large text box containing the configuration commands and their output. At the bottom of the window, there are buttons for "Copy" and "Paste". A status bar at the very bottom left says "Ctrl+F6 to exit CLI focus".

```
%LINK-5-CHANGED: Interface Port-channel3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel3, changed
state to up

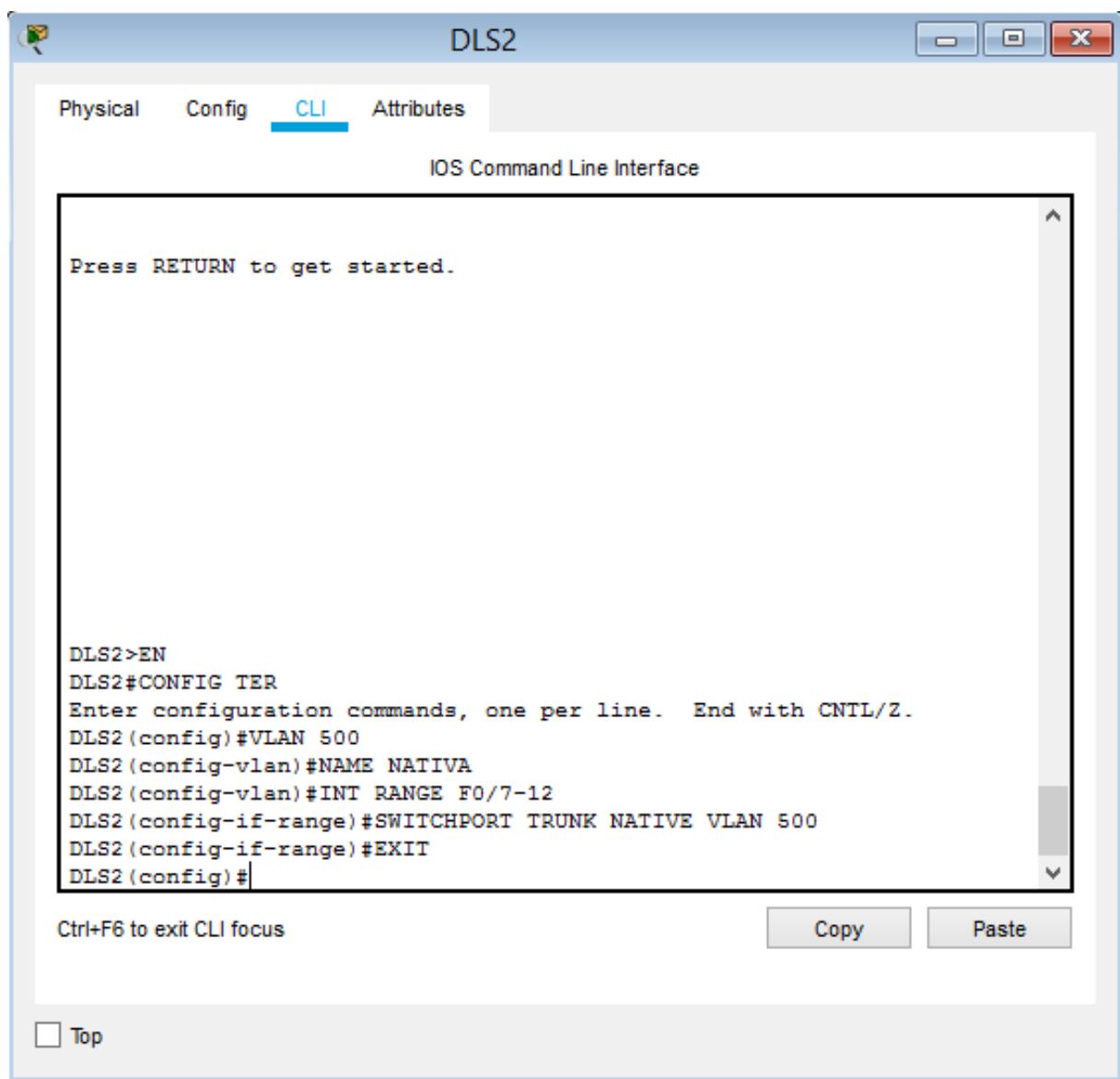
DLS1>en
DLS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#vlan 500
DLS1(config-vlan)#name NATIVA
DLS1(config-vlan)#Int fa0/7-12
^
* Invalid input detected at '^' marker.

DLS1(config-vlan)#Int range fa0/7-12
DLS1(config-if-range)#switchport trunk native vlan 500
DLS1(config-if-range)#exit
DLS1(config)#!
```

