

DIPLOMADO DE PROFUNDIZACION CISCO  
PRUEBA DE HABILIDADES PRÁCTICAS CCNP

**Karen Natali Hernández Cuintaco**

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA - UNAD  
ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA –  
ECBTI INGENIERÍA DE TELECOMUNICACIONES  
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**Karen Natali Hernández Cuintaco**

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DIRECTOR:  
MSc. GERARDO GRANADOS ACUÑA

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA - UNAD  
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BOGOTÁ  
2021

NOTA DE ACEPTACIÓN

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BOGOTA, 29 de noviembre de 2021

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## GLOSARIO

**CISCO:** es una empresa dedicada a la interconexión de redes informáticas y de comunicaciones más grande del mundo. Es por tanto la que domina los sistemas y la que, prácticamente, ha creado un estándar propio para las redes de telecomunicaciones. (tokioschool, s.f.)

**CCNP (Cisco Certified Networking Professional):** Te permite trabajar en un entorno real y te proporciona una base duradera, ya que esta certificación te otorga habilidades que son tan relevantes en redes físicas como en redes virtuales. (tokioschool, s.f.)

**LAN:** es un grupo de computadoras y dispositivos periféricos que comparten una línea de comunicaciones común o un enlace inalámbrico a un servidor dentro de un área geográfica específica. Una red de área local puede servir a tan solo dos o tres usuarios en una oficina en casa o miles de usuarios en la oficina central de una corporación. Los propietarios de viviendas y los administradores de tecnología de la información (TI) configuran una LAN para que los nodos de la red puedan comunicarse y compartir recursos como impresoras o almacenamiento en red. (computerweekly, s.f.)

**WAN:** Las redes LAN son muy populares dentro de empresas u organizaciones, por lo tanto, implica la interconexión de equipos terminales u otras redes que se hallan a grandes distancias entre sí. Su infraestructura requiere de diversos nodos de conmutación y de una importante capacidad para soportar el volumen del tráfico de datos. (Gardey., 2010)

**RED DE COMPUTADORAS:** también llamada red de ordenadores o red informática es un conjunto de equipos conectados por medio de cables, señales, ondas o cualquier otro método de transporte de datos, que comparten información (archivos), recursos (CD-ROM, impresoras, etc.) y servicios (acceso a internet, e-mail, chat, juegos), etc. (S., s.f.)



## RESUMEN

CISCO es una empresa estadounidense que brinda un servicio de soluciones de red, la cual capacita a estudiantes y profesionales que desean enfatizar en dispositivos para redes locales y externas, lo mucho que tecnológicamente se va evolucionando, por eso encontramos las certificaciones como CCNP que nos demuestra las habilidades para crear, efectuar y comprobar la solución de problemas de REDES locales, aunque también trabaja soluciones desarrolladas en cuanto a la seguridad de voz, Wireless y video, por consiguiente con esta certificación se puede emplear en todo lo relacionado con redes y sistemas.

Redes es un conjunto de equipos de cómputo o dispositivos conectados entre sí por medio de recursos de intercambio que son el hardware-software, hablamos también del ENRUTAMIENTO que nos indica del proceso de reenviar paquetes de redes, conservando la mejor ruta y más óptima por este motivo se tiene en cuenta la tabla de enrutamiento, la distancia y el ancho de banda. Por eso encontramos que la ELECTRÓNICA tiene circuitos que involucran componentes eléctricos y tecnología de interconexión con la cual se puede amplificar las señales débiles, un mejor procesamiento de datos y procesamiento de señales, con esto se obtiene un mejor servicio y de calidad.

## ABSTRACT

Cisco is a company that provides training service and solution in local and external network devices with which you have access to voice service, internet and facilitates communication, for all this to take place you must have a good network with excellent infrastructure, which takes into account the routing table, the assembly of the network, the selection of the switches is correct, so that the data exchange is provided in the best way, all this is taken into account in electronic processes at the time of the implementation of this type of services either for a home, office or large companies.

It is good to keep in mind that Cisco provides certifications in CCNP where as professionals can demonstrate the ability to create, carry out and test the best and most correct solution in terms of the implementation of local networks.

## INTRODUCCIÓN

Con el diplomado en CCNP se demuestra la capacidad del estudiante en crear, efectuar y comprobar la solución de problemas de redes locales, aunque también trabaja soluciones desarrolladas en cuanto a la seguridad de voz, inalámbricas y video, con este curso se obtiene los conceptos protocolos de enrutamiento EIGRP, OSPF, BGP, protocolos en IPV6 entre otros.

Con el desarrollo de este ejercicio se configuran plataformas de conmutación basadas en switches, mediante el uso de protocolos como STP y la configuración de VLANs en escenarios de red corporativos, para comprender el modo de operación de las subredes y los beneficios de administrar dominios de broadcast independientes, en múltiples escenarios al interior de una red jerárquica convergente.

Se Emplean herramientas de simulación y laboratorios de acceso remoto con el desenlace de establecer escenarios LAN/WAN que aprueben realizar un análisis sobre el procedimiento de múltiples protocolos, evaluando el desempeño de los routers, mediante el uso de comandos de administración avanzados y bajo el uso de protocolos de vector distancia y estado enlace.

## DESARROLLO

### Escenario Propuesto

#### Topología de la Red:

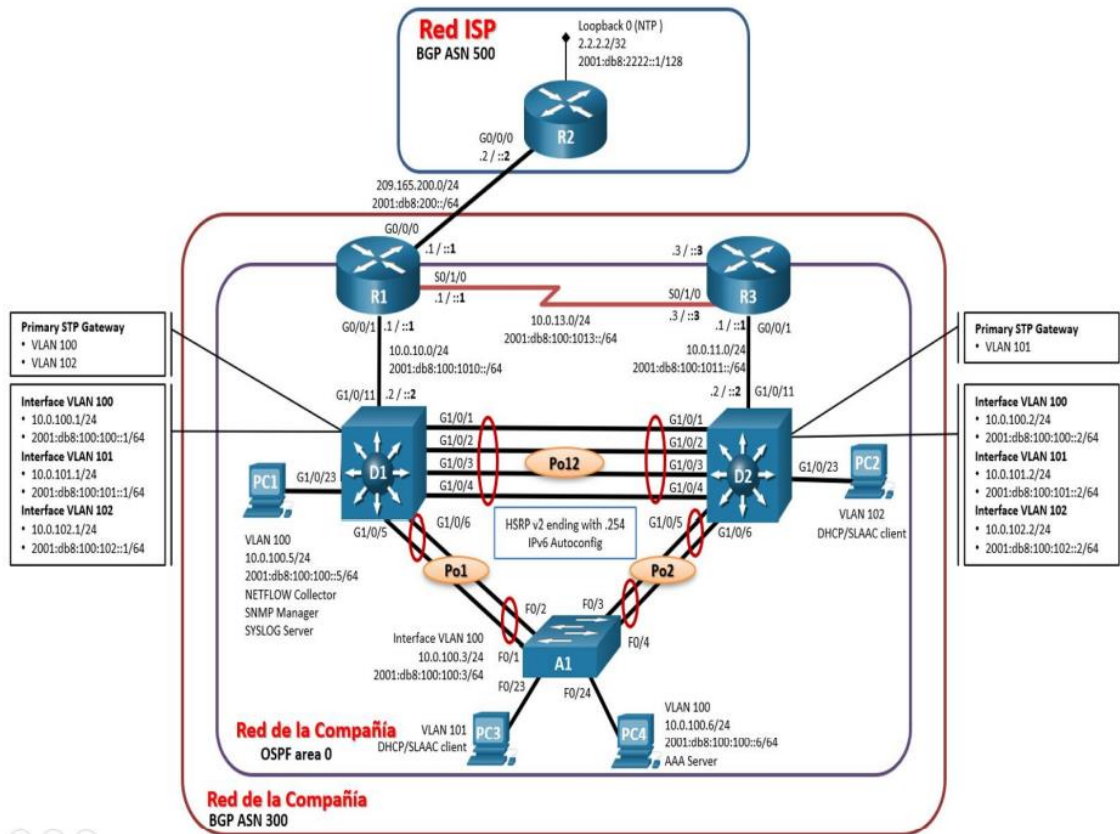


Figura 1 Escenario 1

Tabla 1 de direccionamiento

Dispositivo	Interfaz	Dirección IPv4	Dirección IPv6	IPv6 Link-Local
R1	G0/0/0	209.165.200.2 25/27	2001:db8:200: :1/64	fe80::1:1
	G0/0/1	10.0.10.1/24	2001:db8:100: 1010::1/64	fe80::1:2
	S0/1/0	10.0.13.1/24	2001:db8:100: 1013::1/64	fe80::1:3
R2	G0/0/0	209.165.200.2 26/27	2001:db8:200: :2/64	fe80::2:1
	Loopback0	2.2.2.2/32	2001:db8:222 2::1/128	fe80::2:3
R3	G0/0/1	10.0.11.1/24	2001:db8:100: 1011::1/64	fe80::3:2
	S0/1/0	10.0.13.3/24	2001:db8:100: 1013::3/64	fe80::3:3
D1	G1/0/11	10.0.10.2/24	2001:db8:100: 1010::2/64	fe80::d1:1
	VLAN 100	10.0.100.1/24	2001:db8:100: 100::1/64	fe80::d1:2
	VLAN 101	10.0.101.1/24	2001:db8:100: 101::1/64	fe80::d1:3
	VLAN 102	10.0.102.1/24	2001:db8:100: 102::1/64	fe80::d1:4
D2	G1/0/11	10.0.11.2/24	2001:db8:100: 1011::2/64	fe80::d2:1
	VLAN 100	10.0.100.2/24	2001:db8:100: 100::2/64	fe80::d2:2
	VLAN 101	10.0.101.2/24	2001:db8:100: 101::2/64	fe80::d2:3
	VLAN 102	10.0.102.2/24	2001:db8:100: 102::2/64	fe80::d2:4
A1	VLAN 100	10.0.100.3/23	2001:db8:100: 100::3/64	fe80::a1:1
PC1	NIC	10.0.100.5/24	2001:db8:100: 100::5/64	EUI-64
PC2	NIC	DHCP	SLAAC	EUI-64
PC3	NIC	DHCP	SLAAC	EUI-64
PC4	NIC	10.0.100.6/24	2001:db8:100: 100::6/64	EUI-64

## Part 1: Construir la red y configurar los ajustes básicos de cada dispositivo y el direccionamiento de las interfaces

**Paso 1:** Cablear la red como se muestra en la topología.

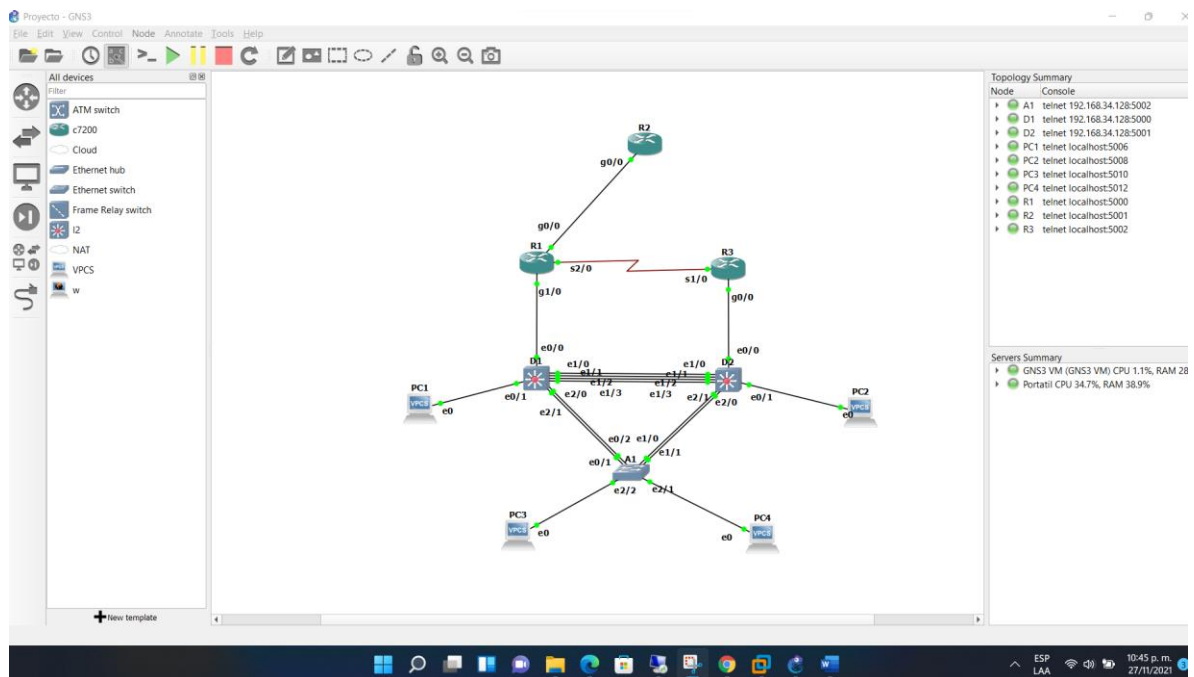


Figura 2 Simulación Escenario 1

### Recursos necesarios

- 3 Routers (Cisco 4221 con Cisco IOS XE versión 16.9.4 imagen universal o comparable)
- 2 Switches (Cisco 3650 con Cisco IOS XE versión 16.9.4 imagen universal o comparable)
- 1 Switch (Cisco 2960 con Cisco IOS versión 15.2 imagen lanbase o comparable)
- 4 PCs (utilice el programa de emulación de terminal)
- Los cables de consola para configurar los dispositivos Cisco IOS van a través de los puertos de consola
- Los cables Ethernet y seriales van como se muestra en la topología

Se realiza el montaje del escenario uno propuesto para esta actividad en GN3, con los recursos requeridos descritos en el párrafo anterior.

