DIPLOMADO DE PROFUNDIZACION CISCO PRUEBA DE HABILIDADES

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SOLUCIÓN A DOS ESCENARIOS PRESENTES BAJO EL USO DEL SIMULADOR GNS3

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Diplomado de opción de grado presentado para obtener el título de
INGENIERO ELECTRONICO

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NOTA DE ACEPTACIÓN

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GLOSARIO

GATEWAY: Este concepto se aplica en comunicación enfocado a la frontera que permite o no la comunicación con otras redes y dispositivos. Se conoce también como puerta de enlace o pasarela y permite la interacción también de protocolos.

GNS3: Software especializado de uso libre para modelar redes de manera virtual mediante el uso de IOS de equipos CISCO que simulan su funcionamiento como si se trataran de equipos reales. Este software fue lanzado en 2008 desarrollado por GNS3, por otra parte, este software permite la interacción entre equipos reales y virtuales.

HOST: Es un equipo, ordenador o computador que funciona como punto de inicio o de fin del proceso de transferencia de datos. Estos equipos requieren de una configuración mínima de direccionamiento para permitir el intercambio de datos.

VIRTUAL MACHINE: Es un software que presta la función de simular un sistema operativo de un equipo de cómputo y que permite flexibilizar con diversos sistemas operativos en cuanto a versión o fabricantes. Esta instalación se realiza sobre un dispositivo físico que incluso permite la interacción entre el virtual y real.

ENRUTAMIENTO: Es el proceso de envío de paquetes en redes de comunicación con gran cantidad de conectividad entre los dispositivos que la conforman. Como punto fundamental este proceso optimiza e identifica la ruta mas óptima para llevar a cabo la comunicación. Este proceso genera tablas de enrutamiento y aplica parámetro como distancia administrativa, métrica, ancho de banda y uso de protocolos.

RESUMEN

El diplomado de profundización CISCO contiene habilidades prácticas que son consideradas una serie de características para el aprendizaje y enrutamiento de diagnóstico, se basa principalmente en potencializar las características de los equipos que componen la topología de la red a través de los conceptos estudiados a lo largo del curso CCNP de CISCO mediante la implementación de comandos lógicos apoyados en el desarrollo en softwares especializados

Los ingenieros electrónicos deben ser capaces de realizar un diagnóstico configuran dispositivos como conmutadores, enrutadores y ordenadores apoyados en los conceptos de redes integrando desempeño, seguridad, redundancia, direccionamiento, manejo de áreas de operación entre otros conceptos, los cuales contribuyen a aumentar el rendimiento y confiabilidad de las redes ya que esto nos permitirá brindar soluciones y respuestas a los diversos problemas que las redes de información, electrónicas y de datos puedan presentar.

De acuerdo con los dos escenarios que se presentan en la prueba de habilidades, se debe seleccionar uno de ellos para realizar el proceso de configuración de redes, utilizando GNS3.

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

ABSTRACT

The CISCO in-depth diploma contains practical skills that are considered a series of characteristics for learning and diagnostic routing, it is mainly based on potentiating the characteristics of the equipment that make up the network topology through the concepts studied throughout the course. CISCO CCNP course through the implementation of logical commands supported by the development of specialized software

Electronic engineers must be able to carry out a diagnosis, configure devices such as switches, routers and computers supported by the concepts of networks integrating performance, security, redundancy, addressing, management of areas of operation, among other concepts, which contribute to increasing performance and reliability of the networks since this will allow us to provide solutions and answers to the various problems that information, electronic and data networks may present.

According to the two scenarios that are presented in the skills test, one of them must be selected to carry out the network configuration process, using GNS3.

Keywords: CISCO, CCNP, Switching, Routing, Networks, Electronics.

INTRODUCCIÓN

Una red representa la interconexión de un conjunto determinado de computadores, a través de dispositivos alámbricos o inalámbricos que, gracias a impulsos eléctricos, ondas electromagnéticas u otros medios físicos, pueden enviar y recibir información relevante en paquetes de datos, como también, compartir sus recursos y actuar como un conjunto organizado.

A continuación, se desarrollará la actividad mediante la herramienta GNS2 la cual permitirá realizar la simulación de la actividad con el fin de afianzar los conocimientos actuales sobre el manejo y configuración de dispositivos de red.

Se presenta la implementación y desarrollo sobre la topología de red propuesta en la cual se llevan a cabo los diferentes pasos de la actividad. En este documento se consignan los comandos utilizados para cada uno de los diferentes pasos propuestos, así como las evidencias tomadas a través de imágenes de las diferentes CLI de los equipos entre ellos, routers, switches y host.

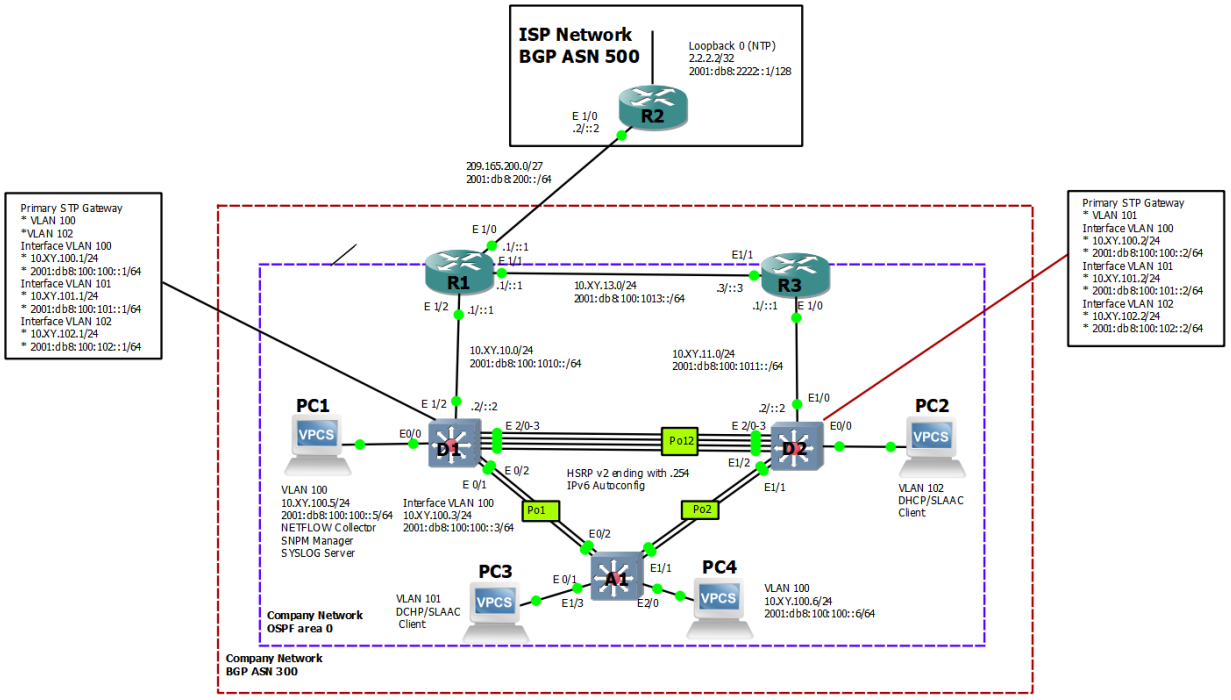
La Universidad Nacional Abierta y a Distancia (UNAD) en el diplomado de profundización CISCO para optener el título de Ingeniero electronico, incluye el aprendizaje de configuración de redes donde se da aplicabilidad a todos los conceptos y temáticas estudiadas y aprendidas a lo largo del proceso de aprendizaje de la carrera, entre los cuales podemos mencionar: CCNA, CCNP, interactuación entre varias redes e internet, comandos utilizados para la protección de acceso, conceptos aplicables para la configuración de redes mediante los protocolos y protocolos de seguridad entre otros.