## DLS2

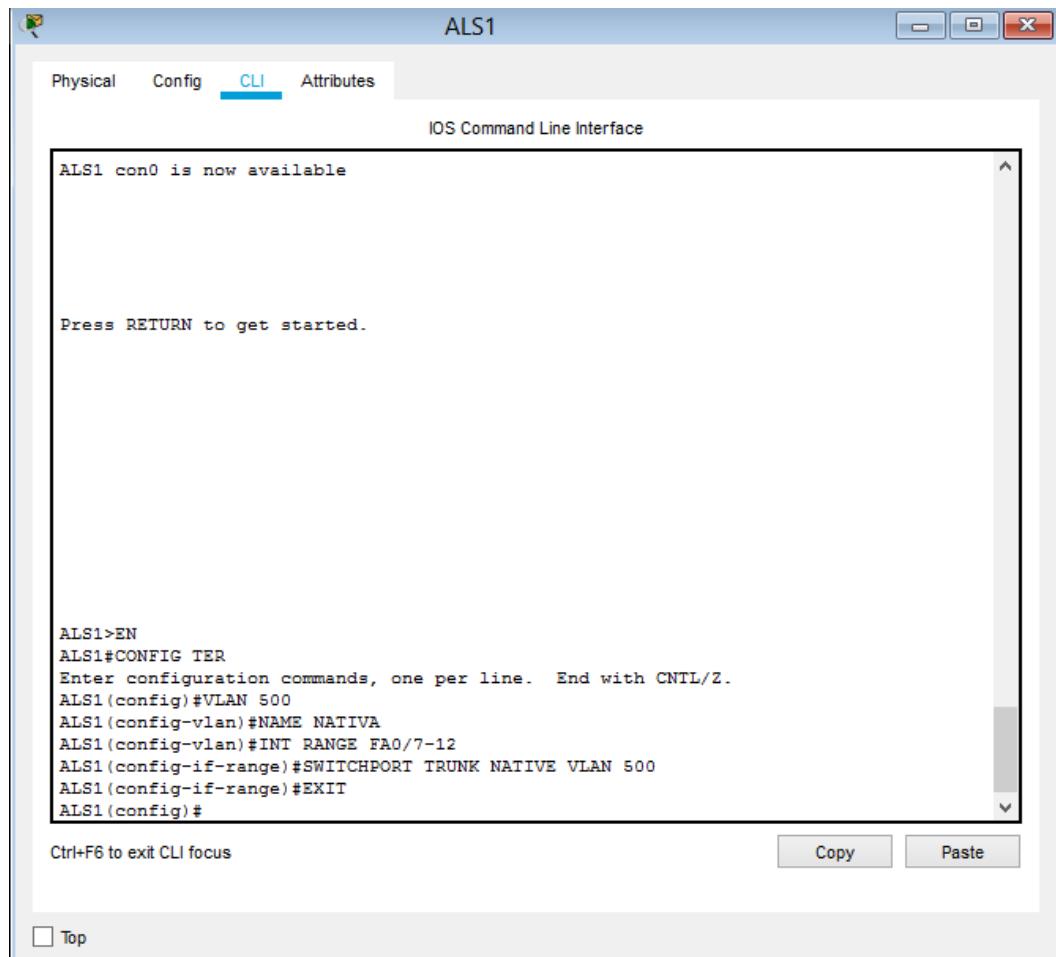
```
DLS2>en
DLS2#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#vlan 500
DLS2(config-vlan)#name NATIVA
DLS2(config-vlan)#Int range fa0/7-12
DLS2(config-if-range)#switchport trunk native vlan 500
DLS2(config-if-range)#exit
```

Figura 35. Asignacion Vlan 500 a Puertos Troncales Switch DLS2.



```
ALS1
ALS1>en
ALS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
ALS1(config)#vlan 500
ALS1(config-vlan)#name NATIVA
ALS1(config-vlan)#Int range fa0/7-12
ALS1(config-if-range)#switchport trunk native vlan 500
ALS1(config-if-range)#exit
```

Figura 36. Asignacion Vlan 500 a Puertos Troncales Switch ALS1



## **ALS2**

```
ALS2>en
ALS2#config ter
ALS2(config)#vlan 500
ALS2(config-vlan)#name NATIVA
ALS2(config-vlan)#Int range fa0/7-12
ALS2(config-if-range)#switchport trunk native vlan 500
ALS2(config-if-range)#exit
```

Figura 37. Asignacion Vlan 500 a Puertos Troncales Switch ALS1

The screenshot shows a Windows application window titled "ALS2". The tab bar at the top has four tabs: "Physical", "Config", "CLI" (which is selected and highlighted in blue), and "Attributes". Below the tabs is a status bar that reads "IOS Command Line Interface". The main area of the window is a text terminal window. It displays the following text:

```
ALS2 con0 is now available

Press RETURN to get started.

ALS2>EN
ALS2#CONFIG TER
Enter configuration commands, one per line. End with CNTL/Z.
ALS2(config)#VLAN 500
ALS2(config-vlan)#NAME NATIVA
ALS2(config-vlan)#INT RANGE FA0/7-12
ALS2(config-if-range)#SWITCHPORT TRUNK NATIVE VLAN 500
ALS2(config-if-range)#EXIT
ALS2(config)#
```

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

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

#### DLS1

```
DLS1(config)#vtp domain CISCO
DLS1(config)#vtp Password ccnp321
```

Figura 37. Configuracion VTP version 3 con Dominio y Contraseña DLS1

The screenshot shows a Windows-style application window titled "DLS1". The tab bar at the top has "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains the following CLI session output:

```
*LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8, changed state to up
*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

DLS1>en
DLS1#config ter
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 domain CISCO
Domain name already set to CISCO.
DLS1(config)#vtp password ccnp321
Setting device VLAN database password to ccnp321
DLS1(config)#

Ctrl+F6 to exit CLI focus
```

At the bottom right of the window are "Copy" and "Paste" buttons. At the bottom left is a checkbox labeled "Top".

