

DIPLOMADO DE PROFUNDIZACIÓN CISCO
PRUEBA DE HABILIDADES PRÁCTICAS CCNP

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA –UNAD
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INGENIERÍA DE TELECOMUNICACIONES
COLOMBIA
2022

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Diplomado de opción de grado presentado para optar el título de INGENIERÍA DE
TELECOMUNICACIONES

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COLOMBIA
2022

Nota de Aceptación

Presidente del Jurado

Jurado

Jurado

Medellín, 27 de noviembre de 2022

CONTENIDO

	Pág.
CONTENIDO	4
LISTA DE TABLAS	5
LISTA DE FIGURAS	6
GLOSARIO	7
RESUMEN	8
ABSTRACT	9
1. INTRODUCCIÓN	10
2. DESARROLLO DEL PROYECTO	11
2.1. Escenario 1	11
2.1.1. Part 1: Build the Network and Configure Basic Device Settings and Interface Addressing.....	13
2.1.2. Part 2: Configure the Layer 2 Network and Host Support	23
2.1.3. Part 3: Configure Routing Protocols.....	31
2.1.4. Part 4: Configure First Hop Redundancy	51
CONCLUSIONES	60
BIBLIOGRAFÍA	61

LISTA DE TABLAS

Tabla 1. Tabla de direcciones	11
Tabla 2. Actividades de la parte 2.....	23
Tabla 3. Actividades de la parte 3.....	32
Tabla 4. Actividades de la parte 4.....	51

LISTA DE FIGURAS

	Pág.
Figura 1. Topología del escenario 1.....	11
Figura 2. Diagrama de topología del escenario 1 en GNS3.....	14
Figura 3. Prueba de conectividad en PC1.....	28
Figura 4. Prueba de conectividad en PC2 y direccionamiento DHCP.....	29
Figura 5. Prueba de conectividad en PC3 y direccionamiento DHCP.....	30
Figura 6. Prueba de conectividad en PC4.....	31
Figura 7. Validación de configuración OSPF en R1.....	38
Figura 8. Validación de configuración OSPF en R3.....	39
Figura 9. Validación de configuración OSPF en D1.....	40
Figura 10. Validación de configuración OSPF en D2.....	41
Figura 11. Validación de configuración OSPF IPv6 en R1.....	42
Figura 12. Validación de configuración OSPF IPv6 en R3.....	43
Figura 13. Validación de configuración OSPF IPv6 en D1.....	44
Figura 14. Validación de configuración OSPF IPv6 en D2.....	45
Figura 15. Validación de configuración BGP y rutas estáticas en R2.....	46
Figura 16. Validación de configuración BGP en R1.....	47
Figura 17. Validación de rutas ip BGP y OSPF en R1.....	48
Figura 18. Validación de rutas IPv6 en R1.....	49
Figura 19. Validación de rutas IPv4 OSPF comenzando en Gateway en R3.....	50
Figura 20. Validación de rutas IPv6 OSPF en R3.....	51
Figura 21. Validación de la configuración IP SLA en D1.....	57
Figura 22. Validación del standby en D1.....	58
Figura 23. Validación de la configuración IP SLA en D2.....	59

GLOSARIO

BGP: es un protocolo mediante el cual se intercambia información de encaminamiento entre sistemas autónomos. Por ejemplo, los proveedores de servicio registrados en Internet suelen componerse de varios sistemas autónomos y para este caso es necesario un protocolo como BGP.

DHCP: es un servidor de Red el cual permite una asignación automática de direcciones IP, gateway predeterminadas, así como otros parámetros de red que necesiten los clientes. El sistema DHCP envía automáticamente todos los parámetros para que los clientes se comuniquen sin problema dentro de la red.

ETHERCHANNEL: es una tecnología de Cisco construida de acuerdo con los estándares 802.3 full-dúplex Fast Ethernet. Permite la agrupación lógica de varios enlaces físicos Ethernet, esta agrupación es tratada como un único enlace y permite sumar la velocidad nominal de cada puerto físico Ethernet usado y así obtener un enlace troncal de alta velocidad.

HSRP: es un protocolo propiedad de CISCO que permite el despliegue de enrutadores redundantes tolerantes de fallos en una red. Este protocolo evita la existencia de puntos de fallo únicos (single point of failure) en la red mediante técnicas de redundancia y comprobación del estado de los routers.

NETWORK: es una red física y lógica que contribuye a lograr estas interconexiones. La misma implica el trabajo conjunto de un número variable de servidores, acumulando con los mismos una capacidad de cómputo significativa.

SLAAC: es un método en el cual un dispositivo puede obtener una dirección IPv6 de unidifusión global sin los servicios de un servidor de DHCPv6. ICMPv6 se encuentra en el centro de SLAAC. ICMPv6 es similar a ICMPv4, pero incluye funcionalidad adicional y es un protocolo mucho más sólido.

SPANNING TREE: es un protocolo de red de capa 2 del modelo OSI. Su función es la de gestionar la presencia de bucles en topologías de red debido a la existencia de enlaces redundantes.

VLAN: es un método para crear redes lógicas independientes dentro de una misma red física. Varias VLAN pueden coexistir en un único conmutador físico o en una única red física.

RESUMEN

En esta prueba de habilidades, se realiza la configuración completa de la red permitiendo que haya una accesibilidad completa de un extremo a otro, para que los hosts tengan un soporte confiable de la puerta de enlace predeterminada y para que los protocolos OSPF y BGP configurados estén operativos dentro de la parte correspondiente a la “Red de la Compañía” en la topología. Estos cambios en las configuraciones son verificados de acuerdo a las especificaciones dadas, cumpliendo cada uno de los detalles y asegurando que los dispositivos funcionen como es requerido.

PALABRAS CLAVE: CISCO, Conmutación, Enrutamiento, Redes, Sistemas.