## Part 2: Configurar la capa 2 de la red y el soporte de Host.

son suministradas a continuación:

### Router R1

```
hostname R1
ipv6 unicast-routing
no ip domain lookup
banner motd # R1, ENCOR Skills Assessment, Scenario 1 Karen Hernandez
line con 0
exec-timeout 0 0
logging synchronous
exit
banner motd # Configuracion de R1 a R2 #
interface g0/0
ip address 209.165.200.225 255.255.255.224
ipv6 address fe80::1:1 link-local
ipv6 address 2001:db8:200::1/64
no shutdown
exit
banner motd # Configuracion de R1 a D1 #
interface g1/0
ip address 10.0.10.1 255.255.255.0
ipv6 address fe80::1:2 link-local
ipv6 address 2001:db8:100:1010::1/64
no shutdown
exit
banner motd # Configuracion de R1 a R3 #
interface s2/0
ip address 10.0.13.1 255.255.255.0
ipv6 address fe80::1:3 link-local
ipv6 address 2001:db8:100:1013::1/64
no shutdown
exit
```

### **Router R2**

```
hostname R2
ipv6 unicast-routing
no ip domain lookup
banner motd # R2, ENCOR Skills Assessment, Scenario 1 Karen Hernandez
line con 0
exec-timeout 0 0
logging synchronous
exit
banner motd # Configuracion de R2 a R1 #
interface g0/0
ip address 209.165.200.226 255.255.255.224
ipv6 address fe80::2:1 link-local
ipv6 address 2001:db8:200::2/64
no shutdown
exit
banner motd # Loopback #
interface Loopback 0
ip address 2.2.2.2 255.255.255.255
ipv6 address fe80::2:3 link-local
ipv6 address 2001:db8:2222::1/128
no shutdown
exit
```

### **Router R3**

```
hostname R3
ipv6 unicast-routing
no ip domain lookup
banner motd # R3, ENCOR Skills Assessment, Scenario 1 Karen Hernandez
line con 0
exec-timeout 0 0
logging synchronous
```

```
exit
banner motd # Configuracion de R3 a D2 #
interface g0/0
ip address 10.0.11.1 255.255.255.0
ipv6 address fe80::3:2 link-local
ipv6 address 2001:db8:100:1011::1/64
no shutdown
exit
banner motd # Configuracion de R3 a R1 #
interface s1/0
ip address 10.0.13.3 255.255.255.0
ipv6 address fe80::3:3 link-local
ipv6 address 2001:db8:100:1010::2/64
no shutdown
exit
```

### **Switch D1**

```
hostname D1
ip routing
ipv6 unicast-routing
no ip domain lookup
banner motd # D1, ENCOR Skills Assessment, Scenario 1 Karen Hernandez #
line con 0
exec-timeout 0 0
logging synchronous
exit
vlan 100
name Management
exit
vlan 101
name UserGroupA
exit
vlan 102
name UserGroupB
```



```
exit
vlan 999
name NATIVE
exit
banner motd # Configuracion de D1 a R1 #
interface e0/0
no switchport
ip address 10.0.10.2 255.255.255.0
ipv6 address fe80::d1:1 link-local
ipv6 address 2001:db8:100:1010::2/64
no shutdown
exit
interface vlan 100
ip address 10.0.100.1 255.255.255.0
ipv6 address fe80::d1:2 link-local
ipv6 address 2001:db8:100:100::1/64
no shutdown
exit
interface vlan 101
ip address 10.0.101.1 255.255.255.0
ipv6 address fe80::d1:3 link-local
ipv6 address 2001:db8:100:101::1/64
no shutdown
exit
interface vlan 102
ip address 10.0.102.1 255.255.255.0
ipv6 address fe80::d1:4 link-local
ipv6 address 2001:db8:100:102::1/64
no shutdown
exit
ip dhcp excluded-address 10.0.101.1 10.0.101.109
ip dhcp excluded-address 10.0.101.141 10.0.101.254
ip dhcp excluded-address 10.0.102.1 10.0.102.109
ip dhcp excluded-address 10.0.102.141 10.0.102.254
```

```
ip dhcp pool VLAN-101
network 10.0.101.0 255.255.255.0
default-router 10.0.101.254
exit
ip dhcp pool VLAN-102
network 10.0.102.0 255.255.255.0
default-router 10.0.102.254
exit
interface e2/0-3, e3/0-3
shutdown
exit
```

## **Switch D2**

```
hostname D2
ip routing
ipv6 unicast-routing
no ip domain lookup
banner motd # D2, ENCOR Skills Assessment, Scenario 1 Karen Hernandez #
line con 0
exec-timeout 0 0
logging synchronous
exit
vlan 100
name Management
exit
vlan 101
name UserGroupA
exit
vlan 102
name UserGroupB
exit
vlan 999
name NATIVE
exit
```

```
banner motd # Configuracion de D2 a R3 #
interface e0/0
no switchport
ip address 10.0.11.2 255.255.255.0
ipv6 address fe80::d1:1 link-local
ipv6 address 2001:db8:100:1011::2/64
no shutdown
exit
interface vlan 100
ip address 10.0.100.2 255.255.255.0
ipv6 address fe80::d2:2 link-local
ipv6 address 2001:db8:100:100::2/64
no shutdown
exit
interface vlan 101
ip address 10.0.101.2 255.255.255.0
ipv6 address fe80::d2:3 link-local
ipv6 address 2001:db8:100:101::2/64
no shutdown
exit
interface vlan 102
ip address 10.0.102.2 255.255.255.0
ipv6 address fe80::d2:4 link-local
ipv6 address 2001:db8:100:102::2/64
no shutdown
exit
ip dhcp excluded-address 10.0.101.1 10.0.101.209
ip dhcp excluded-address 10.0.101.241 10.0.101.254
ip dhcp excluded-address 10.0.102.1 10.0.102.209
ip dhcp excluded-address 10.0.102.241 10.0.102.254
ip dhcp pool VLAN-101
network 10.0.101.0 255.255.255.0
default-router 10.0.101.254
exit
```

```
ip dhcp pool VLAN-102
network 10.0.102.0 255.255.255.0
default-router 10.0.102.254
exit
interface e2/0-3, e3/0-3
shutdown
exit
```

### **Switch A1**

```
hostname A1
no ip domain lookup
banner motd # A1, ENCOR Skills Assessment, Scenario 1 Karen Hernandex
line con 0
exec-timeout 0 0
logging synchronous
exit
vlan 100
name Management
exit
vlan 101
name UserGroupA
exit
vlan 102
name UserGroupB
exit
vlan 999
name NATIVE
exit
interface vlan 100
ip address 10.0.100.3 255.255.255.0
ipv6 address fe80::a1:1 link-local
ipv6 address 2001:db8:100:100::3/64
no shutdown
```





```

R3> no ip address Ethernet1/3
R3> shutdown Ethernet1/3
R3> no ip address Ethernet2/3
R3> shutdown Ethernet2/3
R3> no ip address Ethernet3/2
R3> shutdown Ethernet3/2
R3> no ip address Ethernet3/3
R3> shutdown Ethernet3/3
R3> copy running-config startup-config
Destination filename [startup-config]
Warning: Overwrite the previous startup configuration? [confirm]
Building configuration...
[OK]
R3>

```

Figura 8 aplicando código A1

Comando

### copy running-config startup-config

c. Configure el direccionamiento de los host PC 1 y PC 4 como se muestra en la tabla de direccionamiento.

```

R3> ip 10.0.100.5/24 10.0.100.254
R3> gateway 10.0.100.254
R3> show ip
NAME       : PC1[1]
IP-ADDR   : 10.0.100.5/24
GATEWAY   : 10.0.100.254
MAC       :
L2PORT    :
L3PORT    :
HOST-PORT : 127.0.0.1:18001
VLAN      : 1500
R3> show ipv6
NAME       : PC1[1]
LINK-LOCAL SCOPE : FE80::1208:79FF:FE05:1000/64
GLOBAL SCOPE    : 2001:008:1000:1001::5/64
ROUTER LINK-LAYER
MAC           : 00:50:79:66:00:00
L2PORT       : 150000
L3PORT       :
HOST-PORT    : 127.0.0.1:18001
VLAN         : 1500
R3>

```

Figura 9 direccionamiento del host PC 1

Asigne una dirección de puerta de enlace predeterminada de 10.0.100.254, la





```

D1#
Mon 21 22:20:57.297: NBP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
D1#
Mon 21 22:20:57.367: N1200-1-UPDOWN: Interface Ethernet2/1, changed state to up
D1#
Mon 21 22:20:58.249: RVS-5-COMPID_1: Configured from console by console
Mon 21 22:20:58.369: N1200R070-9-UPDOWN: Line protocol on Interface Ethernet2/1, changed state to up
D1#show interface trunk

Port      Mode      Encapsulation  Status        Native vlan
-----
Et1/0     on        dot1q           trunking      999
Et1/1     on        dot1q           trunking      999
Et1/2     on        dot1q           trunking      999
Et1/3     on        dot1q           trunking      999
Et2/0     on        dot1q           trunking      999
Et2/1     on        dot1q           trunking      999

Port      Vlans allowed on trunk
-----
Et1/0     1-4094
Et1/1     1-4094
Et1/2     1-4094
Et1/3     1-4094
Et2/0     1-4094
Et2/1     1-4094

Port      Vlans allowed and active in management domain
-----
Et1/0     1,100-102,999
Et1/1     1,100-102,999
Et1/2     1,100-102,999
Et1/3     1,100-102,999
Et2/0     1,100-102,999
Et2/1     1,100-102,999

Port      Vlans allowed and active in management domain
-----
Et1/0     1,100-102,999
Et1/1     1,100-102,999
Et1/2     1,100-102,999
Et1/3     1,100-102,999
Et2/0     1,100-102,999
Et2/1     1,100-102,999

Port      Vlans in spanning tree forwarding state and not pruned
-----
Et1/0     1,100-102,999
Et1/1     1,100-102,999
Et1/2     1,100-102,999
Et1/3     1,100-102,999
Et2/0     1,100-102,999
Et2/1     1,100-102,999
D1#
Mon 21 22:21:47.814: NBP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/1 (999), with A1 Ethernet0/2 (1).
D1#
Mon 21 22:21:48.687: NBP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
Mon 21 22:21:49.872: NBP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet1/0 (full duplex).
D1#
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```

Figura 11 enlaza trunk 802.1Q entre D1 and D2

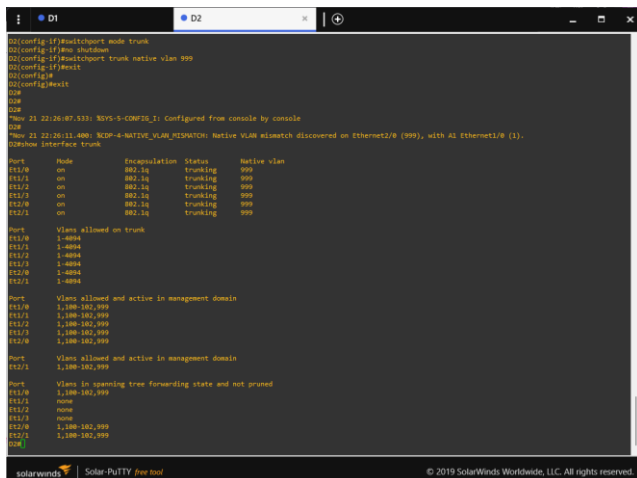
```

interface range e1/0
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
no shutdown
exit
interface range e1/1
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
no shutdown
exit
interface range e1/2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
no shutdown
exit
interface range e1/3
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
no shutdown
exit

```

- D1 and A1





*Figura 13 enlaca trunk 802.1Q entre D2 and A1*

```

interface e2/0
switchport trunk encapsulation dot1q
switchport mode trunk
no shutdown
switchport trunk native vlan 999
exit
  
```

```

interface e2/1
switchport trunk encapsulation dot1q
switchport mode trunk
no shutdown
switchport trunk native vlan 999
exit
  
```

2.2 En todos los switches cambie la VLAN nativa en los enlaces troncales. Especificación se VLAN 999 como la VLAN nativa.  
**Comando show interface trunk**

```

22:14:11.082: NCF-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), with A1 Ethernet1/0 (full duplex).
22:14:11.083: NCF-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), with A1 GigabitEthernet1/0 (full duplex).
22:14:11.084: NCF-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (999), with A1 Ethernet1/0 (1).
22:14:11.085: NCF-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (999), with A1 Ethernet1/0 (1).
22:14:11.086: NCF-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), with A1 GigabitEthernet1/0 (full duplex).
22:14:11.087: NCF-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (999), with A1 Ethernet1/0 (1).
22:14:11.088: NCF-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (999), with A1 Ethernet1/0 (1).