Figura 38. Configuracion VTP version 3 con Dominio y Contraseña DLS2

The screenshot shows a Windows-style application window titled "DLS2". The tab bar at the top has "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains the following CLI session output:

```
*LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8, changed state to up
*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

DLS2>EN
DLS2#CONFIG TEP
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 domain CISCO
Domain name already set to CISCO.
DLS2(config)#vtp password ccnp321
Setting device VLAN database password to ccnp321
DLS2(config)#

Ctrl+F6 to exit CLI focus
```

At the bottom right of the window are "Copy" and "Paste" buttons. At the bottom left is a checkbox labeled "Top".

Figura 39. Configuracion VTP version 3 con Dominio y Contraseña ALS1

The screenshot shows a Windows application window titled "ALS1". The tab bar at the top has "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is a title "IOS Command Line Interface". The main area contains the following CLI session output:

```
%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

ALS1>en
ALS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
ALS1(config)#vtp domain CISCO
Changing VTP domain name from NULL to CISCO
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)#exit
ALS1#
*SYS-5-CONFIG_I: Configured from console by console
```

At the bottom of the window, there are buttons for "Copy" and "Paste". A status message "Ctrl+F6 to exit CLI focus" is displayed. There is also a "Top" button.

- 2) Configurar DLS1 como servidor principal para las VLAN.

```
DLS1>en
DLS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#vtp domain server
Changing VTP domain name from CISCO to server
```

Figura 40. Configuracion Switch DLS1 servidor Principal VLANS.

The screenshot shows a Windows application window titled "DLS1" with a tab bar containing "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is a title "IOS Command Line Interface". The main area displays the following CLI session:

```
DLS1>en
DLS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#vtp domain server
Changing VTP domain name from CISCO to server
DLS1(config)#00:28:01 %DTP-5-DOMAINMISMATCH: Unable to perform trunk
negotiation on port Fa0/8 because of VTP domain mismatch.

00:28:01 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/7 because of VTP domain mismatch.

00:28:01 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/12 because of VTP domain mismatch.

00:28:01 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/11 because of VTP domain mismatch.
```

At the bottom of the window, there are buttons for "Copy" and "Paste", and a checkbox labeled "Top".

3) Configurar ALS1 y ALS2 como clientes VTP.

ALS1

ALS1 (config)# VTP mode Client

ALS2

ALS2 (config)# VTP mode Client

Figura 41. Configuracion Switch ALS1 en modo Clientes VTP.

The screenshot shows a Windows application window titled "ALS1" running the Cisco IOS CLI. The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main pane displays the following text:

```

IOS Command Line Interface
00:32:01 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/7 because of VTP domain mismatch.

00:32:01 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/8 because of VTP domain mismatch.

00:32:31 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/7 because of VTP domain mismatch.

00:32:31 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/8 because of VTP domain mismatch.

ALS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
ALS1(config)#00:33:01 %DTP-5-DOMAINMISMATCH: Unable to perform trunk
negotiation on port Fa0/7 because of VTP domain mismatch.

00:33:01 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/8 because of VTP domain mismatch.

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

```

At the bottom of the window, there are buttons for "Copy" and "Paste", and a checkbox labeled "Top".

e. Configurar en el servidor principal las siguientes VLAN:

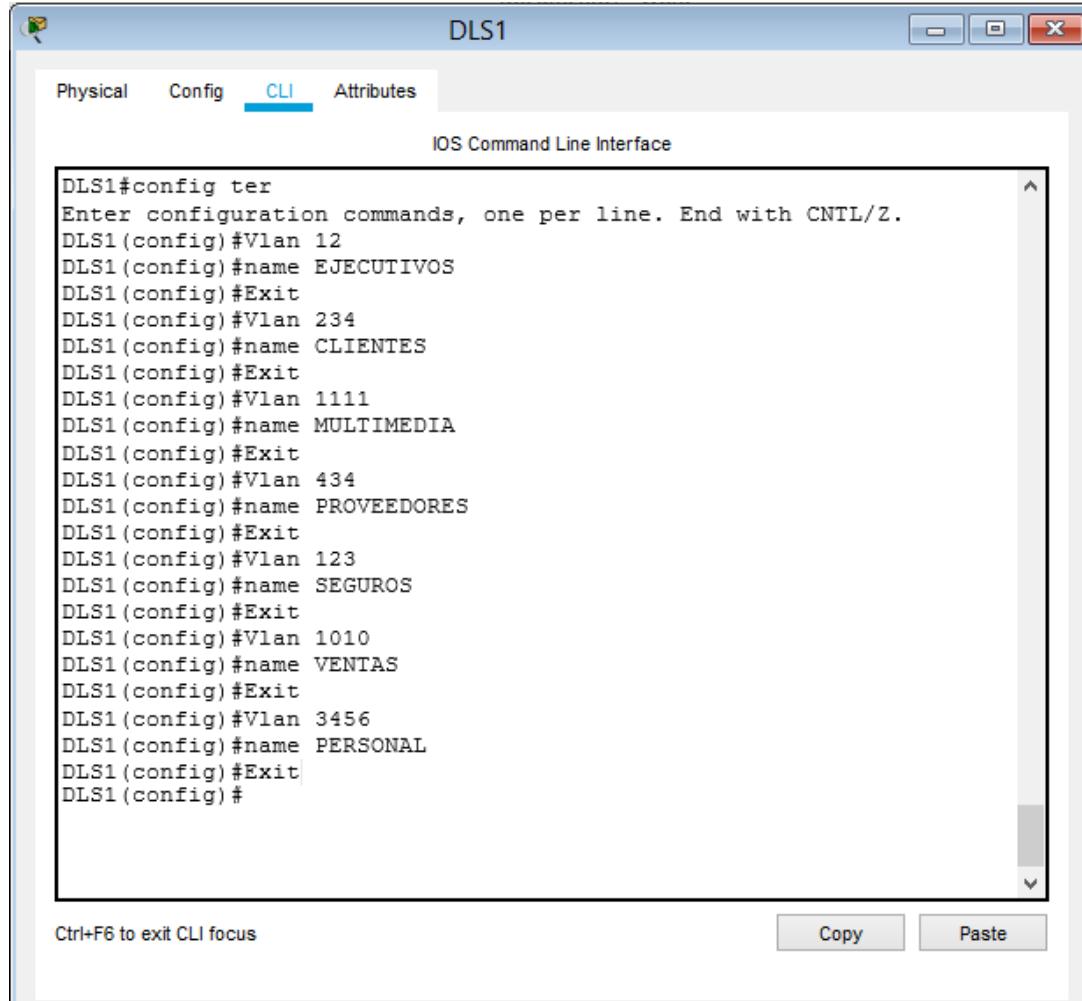
Tabla 5. Configuracion y Direccionamiento de Vlans

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

## **DLS1**

```
DLS1>EN
DLS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#Vlan 12
DLS1(config)#name EJECUTIVOS
DLS1(config)#Exit
DLS1(config)#Vlan 234
DLS1(config)#name CLIENTES
DLS1(config)#Exit
DLS1(config)#Vlan 1111
DLS1(config)#name MULTIMEDIA
DLS1(config)#Exit
DLS1(config)#Vlan 434
DLS1(config)#name PROVEEDORES
DLS1(config)#Exit
DLS1(config)#Vlan 123
DLS1(config)#name SEGUROS
DLS1(config)#Exit
DLS1(config)#Vlan 1010
DLS1(config)#name VENTAS
DLS1(config)#Exit
DLS1(config)#Vlan 3456
DLS1(config)#name PERSONAL
DLS1(config)#Exit
```

Figura 42. Configuracion de Vlans en Servidor Principal DLS1



The screenshot shows a Windows application window titled "DLS1". The window has a tab bar at the top with "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains the following configuration commands:

```
DLS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#Vlan 12
DLS1(config)#name EJECUTIVOS
DLS1(config)#Exit
DLS1(config)#Vlan 234
DLS1(config)#name CLIENTES
DLS1(config)#Exit
DLS1(config)#Vlan 1111
DLS1(config)#name MULTIMEDIA
DLS1(config)#Exit
DLS1(config)#Vlan 434
DLS1(config)#name PROVEEDORES
DLS1(config)#Exit
DLS1(config)#Vlan 123
DLS1(config)#name SEGUROS
DLS1(config)#Exit
DLS1(config)#Vlan 1010
DLS1(config)#name VENTAS
DLS1(config)#Exit
DLS1(config)#Vlan 3456
DLS1(config)#name PERSONAL
DLS1(config)#Exit
DLS1(config)#

```

At the bottom left of the window, it says "Ctrl+F6 to exit CLI focus". At the bottom right, there are "Copy" and "Paste" buttons.

f. En DLS1, suspender la VLAN 434.

```
DLS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#Vlan 434
DLS1(config)#name PROVEEDORES
DLS1(config)#state suspend
DLS1(config)#exit
```

Figura 43. Configuracion de Suspension Vlan 434 en el Servidor DLS1

The screenshot shows a Windows application window titled "DLS1". The tab bar at the top has four tabs: "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is selected, and the window title bar says "IOS Command Line Interface". The main area contains the following configuration commands:

```
DLS1#config ter
Enter configuration commands, one per line. End with CNTL/Z
DLS1(config)#Vlan 434
DLS1(config)#name PROVEEDORES
DLS1(config)#state suspend
DLS1(config)#exit
```