ABSTRACT

In this skills test, the complete network configuration is performed allowing for complete end-to-end accessibility, for hosts to have reliable support of the default gateway, and for configured OSPF and BGP protocols to be operating within the part corresponding to the "Company Network" in the topology. These changes in the configurations are verified according to the given specifications, fulfilling each one of the details and ensuring that the devices work as required.

KEY WORDS: CISCO, Switching, Routing, Networks, Systems

1. INTRODUCCIÓN

De acuerdo a los desarrollos que deben presentarse al momento de realizar una topología de red, se implementa primeramente la configuración de los dispositivos que conforman esta topología que van desde el cambio en el nombre de host, la desactivación de la búsqueda de dominio, la habilitación del direccionamiento ipv6 unicast y la aplicación de mensaje de bienvenida y verificaciones en la línea de consola. Seguido a esto, se realiza la configuración de las interfaces que conforman el direccionamiento, así como la vinculación de interfaces Loopback, aplicación de DHCP y demás configuraciones que dejan lista la topología para realizar las respectivas verificaciones y aseguran la interconexión entre las redes de la compañía.

Luego, se realiza la configuración de la capa 2 de la red y el soporte de Host, habilitando los enlaces trunk 802.1Q entre los switches de capa 3 y el switch de capa 2. Enlazando la troncal a la vlan nativa 999, habilitando el protocolo Rapid Spanning-Tree (RSTP), se configuran los puentes raíz RSTP root bridges según la información suministrada del diagrama de topología, complementado por la adición de un respaldo en caso de el puente raíz falle.

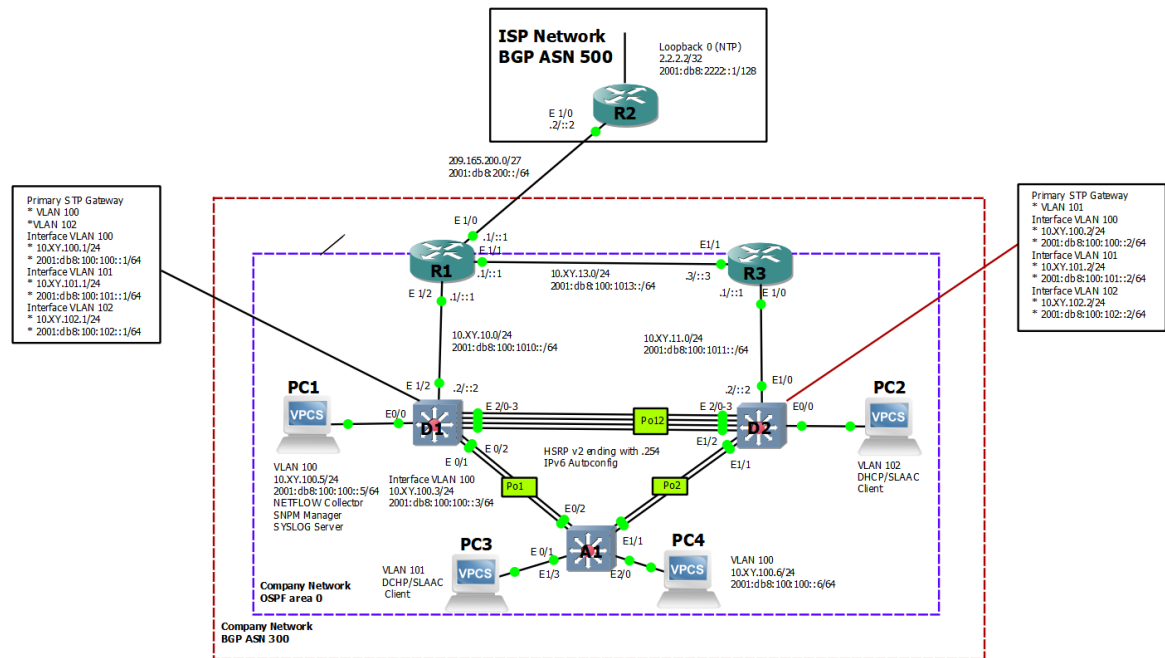
Finalmente se realiza la configuración de los protocolos de enrutamiento en los dispositivos para que la red esté completamente convergente. Para ello se realiza la configuración OSPF tanto para el direccionamiento IPv4 como para el IPv6, se configura MP-BGP en el router R2 y R1.

2. DESARROLLO DEL PROYECTO

2.1. Escenario 1

Topology

Figura 1. Topología del escenario 1



Fuente: Autor del documento.

Addressing Table

Tabla 1. Tabla de direcciones

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	10.79.10.1/24	2001:db8:100:1010::1/64	fe80::1:2

Device	Interface	IPv4 Address	IPv6 Address	IPv6 Link-Local
	E1/1	10.79.13.1/24	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
	Loopback 0	2.2.2.2/32	2001:db8:2222::1/128	fe80::2:3
R3	E1/0	10.79.11.1/24	2001:db8:100:1011::1/64	fe80::3:2
	E1/1	10.79.13.3/24	2001:db8:100:1013::3/64	fe80::3:3
D1	E1/2	10.79.10.2/24	2001:db8:100:1010::2/64	fe80::d1:1
	VLAN 100	10.79.100.1/24	2001:db8:100:100::1/64	fe80::d1:2
	VLAN 101	10.79.101.1/24	2001:db8:100:101::1/64	fe80::d1:3
	VLAN 102	10.79.102.1/24	2001:db8:100:102::1/64	fe80::d1:4
D2	E1/0	10.79.11.2/24	2001:db8:100:1011::2/64	fe80::d2:1
	VLAN 100	10.79.100.2/24	2001:db8:100:100::2/64	fe80::d2:2
	VLAN 101	10.79.101.2/24	2001:db8:100:101::2/64	fe80::d2:3
	VLAN 102	10.79.102.2/24	2001:db8:100:102::2/64	fe80::d2:4
A1	VLAN 100	10.79.100.3/23	2001:db8:100:100::3/64	fe80::a1:1
PC1	NIC	10.79.100.5/24	2001:db8:100:100::5/64	EUI-64
PC2	NIC	DHCP	SLAAC	EUI-64
PC3	NIC	DHCP	SLAAC	EUI-64
PC4	NIC	10.79.100.6/24	2001:db8:100:100::6/64	EUI-64

Fuente: Autor del documento.