Show interface trunk
Port      Mode                Negotiation   Status    Native vlan
-----  -
Vl1/0    on                   auto          trunking 999
Vl1/1    on                   auto          trunking 999
Vl1/2    on                   auto          trunking 999
Vl1/3    on                   auto          trunking 999
Vl1/4    on                   auto          trunking 999
Vl1/5    on                   auto          trunking 999

Show vlags allowed on trunk
Vl1/0    1-4094
Vl1/1    1-4094
Vl1/2    1-4094
Vl1/3    1-4094
Vl1/4    1-4094
Vl1/5    1-4094

Show vlags allowed and active in management domain
Vl1/0    1,100-102,999
Vl1/1    1,100-102,999
Vl1/2    1,100-102,999
Vl1/3    1,100-102,999
Vl1/4    1,100-102,999
Vl1/5    1,100-102,999

Show vlags allowed and active in management domain
Vl1/1    1,100-102,999

Show vlags in spanning tree forwarding state and not pruned
Vl1/0    1,100-102,999
Vl1/1    1,100-102,999
Vl1/2    1,100-102,999
Vl1/3    1,100-102,999
Vl1/4    1,100-102,999
Vl1/5    1,100-102,999
Vl2/0
Vl2/1
Vl2/2
Vl2/3
Vl2/4
Vl2/5
Vl3/0
Vl3/1
Vl3/2
Vl3/3
Vl3/4
Vl3/5
Vl4/0
Vl4/1
Vl4/2
Vl4/3
Vl4/4
Vl4/5
Vl5/0
Vl5/1
Vl5/2
Vl5/3
Vl5/4
Vl5/5

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```

Figura 14 VLAN nativa D1

```

22:14:11.082: NCF-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), with A1 GigabitEthernet1/0 (full duplex).
22:14:11.083: NCF-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), with A1 GigabitEthernet1/0 (full duplex).
22:14:11.084: NCF-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (999), with A1 Ethernet1/0 (1).
22:14:11.085: NCF-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (999), with A1 Ethernet1/0 (1).
22:14:11.086: NCF-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), with A1 GigabitEthernet1/0 (full duplex).
22:14:11.087: NCF-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (999), with A1 Ethernet1/0 (1).
22:14:11.088: NCF-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (999), with A1 Ethernet1/0 (1).

Show interface trunk
Port      Mode                Negotiation   Status    Native vlan
-----  -
Vl1/0    on                   auto          trunking 999
Vl1/1    on                   auto          trunking 999
Vl1/2    on                   auto          trunking 999
Vl1/3    on                   auto          trunking 999
Vl1/4    on                   auto          trunking 999
Vl1/5    on                   auto          trunking 999

Show vlags allowed on trunk
Vl1/0    1-4094
Vl1/1    1-4094
Vl1/2    1-4094
Vl1/3    1-4094
Vl1/4    1-4094
Vl1/5    1-4094

Show vlags allowed and active in management domain
Vl1/0    1,100-102,999
Vl1/1    1,100-102,999
Vl1/2    1,100-102,999
Vl1/3    1,100-102,999
Vl1/4    1,100-102,999
Vl1/5    1,100-102,999

Show vlags allowed and active in management domain
Vl1/1    1,100-102,999

Show vlags in spanning tree forwarding state and not pruned
Vl1/0    1,100-102,999
Vl1/1    none
Vl1/2    none
Vl1/3    none
Vl1/4    none
Vl1/5    none
Vl2/0    1,100-102,999
Vl2/1    1,100-102,999
Vl2/2    1,100-102,999
Vl2/3    1,100-102,999
Vl2/4    1,100-102,999
Vl2/5    1,100-102,999
Vl3/0
Vl3/1
Vl3/2
Vl3/3
Vl3/4
Vl3/5
Vl4/0
Vl4/1
Vl4/2
Vl4/3
Vl4/4
Vl4/5
Vl5/0
Vl5/1
Vl5/2
Vl5/3
Vl5/4
Vl5/5

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```

Figura 15 VLAN nativa D2

2.3 En todos los switches habilite el protocolo Rapid Spanning-Tree (RSTP)  
Use Rapid Spanning Tree (RSPT)

Comando  
spanning-tree mode rapid-pvst



D1 y D2 deben proporcionar respaldo en caso de falla del puente raíz (root bridge).

### Especificaciones

Configure D1 y D2 como raíz (root) para las VLAN apropiadas, con prioridades de apoyo mutuo en caso de falla del switch.

```
spanning-tree mode rapid-pvst
spanning-tree portfast edge default
spanning-tree extend system-id
spanning-tree vlan 100 priority 20576
spanning-tree vlan 101 priority 20672
D1#
Nov 21 22:49:02.796: VDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
D1#
Nov 21 22:49:13.807: VDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet0/9 (full duplex).
D1#
Nov 21 22:49:51.123: VDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
D1#
D1#conf tera
Enter configuration commands, one per line. End with CNTL/Z.
D1(config)#
D1(config)#
D1(config)#
Nov 21 22:50:42.244: VDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet0/9 (full duplex).
Nov 21 22:50:43.241: VDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
D1(config)#spanning-tree vlan 100 root primary
D1(config)#spanning-tree vlan 101 root secondary
D1(config)#spanning-tree vlan 102 root primary
D1(config)#spanning-tree portfast edge default
D1(config)#
D1(config)#exit
D1#
Nov 21 22:51:08.854: SVS-5-COMP3_1: Configured from console by console
D1#show run | include spanning-tree
Spanning tree mode rapid-pvst
spanning-tree mode rapid-pvst
spanning-tree portfast edge default
spanning-tree extend system-id
spanning-tree vlan 100,101 priority 20576
spanning-tree vlan 101 priority 20672
D1#
Nov 21 22:51:31.412: VDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
D1#
```

Figura 19 configure los puentes raíz RSTP D1

```
spanning-tree vlan 100 root primary
spanning-tree vlan 101 root secondary
spanning-tree vlan 102 root primary
spanning-tree portfast edge default
exit
show run | include spanning-tree
```

```
D2 com0 is now available
Press RETURN to get started.

Press RETURN to get started.

Configuración de D2 a R3
D2#conf tera
Enter configuration commands, one per line. End with CNTL/Z.
D2(config)#spanning-tree vlan 100 root primary
D2(config)#spanning-tree vlan 101 root secondary
D2(config)#spanning-tree vlan 102 root primary
D2(config)#spanning-tree portfast edge default
Warning: this command enables portfast by default on all interfaces. You
should now disable portfast explicitly on switched ports leading to hubs,
switches and bridges as they may create temporary bridging loops.
D2(config)#exit
D2#
Nov 21 22:53:27.879: SVS-5-COMP3_1: Configured from console by console
D2#
Nov 21 22:53:29.471: VDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/9 (full duplex).
D2#
D2#show run | include spanning-tree
Spanning tree mode rapid-pvst
spanning-tree mode rapid-pvst
spanning-tree portfast edge default
spanning-tree extend system-id
spanning-tree vlan 100,101 priority 20576
spanning-tree vlan 101 priority 20672
D2#
D2#
D2#
```

Figura 20 configure los puentes raíz RSTP D2



```

D1: [config]#int range e2/0-1
[config]#channel-group 1 mode active
[config]#int range e2/0-1
[config]#exit
D1: 22 11:49:45.964: NBP-5-UPDAB: Line protocol on Interface Ethernet2/0, changed state to down
D1: 22 11:49:46.000: NBP-5-UPDAB: Line protocol on Interface Ethernet2/1, changed state to down
[config]#int range e2/0-1
[config]#channel-group 1 mode active
[config]#int range e2/0-1
[config]#exit
D1: 22 11:49:49.973: NBP-5-UPDAB: Line protocol on Interface Ethernet2/0, changed state to up
[config]#
D1: 22 11:49:51.904: NBP-5-SPAN/SPAN: P2P suspended LACP currently not enabled on the remote port.
D1: 22 11:49:51.941: NBP-5-SPAN/SPAN: P2P suspended LACP currently not enabled on the remote port.
[config]#
D1: 22 11:49:52.136: NBP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
[config]#show
D1: show interfaces trunk
Port      Mode          Encapsulation  Status      Native vlan
-----  -
Et2/0    on            802.1Q         trunking    999
Et2/1    on            802.1Q         trunking    999

Port      Vlans allowed on trunk
-----  -
Et2/0    none
Et2/1    none
Et2/2    1-999

Port      Vlans allowed and active in management domain
-----  -
Et2/0    none
Et2/1    none
Et2/2    1-100-102,999

Port      Vlans in spanning tree forwarding state and not pruned
-----  -
Et2/0    none
Et2/1    none
Et2/2    1-100-102,999

D1: 22 11:49:52.184: NBP-5-COMP2_1: Configured from console by console
D1:
D1:
D1: 22 11:49:54.175: NBP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D1:
D1:

```

Figura 22 D1 a A1 – Port channel 1

```

int range e2/0-1
channel-group 1 mode active
exit

```

• D2 a A1 – Port channel 2

```

D2:
D2: show interfaces trunk
Port      Mode          Encapsulation  Status      Native vlan
-----  -
Et2/0    on            802.1Q         trunking    999
Et2/1    on            802.1Q         trunking    999

Port      Vlans allowed on trunk
-----  -
Et2/0    none
Et2/1    none
Et2/2    1-999

Port      Vlans allowed and active in management domain
-----  -
Et2/0    none
Et2/1    none
Et2/2    1-100-102,999

Port      Vlans in spanning tree forwarding state and not pruned
-----  -
Et2/0    none
Et2/1    none
Et2/2    1-100-102,999

D2: 22 01:20:13.765: NBP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2:
D2: 22 01:17:53.678: NBP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2:
D2: 22 01:19:15.516: NBP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2:
D2:
D2conf term
D2:
D2: Enter configuration commands, one per line. End with CNTL/Z.
D2: [config]#int range e2/0-1
D2: [config]#channel-group 2 mode active
D2: [config]#int range e2/0-1
D2: [config]#exit
D2:
D2: 22 01:20:11.988: NBP-5-COMP2_1: Configured from console by console
D2:
D2: show interfaces trunk
Port      Mode          Encapsulation  Status      Native vlan
-----  -
Et2/0    on            802.1Q         trunking    999
Et2/1    on            802.1Q         trunking    999

Port      Vlans allowed on trunk
-----  -
Et2/0    none
Et2/1    none
Et2/2    1-999

Port      Vlans allowed and active in management domain
-----  -
Et2/0    none
Et2/1    none
Et2/2    1-100-102,999

Port      Vlans in spanning tree forwarding state and not pruned
-----  -
Et2/0    none
Et2/1    none
Et2/2    1-100-102,999

D2: 22 01:20:19.588: NBP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2:
D2:

```

Figura 23 D2 a A1 – Port channel 2

```

int range e2/0-1
channel-group 2 mode active
exit

```

2.6 En todos los switches, configure los puertos de acceso del host (host access port) que se conectan a PC1, PC2, PC3 y PC4.



Configure los puertos de acceso con la configuración de VLAN adecuada, como se muestra en el diagrama de topología.

Los puertos de host deben pasar inmediatamente al estado de reenvío (forwarding)

```
Nov 21 23:15:44.768: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet0/0 (full duplex).
R1(config)#
Nov 21 23:15:55.832: NLM3-3-UPDOWN: Interface Port-channel1, changed state to down
Nov 21 23:15:56.837: NLM3PROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to down
R1(config)#
Nov 21 23:16:02.046: SCS-5-LOADINBL2: (12/): suspended, LACP currently not enabled on the remote port.
R1(config)#
Nov 21 23:16:09.279: NLM3-3-UPDOWN: Interface Port-channel1, changed state to up
Nov 21 23:16:09.281: NLM3PROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to up
R1(config)#
Nov 21 23:16:39.795: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
R1(config)#
Nov 21 23:17:07.500: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet0/0 (full duplex).
R1(config)#
Nov 21 23:17:39.301: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
R1(config)#
Nov 21 23:18:31.028: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet0/0 (full duplex).
R1(config)#
Nov 21 23:18:32.095: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
R1(config)#
Nov 21 23:18:54.633: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet0/0 (full duplex).
R1(config)#
R1(config)#
R1(config)#exit
R1#
Nov 21 23:20:21.099: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
Please use interface #0/1
Building configuration...

Current configuration : 81 bytes
interface Ethernet0/1
switchport access vlan 100
switchport mode access
end
R1#
Nov 21 23:20:22.207: N0VS-5-COMP0_1: Configured from console by console
R1#
R1#
R1#
R1#
R1#
R1#
```

Figura 24 configuración de VLAN adecuada D1

interface e0/1  
switchport mode access  
switchport access vlan 100  
exit

```
Nov 21 23:17:03.151: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
R1#
Nov 21 23:17:34.358: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet0/0 (full duplex).
Please use interface #0/1
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#
R1(config)#
R1(config)#
Nov 21 23:18:05.000: SCS-5-LOADINBL2: (12/): suspended, LACP currently not enabled on the remote port.
R1(config)#
Nov 21 23:18:07.183: NLM3-3-UPDOWN: Interface Port-channel1, changed state to up
Nov 21 23:18:08.183: NLM3PROTO-5-UPDOWN: Line protocol on Interface Port-channel1, changed state to up
R1(config)#
Nov 21 23:18:37.401: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
R1(config)#
Nov 21 23:18:53.000: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
R1(config)#
Nov 21 23:19:47.040: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
R1(config)#
Nov 21 23:20:04.213: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet0/0 (full duplex).
R1(config)#
Nov 21 23:20:04.213: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
R1(config)#
Nov 21 23:22:42.405: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
R1(config)#
Nov 21 23:22:42.405: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet2/0 (999), with A1 Ethernet0/1 (1).
R1(config)#exit
R1#
Nov 21 23:22:01.245: N0VS-5-COMP0_1: Configured from console by console
Please use interface #0/1
Building configuration...

Current configuration : 81 bytes
interface Ethernet0/1
switchport access vlan 102
switchport mode access
end
R1#
R1#
R1#
```

Figura 25 configuración de VLAN adecuada D2

interface e0/1  
switchport mode access  
switchport access vlan 102  
exit

```

Nov 21 23:19:13.096: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/1 (1), with D1 Ethernet2/0 (999).
N/A
Nov 21 23:19:19.695: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (1), with D2 Ethernet2/0 (999).
N/A
Nov 21 23:20:18.809: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/1 (1), with D1 Ethernet2/0 (999).
N/A
Nov 21 23:20:14.767: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (1), with D2 Ethernet2/0 (999).
N/A
Nov 21 23:21:19.048: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/1 (1), with D1 Ethernet2/0 (999).
N/A
Nov 21 23:21:12.428: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (1), with D2 Ethernet2/0 (999).
N/A
Nov 21 23:21:59.362: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/1 (1), with D1 Ethernet2/0 (999).
N/A
Nov 21 23:22:40.097: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (1), with D2 Ethernet2/0 (999).
N/A
Nov 21 23:22:55.381: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (1), with D2 Ethernet2/0 (999).
N/A
Nov 21 23:22:57.118: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/1 (1), with D1 Ethernet2/0 (999).
N/A
N/A
N/A
R1# show run interface e2/1
Building configuration...

Current configuration : 153 bytes
!
interface Ethernet2/1
 switchport access vlan 101
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport mode access
end

R1# show run interface e2/2
Building configuration...