1. Descripción de escenarios propuestos para la prueba de habilidades

Escenario 1

Topología

Figura 1. Topología escenario 1

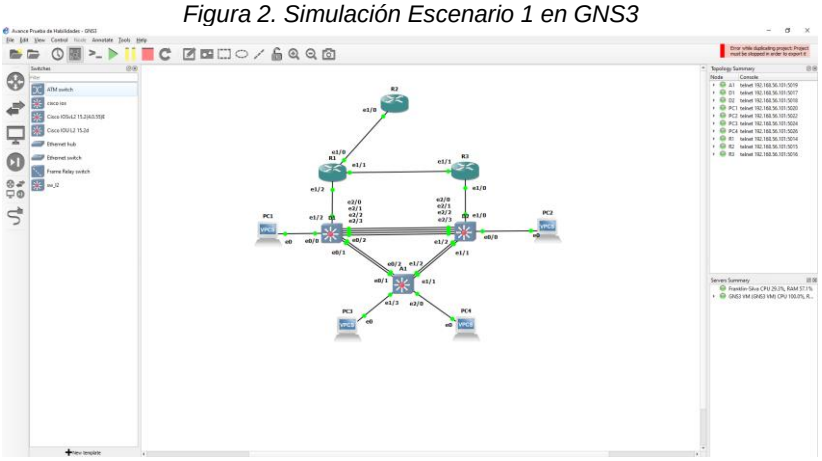


Fuente: Documento Cisco

En este primer escenario se configurarán los dispositivos de una red.
Aplique las configuraciones iniciales y los protocolos de enrutamiento para los routers R1, R2, R3, D1, D2 Y A1 según el diagrama. No asigne passwords en los routers. Configurar las interfaces con las direcciones que se muestran en la topología de red.

Se realiza la simulación en GNS3.

Figura 2. Simulación Escenario 1 en GNS3



Fuente: Autor

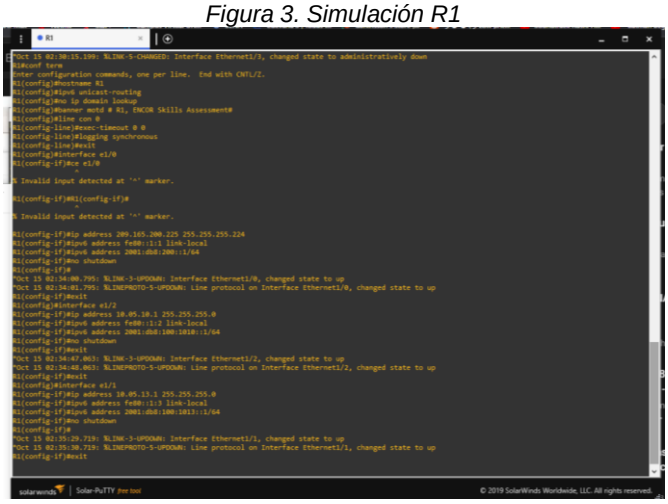
Tabla 1. Direccionamiento

Device	Interface	IPv4 Address	IPv6 Address	IPv6 Link-Local
R1	E1/0	209.165.200.225/27	2001:db8:200::1/64	fe80::1:1
	E1/2	10.05.10.1/24	2001:db8:100:1010::1/64	fe80::1:2
	E1/1	10. 05.13.1/24	2001:db8:100:1013::1/64	fe80::1:3
R2	E1/0	209.165.200.226/27	2001:db8:200::2/64	fe80::2:1
	Loopback0	2.2.2.2/32	2001:db8:2222::1/128	fe80::2:3
R3	E1/0	10. 05.11.1/24	2001:db8:100:1011::1/64	fe80::3:2
	E1/1	10. 05.13.3/24	2001:db8:100:1013::3/64	fe80::3:3
D1	E1/2	10. 05.10.2/24	2001:db8:100:1010::2/64	fe80::d1:1
	VLAN 100	10. 05.100.1/24	2001:db8:100:100::1/64	fe80::d1:2
	VLAN 101	10.05.101.1/24	2001:db8:100:101::1/64	fe80::d1:3
	VLAN 102	10.05.102.1/24	2001:db8:100:102::1/64	fe80::d1:4
D2	E1/0	10.05.11.2/24	2001:db8:100:1011::2/64	fe80::d2:1
	VLAN 100	10.05.100.2/24	2001:db8:100:100::2/64	fe80::d2:2
	VLAN 101	10.05.101.2/24	2001:db8:100:101::2/64	fe80::d2:3
	VLAN 102	10.05.102.2/24	2001:db8:100:102::2/64	fe80::d2:4
A1	VLAN 100	10.05.100.3/23	2001:db8:100:100::3/64	fe80::a1:1
PC1	NIC	10.05.100.5/24	2001:db8:100:100::5/64	EUI-64
PC2	NIC	DHCP	SLAAC	EUI-64
PC3	NIC	DHCP	SLAAC	EUI-64
PC4	NIC	10.05.100.6/24	2001:db8:100:100::6/64	EUI-64