Objectives

Part 1: Build the Network and Configure Basic Device Settings and Interface Addressing

Part 2: Configure the Layer 2 Network and Host Support

Part 3: Configure Routing Protocols

Part 4: Configure First-Hop Redundancy

Background / Scenario

In this skills assessment, you are responsible for completing the configuration of the network so there is full end-to-end reachability, so the hosts have reliable default gateway support, and so that management protocols are operational within the “Company Network” part of the topology. Be careful to verify that your configurations meet the provided specifications and that the devices perform as required.

Note: The routers used with CCNP hands-on labs are Cisco 7200 routers. The switches used in the labs are Cisco Catalyst L2 switches. Other routers, switches, and Cisco IOS versions can be used. Depending on the model and Cisco IOS version, the commands available and the output produced might vary from what is shown in the labs.

Note: Make sure that the switches have been erased and have no startup configurations. If you are unsure, contact your instructor.

Note: The letters "X, Y" represent the last two digits of your ID number (cédula).

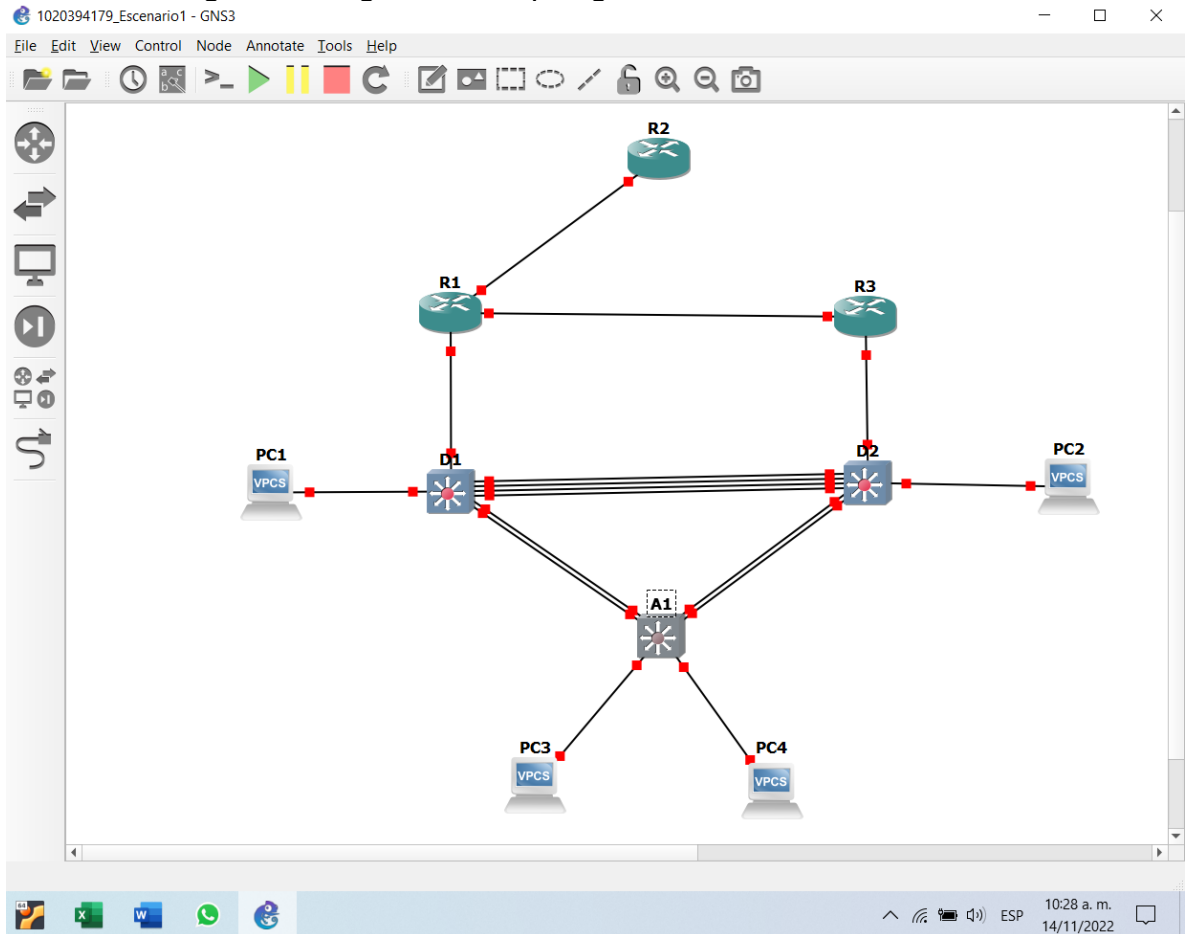
2.1.1. Part 1: Build the Network and Configure Basic Device Settings and Interface Addressing

In Part 1, you will set up the network topology and configure basic settings and interface addressing.

Step 1. Cable the network as shown in the topology.

Attach the devices as shown in the topology diagram, and cable as necessary.

Figura 2. Diagrama de topología del escenario 1 en GNS3.



Fuente: Autor del documento.

Step 2. Configure basic settings for each device.

- a. Console into each device, enter global configuration mode, and apply the basic settings. The startup configurations for each device are provided below.