Current configuration : 81 bytes
!
interface Ethernet2/2
 switchport access vlan 100
 switchport mode access
end
!
!
!
R1#
Nov 21 23:23:49.648: NCP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on Ethernet1/0 (1), with D2 Ethernet2/0 (999).
N/A

```

Figura 26 configuración de VLAN adecuada A1

```

interface e2/1
switchport mode access
switchport access vlan 101
exit

```

```

interface e2/2
switchport mode access
switchport access vlan 100
exit

```

```
show run interface e2/2
```

2.7 Verifique los servicios DHCP IPv4.

PC2 y PC3 son clientes DHCP y deben recibir direcciones IPv4 válidas.

```

Welcome to Virtual PC Simulator, version 0.6.2
Dedicated to DnLing.
Build Date: Apr 18 2018 02:42:28
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VPCS is free software, distributed under the terms of the "BSD" license.
Source code and license can be found at vpcs.sf.net.
For more information, please visit www.freecore.com.cn.

Press '?' to get help.

Executing the startup file.

PC2> ip dhcp
DHCP IP 10.0.102.218/24 on 10.0.102.254

PC2> show ip
Name: PC2[1]
IPADDR : 10.0.102.218/24
GATEWAY : 10.0.102.254
DNS :
DHCP_SERVER : 10.0.102.2
DHCP_LEASE : 86772: 8488043280/75600
MAC : 08:00:27:00:00:00:00:00
VLAN : 200024
VLAN_PORT : 127.0.0.1:10025
VLAN : 1000
PC2>

```

Figura 27 servicios DHCP IPv4 PC2

```

PC3>
PC3>
PC3>
PC3>
PC3>
PC3>
PC3>
PC3>
PC3>
PC3>
PC3>
PC3>
PC3>
PC3>
PC3>
PC3>
PC3> ip dhcp
DHCP IP 10.0.101.210/24 GW 10.0.101.254
PC3> show ip
Name      : PC3[1]
IP/MASK   : 10.0.101.210/24
GATEWAY   : 10.0.101.254
DNS       :
DHCP SERVER : 10.0.101.2
DHCP LEASE : 86396, 86400/43200/75600
MAC       : 08:50:79:65:65:02
LCPU      : 10000
RHOST:PORT : 127.0.0.1:10027
MTU       : 1500
PC3>
PC3>
PC3>
PC3>
PC3>
PC3>

```

Figura 28 servicios DHCP IPv4 PC3

2.8 Verifique la conectividad de la LAN local  
 PC1 debería hacer ping con éxito a:

- D1: 10.0.100.1
- D2: 10.0.100.2
- PC4: 10.0.100.6

```

PC1> ping 10.0.100.1
64 bytes from 10.0.100.1 icmp_seq=1 ttl=255 time=0.719 ms
64 bytes from 10.0.100.1 icmp_seq=2 ttl=255 time=1.406 ms
64 bytes from 10.0.100.1 icmp_seq=3 ttl=255 time=1.430 ms
64 bytes from 10.0.100.1 icmp_seq=4 ttl=255 time=1.359 ms
64 bytes from 10.0.100.1 icmp_seq=5 ttl=255 time=0.651 ms

PC1> ping 10.0.100.2
64 bytes from 10.0.100.2 icmp_seq=1 ttl=255 time=0.613 ms
64 bytes from 10.0.100.2 icmp_seq=2 ttl=255 time=2.189 ms
64 bytes from 10.0.100.2 icmp_seq=3 ttl=255 time=1.614 ms
64 bytes from 10.0.100.2 icmp_seq=4 ttl=255 time=1.446 ms
64 bytes from 10.0.100.2 icmp_seq=5 ttl=255 time=0.929 ms

PC1> ping 10.0.100.6
64 bytes from 10.0.100.6 icmp_seq=1 ttl=64 time=1.594 ms
64 bytes from 10.0.100.6 icmp_seq=2 ttl=64 time=1.574 ms
64 bytes from 10.0.100.6 icmp_seq=3 ttl=64 time=3.479 ms
64 bytes from 10.0.100.6 icmp_seq=4 ttl=64 time=2.314 ms
64 bytes from 10.0.100.6 icmp_seq=5 ttl=64 time=2.042 ms

PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>

```

Figura 29 Ping PC1 A D1 - D2 - PC4

PC2 debería hacer ping con éxito a:

- D1: 10.0.102.1
- D2: 10.0.102.2

```

PC2> ping
Ping the network HOST. HOST can be an ip address or name
Options:
  -i ICMP mode, default
  -s SYN mode
  -c COUNT Packet count, default 5
  -D DONT Set the Don't Fragment bit
  -F FLAG Top header FLAG [C|E|A|P|N|S|F]
  -l SIZE Wait 88 milliseconds between sending each packet
  -p protocol Use IP protocol in ping packets
  -P PING Use IP protocol, 17 - UDP, 6 - TCP
  -p port Destination port
  -s port Source port
  -T TTL Set TTL, default 64
  -t Send packets until interrupted by Ctrl+C
  -w MS Wait 88 milliseconds to receive the response

Notes: 1. Using names requires DNS to be set.
       2. Use Ctrl+C to stop the command.

PC2> ping 10.0.102.2
64 bytes from 10.0.102.2: icmp_seq=1 ttl=255 time=0.768 ms
64 bytes from 10.0.102.2: icmp_seq=2 ttl=255 time=0.678 ms
64 bytes from 10.0.102.2: icmp_seq=3 ttl=255 time=0.787 ms
64 bytes from 10.0.102.2: icmp_seq=4 ttl=255 time=0.883 ms
64 bytes from 10.0.102.2: icmp_seq=5 ttl=255 time=0.733 ms

PC2> ping 10.0.102.1
64 bytes from 10.0.102.1: icmp_seq=1 ttl=255 time=0.838 ms
64 bytes from 10.0.102.1: icmp_seq=2 ttl=255 time=1.186 ms
64 bytes from 10.0.102.1: icmp_seq=3 ttl=255 time=0.811 ms
64 bytes from 10.0.102.1: icmp_seq=4 ttl=255 time=1.006 ms
64 bytes from 10.0.102.1: icmp_seq=5 ttl=255 time=0.867 ms

PC2>
PC2>
PC2>
PC2>
PC2>
PC2>
PC2>
PC2>
PC2>
PC2>

```

Figura 30 Ping PC2 A D1 - D2

PC3 debería hacer ping con éxito a:

- D1: 10.0.101.1
- D2: 10.0.101.2

```

PC3> show ip
NAME       : PC3[1]
IP/MASK    : 10.0.101.210/24
GATEWAY    : 10.0.101.254
DNS        :
DHCP SERVER : 10.0.101.2
DHCP LEASE  : 86396, 86400/43200/75600
MAC        : 00:15:17:66:68:02
I/F/PORT   : 100/0
RHOST:PORT : 127.0.0.1:10027
RTTU       : 1500

PC3>
PC3>
PC3>
PC3>
PC3> ping 10.0.101.1
64 bytes from 10.0.101.1: icmp_seq=1 ttl=255 time=1.041 ms
64 bytes from 10.0.101.1: icmp_seq=2 ttl=255 time=1.424 ms
64 bytes from 10.0.101.1: icmp_seq=3 ttl=255 time=0.301 ms
64 bytes from 10.0.101.1: icmp_seq=4 ttl=255 time=2.575 ms
64 bytes from 10.0.101.1: icmp_seq=5 ttl=255 time=2.531 ms

PC3> ping 10.0.101.2
64 bytes from 10.0.101.2: icmp_seq=1 ttl=255 time=1.249 ms
64 bytes from 10.0.101.2: icmp_seq=2 ttl=255 time=2.632 ms
64 bytes from 10.0.101.2: icmp_seq=3 ttl=255 time=1.311 ms
64 bytes from 10.0.101.2: icmp_seq=4 ttl=255 time=1.134 ms
64 bytes from 10.0.101.2: icmp_seq=5 ttl=255 time=1.105 ms

PC3>

```

Figura 31 Ping PC3 A D1 - D2

PC4 debería hacer ping con éxito a:

- D1: 10.0.100.1
- D2: 10.0.100.2
- PC1: 10.0.100.5



```
PC4>
PC4>
PC4> ping 10.0.100.1
84 bytes from 10.0.100.1 icmp_seq=1 ttl=255 time=0.997 ms
84 bytes from 10.0.100.1 icmp_seq=2 ttl=255 time=1.236 ms
84 bytes from 10.0.100.1 icmp_seq=3 ttl=255 time=1.156 ms
84 bytes from 10.0.100.1 icmp_seq=4 ttl=255 time=1.217 ms
84 bytes from 10.0.100.1 icmp_seq=5 ttl=255 time=1.282 ms

PC4> ping 10.0.100.2
84 bytes from 10.0.100.2 icmp_seq=1 ttl=255 time=1.010 ms
84 bytes from 10.0.100.2 icmp_seq=2 ttl=255 time=1.030 ms
84 bytes from 10.0.100.2 icmp_seq=3 ttl=255 time=1.067 ms
84 bytes from 10.0.100.2 icmp_seq=4 ttl=255 time=1.575 ms
84 bytes from 10.0.100.2 icmp_seq=5 ttl=255 time=1.306 ms

PC4> ping 10.0.100.5
84 bytes from 10.0.100.5 icmp_seq=1 ttl=64 time=1.807 ms
84 bytes from 10.0.100.5 icmp_seq=2 ttl=64 time=1.486 ms
84 bytes from 10.0.100.5 icmp_seq=3 ttl=64 time=1.626 ms
84 bytes from 10.0.100.5 icmp_seq=4 ttl=64 time=1.599 ms
84 bytes from 10.0.100.5 icmp_seq=5 ttl=64 time=1.621 ms

PC4>
PC4>
PC4>
PC4>
PC4>
PC4>
PC4>
PC4>
PC4>
```

*Figura 32 Ping PC4 A D1 - D2 -PC1*

Se configura interfaces troncales IEEE 802.1Q para reorganizar enlaces troncales en las interfaces Fast y Gigabit Ethernet, luego se cambia la VLAN nativa en los enlaces troncales. El tráfico entre switches son el único que no se encapsule en enlaces trunk, se ejecuta el comando spanning-tree mode rapid-pvst del modo de configuración global y se configura los puentes raíz RSTP que es la activación de RSTP a nivel global en todos los puentes participantes, Se asigna EtherChannels LACP ya que pueden interconectar switches, routers, servidores o clientes. Los puertos usados deben tener las mismas características y configuración. Por último, se Verifica la conectividad de la LAN local realizando ping en los dispositivos para comprobar se conexión.

## Part 3: Configurar los protocolos de enrutamiento

En esta parte, debe configurar los protocolos de enrutamiento IPv4 e IPv6. Al final de esta parte, la red debería estar completamente convergente. Los pings de IPv4 e IPv6 a la interfaz Loopback 0 desde D1 y D2 deberían ser exitosos

Nota: Los pings desde los hosts no tendrán éxito porque sus puertas de enlace predeterminadas apuntan a la dirección HSRP que se habilitará en la Parte 4. Las tareas de configuración son las siguientes:

3.1 En la “Red de la Compañía” (es decir, R1, R3, D1, y D2), configure single-área OSPFv2 en área 0.

Especificaciones:

Use OSPF Process ID 4 y asigne los siguientes router-IDs:

- R1: 0.0.4.1
- R3: 0.0.4.3
- D1: 0.0.4.131
- D2: 0.0.4.132

En R1, R3, D1, y D2, anuncie todas las redes directamente conectadas / VLANs en Area 0.

- En R1, no publique la red R1 – R2.
- En R1, propague una ruta por defecto. Note que la ruta por defecto deberá ser provista por BGP.

Deshabilite las publicaciones OSPFv2 en:

- D1: todas las interfaces excepto G1/0/11
- D2: todas las interfaces excepto G1/0/11



```
R1#R1
% Bad IP address or host name
% Unknown command or computer name, or unable to find computer address
R1#show run | section ^router ospf
router ospf 4
 router-id 0.0.4.1
 log-adjacency-changes
 network 10.0.10.0 0.0.0.255 area 0
 network 10.0.13.0 0.0.0.255 area 0
 default-information originate
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
```

*Figura 33 router ospf 4 R1*

R1

```
router-id 0.0.4.1
do show ip route connected
network 10.0.10.0 0.0.0.255 area 0
network 10.0.13.0 0.0.0.255 area 0
default-information originate
exit
```

show run | section ^router ospf

• R3: 0.0.4.3



```
R3#
R3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 4
R3(config-router)#router-id 0.0.4.3
R3(config-router)#do show ip route connected
  10.0.0.0/24 is subnetted, 2 subnets
C       10.0.11.0 is directly connected, GigabitEthernet0/0
C       10.0.13.0 is directly connected, Serial1/0
R3(config-router)#network 10.0.11.0 0.0.0.255 area 0
R3(config-router)#network 10.0.13.0 0.0.0.255 area 0
R3(config-router)#exit
R3(config)#
R3(config)#
*Nov 21 21:35:09.523: NOSPFF-5-ADJCHG: Process 4, Nbr 0.0.4.1 on Serial1/0 from LOADING to FULL, Loading Done
R3(config)#exit
R3#
R3#
*Nov 21 21:35:12.607: NSYS-5-CONFIG_I: Configured from console by console
R3#
R3#show run | section ^router ospf
router ospf 4
router-id 0.0.4.3
log-adjacency-changes
network 10.0.11.0 0.0.0.255 area 0
network 10.0.13.0 0.0.0.255 area 0
R3#
R3#
R3#
```

Figura 34 router ospf 4 R3

```
router ospf 4
router-id 0.0.4.3
do show ip route connected
network 10.0.11.0 0.0.0.255 area 0
network 10.0.13.0 0.0.0.255 area 0
exit
```

show run | section ^router ospf

• D1: 0.0.4.131