Router R1

```
hostname R1
ipv6 unicast-routing
no ip domain lookup
banner motd # R1, ENCOR Skills Assessment#
line con 0
exec-timeout 0 0
logging synchronous
exit
interface e1/0
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
interface e1/2
ip address 10.05.10.1 255.255.255.0
ipv6 address fe80::1:2 link-local
ipv6 address 2001:db8:100:1010::1/64
no shutdown
exit
interface e1/1
ip address 10.05.13.1 255.255.255.0
ipv6 address fe80::1:3 link-local
ipv6 address 2001:db8:100:1013::1/64
no shutdown
exit
```

Figura 3. Simulación R1



Fuente: Autor

Router R2

hostname R2

ipv6 unicast-routing

no ip domain lookup

banner motd # R2, ENCOR Skills Assessment#

line con 0

exec-timeout 0 0

logging synchronous

exit

interface e1/0

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

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

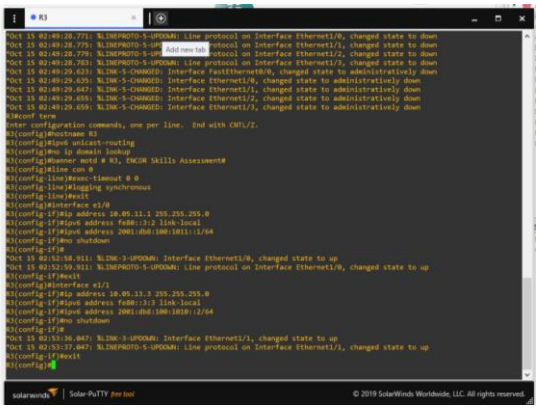
Figura 4. Simulación R2

Fuente: Autor

Router R3

```
hostname R3
ipv6 unicast-routing
no ip domain lookup
banner motd # R3, ENCOR Skills Assessment#
line con 0
exec-timeout 0 0
logging synchronous
exit
interface e1/0
ip address 10.05.11.1 255.255.255.0
ipv6 address fe80::3:2 link-local
ipv6 address 2001:db8:100:1011::1/64
no shutdown
exit
interface e1/1
ip address 10.05.13.3 255.255.255.0
ipv6 address fe80::3:3 link-local
ipv6 address 2001:db8:100:1010::2/64
no shutdown
exit
```

Figura 5. Simulación R3



Fuente: Autor

Switch D1

hostname D1

ip routing

ipv6 unicast-routing

no ip domain lookup

banner motd # D1, ENCOR Skills Assessment#

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 e1/2
no switchport
ip address 10.05.10.2 255.255.255.0
ipv6 address fe80::d1:1 link-local
ipv6 address 2001:db8:100:1010::2/64
no shutdown
exit
interface vlan 100
ip address 10.05.100.1 255.255.255.0
ipv6 address fe80::d1:2 link-local
ipv6 address 2001:db8:100:100::1/64
no shutdown
exit
interface vlan 101
ip address 10.05.101.1 255.255.255.0
ipv6 address fe80::d1:3 link-local
ipv6 address 2001:db8:100:101::1/64
no shutdown
exit
interface vlan 102
ip address 10.05.102.1 255.255.255.0
ipv6 address fe80::d1:4 link-local
ipv6 address 2001:db8:100:102::1/64
no shutdown
exit
ip dhcp excluded-address 10.05.101.1 10.05.101.109
ip dhcp excluded-address 10.05.101.141 10.05.101.254
ip dhcp excluded-address 10.05.102.1 10.05.102.109
ip dhcp excluded-address 10.05.102.141 10.05.102.254
ip dhcp pool VLAN-101
network 10.05.101.0 255.255.255.0
default-router 10.05.101.254
exit
```

ip dhcp pool VLAN-102

network 10.05.102.0 255.255.255.0

default-router 10.05.102.254

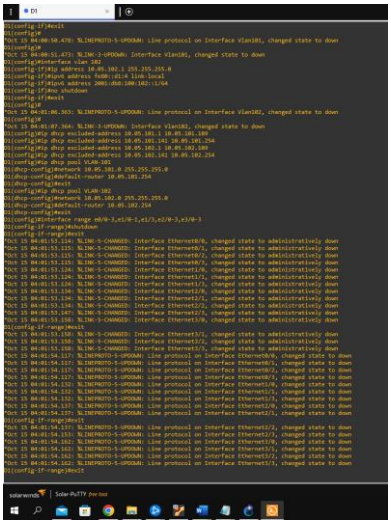
exit

interface range e0/0-3,e1/0-1,e1/3,e2/0-3,e3/0-3

shutdown

exit

Figura 6. Simulación Switch D1



Fuente: Autor

Switch D2

hostname D2

ip routing

ipv6 unicast-routing

no ip domain lookup

banner motd # D2, ENCOR Skills Assessment#

line con 0

exec-timeout 0 0

logging synchronous

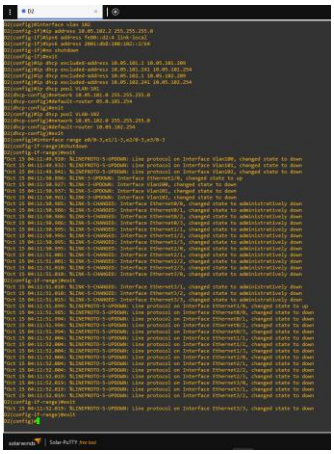
exit

vlan 100

```
name Management
exit
vlan 101
name UserGroupA
exit
vlan 102
name UserGroupB
exit
vlan 999
name NATIVE
exit
interface e1/0
no switchport
ip address 10.05.11.2 255.255.255.0
ipv6 address fe80::d1:1 link-local
ipv6 address 2001:db8:100:1011::2/64
no shutdown
exit
interface vlan 100
ip address 10.05.100.2 255.255.255.0
ipv6 address fe80::d2:2 link-local
ipv6 address 2001:db8:100:100::2/64
no shutdown
exit
interface vlan 101
ip address 10.05.101.2 255.255.255.0
ipv6 address fe80::d2:3 link-local
ipv6 address 2001:db8:100:101::2/64
no shutdown
```