Router R1

```
R1(config)#hostname R1 //Se configura el nombre del dispositivo
R1(config)#ipv6 unicast-routing //Se habilita el enrutamiento de direcciones IPv6
R1(config)#no ip domain lookup //Se desactiva la búsqueda DNS
R1(config)#banner motd # R1, ENCOR Skills Assessment# //Se configura un banner
R1(config)#line con 0
```

```

R1(config-line)# exec-timeout 0 0 //Se configura el tiempo de salida
exec
R1(config-line)# logging synchronous //Se habilita el inicio de sesión
sincrónico
R1(config-line)# exit
R1(config)#interface e1/0 //Se accede a la interfaz
R1(config-if)# ip address 209.165.200.225 255.255.255.224 //Se configura el
direccionamiento IPv4
R1(config-if)# ipv6 address fe80::1:1 link-local //Se configura el direccionamiento
para el enlace local
R1(config-if)# ipv6 address 2001:db8:200::1/64 //Se configura el direccionamiento
IPv6
R1(config-if)# no shutdown //Se enciende la interfaz
R1(config-if)# exit
R1(config)#interface e1/2 //Se accede a la interfaz
R1(config-if)# ip address 10.79.10.1 255.255.255.0 //Se configura el
direccionamiento IPv4
R1(config-if)# ipv6 address fe80::1:2 link-local //Se configura el direccionamiento
para el enlace local
R1(config-if)# ipv6 address 2001:db8:100:1010::1/64 //Se configura el
direccionamiento IPv6
R1(config-if)# no shutdown //Se enciende la interfaz
R1(config-if)# exit
R1(config)#interface e1/1 //Se accede a la interfaz
R1(config-if)# ip address 10.79.13.1 255.255.255.0 //Se configura el
direccionamiento IPv4
R1(config-if)# ipv6 address fe80::1:3 link-local //Se configura el direccionamiento
para el enlace local
R1(config-if)# ipv6 address 2001:db8:100:1013::1/64 //Se configura el
direccionamiento IPv6
R1(config-if)# no shutdown //Se enciende la interfaz
R1(config-if)# exit
R1(config)#

```

Router R2

```

R2(config)#hostname R2 //Se configura el nombre del
dispositivo
R2(config)#ipv6 unicast-routing //Se habilita el enrutamiento de
direcciones IPv6
R2(config)#no ip domain lookup //Se desactiva la búsqueda DNS
R2(config)#banner motd # R2, ENCOR Skills Assessment# //Se configura un
banner
R2(config)#line con 0

```

```

R2(config-line)# exec-timeout 0 0 //Se configura el tiempo de salida
exec
R2(config-line)# logging synchronous //Se habilita el inicio de sesión
sincrónico
R2(config-line)# exit
R2(config)#interface e1/0 //Se accede a la interfaz
R2(config-if)# ip address 209.165.200.226 255.255.255.224 //Se configura el
direccionamiento IPv4
R2(config-if)# ipv6 address fe80::2:1 link-local //Se configura el direccionamiento
para el enlace local
R2(config-if)# ipv6 address 2001:db8:200::2/64 //Se configura el direccionamiento
IPv6
R2(config-if)# no shutdown //Se enciende la interfaz
R2(config-if)# exit
R2(config)#interface Loopback 0 //Se accede a la interfaz
R2(config-if)# ip address 2.2.2.2 255.255.255.255 //Se configura el
direccionamiento IPv4
R2(config-if)# ipv6 address fe80::2:3 link-local //Se configura el direccionamiento
para el enlace local
R2(config-if)# ipv6 address 2001:db8:2222::1/128 //Se configura el
direccionamiento IPv6
R2(config-if)# no shutdown //Se enciende la interfaz
R2(config-if)# exit
R2(config)#

```

Router R3

```

R3(config)#hostname R3 //Se configura el nombre del
dispositivo
R3(config)#ipv6 unicast-routing //Se habilita el enrutamiento de
direcciones IPv6
R3(config)#no ip domain lookup //Se desactiva la búsqueda DNS
R3(config)#banner motd # R3, ENCOR Skills Assessment# //Se configura un
banner
R3(config)#line con 0
R3(config-line)# exec-timeout 0 0 //Se configura el tiempo de salida
exec
R3(config-line)# logging synchronous //Se habilita el inicio de sesión
sincrónico
R3(config-line)# exit
R3(config)#interface e1/0 //Se accede a la interfaz
R3(config-if)# ip address 10.79.11.1 255.255.255.0 //Se configura el
direccionamiento IPv4
R3(config-if)# ipv6 address fe80::3:2 link-local //Se configura el direccionamiento
para el enlace local

```



```

R3(config-if)# ipv6 address 2001:db8:100:1011::1/64 //Se configura el
direccionamiento IPv6
R3(config-if)# no shutdown //Se enciende la interfaz
R3(config-if)# exit
R3(config)#interface e1/1 //Se accede a la interfaz
R3(config-if)# ip address 10.79.13.3 255.255.255.0 //Se configura el
direccionamiento IPv4
R3(config-if)# ipv6 address fe80::3:3 link-local //Se configura el direccionamiento
para el enlace local
R3(config-if)# ipv6 address 2001:db8:100:1010::2/64 //Se configura el
direccionamiento IPv6
R3(config-if)# no shutdown //Se enciende la interfaz
R3(config-if)# exit
R3(config)#

```

Switch D1

```

D1(config)#hostname D1 //Se configura el nombre del
dispositivo
D1(config)#ip routing //Se configura el enrutamiento de
direcciones IPv4
D1(config)#ipv6 unicast-routing //Se habilita el enrutamiento de
direcciones IPv6
D1(config)#no ip domain lookup //Se desactiva la búsqueda DNS
D1(config)#banner motd # D1, ENCOR Skills Assessment# //Se configura un
banner
D1(config)#line con 0
D1(config-line)# exec-timeout 0 0 //Se configura el tiempo de salida
exec
D1(config-line)# logging synchronous //Se habilita el inicio de sesión
sincrónico
D1(config-line)# exit
D1(config)#vlan 100 //Se configura la vlan
D1(config-vlan)# name Management //Se asigna un nombre de vlan
D1(config-vlan)# exit
D1(config)#vlan 101 //Se configura la vlan
D1(config-vlan)# name UserGroupA //Se asigna un nombre de vlan
D1(config-vlan)# exit
D1(config)#vlan 102 //Se configura la vlan
D1(config-vlan)# name UserGroupB //Se asigna un nombre de vlan
D1(config-vlan)# exit
D1(config)#vlan 999 //Se configura la vlan
D1(config-vlan)# name NATIVE //Se asigna un nombre de vlan
D1(config-vlan)# exit
D1(config)#interface e1/2 //Se accede a la interfaz