```

D1#
D1# 10.0.101.1/32 is directly connected, Vlan101
C
D1# 10.0.102.0/24 is directly connected, Vlan102
L
D1# 10.0.102.1/32 is directly connected, Vlan102
C
D1(config-router)#network 10.0.10.0 0.0.0.255 area 0
D1(config-router)#network 10.0.100.0 0.0.0.255 area 0
D1(config-router)#network 10.0.101.0 0.0.0.255 area 0
D1(config-router)#network 10.0.102.0 0.0.0.255 area 0
D1(config-router)#passive-interface default
D1(config-router)#no passive-interface e0/0
D1(config-router)#exit
D1(config)#
D1#
D1#
D1# Nov 22 02:58:12.527: %SYS-5-CONFIG_I: Configured from console by console
D1#
D1# Nov 22 02:58:15.578: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.1 on Ethernet0/0 from LOADING to FULL, Loading Done
D1#
D1# Nov 22 02:58:46.177: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet1/0 (full duplex).
D1#
D1#show run | section ^router ospf
D1#
router ospf 4
router-id 0.0.4.131
passive-interface default
no passive-interface Ethernet0/0
network 10.0.10.0 0.0.0.255 area 0
network 10.0.100.0 0.0.0.255 area 0
network 10.0.101.0 0.0.0.255 area 0
network 10.0.102.0 0.0.0.255 area 0
D1#
D1#
D1#

```

Figura 35 router ospf 4 D1

```

router ospf 4
router-id 0.0.4.131
do show ip route connected
network 10.0.10.0 0.0.0.255 area 0
network 10.0.100.0 0.0.0.255 area 0
network 10.0.101.0 0.0.0.255 area 0
network 10.0.102.0 0.0.0.255 area 0
passive-interface default
no passive-interface e0/0
exit
show run | section ^router ospf

```

• D2: 0.0.4.132

```

D2#
D2# 10.0.100.0/24 is directly connected, Vlan100
C
D2# 10.0.100.2/32 is directly connected, Vlan100
C
D2# 10.0.101.0/24 is directly connected, Vlan101
L
D2# 10.0.101.2/32 is directly connected, Vlan101
C
D2# 10.0.102.0/24 is directly connected, Vlan102
L
D2# 10.0.102.2/32 is directly connected, Vlan102
C
D2(config-router)#network 10.0.11.0 0.0.0.255 area 0
D2(config-router)#network 10.0.100.0 0.0.0.255 area 0
D2(config-router)#network 10.0.101.0 0.0.0.255 area 0
D2(config-router)#network 10.0.102.0 0.0.0.255 area 0
D2(config-router)#passive-interface default
D2(config-router)#no passive-interface e0/0
D2(config-router)#exit
D2(config)#
D2#
D2#
D2# Nov 22 03:00:11.424: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.3 on Ethernet0/0 from LOADING to FULL, Loading Done
D2#
D2#
D2# Nov 22 03:00:13.464: %SYS-5-CONFIG_I: Configured from console by console
D2#
D2# Nov 22 03:00:14.998: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2#
D2#show run | section ^router ospf
D2#
router ospf 4
router-id 0.0.4.132
passive-interface default
no passive-interface Ethernet0/0
network 10.0.11.0 0.0.0.255 area 0
network 10.0.100.0 0.0.0.255 area 0
network 10.0.101.0 0.0.0.255 area 0
network 10.0.102.0 0.0.0.255 area 0
D2#
D2#
D2#

```

Figura 36 router ospf 4 D2

```

router ospf 4
router-id 0.0.4.132

```



```

do show ip route connected
network 10.0.11.0 0.0.0.255 area 0
network 10.0.100.0 0.0.0.255 area 0
network 10.0.101.0 0.0.0.255 area 0
network 10.0.102.0 0.0.0.255 area 0
passive-interface default
no passive-interface e0/0
exit

```

show run | section ^router ospf

3.2 En la “Red de la Compañía” (es decir, R1, R3, D1, y D2), configure classic single-area OSPFv3 en area 0.

Use OSPF Process ID 6 y asigne los siguientes router-IDs:

- R1: 0.0.6.1
- R3: 0.0.6.3
- D1: 0.0.6.131
- D2: 0.0.6.132

En R1, R3, D1, y D2, anuncie todas las redes directamente conectadas / VLANs en Area 0.

- En R1, no publique la red R1 – R2.
- On R1, propague una ruta por defecto. Note que la ruta por defecto deberá ser provista por BGP.

Deshabilite las publicaciones OSPFv3 en:

- D1: todas las interfaces excepto G1/0/11
- D2: todas las interfaces excepto G1/0/11

- R1: 0.0.6.1

```

Nov 21 21:48:14.031: NOSP-5-ADJING: Process 4, Nbr 0.0.4.131 on GigabitEthernet1/0 from LOADING to FULL, Loading Done
R1#
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ipw router ospf 6
R1(config-rtr)#router-id 0.0.6.1
R1(config-rtr)#default-information originate
R1(config-rtr)#interface g0/0
R1(config-if)#ipw ospf 6 area 0
R1(config-if)#interface g1/0
R1(config-if)#ipw ospf 6 area 0
R1(config-if)#
R1(config-if)#exit
R1(config)#exit
R1#
Nov 21 21:52:32.475: NOSP-5-COMPID_1: Configured from console by console
R1#show run | section ^ipw router
ipw router ospf 6
  router-id 0.0.6.1
  log-adjacency-changes
  default-information originate
R1#show ipw ospf interface brief
Interface  PID Area      Intf ID  Cost  State  Nbrs  P/C
Gi2/0     6  0        7       64   P2P   0/0
Gi1/0     6  0        6       1    DR   0/0
R1#

```

Figura 37 router ospf 6 R1

ipw6 router ospf 6  
router-id 0.0.6.1

default-information originate  
 interface s2/0  
 ipv6 ospf 6 area 0  
 interface g1/0  
 ipv6 ospf 6 area 0

- R3: 0.0.6.3

```

R3(config-if)#exit
R3(config)#
R3(config)#ipv6 router ospf 6
R3#
Nov 21 21:52:33.719: %SYS-5-COMPIL_1: Configured from console by console
R3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ipv6 router ospf 6
R3(config-rtr)#router-id 0.0.6.3
R3(config-rtr)#interface s1/0
R3(config-if)#ipv6 ospf 6 area 0
R3(config-if)#interface g0/0
R3(config-if)#ipv6 ospf 6 area 0
R3(config-if)#
R3(config-if)#
Nov 21 21:53:29.251: %OSPFV3-5-ADJING: Process 6, Nbr 0.0.6.1 on Serial1/0 from LOADING to FULL, Loading Done
R3(config-if)#exit
R3(config)#exit
R3#
Nov 21 21:53:47.823: %SYS-5-COMPIL_1: Configured from console by console
R3#show run | section "ipv6 router
ipv6 router ospf 6
  router-id 0.0.6.3
  log-adjacency-changes
R3#show ipv6 ospf interface brief
Interface  PID Area          Intf ID  Cost  State  Nbrs  F/C
Ser1/0    6  0             6        64  P2P   1/1
S1/0      6  0             5         1  DR    0/0
R3#
  
```

Figura 38 router ospf 6 R3

ipv6 router ospf 6  
 router-id 0.0.6.3  
 interface s1/0  
 ipv6 ospf 6 area 0  
 interface g0/0  
 ipv6 ospf 6 area 0  
 exit

- D1: 0.0.6.131

```

D1(config-rtr)#interface v1an102
D1(config-if)#ipv6 ospf 6 area 0
D1(config-if)#interface v1an101
D1(config-if)#ipv6 ospf 6 area 0
D1(config-if)#interface v1an100
D1(config-if)#ipv6 ospf 6 area 0
D1(config-if)#interface e0/0
D1(config-if)#ipv6 ospf 6 area 0
D1(config-if)#no passive-interface e0/0
D1#
% Invalid input detected at '^' marker.
D1(config-if)#
Nov 22 03:06:45.911: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEth
e0/0 (full duplex).
D1(config-if)#exit
D1(config)#exit
D1#
Nov 22 03:07:19.678: %SYS-5-COMPIL_1: Configured from console by console
D1#show run | section "ipv6 router
ipv6 router ospf 6
  router-id 0.0.6.131
  passive-interface default
D1#show ipv6 ospf interface brief
Interface  PID Area          Intf ID  Cost  State  Nbrs  F/C
Et0/0     6  0             21        10  DR    0/0
V1100     6  0             23         1  DR    0/0
V1101     6  0             24         1  DR    0/0
V1102     6  0             25         1  DR    0/0
D1#
  
```

Figura 39 router ospf 6 D1

ipv6 router ospf 6

```

router-id 0.0.6.131
passive-interface default
interface vlan102
ipv6 ospf 6 area 0
interface vlan101
ipv6 ospf 6 area 0
interface vlan100
ipv6 ospf 6 area 0
interface e0/0
ipv6 ospf 6 area 0
no passive-interface e0/0
exit

```

• D2: 0.0.6.132

```

D2(config-rttr)#interface vlan102
D2(config-if)#ipv6 ospf 6 area 0
D2(config-if)#interface vlan101
D2(config-if)#ipv6 ospf 6 area 0
D2(config-if)#interface vlan100
D2(config-if)#ipv6 ospf 6 area 0
D2(config-if)#interface e0/0
D2(config-if)#ipv6 ospf 6 area 0
D2(config-if)#no passive-interface e0/0
D2
% Invalid input detected at '^' marker.
D2(config-if)#
*Nov 22 03:09:14.861: XCDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2(config-if)#exit
D2(config)#exit
D2#
D2#
*Nov 22 03:09:21.872: XSYS-5-CONFIG_I: Configured from console by console
D2#show run | section "ipv6 router
ipv6 router ospf 6
router-id 0.0.6.132
passive-interface default
D2#show ip ospf interface brief
Interface PID Area Intf ID Cost State Nbrs F/C
Et0/0 6 0 22 10 WAIT 0/0
V100 6 0 24 1 WAIT 0/0
V101 6 0 25 1 WAIT 0/0
V102 6 0 26 1 WAIT 0/0
D2#

```

Figura 40 router ospf 6 D2

```

ipv6 router ospf 6
router-id 0.0.6.132
passive-interface default
interface vlan102
ipv6 ospf 6 area 0
interface vlan101
ipv6 ospf 6 area 0
interface vlan100
ipv6 ospf 6 area 0
interface e0/0
ipv6 ospf 6 area 0
no passive-interface e0/0
exit

```

3.3 En R2 en la “Red ISP”, configure MP-BGP.  
Configure dos rutas estáticas predeterminadas a través de la interfaz Loopback 0:



R2

```

R2#configure
R2(config)#router bgp 500
R2(config-router)#neighbor 2001:DB8:200::1 remote-as 300
R2(config-router)#neighbor 209.165.200.225 remote-as 300
R2(config-router)#address-family ipv4
R2(config-router-af)#network 0.0.0.0
R2(config-router-af)#network 2.2.2.2 mask 255.255.255.255
R2(config-router-af)#no neighbor 2001:DB8:200::1 activate
R2(config-router-af)#neighbor 209.165.200.225 activate
R2(config-router-af)#exit-address-family
R2(config-router-af)#address-family ipv6
R2(config-router-af)#network ::/0
R2(config-router-af)#network 2001:DB8:2222::/128
R2(config-router-af)#neighbor 2001:DB8:200::1 activate
R2(config-router-af)#exit-address-family
R2(config-router-af)#exit
R2#

```

Figura 42 IPv6 address family R2

```

router bgp 500
bgp router-id 2.2.2.2
neighbor 2001:DB8:200::1 remote-as 300
neighbor 209.165.200.225 remote-as 300
address-family ipv4
network 0.0.0.0
network 2.2.2.2 mask 255.255.255.255
no neighbor 2001:DB8:200::1 activate
neighbor 209.165.200.225 activate
exit-address-family
address-family ipv6
network ::/0
network 2001:DB8:2222::/128
neighbor 2001:DB8:200::1 activate
exit-address-family
address-family ipv6
network ::/0
network 2001:DB8:2222::/128
neighbor 2001:DB8:200::1 activate
exit-address-family
address-family ipv6
network ::/0
network 2001:DB8:2222::/128
neighbor 2001:DB8:200::1 activate
exit-address-family
address-family ipv6
network ::/0
network 2001:DB8:2222::/128
neighbor 2001:DB8:200::1 activate
exit-address-family
exit

```

```

router bgp 500
ip route 0.0.0.0 0.0.0.0 Loopback0
ipv6 route ::/0 Loopback0
exit

```

3.4 En R1 en la "Red ISP", configure MP-BGP.  
Configure dos rutas resumen estáticas a la interfaz Null 0:

- Una ruta resumen IPv4 para 10.0.0.0/8.
  - Una ruta resumen IPv6 para 2001:db8:100::/48. Configure R1 en BGP ASN 300 y use el router-id 1.1.1.1.
- Configure una relación de vecino IPv4 e IPv6 con R2 en ASN 500. En IPv4 address family:
- Deshabilite la relación de vecino IPv6.
  - Habilite la relación de vecino IPv4.
  - Anuncie la red 10.0.0.0/8.
- En IPv6 address family:
- Deshabilite la relación de vecino IPv4.
  - Habilite la relación de vecino IPv6.
  - Anuncie la red 2001:db8:100::/48.