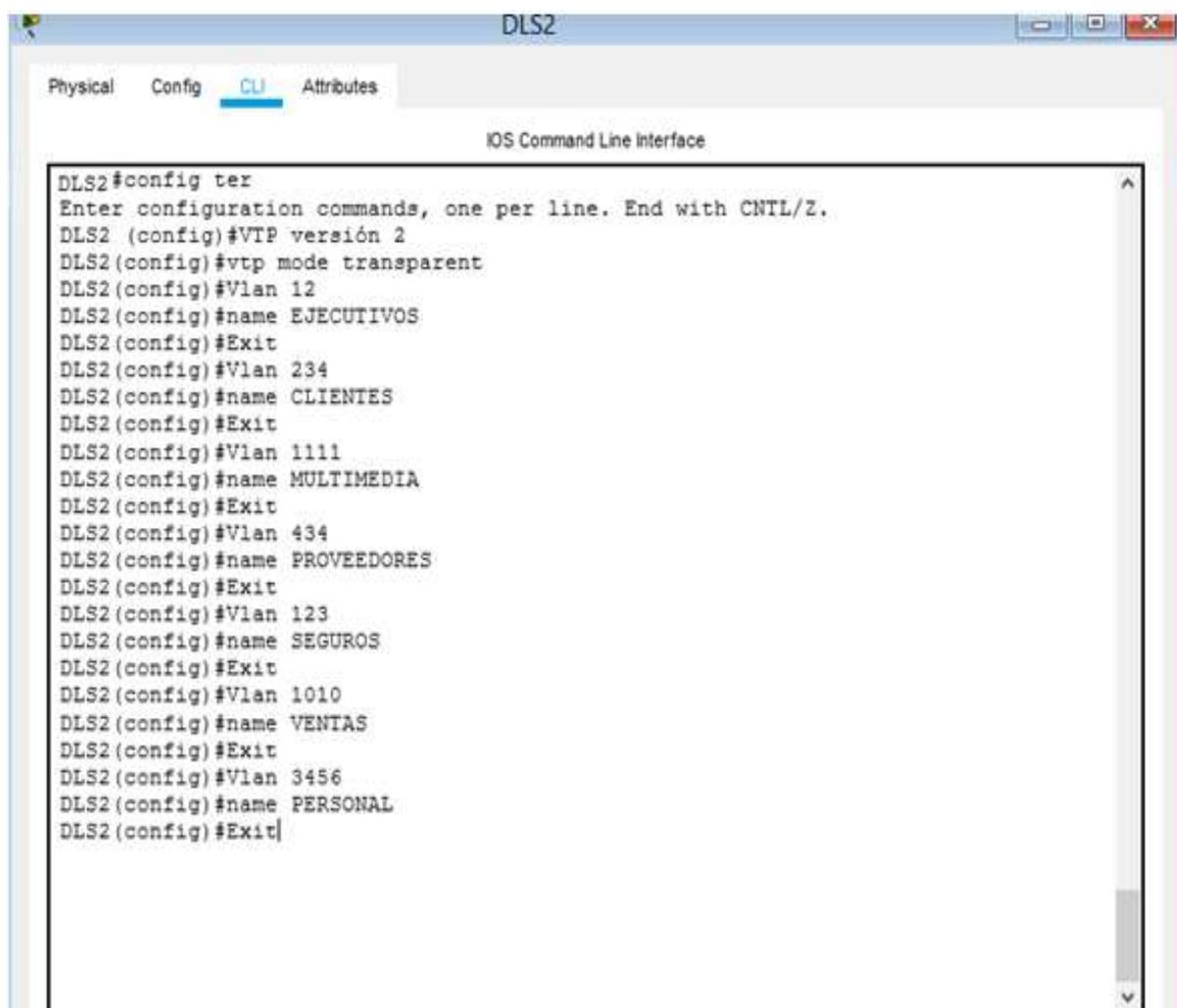
At the bottom of the window, there are buttons for "Copy" and "Paste". Below the window, on the desktop, there is a small toolbar with a "Top" button.

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

```
DLS2#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS2 (config)#VTP versión 2
DLS2(config)#vtp mode transparent
DLS2(config)#Vlan 12
DLS2(config)#name EJECUTIVOS
DLS2(config)#Exit
DLS2(config)#Vlan 234
DLS2(config)#name CLIENTES
DLS2(config)#Exit
DLS2(config)#Vlan 1111
DLS2(config)#name MULTIMEDIA
DLS2(config)#Exit
```

```
DLS2(config)#Vlan 434
DLS2(config)#name PROVEEDORES
DLS2(config)#Exit
DLS2(config)#Vlan 123
DLS2(config)#name SEGUROS
DLS2(config)#Exit
DLS2(config)#Vlan 1010
DLS2(config)#name VENTAS
DLS2(config)#Exit
DLS2(config)#Vlan 3456
DLS2(config)#name PERSONAL
DLS2(config)#Exit
```