```

```

D1(config-if)# no switchport //Se desactiva el switchport
D1(config-if)# ip address 10.79.10.2 255.255.255.0 //Se configura el
direccionamiento IPv4
D1(config-if)# ipv6 address fe80::d1:1 link-local //Se configura el
direccionamiento para el enlace local
D1(config-if)# ipv6 address 2001:db8:100:1010::2/64 //Se configura el
direccionamiento IPv6
D1(config-if)# no shutdown //Se enciende la interfaz
D1(config-if)# exit
D1(config)#interface vlan 100 //Se accede a la interfaz
D1(config-if)# ip address 10.79.100.1 255.255.255.0 //Se configura el
direccionamiento IPv4
D1(config-if)# ipv6 address fe80::d1:2 link-local //Se configura el
direccionamiento para el enlace local
D1(config-if)# ipv6 address 2001:db8:100:100::1/64 //Se configura el
direccionamiento IPv6
D1(config-if)# no shutdown //Se enciende la interfaz
D1(config-if)# exit
D1(config)#interface vlan 101 //Se accede a la interfaz
D1(config-if)# ip address 10.79.101.1 255.255.255.0 //Se configura el
direccionamiento IPv4
D1(config-if)# ipv6 address fe80::d1:3 link-local //Se configura el
direccionamiento para el enlace local
D1(config-if)# ipv6 address 2001:db8:100:101::1/64 //Se configura el
direccionamiento IPv6
D1(config-if)# no shutdown //Se enciende la interfaz
D1(config-if)# exit
D1(config)#interface vlan 102 //Se accede a la interfaz
D1(config-if)# ip address 10.79.102.1 255.255.255.0 //Se configura el
direccionamiento IPv4
D1(config-if)# ipv6 address fe80::d1:4 link-local //Se configura el
direccionamiento para el enlace local
D1(config-if)# ipv6 address 2001:db8:100:102::1/64 //Se configura el
direccionamiento IPv6
D1(config-if)# no shutdown //Se enciende la interfaz
D1(config-if)# exit
D1(config)#ip dhcp excluded-address 10.79.101.1 10.79.101.109 //Se excluyen
las direcciones para el servidor DHCP
D1(config)#ip dhcp excluded-address 10.79.101.141 10.79.101.254//Se excluyen
las direcciones para el servidor DHCP
D1(config)#ip dhcp excluded-address 10.79.102.1 10.79.102.109 //Se excluyen
las direcciones para el servidor DHCP
D1(config)#ip dhcp excluded-address 10.79.102.141 10.79.102.254//Se excluyen
las direcciones para el servidor DHCP
D1(config)#ip dhcp pool VLAN-101 //Se configura un pool DHCP

```

```

D1(dhcp-config)# network 10.79.101.0 255.255.255.0 //Se define la red del pool de
direcciones DHCP
D1(dhcp-config)# default-router 10.79.101.254 //Se configura la puerta
predeterminada de enlace para el pool de direcciones DHCP
D1(dhcp-config)# exit
D1(config)#ip dhcp pool VLAN-102 //Se configura un pool DHCP
D1(dhcp-config)# network 10.79.102.0 255.255.255.0 //Se define la red del pool de
direcciones DHCP
D1(dhcp-config)# default-router 10.79.102.254 //Se configura la puerta
predeterminada de enlace para el pool de direcciones DHCP
D1(dhcp-config)# exit
D1(config)#interface range e0/0-3,e1/0-1,e1/3,e2/0-3,e3/0-3 //Se accede a un
rango de direcciones
D1(config-if-range)# shutdown //Se apagan las interfaces
D1(config-if-range)# exit
D1(config)#

```

Switch D2

```

D2(config)#hostname D2 //Se configura el nombre del
dispositivo
D2(config)#ip routing //Se configura el enrutamiento de
direcciones IPv4
D2(config)#ipv6 unicast-routing //Se habilita el enrutamiento de
direcciones IPv6
D2(config)#no ip domain lookup //Se desactiva la búsqueda DNS
D2(config)#banner motd # D2, ENCOR Skills Assessment# //Se configura un
banner
D2(config)#line con 0
D2(config-line)# exec-timeout 0 0 //Se configura el tiempo de salida
exec
D2(config-line)# logging synchronous //Se habilita el inicio de sesión
sincrónico
D2(config-line)# exit
D2(config)#vlan 100 //Se configura la vlan
D2(config-vlan)# name Management //Se asigna un nombre de vlan
D2(config-vlan)# exit
D2(config)#vlan 101 //Se configura la vlan
D2(config-vlan)# name UserGroupA //Se asigna un nombre de vlan
D2(config-vlan)# exit
D2(config)#vlan 102 //Se configura la vlan
D2(config-vlan)# name UserGroupB //Se asigna un nombre de vlan
D2(config-vlan)# exit
D2(config)#vlan 999 //Se configura la vlan
D2(config-vlan)# name NATIVE //Se asigna un nombre de vlan