```

R1
R1
R1# show run | include secret
R1# show run | exclude !
% Invalid input detected at '^' marker.
R1#
R1# show run | section router bgp
router bgp 300
  bgp router-id 1.1.1.1
  bgp log-neighbor-changes
  neighbor 2001:db8:100::f48 remote-as 500
  neighbor 10.0.0.222 remote-as 500
  !
  address-family ipv4
    no neighbor 2001:db8:100::f48 activate
    neighbor 200.105.200.220 activate
    no auto-summary
    no synchronization
    network 10.0.0.0
  exit-address-family
  !
  address-family ipv6
    neighbor 2001:db8:100::f48 activate
    network 2001:db8:100::/48
  exit-address-family
R1#
R1# show run | section bgp
router bgp 300
  bgp router-id 1.1.1.1
  bgp log-neighbor-changes
  neighbor 2001:db8:100::f48 remote-as 500
  neighbor 10.0.0.222 remote-as 500
  !
  address-family ipv4
    no neighbor 2001:db8:100::f48 activate
    neighbor 200.105.200.220 activate
    no auto-summary
    no synchronization
    network 10.0.0.0
  exit-address-family
  !
  address-family ipv6
    neighbor 2001:db8:100::f48 activate
    network 2001:db8:100::/48
  exit-address-family
R1#
R1#
R1#

```

Figura 43 IPv6 relación de vecino IPv4 e IPv6 R1

show ip route | include O|B  
 show ipv6 route

```

R2
no neighbor 2001:0001:0001::1 activate
neighbor 2001:001:000:126 activate
no authentication
no authentication
network 10.0.0.0
exit address-family
address-family ipv6
neighbor 2001:0001:0001::1 activate
network 2001:0001:000:126
exit address-family
end

ip route 10 route | include 0/0
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, P - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       I1 - OSPF inter area type 1, I2 - OSPF inter area type 2
       O - ODR, P - periodic downloaded static route
       * - candidate default
0 0.0.0.0 [1/0/0] via 200.100.0.0, R2/120:10
0 0.0.11.0 [1/0/0] via 10.0.11.1, R2/120:10, Serial1/0
0 0.0.102.0 [1/0/0] via 10.0.102.1, R2/120:10, GigabitEthernet1/0
0 0.0.100.0 [1/0/0] via 10.0.100.2, R2/120:10, GigabitEthernet1/0
0 0.0.101.0 [1/0/0] via 10.0.101.2, R2/120:10, GigabitEthernet1/0
0 0.0.0/0 [1/0/0] via 200.100.0.0, R2/120:10

ip route ipv6 route
ip route 2001:0001:0001:0001::0/64 default 0 metric 10
Codes: C - connected, L - local, S - static, U - user, P - user, Static route
       D - EIGRP, EX - EIGRP external, R - RIP, IA - ISIS IA
       I1 - ISIS IA, I2 - ISIS interarea, IS - ISIS summary, O - OSPF
       O - OSPF intra, OI - OSPF inter, OI1 - OSPF ext 1, OI2 - OSPF ext 2
       N1 - OSPF NSSA ext 1, N2 - OSPF NSSA ext 2
0 2001:0001:0001:0001::/64 [1/0/0]
  via GigabitEthernet1/0, directly connected
0 2001:0001:0001:0001::126 [1/0/0]
  via GigabitEthernet1/0, receive
0 2001:0001:0001:0001::126 [1/0/0]
  via GigabitEthernet1/0, receive
0 2001:0001:0001:0001::126 [1/0/0]
  via Serial1/0, directly connected
0 2001:0001:0001:0001::126 [1/0/0]
  via Serial1/0, receive
0 2001:0001:0001:0001::126 [1/0/0]
  via GigabitEthernet0/0, directly connected
0 2001:0001:0001:0001::126 [1/0/0]
  via GigabitEthernet0/0, receive
#end

```

Figura 44 Verify Routing Tables R1

```

D1
interface vlan 100
standby version 2
standby 104 ip 10.0.100.254
standby 104 priority 150
standby 104 preempt
standby 104 timers 5 15
exit
interface vlan 101
standby version 2
standby 114 ip 10.0.101.254
standby 114 preempt
standby 114 timers 5 15
exit
interface vlan 102
standby version 2
standby 124 ip 10.0.102.254
standby 124 priority 150
standby 124 preempt
standby 124 timers 5 15
exit
interface vlan 100
standby version 2
standby 106 ipv6 FE80::5:73FF:FEA0:6A
standby 106 priority 150
standby 106 preempt
standby 106 timers 5 15
exit
interface vlan 101

```

```
standby version 2
standby 116 ipv6 FE80::5:73FF:FEA0:74
standby 116 preempt
standby 116 timers 5 15
exit
interface vlan 102
standby version 2
standby 126 ipv6 FE80::5:73FF:FEA0:7E
standby 126 priority 150
standby 126 preempt
standby 126 timers 5 15
```

D2

```
interface vlan 100
standby version 2
standby 104 ip 10.0.100.254
standby 104 preempt
standby 104 timers 5 15
exit
interface vlan 101
standby version 2
standby 114 ip 10.0.101.254
standby 104 priority 150
standby 114 preempt
standby 114 timers 5 15
exit
interface vlan 102
standby version 2
standby 124 ip 10.0.102.254
standby 124 preempt
standby 124 timers 5 15
exit
interface vlan 100
standby version 2
standby 106 ipv6 FE80::5:73FF:FEA0:6A
standby 106 preempt
standby 106 timers 5 15
exit
interface vlan 101
standby version 2
standby 116 ipv6 FE80::5:73FF:FEA0:74
standby 116 priority 150
standby 116 preempt
standby 116 timers 5 15
```





## Parte 4: Configurar la Redundancia del Primer Salto (First Hop Redundancy)

4.1 En D1, cree IP SLAs que prueben la accesibilidad de la interfaz R1 G0/0/1. Cree dos IP SLAs.

- Use la SLA número 4 para IPv4.
- Use la SLA número 6 para IPv6.

Las IP SLAs probarán la disponibilidad de la interfaz R1 G0/0/1 cada 5 segundos. Programe la SLA para una implementación inmediata sin tiempo de finalización. Cree una IP SLA objeto para la IP SLA 4 y una para la IP SLA 6.

- Use el número de rastreo 4 para la IP SLA 4.
- Use el número de rastreo 6 para la IP SLA 6.

Los objetos rastreados deben notificar a D1 si el estado de IP SLA cambia de Down a Up después de 10 segundos, o de Up a Down después de 15 segundos.



```
D1#
Nov 23 00:39:55.186: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet0/0
D1#
Nov 23 00:40:55.140: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet0/0
D1#
D1#
D1#
D1#
Nov 23 00:41:55.125: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R1 GigabitEthernet0/0
D1#show run | section ip sla
track 4 ip sla 4
delay down 10 up 15
track 6 ip sla 6
delay down 10 up 15
ip sla 4
icmp-echo 10.0.10.1
frequency 5
ip sla schedule 4 life forever start-time now
ip sla 6
icmp-echo 2001:DB8:100:1010::11
frequency 5
ip sla schedule 6 life forever start-time now
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
```

Figura 46 IP SLA 4 y IP SLA 6 D1

```
D1
track 4 ip sla 4
delay down 10 up 15
exit
track 6 ip sla 6
delay down 10 up 15
exit
ip sla 4
icmp-echo 10.0.10.1
frequency 5
exit
```

```

ip sla schedule 4 life forever start-time now
ip sla 6
icmp-echo 2001:DB8:100:1010::1
frequency 5
exit
ip sla schedule 6 life forever start-time now

```



Figura 47 IP SLA 4 y IP SLA 6 D2

D2

```

track 4 ip sla 4
delay down 10 up 15
exit
track 6 ip sla 6
delay down 10 up 15
exit
ip sla 4
icmp-echo 10.0.11.1
frequency 5
exit
ip sla schedule 4 life forever start-time now
ip sla 6
icmp-echo 2001:DB8:100:1011::1
frequency 5
exit
ip sla schedule 6 life forever start-time now

```

4.2 En D2, cree IP SLAs que prueben la accesibilidad de la interfaz R3 G0/0/1. Cree IP SLAs.

- Use la SLA número 4 para IPv4.

- Use la SLA número 6 para IPv6.
- Las IP SLAs probarán la disponibilidad de la interfaz R3 G0/0/1 cada 5 segundos. Programe la SLA para una implementación inmediata sin tiempo de finalización. Cree una IP SLA objeto para la IP SLA 4 and one for IP SLA 6.
- Use el número de rastreo 4 para la IP SLA 4.
  - Use el número de rastreo 6 para la SLA 6.
- Los objetos rastreados deben notificar a D1 si el estado de IP SLA cambia de Down a Up después de 10 segundos, o de Up a Down después de 15 segundos.

```

D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#show run | section ip sla
track 4 ip sla 4
delay down 10 up 15
track 6 ip sla 6
delay down 10 up 15
ip sla 4
icmp-echo 10.0.11.1
frequency 5
ip sla schedule 4 life forever start-time now
ip sla 6
icmp-echo 2001:DB8:100:1011::1
frequency 5
ip sla schedule 6 life forever start-time now
D2#
D2#
D2#
D2#

```

Figura 48 IP SLA 4 and one for IP SLA 6.D2

D1

```

interface vlan 100
standby version 2
standby 104 ip 10.0.100.254
standby 104 priority 150
standby 104 preempt
standby 104 timers 5 15
exit
interface vlan 101
standby version 2
standby 114 ip 10.0.101.254
standby 114 preempt
standby 114 timers 5 15
exit
interface vlan 102
standby version 2
standby 124 ip 10.0.102.254

```

```
standby 124 priority 150
standby 124 preempt
standby 124 timers 5 15
exit
interface vlan 100
standby version 2
standby 106 ipv6 FE80::5:73FF:FEA0:6A
standby 106 priority 150
standby 106 preempt
standby 106 timers 5 15
exit
interface vlan 101
standby version 2
standby 116 ipv6 FE80::5:73FF:FEA0:74
standby 116 preempt
standby 116 timers 5 15
exit
interface vlan 102
standby version 2
standby 126 ipv6 FE80::5:73FF:FEA0:7E
standby 126 priority 150
standby 126 preempt
standby 126 timers 5 15
```

## D2

```
interface vlan 100
standby version 2
standby 104 ip 10.0.100.254
standby 104 preempt
standby 104 timers 5 15
exit
interface vlan 101
standby version 2
standby 114 ip 10.0.101.254
standby 104 priority 150
standby 114 preempt
standby 114 timers 5 15
exit
interface vlan 102
standby version 2
standby 124 ip 10.0.102.254
standby 124 preempt
standby 124 timers 5 15
exit
```

```

interface vlan 100
standby version 2
standby 106 ipv6 FE80::5:73FF:FEA0:6A
standby 106 preempt
standby 106 timers 5 15
exit
interface vlan 101
standby version 2
standby 116 ipv6 FE80::5:73FF:FEA0:74
standby 116 priority 150
standby 116 preempt
standby 116 timers 5 15
exit
interface vlan 102
standby version 2
standby 126 ipv6 FE80::5:73FF:FEA0:7E
standby 126 preempt
standby 126 timers 5 15
exit

```

#### 4.3 En D1 configure HSRPv2.

D1 es el router primario para las VLANs 100 y 102; por lo tanto, su prioridad también se cambiará a 150.

Configure HSRP version 2.

Configure IPv4 HSRP grupo 104 para la VLAN 100:

- Asigne la dirección IP virtual 10.0.100.254.
- Establezca la prioridad del grupo en 150.
- Habilite la preferencia (preemption).
- Rastree el objeto 4 y decremente en 60.

Configure IPv4 HSRP grupo 114 para la VLAN 101:

- Asigne la dirección IP virtual 10.0.101.254.
- Habilite la preferencia (preemption).
- Rastree el objeto 4 para disminuir en 60.

Configure IPv4 HSRP grupo 124 para la VLAN 102:

- Asigne la dirección IP virtual 10.0.102.254.
- Establezca la prioridad del grupo en 150.
- Habilite la preferencia (preemption).
- Rastree el objeto 4 para disminuir en 60.

Configure IPv6 HSRP grupo 106 para la VLAN 100:

- Asigne la dirección IP virtual usando ipv6 autoconfig.
- Establezca la prioridad del grupo en 150.
- Habilite la preferencia (preemption).
- Rastree el objeto 6 y decremente en 60.

Configure IPv6 HSRP grupo 116 para la VLAN 101:

- Asigne la dirección IP virtual usando ipv6 autoconfig.

- Habilite la preferencia (preemption).
  - Registre el objeto 6 y decremente en 60.
- Configure IPv6 HSRP grupo 126 para la VLAN 102:
- Asigne la dirección IP virtual usando ipv6 autoconfig.
  - Establezca la prioridad del grupo en 150.
  - Habilite la preferencia (preemption).
  - Rastree el objeto 6 y decremente en 60.

En D2, configure HSRPv2.

D2 es el router primario para la VLAN 101; por lo tanto, su prioridad también se cambiará a 150.

Configure HSRP version 2.

Configure IPv4 HSRP grupo 104 para la VLAN 100:

- Asigne la dirección IP virtual 10.0.100.254.
- Habilite la preferencia (preemption).
- Rastree el objeto 4 y decremente en 60.

Configure IPv4 HSRP grupo 114 para la VLAN 101:

- Asigne la dirección IP virtual 10.0.101.254.
- Establezca la prioridad del grupo en 150.
- Habilite la preferencia (preemption).
- Rastree el objeto 4 para disminuir en 60.

Configure IPv4 HSRP grupo 124 para la VLAN 102:

- Asigne la dirección IP virtual 10.0.102.254.
- Habilite la preferencia (preemption).
- Rastree el objeto 4 para disminuir en 60.

Configure IPv6 HSRP grupo 106 para la VLAN 100:

- Asigne la dirección IP virtual usando ipv6 autoconfig.
- Habilite la preferencia (preemption).
- Rastree el objeto 6 para disminuir en 60.

Configure IPv6 HSRP grupo 116 para la VLAN 101:

- Asigne la dirección IP virtual usando ipv6 autoconfig.
- Establezca la prioridad del grupo en 150.
- Habilite la preferencia (preemption).
- Rastree el objeto 6 para disminuir en 60.

Configure IPv6 HSRP grupo 126 para la VLAN 102:

- Asigne la dirección IP virtual usando ipv6 autoconfig.
- Habilite la preferencia (preemption).
- Rastree el objeto 6 para disminuir en 60.