Figura 44. Configuracion de Vlans en Switch DLS2

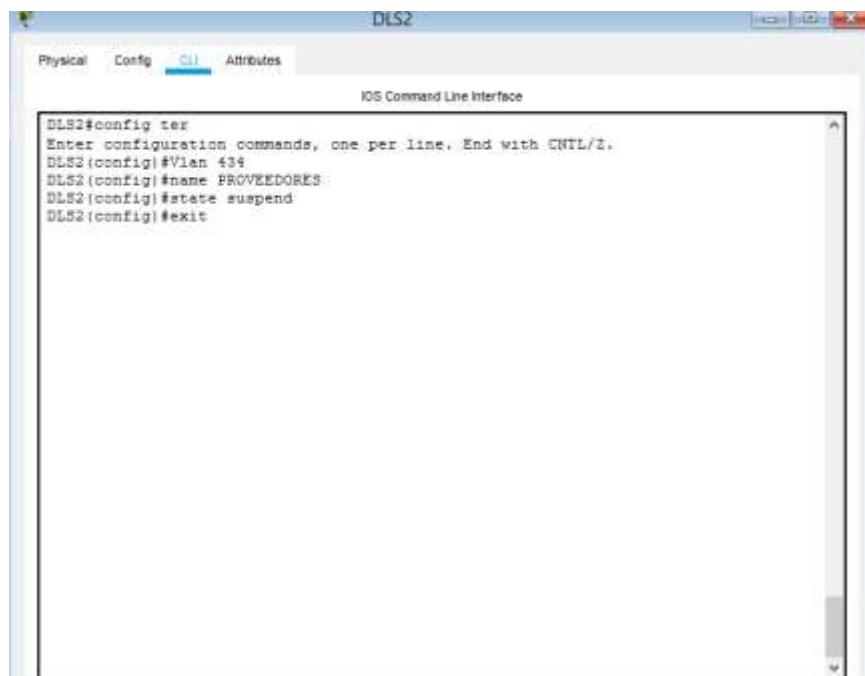


The screenshot shows a Windows-style application window titled "DLS2". The window has tabs at the top: "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains the command-line history:

```
DLS2#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS2 (config)#VTP versión 2
DLS2(config)#vtp mode transparent
DLS2(config)#Vlan 12
DLS2(config)#name EJECUTIVOS
DLS2(config)#Exit
DLS2(config)#Vlan 234
DLS2(config)#name CLIENTES
DLS2(config)#Exit
DLS2(config)#Vlan 1111
DLS2(config)#name MULTIMEDIA
DLS2(config)#Exit
DLS2(config)#Vlan 434
DLS2(config)#name PROVEEDORES
DLS2(config)#Exit
DLS2(config)#Vlan 123
DLS2(config)#name SEGUROS
DLS2(config)#Exit
DLS2(config)#Vlan 1010
DLS2(config)#name VENTAS
DLS2(config)#Exit
DLS2(config)#Vlan 3456
DLS2(config)#name PERSONAL
DLS2(config)#Exit|
```

- h. Suspender VLAN 434 en DLS2.

Figura 45. Configuracion de Suspension Vlan 434 en el Switch DLS2



The screenshot shows a Windows-style application window titled "DLS2". The tab bar at the top has "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains the following command history:

```
DLS2#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#Vlan 434
DLS2(config)#name PROVEEDORES
DLS2(config)#state suspend
DLS2(config)#exit
```

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

Figura 46. Creacion VLAN 567 en DLS2

```

DLS2
Physical Config CLI Attributes
IOS Command Line Interface

03:33:46 %VTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation on port Fa0/11 because of
VTP domain mismatch.

03:33:46 %VTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation on port Fa0/12 because of
VTP domain mismatch.

03:34:16 %VTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation on port Fa0/11 because of
VTP domain mismatch.

03:34:16 %VTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation on port Fa0/12 because of
VTP domain mismatch.

DLS2(config-vlan)#exit
DLS2(config)#vtp domain PRODUCTION
DLS2(config-vlan)#exit
DLS2(config)#03:34:45 %VTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation on port
Fa0/11 because of VTP domain mismatch.

03:34:46 %VTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation on port Fa0/12 because of
VTP domain mismatch.

!
DLS2#
VTP-5-CONFIG_I: Configured from console by console
03:45:16 %VTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation on port Fa0/11 because of
VTP domain mismatch.

03:45:16 %VTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation on port Fa0/12 because of
VTP domain mismatch.

```

- 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.

DLS1#config ter

Enter configuration commands, one per line. End with CNTL/Z.

DLS1(config)#spanning-tree VLAN 1,12,434,500,1010,1111 root primary

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

DLS1(config)#exit

Figura 47. Configuracion Spanning tree root VLAN en DLS1.

The screenshot shows a Windows-style application window titled "DLS1". The tab bar at the top has four tabs: "Physical", "Config", "CLI" (which is highlighted in blue), and "Attributes". Below the tabs is a title bar "IOS Command Line Interface". The main area contains a command-line session:

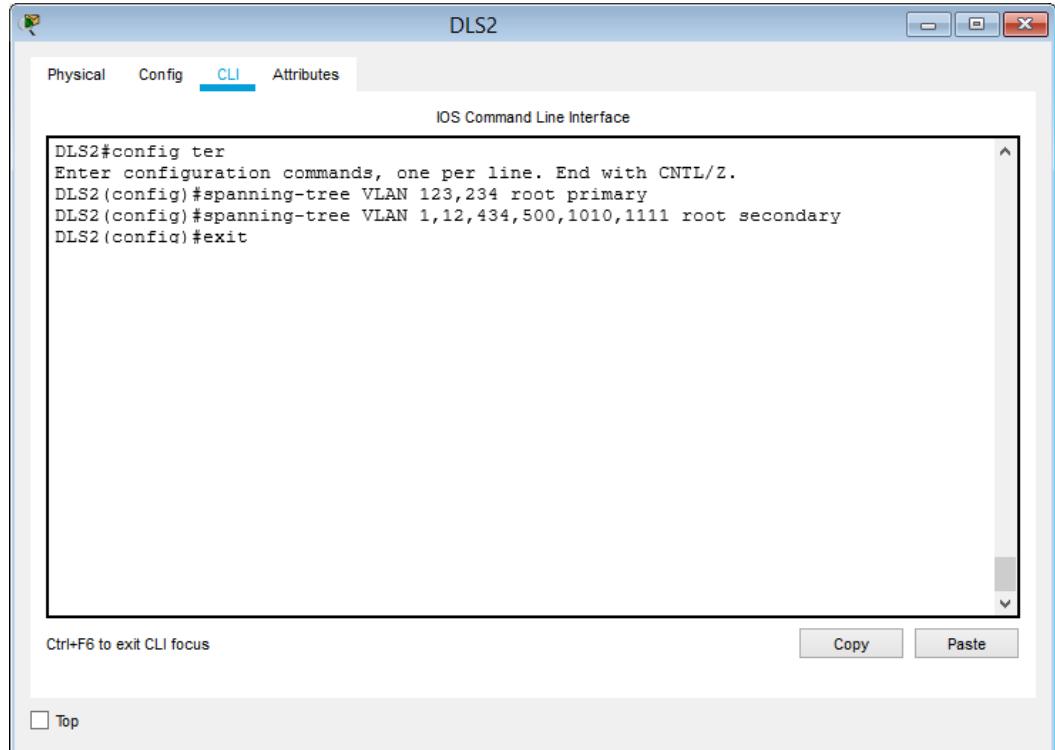
```
DLS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#spanning-tree VLAN 1,12,434,500,1010,1111 root primary
DLS1(config)#spanning-tree VLAN 123,234 root secondary
DLS1(config)#exit
```

At the bottom of the window, there are buttons for "Copy" and "Paste", and a checkbox labeled "Top".

- 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.

```
DLS2#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#spanning-tree VLAN 123,234 root primary
DLS2(config)#spanning-tree VLAN 1,12,434,500,1010,1111 root secondary
DLS2(config)#exit
```

Figura 48. Configuracion Spanning tree root VLAN en DLS2.



- 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 éstos puertos.  

```
interface range fastethernet0/1-24
switchport mode trunk
vlan
exit
```

Figura 49. Configuracion de Puertos Troncales en Vlan.

```

mismatch.

00:05:00 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/8 because of VTP domain mismatch.

00:05:00 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/11 because of VTP domain mismatch.

00:05:00 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/12 because of VTP domain mismatch.

DLS1(config-if-range)#switchport trunk native vlan 434
DLS1(config-if-range)#switchport trunk native vlan 123
DLS1(config-if-range)#switchport trunk native vlan 1010
DLS1(config-if-range)#switchport trunk native vlan 3456
DLS1(config-if-range)#00:05:30 %DTP-5-DOMAINMISMATCH: Unable to
perform trunk negotiation on port Fa0/7 because of VTP domain
mismatch.

00:05:30 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/8 because of VTP domain mismatch.

00:05:30 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/11 because of VTP domain mismatch.

```

Ctrl+F6 to exit CLI focus           

Top

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

Tabla 6. Configurar puertos de Acceso interfaz Vlans

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#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#int fa0/6
DLS1(config-if)#switchport trunk native vlan 3456
DLS1(config-if)#exit
DLS1(config)#int fa0/15
DLS1(config-if)#switchport trunk native vlan 1111

```

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

## **DLS2**

```
DLS2#config ter
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#int fa0/6
DLS2(config-if)#switchport trunk native vlan 12
DLS2(config-if)#switchport trunk native vlan 1010
DLS2(config-if)#exit
DLS2(config)#int fa0/15
DLS2(config-if)#switchport trunk native vlan 1111
DLS2(config-if)#exit
DLS2(config)#int range fa0/16-18
DLS2(config-if)#switchport trunk native vlan 567
DLS2(config-if)#exit
```

## **ALS1**

```
ALS1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
ALS1(config)#int fa0/6
ALS1(config-if)#switchport trunk native vlan 123
ALS1(config-if)#switchport trunk native vlan 1010
ALS1(config-if)#exit
ALS1(config)#int fa0/15
ALS1(config-if)#switchport trunk native vlan 1111
ALS1(config-if)#exit
```

## **ALS2**

```
ALS2#config ter
Enter configuration commands, one per line. End with CNTL/Z.
ALS2(config)#int fa0/6
ALS2(config-if)#switchport trunk native vlan 234
ALS2(config-if)#exit
ALS2(config)#int fa0/15
ALS2(config-if)#switchport trunk native vlan 1111
ALS2(config-if)#exit
```

## 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

Figura 50. Verificacion VLAN Creadas DLS1.