```

```

D2(config-vlan)# exit
D2(config)#interface e1/0 //Se accede a la interfaz
D2(config-if)# no switchport //Se desactiva el switchport
D2(config-if)# ip address 10.79.11.2 255.255.255.0 //Se configura el
direccionamiento IPv4
D2(config-if)# ipv6 address fe80::d1:1 link-local //Se configura el direccionamiento
para el enlace local
D2(config-if)# ipv6 address 2001:db8:100:1011::2/64 //Se configura el
direccionamiento IPv6
D2(config-if)# no shutdown //Se enciende la interfaz
D2(config-if)# exit
D2(config)#interface vlan 100 //Se accede a la interfaz
D2(config-if)# ip address 10.79.100.2 255.255.255.0 //Se configura el
direccionamiento IPv4
D2(config-if)# ipv6 address fe80::d2:2 link-local //Se configura el direccionamiento
para el enlace local
D2(config-if)# ipv6 address 2001:db8:100:100::2/64 //Se configura el
direccionamiento IPv6
D2(config-if)# no shutdown //Se enciende la interfaz
D2(config-if)# exit
D2(config)#interface vlan 101 //Se accede a la interfaz
D2(config-if)# ip address 10.79.101.2 255.255.255.0 //Se configura el
direccionamiento IPv4
D2(config-if)# ipv6 address fe80::d2:3 link-local //Se configura el direccionamiento
para el enlace local
D2(config-if)# ipv6 address 2001:db8:100:101::2/64 //Se configura el
direccionamiento IPv6
D2(config-if)# no shutdown //Se enciende la interfaz
D2(config-if)# exit
D2(config)#interface vlan 102 //Se accede a la interfaz
D2(config-if)# ip address 10.79.102.2 255.255.255.0 //Se configura el
direccionamiento IPv4
D2(config-if)# ipv6 address fe80::d2:4 link-local //Se configura el direccionamiento
para el enlace local
D2(config-if)# ipv6 address 2001:db8:100:102::2/64 //Se configura el
direccionamiento IPv6
D2(config-if)# no shutdown //Se enciende la interfaz
D2(config-if)# exit
D2(config)#ip dhcp excluded-address 10.79.101.1 10.79.101.209 //Se excluyen
las direcciones para el servidor DHCP
D2(config)#ip dhcp excluded-address 10.79.101.241 10.79.101.254 //Se excluyen
las direcciones para el servidor DHCP
D2(config)#ip dhcp excluded-address 10.79.102.1 10.79.102.209 //Se excluyen
las direcciones para el servidor DHCP

```

```

D2(config)#ip dhcp excluded-address 10.79.102.241 10.79.102.254//Se excluyen
las direcciones para el servidor DHCP
D2(config)#ip dhcp pool VLAN-101 //Se configura un pool DHCP
D2(dhcp-config)# network 10.79.101.0 255.255.255.0 //Se define la red del pool de
direcciones DHCP
D2(dhcp-config)# default-router 79.0.101.254 //Se configura la puerta
predeterminada de enlace para el pool de direcciones DHCP
D2(dhcp-config)# exit
D2(config)#ip dhcp pool VLAN-102 //Se configura un pool DHCP
D2(dhcp-config)# network 10.79.102.0 255.255.255.0 //Se define la red del pool de
direcciones DHCP
D2(dhcp-config)# default-router 10.79.102.254 //Se configura la puerta
predeterminada de enlace para el pool de direcciones DHCP
D2(dhcp-config)# exit
D2(config)#interface range e0/0-3,e1/1-3,e2/0-3,e3/0-3 //Se accede a un
rango de direcciones
D2(config-if-range)# shutdown //Se apagan las interfaces
D2(config-if-range)# exit
D2(config)#

```

Switch A1

```

A1(config)#hostname A1 //Se configura el nombre del
dispositivo
A1(config)#no ip domain lookup //Se desactiva la búsqueda DNS
A1(config)#banner motd # A1, ENCOR Skills Assessment# //Se configura un
banner
A1(config)#line con 0
A1(config-line)# exec-timeout 0 0 //Se configura el tiempo de salida
exec
A1(config-line)# logging synchronous //Se habilita el inicio de sesión
sincrónico
A1(config-line)# exit
A1(config)#vlan 100 //Se configura la vlan
A1(config-vlan)# name Management //Se asigna un nombre de vlan
A1(config-vlan)# exit
A1(config)#vlan 101 //Se configura la vlan
A1(config-vlan)# name UserGroupA //Se asigna un nombre de vlan
A1(config-vlan)# exit
A1(config)#vlan 102 //Se configura la vlan
A1(config-vlan)# name UserGroupB //Se asigna un nombre de vlan
A1(config-vlan)# exit
A1(config)#vlan 999 //Se configura la vlan
A1(config-vlan)# name NATIVE //Se asigna un nombre de vlan
A1(config-vlan)# exit

```

```

A1(config)#interface vlan 100 //Se accede a la interfaz
A1(config-if)# ip address 10.79.100.3 255.255.255.0 //Se configura el
direccionamiento IPv4
A1(config-if)# ipv6 address fe80::a1:1 link-local //Se configura el
direccionamiento para el enlace local
A1(config-if)# ipv6 address 2001:db8:100:100::3/64 //Se configura el
direccionamiento IPv6
A1(config-if)# no shutdown //Se enciende la interfaz
A1(config-if)# exit
A1(config)#interface range e0/0,e0/3,e1/0,e2/1-3,e3/0-3 //Se accede a un
rango de interfaces
A1(config-if-range)# shutdown //Se apagan las interfaces
A1(config-if-range)# exit
A1(config)#

```

b. Save the running configuration to startup-config on all devices.

```

R1#copy running-config startup-config //Se guarda la configuracion del
dispositivo
R2#copy running-config startup-config //Se guarda la configuracion del
dispositivo
R3#copy running-config startup-config //Se guarda la configuracion del
dispositivo
D1#copy running-config startup-config //Se guarda la configuracion del
dispositivo
D2#copy running-config startup-config //Se guarda la configuracion del
dispositivo
A1#copy running-config startup-config //Se guarda la configuracion del
dispositivo

```

c. Configure PC 1 and PC 4 host addressing as shown in the addressing table.
Assign a default gateway address of 10.56.100.254 which will be the HSRP
virtual IP address used in Part 4.