```

Ethernet1/0 (full duplex).
D1#
*Nov 23 00:56:55.112: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex)
Ethernet1/0 (full duplex).
D1#
*Nov 23 00:57:55.099: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex)
Ethernet1/0 (full duplex).
D1#
*Nov 23 00:58:55.110: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex)
Ethernet1/0 (full duplex).
D1#
*Nov 23 00:59:55.535: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex)
Ethernet1/0 (full duplex).
D1#
D1#
D1#
D1#show standby brief
          P indicates configured to preempt.
          |
Interface  Grp  Pri  P State   Active        Standby        Virtual IP
-----
Vl100      104  150  P Active local        10.0.100.2     10.0.100.254
Vl100      106  150  P Active local        FE80::D2:12    FE80::5:73FF:FEA0:6A
Vl101      114  100  P Active local        10.0.101.2     10.0.101.254
Vl101      116  100  P Standby FE80::D2:3    local          FE80::5:73FF:FEA0:74
Vl102      124  150  P Active local        10.0.102.2     10.0.102.254
Vl102      126  150  P Active local        FE80::D2:4     FE80::5:73FF:FEA0:7E
D1#
D1#
D1#
D1#

```

Figura 49 configure HSRPv2 D1

```

interface vlan 100
standby version 2
standby 104 ip 10.0.100.254
standby 104 priority 150
standby 104 preempt
standby 104 timers 5 15
exit
interface vlan 101
standby version 2
standby 114 ip 10.0.101.254
standby 114 preempt
standby 114 timers 5 15
exit
interface vlan 102
standby version 2
standby 124 ip 10.0.102.254
standby 124 priority 150
standby 124 preempt
standby 124 timers 5 15
exit
interface vlan 100
standby version 2
standby 106 ipv6 FE80::5:73FF:FEA0:6A
standby 106 priority 150
standby 106 preempt
standby 106 timers 5 15
exit
interface vlan 101

```



```

standby version 2
standby 116 ipv6 FE80::5:73FF:FEA0:74
standby 116 preempt
standby 116 timers 5 15
exit
interface vlan 102
standby version 2
standby 126 ipv6 FE80::5:73FF:FEA0:7E
standby 126 priority 150
standby 126 preempt
standby 126 timers 5 15

```

```

D2#
*Nov 23 01:00:28.750: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex)
) with R3 GigabitEthernet0/0 (full duplex).
D2#
*Nov 23 01:00:28.660: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex)
) with R3 GigabitEthernet0/0 (full duplex).
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#show standby brief
          P indicates configured to preempt.
-----
Interface  Grp  Pri  P State   Active        Standby        Virtual IP
-----
Vl100      104  100  P Standby 10.0.100.1    local          10.0.100.254
Vl100      106  100  P Standby FE80::D1:2    local          FE80::5:73FF:FEA0:6A
Vl101      114  100  P Standby 10.0.101.1    local          10.0.101.254
Vl101      116  150  P Active  local         FE80::D1:3    FE80::5:73FF:FEA0:74
Vl102      124  100  P Standby 10.0.102.1    local          10.0.102.254
Vl102      126  100  P Standby FE80::D1:4    local          FE80::5:73FF:FEA0:7E
D2#
D2#
D2#
D2#
D2#

```

Figura 50 configure HSRPv2 D2

D2

```

interface vlan 100
standby version 2
standby 104 ip 10.0.100.254
standby 104 preempt
standby 104 timers 5 15
exit
interface vlan 101
standby version 2
standby 114 ip 10.0.101.254
standby 104 priority 150
standby 114 preempt
standby 114 timers 5 15
exit
interface vlan 102

```

```
standby version 2
standby 124 ip 10.0.102.254
standby 124 preempt
standby 124 timers 5 15
exit
interface vlan 100
standby version 2
standby 106 ipv6 FE80::5:73FF:FEA0:6A
standby 106 preempt
standby 106 timers 5 15
exit
interface vlan 101
standby version 2
standby 116 ipv6 FE80::5:73FF:FEA0:74
standby 116 priority 150
standby 116 preempt
standby 116 timers 5 15
exit
interface vlan 102
standby version 2
standby 126 ipv6 FE80::5:73FF:FEA0:7E
standby 126 preempt
standby 126 timers 5 15
exit
```

Se Programa la SLA para una implementación inmediata sin tiempo de finalización  
Los objetos rastreados deben notificar a D1 si el estado de IP SLA cambia de  
Down a Up

## Parte 5: Seguridad

En esta parte debe configurar varios mecanismos de seguridad en los dispositivos de la topología.

Las tareas de configuración son las siguientes:

### 5.1

En todos los dispositivos, proteja el EXEC privilegiado usando el algoritmo de encriptación SCRYPT.

Contraseña: cisco12345cisco



```
rnet0/0 (not full duplex), with R1 GigabitEthernet1/0 (full duplex).
*Nov 28 03:52:56.269: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethe
rnet0/0 (not full duplex), with R1 GigabitEthernet1/0 (full duplex).
*Nov 28 03:53:56.282: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethe
rnet0/0 (not full duplex), with R1 GigabitEthernet1/0 (full duplex).
*Nov 28 03:54:56.294: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethe
rnet0/0 (not full duplex), with R1 GigabitEthernet1/0 (full duplex).
*Nov 28 03:55:56.290: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethe
rnet0/0 (not full duplex), with R1 GigabitEthernet1/0 (full duplex).
*Nov 28 03:56:56.291: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethern
et0/0 (not full duplex), with R1 GigabitEthernet1/0 (full duplex). Configuracion de D1 a R1
D1#
D1#
D1#
*Nov 28 03:57:56.310: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethern
et0/0 (not full duplex), with R1 GigabitEthernet1/0 (full duplex).
D1#
D1#
D1#ena
D1#
D1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
D1(config)#enable secret cisco12345cisco
D1(config)#
D1(config)#
D1(config)#exit
D1#
*Nov 28 03:58:20.672: %SYS-5-CONFIG_I: Configured from console by console
D1#
D1#
D1#
```

Figura 51 encriptación SCRYPT D1

```

R1 R3 D1 D2 x A1
rnet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
*Nov 28 03:56:57.330: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
*Nov 28 03:57:57.341: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
*Nov 28 03:58:57.344: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
*Nov 28 03:59:57.337: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
*Nov 28 04:00:57.351: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
*Nov 28 04:01:57.351: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
*Nov 28 04:02:57.319: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
*Nov 28 04:03:57.328: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex). Configuración de D2 a R3
D2#
D2#
D2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
D2(config)#enable secret cisco12345cisco
D2(config)#
D2(config)#exit
D2#
*Nov 28 04:04:54.508: %SYS-5-CONFIG_I: Configured from console by console
D2#
*Nov 28 04:04:57.367: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2#
solarwinds Solar-PuTTY free tool © 2019 SolarWinds Worldwide, LLC. All rights reserved.

```

Figura 52 encriptación SCRYPT D2

```

R1 R3 D1 D2 A1 x
*Nov 28 03:29:46.239: %LINK-5-CHANGED: Interface Ethernet1/2, changed state to a
dministratively down
*Nov 28 03:29:46.244: %LINK-5-CHANGED: Interface Ethernet0/3, changed state to a
dministratively down
*Nov 28 03:29:46.244: %LINK-5-CHANGED: Interface Ethernet0/0, changed state to a
dministratively down
*Nov 28 03:29:46.358: %LINK-5-CHANGED: Interface Vlan1, changed state to adminis
tratively down
*Nov 28 03:29:46.429: %LINK-3-UPDOWN: Interface Vlan100, changed state to up
*Nov 28 03:29:47.435: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan100, c
hanged state to up
*Nov 28 03:29:52.284: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-chann
el2, changed state to up
*Nov 28 03:29:53.996: %LINEPROTO-5-UPDOWN: Line protocol on Interface Port-chann
el1, changed state to u
A1, ENCOR Skills Assessment, Scenario 1 Karen Hernandez
A1#
A1#
A1#ena
A1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
A1(config)#
A1(config)#enable secret cisco12345cisco
A1(config)#
A1(config)#exit
A1#
*Nov 28 03:56:50.475: %SYS-5-CONFIG_I: Configured from console by console
A1#
A1#
A1#
A1#
A1#
A1#
A1#
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```

Figura 53 encriptación SCRYPT A1

## Comando enable secret cisco12345cisco

### 5.2

En todos los dispositivos, cree un usuario local y protéjalo usando el algoritmo de encriptación SCRYPT.

Detalles de la cuenta encriptada SCRYPT:

- Nombre de usuario Local: sadmin
- Nivel de privilegio 15
- Contraseña: cisco12345cisco

```

Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#enable secret cisco12345cisco
R1(config)#
R1(config)#exit
R1#
R1#
*Nov 27 22:54:24.331: %SYS-5-CONFIG_I: Configured from console by console
R1#enable secret cisco12345cisco
R1#
% Invalid input detected at '^' marker.

R1#show run | include secret
enable secret 5 $1$tU1Q$zrf1ow2Pp.lgkE0mTgtnsS1
R1#
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#username sadmin privilege 15 secret cisco12345cisco
R1(config)#
R1(config)#exit
R1#
*Nov 27 23:11:50.415: %SYS-5-CONFIG_I: Configured from console by console
R1#show run | include secret
enable secret 5 $1$tU1Q$zrf1ow2Pp.lgkE0mTgtnsS1
username sadmin privilege 15 secret 5 $1$ZCFU5ZHLXJ3.H3uKHMMQ6LmAhp0
R1#
R1#
R1#
R1#
R1#
R1#

```

Figura 54 encriptación SCRYPT R1

## Comando username sadmin privilege 15 secret cisco12345cisco

### 5.3

En todos los dispositivos (excepto R2), habilite AAA. Habilite AAA.

```

*Nov 28 04:42:07.294: %SDPF-5-AD30MG: Process 4, Mbr 0.0.4.1 on Ethernet8/8 from
LOADING to FULL, Loading Done
D1(config)#
D1(config)#
D1(config)#exit
D1#
*Nov 28 04:55:43.162: %SYS-5-CONFIG_I: Configured from console by console
D1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
D1(config)#enable secret cisco12345cisco
D1(config)#username sadmin privilege 15 secret cisco12345cisco
D1(config)#aaa new-model
D1(config)#aaa session-id common
D1(config)#radius server RADIUS
D1(config-radius-server)#ip 10.0.100.6 auth-port 1812 acct-port 1813
D1(config-radius-server)#key Strongpass
D1(config-radius-server)#
D1(config-radius-server)#end
D1#
*Nov 28 04:57:11.286: %SYS-5-CONFIG_I: Configured from console by console
D1#show run aaa | exclude !
username sadmin privilege 15 secret 5 $1$clhda3jph6u6ambj3h0Uv6zV.

radius server RADIUS
address ip 10.0.100.6 auth-port 1812 acct-port 1813
key Strongpass

aaa new-model
aaa session-id common
D1#

```

Figura 55 habilite AAA D1

```

R1 R3 D1 D2 A1
Enter configuration commands, one per line. End with CNTL/Z.
D2(config)#enable secret cisco12345cisco
D2(config)#username sadefin privilege 15 secret cisco12345cisco
D2(config)#aaa new-model
D2(config)#
*Nov 28 04:57:57.348: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2(config)#aaa session-id common
D2(config)#aaa authentication login default group radius local
D2(config)#radius server RADIUS
D2(config-radius-server)#address ipv4 10.0.100.6 auth-port 1812 acct-port 1813
D2(config-radius-server)#key $trongPass
D2(config-radius-server)#exit
D2(config)#exit
D2#
*Nov 28 04:58:16.273: NYS-9-COMP20_1: Configured from console by console
D2#
*Nov 28 04:58:57.359: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2#
*Nov 28 04:59:57.334: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2#show run aaa | exclude |
aaa authentication login default group radius local
username sadefin privilege 15 secret 5 $!$o3sd$Newscv1fQ05soA99a.
!
!
!
!
!
!
radius server RADIUS
address ipv4 10.0.100.6 auth-port 1812 acct-port 1813
key $trongPass
!
aaa new-model
aaa session-id common
!
D2#
*Nov 28 05:00:57.341: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2#
*Nov 28 05:01:57.337: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2#
*Nov 28 05:02:57.357: NCP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex), with R3 GigabitEthernet0/0 (full duplex).
D2#
solarwinds | Solar-PuTTY free tool © 2019 SolarWinds Worldwide, LLC. All rights reserved.

```

Figura 56 habilite AAA D2

## Comando aaa authentication login default group radius local

### 5.4

En todos los dispositivos (excepto R2), configure las especificaciones del servidor RADIUS.

Especificaciones del servidor RADIUS.:

- Dirección IP del servidor RADIUS es 10.0.100.6.
- Puertos UDP del servidor RADIUS son 1812 y 1813.
- Contraseña: \$trongPass



```

Building configuration...
Current configuration : 2601 bytes
!
upgrade fd auto
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R1
!
boot-start-marker
boot-end-marker
!
logging message-counter syslog
enable secret 5 $1$ou0$e=Uj7w41a8ccj8slc1
!
aaa new-model
!
aaa authentication login default group radius local
!
aaa session-id common
ip source-route
no ip icmp rate-limit unreachable
ip cef
!
!
no ip domain lookup
ipv6 unicast-routing
ipv6 cef
!
multilink bundle-name authenticated
!
!
!
--More--
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```

Figura 58 autenticación AAA .A1

### Comando

aaa new-model  
 aaa session-id common

### 5.6

Verifique el servicio AAA en todos los dispositivos (except R2).  
 Cierre e inicie sesión en todos los dispositivos (except R2) con el usuario: raduser  
 y la contraseña: upass123.

Se protege proteja el EXEC privilegiado usando el algoritmo de encriptación  
 SCRIPT.

Contraseña: cisco12345cisco

Se Verifica el servicio AAA en todos los dispositivos





## Comando ntp master 3

### 6.3

Configure NTP en R1, R3, D1, D2, y A1.

Configure NTP de la siguiente manera:

- R1 debe sincronizar con R2.
- R3, D1 y A1 para sincronizar la hora con R1.
- D2 para sincronizar la hora con R3.

### Comando

Clock is synchronized, stratum 4, reference is 2.2.2.2

Clock is synchronized, stratum 5, reference is 10.0.10.1

### 6.4

Configure Syslog en todos los dispositivos excepto R2


Syslogs deben enviarse a la PC1 en 10.0.100.5 en el nivel WARNING.

### Comando

logging trap warnings

logging host 10.0.100.5

logging synchronous