```
exit
interface vlan 102
ip address 10.05.102.2 255.255.255.0
ipv6 address fe80::d2:4 link-local
ipv6 address 2001:db8:100:102::2/64
no shutdown
exit
ip dhcp excluded-address 10.05.101.1 10.05.101.209
ip dhcp excluded-address 10.05.101.241 10.05.101.254
ip dhcp excluded-address 10.05.102.1 10.05.102.209
ip dhcp excluded-address 10.05.102.241 10.05.102.254
ip dhcp pool VLAN-101
network 10.05.101.0 255.255.255.0
default-router 05.0.101.254
exit
ip dhcp pool VLAN-102
network 10.05.102.0 255.255.255.0
default-router 10.05.102.254
exit
interface range e0/0-3,e1/1-3,e2/0-3,e3/0-3
shutdown
exit
```

Figura 7. Simulación Switch D2



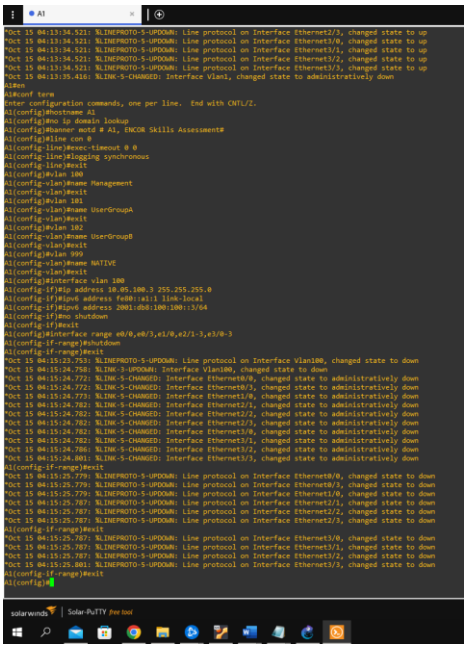
Fuente: Autor

Switch A1

hostname A1
no ip domain lookup
banner motd # A1, ENCOR Skills Assessment#
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 10.05.100.3 255.255.255.0
ipv6 address fe80::a1:1 link-local
ipv6 address 2001:db8:100:100::3/64
no shutdown
exit
interface range e0/0,e0/3,e1/0,e2/1-3,e3/0-3
shutdown

exit

Figura 8. Simulación Switch A1



Fuente: Autor

Tabla 2. Tareas de configuración Parte 1

Task#	Task	Specification	Points
2.1	On all switches, configure IEEE 802.1Q trunk interfaces on interconnecting switch links	Enable 802.1Q trunk links between: • D1 and D2 • D1 and A1 • D2 and A1	6
2.2	On all switches, change the native VLAN on trunk links.	Use VLAN 999 as the native VLAN.	6
2.3	On all switches, enable the Rapid Spanning-Tree Protocol.	Use Rapid Spanning Tree.	3
2.4	On D1 and D2, configure the appropriate RSTP root bridges based on the information in the topology diagram. D1 and D2 must provide backup in case of root bridge failure.	Configure D1 and D2 as root for the appropriate VLANs with mutually supporting priorities in case of switch failure.	2
2.5	On all switches, create LACP EtherChannels as shown in the topology diagram.	Use the following channel numbers: • D1 to D2 – Port channel 12 • D1 to A1 – Port channel 1 • D2 to A1 – Port channel 2	3
2.6	On all switches, configure host access ports connecting to PC1, PC2, PC3, and PC4.	Configure access ports with appropriate VLAN settings as shown in the topology diagram. Host ports should transition immediately to forwarding state.	4
2.7	Verify IPv4 DHCP services.	PC2 and PC3 are DHCP clients and should be receiving valid IPv4 addresses.	1

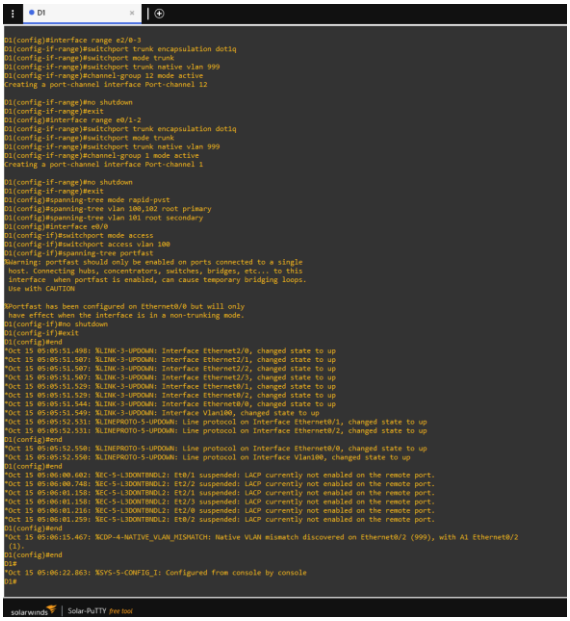
Task#	Task	Specification	Points
2.8	Verify local LAN connectivity.	PC1 should successfully ping: • D1: 10.05.100.1 • D2: 10.05.100.2 • PC4: 10.XY.100.6 PC2 should successfully ping: • D1: 10.05.102.1 • D2: 10.05.102.2 PC3 should successfully ping: • D1: 10.05.101.1 • D2: 10.05.101.2 PC4 should successfully ping: • D1: 10.05.100.1 • D2: 10.05.100.2 • PC1: 10.05.100.5	1

Switch D1