Configuración en PC1

```

PC1> ip 10.79.100.5 255.255.255.0 10.79.100.254 //Se configura el
direccionamiento IPv4 del equipo

```

PC1> ip 2001:db8:100:100::5/64 eui-64 //Se configura el direccionamiento IPv6 del equipo

Configuración en PC4

PC4> ip 10.79.100.6 255.255.255.0 10.79.100.254 //Se configura el direccionamiento IPv4 del equipo

PC4> ip 2001:db8:100:100::6/64 eui-64 //Se configura el direccionamiento IPv6 del equipo

2.1.2. Part 2. Configure the Layer 2 Network and Host Support

In this part of the Skills Assessment, you will complete the Layer 2 network configuration and set up basic host support. At the end of this part, all the switches should be able to communicate. PC2 and PC3 should receive addressing from DHCP and SLAAC.

Your configuration tasks are as follows:

Tabla 2. Actividades de la parte 2.

Task#	Task	Specification
2.1	On all switches, configure IEEE 802.1Q trunk interfaces on interconnecting switch links	Enable 802.1Q trunk links between: <ul style="list-style-type: none"> • D1 and D2 • D1 and A1 • D2 and A1
2.2	On all switches, change the native VLAN on trunk links.	Use VLAN 999 as the native VLAN.
2.3	On all switches, enable the Rapid Spanning-Tree Protocol.	Use Rapid Spanning Tree.
2.4	On D1 and D2, configure the appropriate RSTP root bridges based on the information in the topology diagram.	Configure D1 and D2 as root for the appropriate VLANs with mutually supporting priorities in case of switch failure.

Task#	Task	Specification
	D1 and D2 must provide backup in case of root bridge failure.	
2.5	On all switches, create LACP EtherChannels as shown in the topology diagram.	Use the following channel numbers: <ul style="list-style-type: none"> • D1 to D2 – Port channel 12 • D1 to A1 – Port channel 1 • D2 to A1 – Port channel 2
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.
2.7	Verify IPv4 DHCP services.	PC2 and PC3 are DHCP clients and should be receiving valid IPv4 addresses.
2.8	Verify local LAN connectivity.	PC1 should successfully ping: <ul style="list-style-type: none"> • D1: 10.79.100.1 • D2: 10.79.100.2 • PC4: 10.79.100.6 PC2 should successfully ping: <ul style="list-style-type: none"> • D1: 10.79.102.1 • D2: 10.79.102.2 PC3 should successfully ping: <ul style="list-style-type: none"> • D1: 10.79.101.1 • D2: 10.79.101.2 PC4 should successfully ping: <ul style="list-style-type: none"> • D1: 10.79.100.1 • D2: 10.79.100.2 • PC1: 10.79.100.5

Fuente: Autor del documento.

Configuración en D1

```
D1(config)#interface range e2/0-3 //Se accede a las interfaces
D1(config-if-range)#switchport trunk encapsulation dot1q //Se habilita la
encapsulación para el enlace troncal
```



```

D1(config-if-range)# switchport mode trunk //Se configuran las interfaces como
enlaces troncales
D1(config-if-range)# switchport trunk native vlan 999 //Se configura la vlan como
nativa
D1(config-if-range)# channel-group 12 mode active //Se habilita el LACP de
grupo 12
D1(config-if-range)# no shutdown //Se enciende las interfaces
D1(config-if-range)# exit
D1(config)#interface range e0/1-2 //Se accede a las interfaces
D1(config-if-range)#switchport trunk encapsulation dot1q //Se habilita la
encapsulación para el enlace troncal
D1(config-if-range)# switchport mode trunk //Se configuran las interfaces como
enlaces troncales
D1(config-if-range)# switchport trunk native vlan 999 //Se configura la vlan como
nativa
D1(config-if-range)# channel-group 1 mode active //Se habilita el LACP de
grupo 1
D1(config-if-range)# no shutdown //Se enciende las interfaces
D1(config-if-range)# exit
D1(config)#spanning-tree mode rapid-pvst //Se habilita el modo rapid-pvst
D1(config)#spanning-tree vlan 100,102 root primary //Se configuran las vlans
como raices primarias de spanning-tree
D1(config)#spanning-tree vlan 101 root secondary //Se configuran las vlans
como raices secundarias de spanning-tree
D1(config)#interface e0/0 //Se configuran las vlans como
raices secundarias de spanning-tree
D1(config-if)# switchport mode access //Se configura en modo de acceso
D1(config-if)# switchport access vlan 100 //Se configura la vlan en el puerto de
acceso
D1(config-if)# spanning-tree portfast //Se configura la vlan en el puerto de
acceso
D1(config-if)# no shutdown //Se enciende las interfaces
D1(config-if)# exit
D1(config)#end

```

Configuración en D2

```

D2(config)#interface range e2/0-3 //Se accede a las interfaces
D2(config-if-range)#switchport trunk encapsulation dot1q //Se habilita la
encapsulación para el enlace troncal
D2(config-if-range)# switchport mode trunk //Se configuran las interfaces como
enlaces troncales
D2(config-if-range)# switchport trunk native vlan 999 //Se configura la vlan
como nativa

```

```

D2(config-if-range)# channel-group 12 mode active //Se habilita el LACP
de grupo 12
D2(config-if-range)# no shutdown //Se enciende la interface
D2(config-if-range)# exit
D2(config)#interface range e1/1-2 //Se accede a las interfaces
D2(config-if-range)#switchport trunk encapsulation dot1q //Se habilita la
encapsulación para el enlace troncal
D2(config-if-range)# switchport mode trunk

D2(config-if-range)# switchport trunk native vlan 999 //Se configura la vlan
como nativa
D2(config-if-range)# channel-group 2 mode active //Se habilita el LACP
de grupo 2
D2(config-if-range)# no shutdown //Se enciende las interfaces
D2(config-if-range)# exit
D2(config)#!
D2(config)#spanning-tree mode rapid-pvst //Se habilita el modo rapid-pvst
D2(config)#spanning-tree vlan 101 root primary //Se configuran las vlans
como raices primarias de spanning-tree
D2(config)#spanning-tree vlan 100,102 root secondary //Se configuran las
vlans como raices secundarias de spanning-tree
D2(config)#!
D2(config)#interface e0/0 //Se accede a las interfaces
D2(config-if)# switchport mode access
D2(config-if)# switchport access vlan 102 //Se configura la vlan en el puerto de
acceso
D2(config-if)# spanning-tree portfast //Se configura el spanning-tree en
modo portfast
D2(config-if)# no shutdown //Se enciende las interfaces
D2(config-if)# exit
D2(config)#end