```
IOS Command Line Interface
VLAN Name          Status    Ports
---- --
 12   ADMON        active   Fa0/10, Fa0/11, Fa0/12,
 123  SEGUROS      active   Fa0/13, Fa0/14, Fa0/15, Fa0/16,
 234  CLIENTES     active   Fa0/17, Fa0/18, Fa0/19, Fa0/20,
 434  PROVEEDORES  active   Fa0/21, Fa0/22, Fa0/23, Fa0/24,
 500  NATIVA       active
 1002 fddi-default active
 1003 token-ring-default active
 1004 fddinet-default active
 1005 trnet-default   active
 1111 MULTIMEDIA    active
 3456 PERSONAL      active
VLAN Type SAID      MTU Parent RingNo BridgeNo Stp BrdgMode
Trans1 Trans2
----- ----- ----- ----- ----- ----- ----- ----- -----
```

Ctrl+F6 to exit CLI focus     

Top

Figura 51. Verificacion VLAN Creadas DLS2

```
Fa0/6          Fa0/7, Fa0/8, Fa0/9,  
Fa0/10         Fa0/11, Fa0/12,  
Fa0/13, Fa0/14 Fa0/15, Fa0/16,  
Fa0/17, Fa0/18 Fa0/19, Fa0/20,  
Fa0/21, Fa0/22 Fa0/23, Fa0/24,  
Gig0/1, Gig0/2  
12 ADMON      active  
123 SEGUROS   active  
234 CLIENTES  active  
434 proveedores active  
500 NATIVA    active  
567 PRODUCCION active  
1002 fddi-default active  
1003 token-ring-default active  
1004 fddinet-default active  
1005 trnet-default active  
1010 VENTAS   active  
1111 MULTIMEDIA active  
3456 PERSONAL  active
```

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

Figura 52. Verificacion Etherchannel en DLS1

```
DLS1#SH 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(RD)      -  
2     Po2(SD)       LACP     Fa0/7(I)  Fa0/8(I)  
3     Po3(SD)       PAgP    Fa0/9(I)  Fa0/10(I)  
DLS1#  
DLS1#  
DLS1#
```

Figura 53. Verificacion Etherchannel en ALS1

```
E01:53:37 %DTP-5-DOMAINMISMATCH: Unable to perform trunk negotiation
on port Fa0/8 because of VTP domain mismatch.

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

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

Group  Port-channel  Protocol    Ports
-----+-----+-----+
+-----+
2      Po2 (SD)      LACP        Fa0/7(I)  Fa0/8(I)
3      Po3 (SD)      PAgP        Fa0/9(I)  Fa0/10(I)
ALS1#
```

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

Figura 54. Verificacion Spanning tree en DLS1

```
Root bridge for: default
Extended system ID      is enabled
Portfast Default        is disabled
PortFast BPDU Guard Default is disabled
Portfast BPDU Filter Default is disabled
Loopguard Default       is disabled
EtherChannel misconfig guard is disabled
UplinkFast              is disabled
BackboneFast            is disabled
Configured Pathcost method used is short

Name          Blocking  Listening  Learning  Forwarding  STP
Active
-----+-----+-----+-----+-----+
VLAN0001      0         0         0         7
7
-----+-----+-----+-----+-----+
6 vlangs      0         0         0         7
7

DLS1#
DLS1#
```

Figura 55. Verificacion Spanning tree en DLS2

DLS2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Switch is in pvst mode
Root bridge for:
Extended system ID      is enabled
Portfast Default        is disabled
PortFast BPDU Guard Default  is disabled
Portfast BPDU Filter Default is disabled
Loopguard Default       is disabled
EtherChannel misconfig guard is disabled
UplinkFast              is disabled
BackboneFast             is disabled
Configured Pathcost method used is short

Name          Blocking Listening Learning Forwarding STP
Active
-----
-----
```

Name	Blocking	Listening	Learning	Forwarding	STP
VLAN0001	1	0	0	6	
7					
-----	-----	-----	-----	-----	-----
7 vlans	1	0	0	6	
7					

DLS2#01:57:06 %DTP-5-DOMAINMISMATCH: Unable to perform trunk

Ctrl+F6 to exit CLI focus

Copy Paste

## **CONCLUSIONES**

En el escenario 1 se establecieron protocolos de enlace que por sus características cada uno tiene sus ventajas respecto a las demás, por ejemplo el protocolo EIGRP es un protocolo híbrido que tiene en cuenta el estado del enlace tanto como el vector distancia, es exclusivo de cisco y se hace más conveniente para redes grandes.

Con la creación y configuración de Vlans las cuales son de uso independientes dentro de una red estructurada; realizadas para funcionar de manera lógica en los dispositivos mejorando la red en cuanto de rendimiento y envío de datos y actualizaciones .

Los dos escenarios se implementaron aplicando los conceptos y temáticas de configuración y estructuración de redes con protocolos de enrutamiento eigrp,ospf complementado el uso de las Vlan y la asignación de las mismas en habilitación en servidores principales utilizando protocolos VTP con versiones que permitan el flujo de información de forma interna y externa en la red.

Mediante los software de simulación GNS3 y CISCO PACKET TRACER nos permitieron entrar en un entorno cercano a lo real mediante las configuraciones y métodos que se emplean en la creación de redes y el funcionamiento de equipos para la recepción y entrega de información.

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