```
interface range e2/0-3
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
channel-group 12 mode active
no shutdown
exit
interface range e0/1-2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
channel-group 1 mode active
no shutdown
exit
spanning-tree mode rapid-pvst
spanning-tree vlan 100,102 root primary
spanning-tree vlan 101 root secondary
interface e0/0
switchport mode access
switchport access vlan 100
```

spanning-tree portfast
no shutdown
exit
end

Figura 9. Configuración Switch D1



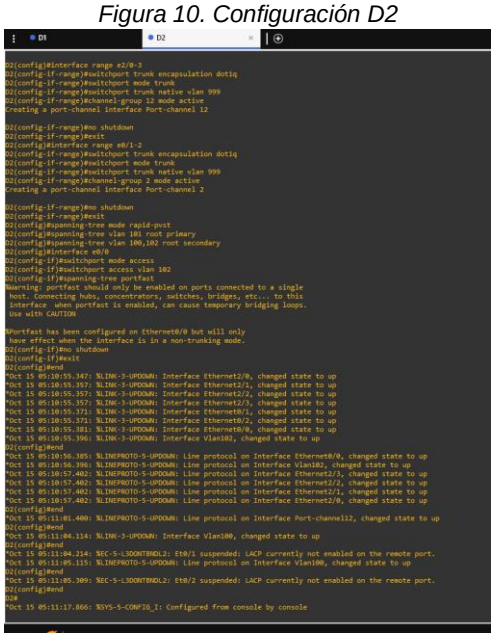
Fuente: Autor

Switch D2

interface range e2/0-3
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
channel-group 12 mode active
no shutdown
exit
interface range e0/1-2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
channel-group 2 mode active
no shutdown
exit
spanning-tree mode rapid-pvst
spanning-tree vlan 101 root primary
spanning-tree vlan 100,102 root secondary
interface e0/0
switchport mode access

switchport access vlan 102
spanning-tree portfast
no shutdown
exit
end

Figura 10. Configuración D2



Fuente: Autor

Switch A1

panning-tree mode rapid-pvst
interface range e0/1-2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
channel-group 1 mode active
no shutdown
exit
interface range e1/1-2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
channel-group 2 mode active
no shutdown
exit
interface range e1/3
switchport mode access
switchport access vlan 101
spanning-tree portfast

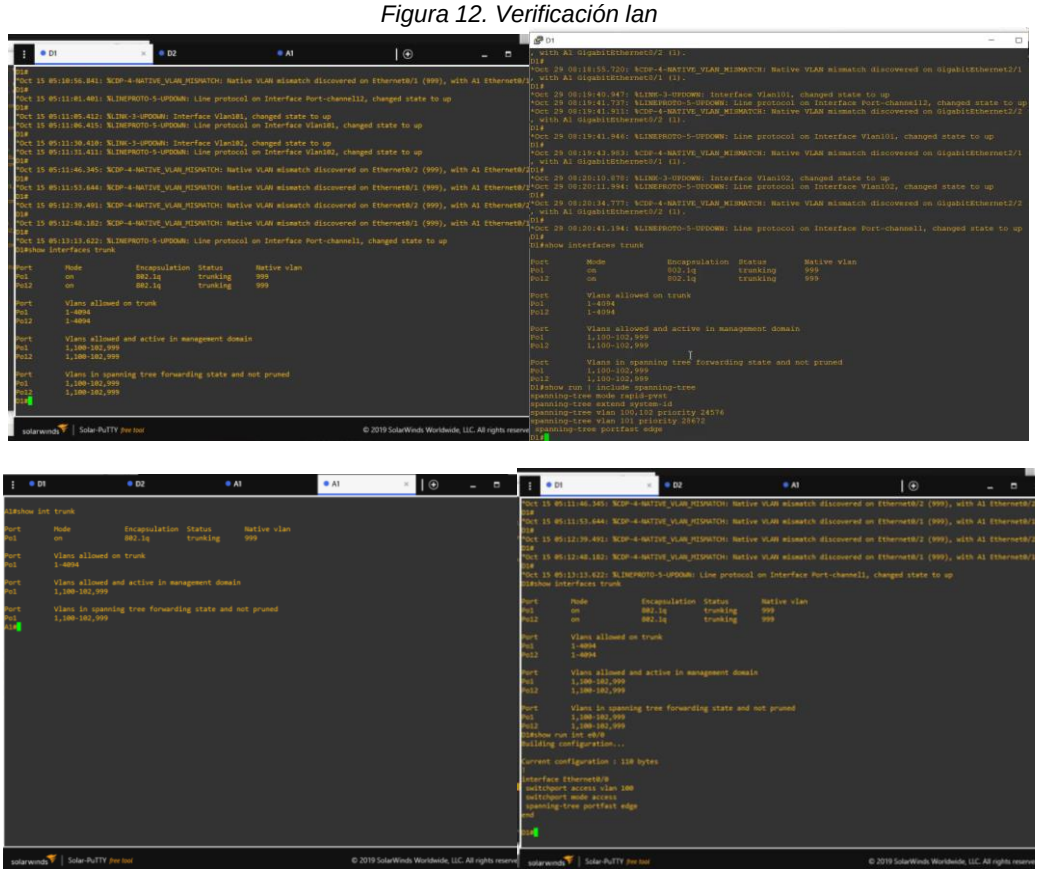
no shutdown
exit
interface range e2/0
switchport mode access
switchport access vlan 100
spanning-tree portfast
no shutdown
exit
end

Figura 11. Configuración Switch A1

uente: Autor

Verify local LAN connectivity

Figura 12. Verificación lan



Escenario 2

Tabla 3. Tareas de configuración Parte 2

Task#	Task	Specification	Points
3.1	On the “Company Network” (i.e., R1, R3, D1, and D2), configure single-area OSPFv2 in area 0.	Use OSPF Process ID **4** and assign the following router-IDs: • R1: 0.0.4.1 • R3: 0.0.4.3 • D1: 0.0.4.131 • D2: 0.0.4.132 On R1, R3, D1, and D2, advertise all directly connected networks / VLANs in Area 0. • On R1, do not advertise the R1 – R2 network. • On R1, propagate a default route. Note that the default route will be provided by BGP. Disable OSPFv2 advertisements on: • D1: All interfaces except E1/2 • D2: All interfaces except E1/0	8
3.2	On the “Company Network” (i.e., R1, R3, D1, and D2), configure classic single-area OSPFv3 in area 0.	Use OSPF Process ID **6** and assign the following router-IDs: • R1: 0.0.6.1 • R3: 0.0.6.3 • D1: 0.0.6.131 • D2: 0.0.6.132 On R1, R3, D1, and D2, advertise all directly connected networks / VLANs in Area 0. • On R1, do not advertise the R1 – R2 network. • On R1, propagate a default route. Note that the default route will be provided by BGP. Disable OSPFv3 advertisements on: • D1: All interfaces except E1/2 • D2: All interfaces except E1/0	8

Task#	Task	Specification	Points
3.3	On R2 in the “ISP Network”, configure MP-BGP.	Configure two default static routes via interface Loopback 0: • An IPv4 default static route. • An IPv6 default static route. Configure R2 in BGP ASN **500** and use the router-id 2.2.2.2. Configure and enable an IPv4 and IPv6 neighbor relationship with R1 in ASN 300. In IPv4 address family, advertise: • The Loopback 0 IPv4 network (/32). • The default route (0.0.0.0/0). In IPv6 address family, advertise: • The Loopback 0 IPv4 network (/128). • The default route (::/0).	4
3.4	On R1 in the “ISP Network”, configure MP-BGP.	Configure two static summary routes to interface Null 0: • A summary IPv4 route for 10.05.0.0/8. • A summary IPv6 route for 2001:db8:100::/48. Configure R1 in BGP ASN **300** and use the router-id 1.1.1.1. Configure an IPv4 and IPv6 neighbor relationship with R2 in ASN 500. In IPv4 address family: • Disable the IPv6 neighbor relationship. • Enable the IPv4 neighbor relationship. • Advertise the 10.05.0.0/8 network. In IPv6 address family: • Disable the IPv4 neighbor relationship. • Enable the IPv6 neighbor relationship. • Advertise the 2001:db8:100::/48 network.	4

Router R1