```
D1#
D1#
"Nov 28 06:11:22.523: %SYS-5-CONFIG_I: Configured from console by console
D1#
"Nov 28 06:12:04.617: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
duplex).
D1#
"Nov 28 06:13:04.604: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
duplex).
D1#
"Nov 28 06:14:04.598: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
duplex).
D1#
"Nov 28 06:15:04.596: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
duplex).
D1#
"Nov 28 06:16:04.618: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
duplex).
D1#
"Nov 28 06:17:04.612: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
duplex).
D1#
Nov 28 06:18:04.600: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
duplex).
D1#
Nov 28 06:19:04.599: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
duplex).
D1#show ip access-list SNMP-NMS
Standard IP access list SNMP-NMS
 10 permit 10.0.100.5
D1#
D1#
D1#
D1#
D1#
D1#
D1#
```

Figura 61 SNMP-NMS D1

Standard IP access list SNMP-NMS

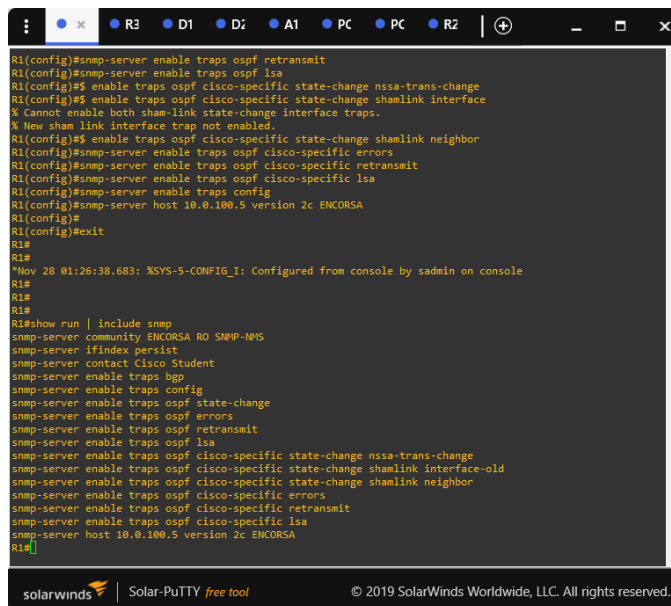
10 permit 10.0.100.5

show ip access-list SNMP-NMS

## 6.5

Configure SNMPv2c en todos los dispositivos excepto R2  
Especificaciones de SNMPv2:

- Únicamente se usará SNMP en modo lectura (Read-Only).
- Limite el acceso SNMP a la dirección IP de la PC1.
- Configure el valor de contacto SNMP con su nombre.
- Establezca el community string en ENCORSA.
- En R3, D1, y D2, habilite el envío de traps config y ospf.
- En R1, habilite el envío de traps bgp, config, y ospf.
- En A1, habilite el envío de traps config.



```
R1(config)#snmp-server enable traps ospf retransmit
R1(config)#snmp-server enable traps ospf lsa
R1(config)# enable traps ospf cisco-specific state-change nssa-trans-change
R1(config)# enable traps ospf cisco-specific state-change shamlink interface
% Cannot enable both sham-link state-change interface traps.
% New sham link interface trap not enabled.
R1(config)# enable traps ospf cisco-specific state-change shamlink neighbor
R1(config)#snmp-server enable traps ospf cisco-specific errors
R1(config)#snmp-server enable traps ospf cisco-specific retransmit
R1(config)#snmp-server enable traps ospf cisco-specific lsa
R1(config)#snmp-server enable traps config
R1(config)#snmp-server host 10.0.100.5 version 2c ENCORSA
R1(config)#
R1(config)#exit
R1#
R1#
*Nov 28 01:26:38.683: %SYS-5-CONFIG_I: Configured from console by admin on console
R1#
R1#
R1#
R1#show run | include snmp
snmp-server community ENCORSA RO SNMP-NMS
snmp-server ifindex persist
snmp-server contact Cisco Student
snmp-server enable traps bgp
snmp-server enable traps config
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface-old
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server host 10.0.100.5 version 2c ENCORSA
R1#
```

Figura 62 traps bgp, config, y ospf. R1

```
snmp-server community ENCORSA RO SNMP-NMS
snmp-server contact Cisco Student
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
```

```

snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server enable traps config
snmp-server enable traps bgp
snmp-server host 10.0.100.5 version 2c ENCORSA
end

```

```

R1 x D1 D2 A1 PC PC R2
snmp-server enable traps config
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface-old
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server host 10.0.100.5 version 2c ENCORSA
R3#
R3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#snmp-server community ENCORSARO SNMP-NMS
R3(config)#snmp-server contact Cisco Student
R3(config)#snmp-server enable traps ospf state-change
R3(config)#snmp-server enable traps ospf errors
R3(config)#snmp-server enable traps ospf retransmit
R3(config)#snmp-server enable traps ospf lsa
R3(config)#snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
R3(config)#snmp-server enable traps ospf cisco-specific state-change shamlink interface
% Cannot enable both sham-link state-change interface traps.
% New sham link interface trap not enabled.
R3(config)#snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
R3(config)#snmp-server enable traps ospf cisco-specific errors
R3(config)#snmp-server enable traps ospf cisco-specific retransmit
R3(config)#snmp-server enable traps ospf cisco-specific lsa
R3(config)#snmp-server enable traps config
R3(config)#snmp-server host 10.0.100.5 version 2c ENCORSA
R3(config)#
R3(config)#
R3(config)#exit
R3#
R3#
Nov 28 01:25:43.683: %SYS-5-CONFIG_I: Configured from console by console
R3#

```

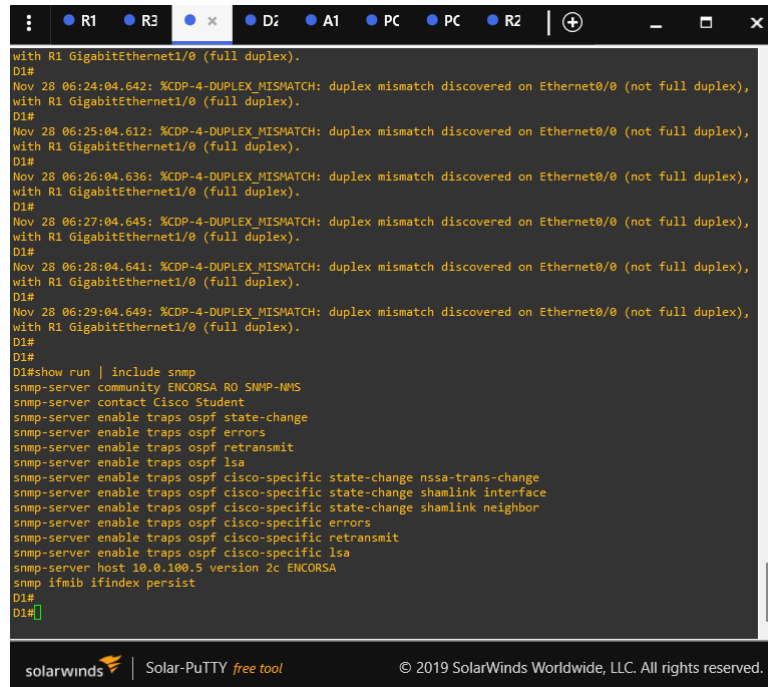
Figura 63 traps config y ospf. R3

```

snmp-server community ENCORSARO SNMP-NMS
snmp-server contact Cisco Student
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa

```

```
snmp-server enable traps config
snmp-server host 10.0.100.5 version 2c ENCORSA
end
```



```
with R1 GigabitEthernet1/0 (full duplex).
D1#
Nov 28 06:24:04.642: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
with R1 GigabitEthernet1/0 (full duplex).
D1#
Nov 28 06:25:04.612: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
with R1 GigabitEthernet1/0 (full duplex).
D1#
Nov 28 06:26:04.636: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
with R1 GigabitEthernet1/0 (full duplex).
D1#
Nov 28 06:27:04.645: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
with R1 GigabitEthernet1/0 (full duplex).
D1#
Nov 28 06:28:04.641: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
with R1 GigabitEthernet1/0 (full duplex).
D1#
Nov 28 06:29:04.649: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
with R1 GigabitEthernet1/0 (full duplex).
D1#
D1#
D1#show run | include snmp
snmp-server community ENCORSA RO SNMP-NMS
snmp-server contact Cisco Student
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server host 10.0.100.5 version 2c ENCORSA
snmp ifmib ifindex persist
D1#
D1#
```

Figura 64 traps config y ospf.D1

```
snmp-server community ENCORSA RO SNMP-NMS
snmp-server contact Cisco Student
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server enable traps config
snmp-server host 10.0.100.5 version 2c ENCORSA
end
```

```
% Invalid input detected at '^' marker.
D2(config)#snmp-server host 10.0.100.5 version 2c ENCORSA
D2(config)#
D2(config)#exit
D2#
D2#
*Nov 28 06:27:07.987: %SYS-5-CONFIG_I: Configured from console by sadmin on console
D2#
*Nov 28 06:27:57.392: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
with R3 GigabitEthernet0/0 (full duplex).
D2#
*Nov 28 06:28:57.416: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
with R3 GigabitEthernet0/0 (full duplex).
D2#
*Nov 28 06:29:57.378: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet0/0 (not full duplex),
with R3 GigabitEthernet0/0 (full duplex).
D2#
D2#
D2#show run | include snmp
snmp-server community ENCORSA RO SNMP-NMS
snmp-server contact Cisco Student
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server host 10.0.100.5 version 2c ENCORSA
snmp ifmib ifindex persist
D2#
D2#
D2#
```

Figura 65 traps config y ospf.D2

```
snmp-server community ENCORSA RO SNMP-NMS
snmp-server contact Cisco Student
snmp-server enable traps ospf state-change
snmp-server enable traps ospf errors
snmp-server enable traps ospf retransmit
snmp-server enable traps ospf lsa
snmp-server enable traps ospf cisco-specific state-change nssa-trans-change
snmp-server enable traps ospf cisco-specific state-change shamlink interface
snmp-server enable traps ospf cisco-specific state-change shamlink neighbor
snmp-server enable traps ospf cisco-specific errors
snmp-server enable traps ospf cisco-specific retransmit
snmp-server enable traps ospf cisco-specific lsa
snmp-server enable traps config
snmp-server host 10.0.100.5 version 2c ENCORSA
end
```

```
A1(config)#
A1(config)#
A1(config)#snmp-server community ENCORSA RO SNMP-NMS
A1(config)#snmp-server contact Cisco Student
A1(config)#snmp-server enable traps config
^
% Invalid input detected at '^' marker.
A1(config)#snmp-server host 10.0.100.5 version 2c ENCORSA
A1(config)#
A1(config)#exit
A1#
A1#
A1#
*Nov 28 06:27:26.742: %SYS-5-CONFIG_I: Configured from console by sadmin on console
A1#
A1#
A1#show run | include snmp
snmp-server community ENCORSA RO SNMP-NMS
snmp-server contact Cisco Student
snmp-server host 10.0.100.5 version 2c ENCORSA
A1#
A1#
A1#
A1#
A1#
A1#
A1#
A1#
A1#
A1#
A1#
A1#
A1#
A1#
A1#
A1#
```

Figura 66 traps config A1

```
snmp-server community ENCORSA RO SNMP-NMS
snmp-server contact Cisco Student
snmp-server enable traps config
snmp-server host 10.0.100.5 version 2c ENCORSA
end
```

inicialmente se configure el reloj local a la hora UTC actual, luego Configurar R2 como NTP maestro en el nivel de estrato 3, también Configure Syslog en todos los dispositivos ya que sirve para el envío de mensajes de registro en una red IP. Configure SNMPv2c en todos los dispositivos el cual es utilizado para enviar comunicaciones del entorno y de las máquinas virtuales a los sistemas de administración.

## CONCLUSIONES

Se configura interfaces troncales IEEE 802.1Q para reorganizar enlaces troncales en las interfaces Fast y Gigabit Ethernet, luego se cambia la VLAN nativa en los enlaces troncales. El tráfico entre switches son el único que no se encapsule en enlaces trunk, se ejecuta el comando spanning-tree mode rapid-pvst del modo de configuración global y se configura los puentes raíz RSTP que es la activación de RSTP a nivel global en todos los puentes participantes,

Se asigna EtherChannels LACP ya que pueden interconectar switches, routers, servidores o clientes. Los puertos usados deben tener las mismas características y configuración.

Por último, se Verifica la conectividad de la LAN local realizando ping en los dispositivos para comprobar se conexión.

Se configura single-área OSPFv2 en área 0. Que es un protocolo de routing de estado de enlace para IPv4. Se Deshabilita las publicaciones OSPFv2, se configura classic, con el comando single-area en area 0.

En IPv6 address family, el soporte para el IPv6 que rutea los prefijos y el más de gran tamaño de los direccionamientos del IPv6.

Se Configura una relación de vecino IPv4 e IPv6, es el sistema de identificación que usa Internet para enviar información entre los dispositivos.

Se Programa la SLA para una implementación inmediata sin tiempo de finalización Los objetos rastreados deben notificar a D1 si el estado de IP SLA cambia de Down a Up



## BIBLIOGRAFÍA

AMBIT-BST. (23 de 01 de 2020). *ambit-bst*. Obtenido de <https://www.ambit-bst.com/blog/ccna-la-certificaci%C3%B3n-de-cisco-c%C3%B3mo-conseguirla>

COMPUTERWEEKLY. (s.f.). *computerweekly*. Obtenido de <https://www.computerweekly.com/es/definicion/Red-de-area-local-o-LAN>

GARDEY., J. P. (2010). *definicion*. Obtenido de <https://definicion.de/wan/>  
S., L. G. (s.f.). *Teoría de Redes de computadoras*. Obtenido de [https://www.oas.org/juridico/spanish/cyber/cyb29\\_computer\\_int\\_sp.pdf](https://www.oas.org/juridico/spanish/cyber/cyb29_computer_int_sp.pdf)

TOKIOSCHOOL. (s.f.). *tokioschool*. Obtenido de <https://www.tokioschool.com/noticias/que-es-cisco/>

XFINITY. (s.f.). *xfinity*. Obtenido de <https://es.xfinity.com/hub/internet/internet-service-providers>