```
router ospf 4
router-id 0.0.4.1
network 10.05.10.0 0.0.0.255 area 0
network 10.05.13.0 0.0.0.255 area 0
default-information originate
exit
ipv6 router ospf 4
router-id 0.0.6.1
default-information originate
exit
interface e1/2
ipv6 ospf 6 area 0
exit
interface e1/1
ipv6 ospf 6 area 0
exit
ip route 10.05.0.0 255.0.0.0 nullo
ipv6 route 2001:db8:100::/48 nullo
router bgp 300
bgp router-id 1.1.1.1
neighbor 209.165.200.226 remote-as 500
neighbor 2001:db8:200::2 remote-as 500
address-family ipv4 unicast
neighbor 209.165.200.226 activate
no neighbor 2001:db8:200::2 activate
network 10.05.0.0 mask 255.0.0.0
```

exit-address-family

address-family ipv6 unicast

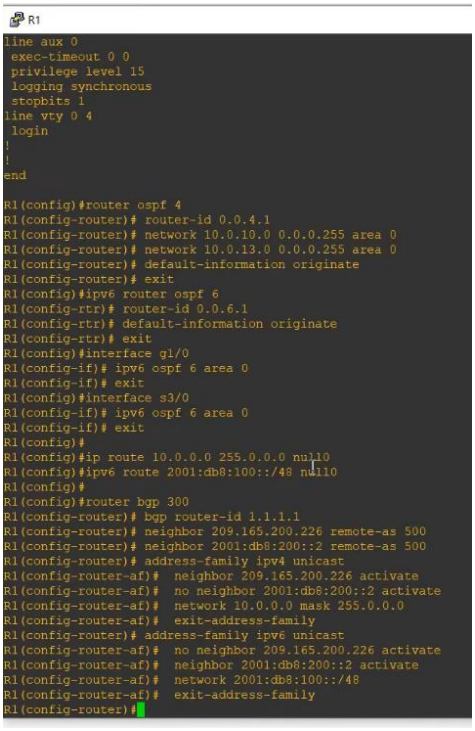
no neighbor 209.165.200.226 activate

neighbor 2001:db8:200::2 activate

network 2001:db8:100::/48 activate

exit-address-family

Figura 13. Configuración router R1



Fuente: Autor

Router 2

ip route 0.0.0.0 0.0.0.0 loopback 0

ipv6 router::/0 loopback 0

router bgp 500

bgp router-id 2.2.2.2

neighbor 209.165.200.225 remote-as 300

neighbor 2001:db8:200::1 remote-as 300

address-family ipv4

neighbor 209.165.200.225 activate

no neighbor 2001:db8:200::1 activate

network 2.2.2.2 mask 255.255.255.255

network 0.0.0.0

exit-address-family

address-family ipv6

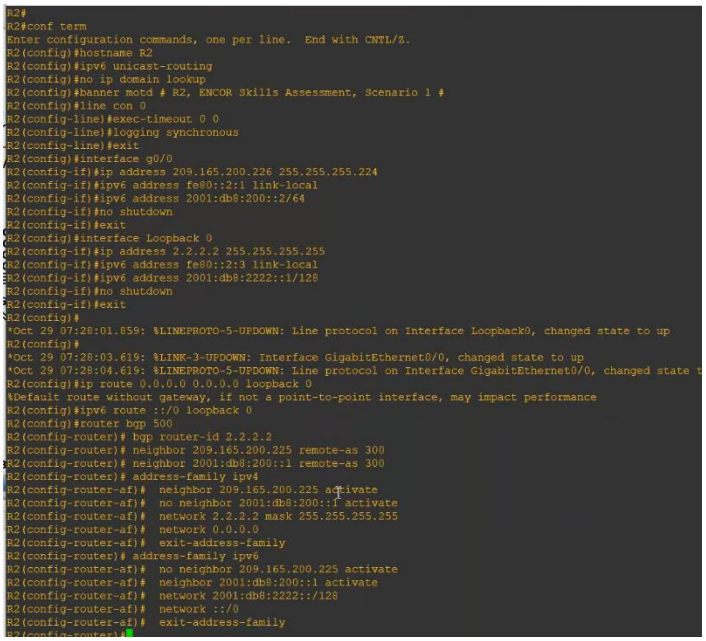
no neighbor 209.165.200.255 activate

neighbor 2001:db8:2222::/128

network::/0

exit-address-family

Figura 14. Configuración router R2



Fuente: Autor

Router R3

router ospf 4

router-id 0.0.4.3

network 10.05.11.0.0.0.0.255 area 0

network 10.05.13.0.0.0.0.255 area 0

exit

ipv6 router ospf 6

router-id 0.0.6.3

exit

interface e1/0

ipv6 ospf 6 area 0

exit

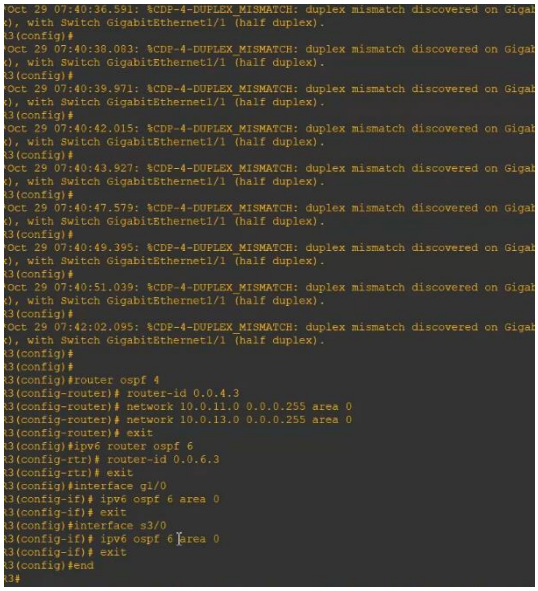
interface e1/1

ipv6 ospf 6 area 0

exit

end

Figura 15. Configuración router R3



Fuente: Autor

Switch D1

router ospf 4

router-id 0.0.4.131

network 10.05.100.0 0.0.0.255 area 0

network 10.05.101.0 0.0.0.255 area 0

network 10.05.102.0 0.0.0.255 area 0

network 10.05.10.0.0 0.0.255 area 0

passive-interface default

no passive-interface e1/2

exit

ipv6 router ospf 6

router-id 0.0.6.131

passive-interface default

no passive-interface e1/2

exit

interface e1/2

ipv6 ospf 6 area 0

exit

interface vlan 100

ipv6 ospf 6 area 0

exit

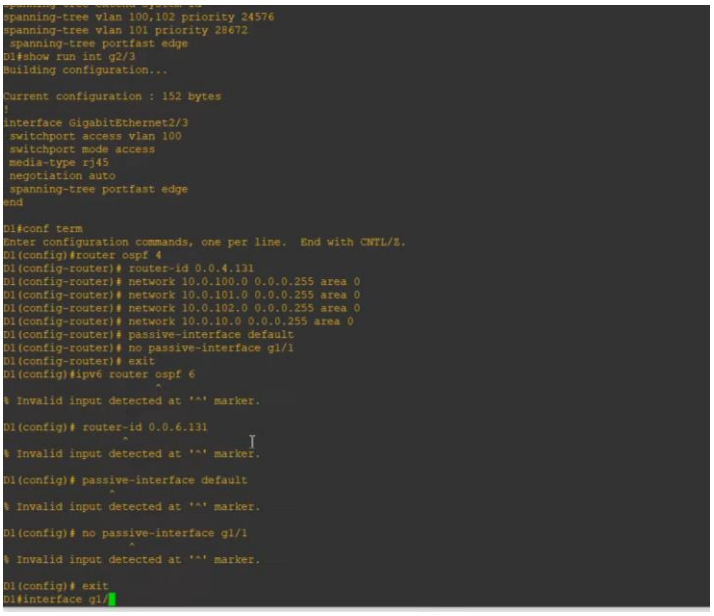
interface vlan 101

ipv6 ospf 6 area 0

exit

interface vlan 102

Figura 16. Configuración Switch D1

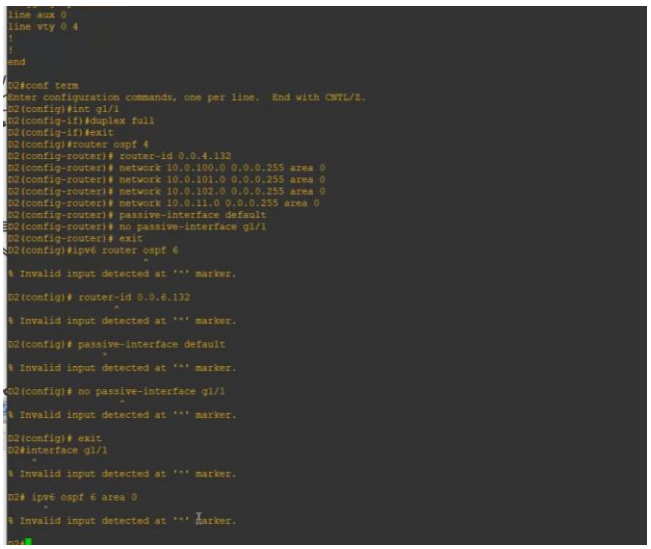


Fuente: Autor

Switch D2

```
router ospf 4
router-id 0.0.4.132
network 10.05.100.0.0.0.0.255 area 0
network 10.05.101.0.0.0.0.255 area 0
network 10.05.102.0.0.0.0.255 area 0
network 10.05.11.0.0.0.0.255 area 0
passive-interface default
no passive-interface e1/2
exit
ipv6 router ospf 6
router-id 0.0.6.132
passive-interface default
no passive-interface e1/2
exit
interface e1/2
ipv6 ospf 6 area 0
exit
interface vlan 100
ipv6 ospf 6 area 0
exit
interface vlan 101
ipv6 ospf 6 area 0
exit
interface vlan 102
ipv6 ospf 6 area 0
exit
end
```

Figura 17. Configuración Switch D2



Fuente: Autor

Tabla 4. Tareas de configuración Parte 3

Task#	Task	Specification	Points
4.1	On D1, create IP SLAs that test the reachability of R1 interface E1/2.	Create two IP SLAs. • Use SLA number **4** for IPv4. • Use SLA number **6** for IPv6. The IP SLAs will test availability of R1 E1/2 interface every 5 seconds. Schedule the SLA for immediate implementation with no end time. Create an IP SLA object for IP SLA 4 and one for IP SLA 6. • Use track number **4** for IP SLA 4. • Use track number **6** for IP SLA 6. The tracked objects should notify D1 if the IP SLA state changes from down to up after 10 seconds, or from up to down after 15 seconds.	2
4.2	On D2, create IP SLAs that test the reachability of R3 interface E1/0.	Create two IP SLAs. • Use SLA number **4** for IPv4. • Use SLA number **6** for IPv6. The IP SLAs will test availability of R3 E1/0 interface every 5 seconds. Schedule the SLA for immediate implementation with no end time. Create an IP SLA object for IP SLA 4 and one for IP SLA 6. • Use track number **4** for IP SLA 4. • Use track number **6** for IP SLA 6. The tracked objects should notify D1 if the IP SLA state changes from down to up after 10 seconds, or from up to down after 15 seconds.	2
4.3	On D1, configure HSRPv2.	D1 is the primary router for VLANs 100 and 102; therefore, their priority will also be changed to 150. Configure HSRP version 2. Configure IPv4 HSRP group **104** for VLAN 100: • Assign the virtual IP address **10.05.100.254**. • Set the group priority to **150**. • Enable preemption. • Track object 4 and decrement by 60. Configure IPv4 HSRP group **114** for VLAN 101: • Assign the virtual IP address **10.05.101.254**. • Enable preemption. • Track object 4 to decrement by 60. Configure IPv4 HSRP group **124** for VLAN 102: • Assign the virtual IP address **10.05.102.254**. • Set the group priority to **150**.	8

Task#	Task	Specification	Points
		• Enable preemption. • Track object 4 to decrement by 60. Configure IPv6 HSRP group **106** for VLAN 100: • Assign the virtual IP address using **ipv6 autoconfig**. • Set the group priority to **150**. • Enable preemption. • Track object 6 and decrement by 60. Configure IPv6 HSRP group **116** for VLAN 101: • Assign the virtual IP address using **ipv6 autoconfig**. • Enable preemption. • Track object 6 and decrement by 60. Configure IPv6 HSRP group **126** for VLAN 102: • Assign the virtual IP address using **ipv6 autoconfig**. • Set the group priority to **150**. • Enable preemption. • Track object 6 and decrement by 60.	
	On D2, configure HSRPv2.	D2 is the primary router for VLAN 101; therefore, the priority will also be changed to 150. Configure HSRP version 2. Configure IPv4 HSRP group **104** for VLAN 100: • Assign the virtual IP address **10.05.100.254**. • Enable preemption. • Track object 4 and decrement by 60. Configure IPv4 HSRP group **114** for VLAN 101: • Assign the virtual IP address **10.05.101.254**. • Set the group priority to **150**. • Enable preemption. • Track object 4 to decrement by 60. Configure IPv4 HSRP group **124** for VLAN 102: • Assign the virtual IP address **10.05.102.254**. • Enable preemption. • Track object 4 to decrement by 60. Configure IPv6 HSRP group **106** for VLAN 100: • Assign the virtual IP address using **ipv6 autoconfig**. • Enable preemption. • Track object 6 and decrement by 60. Configure IPv6 HSRP group **116** for VLAN 101: • Assign the virtual IP address using **ipv6 autoconfig**. • Set the group priority to **150**. • Enable preemption. • Track object 6 and decrement by 60. Configure IPv6 HSRP group **126** for VLAN 102:	

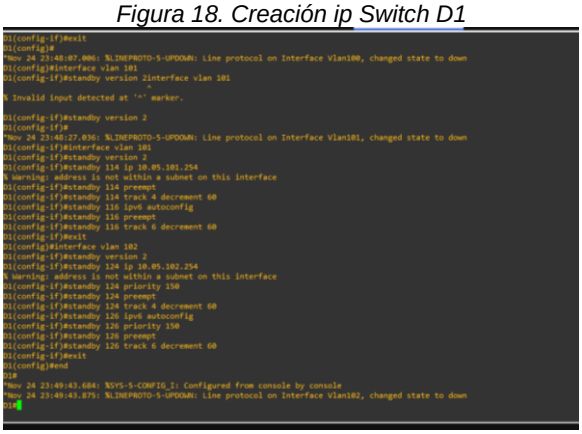
Task#	Task	Specification	Points
		• Assign the virtual IP address using **ipv6 autoconfig**. • Enable preemption. • Track object 6 and decrement by 60.	

Switch d1

```
ip sla 4
icmp-echo 10.0.10.1
frequency 5
exit
ip sla 6
icmp-echo 2001:db8:100:1010::1
frequency 5
exit
ip sla schedule 4 life forever start:time now
ip sla schedule 6 life forever start:time now
track 4 ip sla 4
delay down 10 up 15
exit
track 6 ip sla 6
delay down 10 up 15
exit
interface vlan 100
standby version 2
standby 104 ip 10.05.100.254
standby 104 priority 150
standby 104 preempt
standby 104 track 4 decrement 60
standby 106 ipv6 autoconfig
standby 106 priority 150
standby 106 preempt
standby 106 track 6 decrement 60
exit
interface vlan 101
standby version 2
standby 114 ip 10.05.101.254
standby 114 preempt
standby 114 track 4 decrement 60
standby 116 ipv6 autoconfig
standby 116 preempt
standby 116 track 6 decrement 60
exit
interface vlan 102
standby version 2
standby 124 ip 10.05.102.254
standby 124 priority 150
standby 124 preempt
standby 124 track 4 decrement 60
```

standby 126 ipv6 autoconfig
standby 126 priority 150
standby 126 preempt
standby 126 track 6 decrement 60
exit
end

Figura 18. Creación ip Switch D1



Fuente: Autor

Switch D2

ip sla 4
icmp-echo 10.05.11.1
frequency 5
exit
ip sla 6
icmp-echo 2001:db8:100:100:1011::1
frequency 5
exit
ip sla schedule 4 life forever start-time now
ip sla schedule 6 life forever start-time now
track 4 ip sla 4
delay down 10 up 15
exit
track 6 ip sla 6
delay down 10 up 15
exit
interface vlan 100
standby version 2
standby 104 ip 10.05.100.254
standby 104 preempt

standby 104 track 4 decrement 60
standby 106 ipv6 autoconfig
standby 106 preempt
standby 106 track 6 decrement 60
exit
interface vlan 101
standby version 2
standby 114 ip 10.05.101.254
standby 114 priority 150
standby 114 preempt
standby 114 track 4 decrement 60
standby 116 ipv6 autoconfig
standby 116 priority 150
standby 116 preempt
standby 116 track 6 decrement 60
exit
interface vlan 102
standby version 2
standby 124 ip 10.05.102.254
standby 124 preempt
standby 124 track 4 decrement 60
standby 126 ipv6 autoconfig
standby 126 preempt
standby 126 track 6 decrement 60
exit
end

Figura 19. Creación ip Switch D2

Fuente: Auto

CONCLUSIONES

Con el presente trabajo se comprende la manera en cómo se configuran los dispositivos de red para que funcionen de forma correcta ya que es necesario el conocimiento y manejo de habilidades para poder configurar y brindar solución, a todo lo relacionado con el manejo de redes de datos.

Al realizar los 2 escenarios propuestos ponemos en practica todas las habilidades y destrezas aprendidas en los capítulos de cisco para poder configurar y brindar una solución a lo propuesto.

Para finalizar, se aprende y entiende que las redes son algo muy importante en la actualidad, pues permiten el contacto en todo el mundo ya que de ellas depende la comunicación dentro de empresas, casas, etc., por tanto, es de gran relevancia que se conozca su complejidad y desarrollo

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