```

Configuración en A1

```

A1#configure terminal
A1(config)#spanning-tree mode rapid-pvst //Se habilita el modo rapid-pvst
A1(config)#interface range e0/1-2 //Se accede a las interfaces
A1(config-if-range)#switchport trunk encapsulation dot1q //Se habilita la
encapsulación para el enlace troncal
A1(config-if-range)# switchport mode trunk //Se configuran las interfaces como
enlaces troncales
A1(config-if-range)# switchport trunk native vlan 999 //Se configura la vlan como
nativa
A1(config-if-range)# channel-group 1 mode active //Se habilita el LACP de
grupo 1

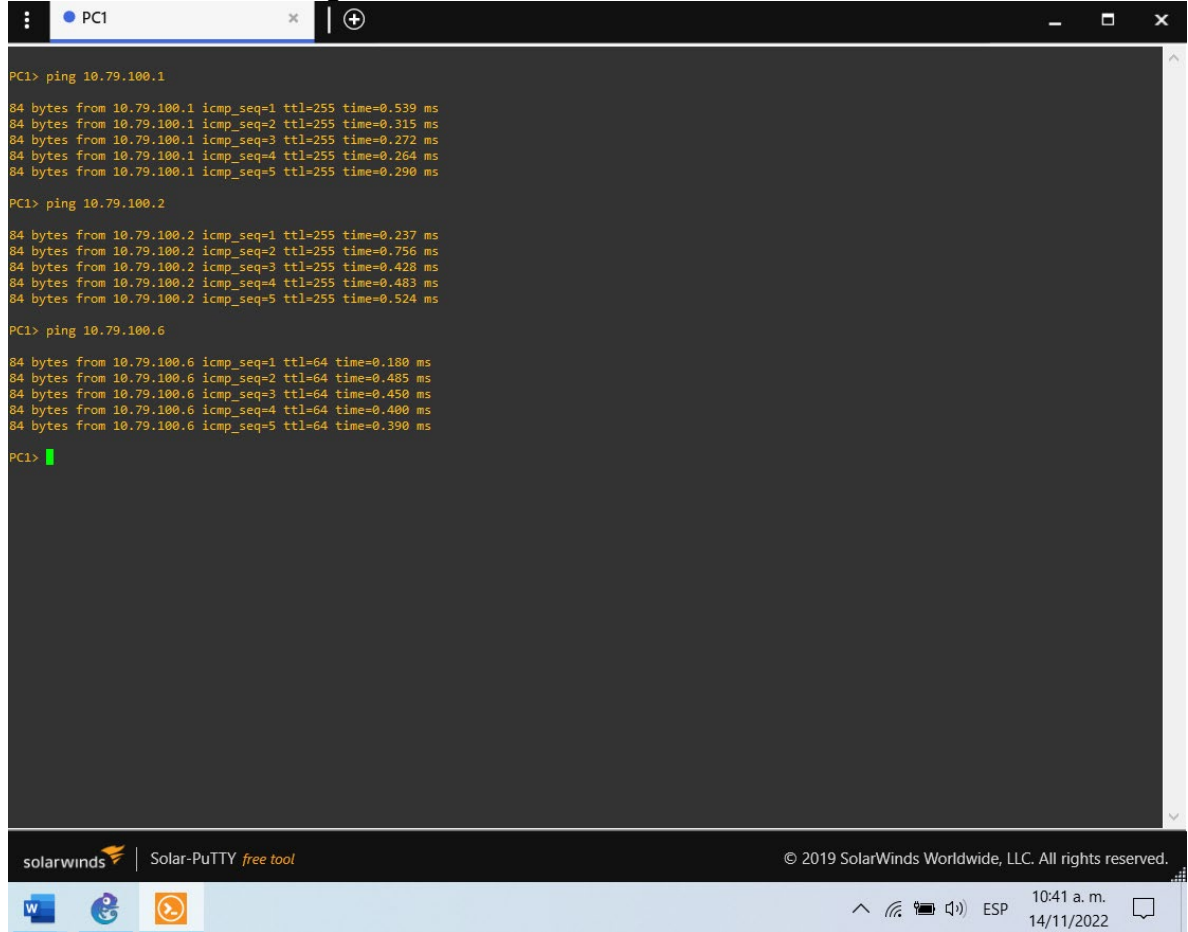
```

```

A1(config-if-range)# no shutdown //Se enciende las interfaces
A1(config-if-range)# exit
A1(config)#interface range e1/1-2 //Se accede a las interfaces
A1(config-if-range)#switchport trunk encapsulation dot1q //Se habilita la
encapsulación para el enlace troncal
A1(config-if-range)# switchport mode trunk //Se configuran las interfaces como
enlaces troncales
A1(config-if-range)# switchport trunk native vlan 999 //Se configura la vlan como
nativa
A1(config-if-range)# channel-group 2 mode active //Se habilita el LACP de
grupo 2
A1(config-if-range)# no shutdown //Se enciende las interfaces
A1(config-if-range)# exit
A1(config)#interface e1/3 //Se accede a las interfaces
A1(config-if)# switchport mode access //Se configura en modo de acceso
A1(config-if)# switchport access vlan 101 //Se configura la vlan en el puerto de
acceso
A1(config-if)# spanning-tree portfast //Se configura el spanning-tree en
modo portfast
A1(config-if)# no shutdown //Se enciende las interfaces
A1(config-if)# exit
A1(config)#interface e2/0 //Se accede a las interfaces
A1(config-if)# switchport mode access //Se configura en modo de acceso
A1(config-if)# switchport access vlan 100 //Se configura la vlan en el puerto de
acceso
A1(config-if)# spanning-tree portfast //Se configura el spanning-tree en
modo portfast
A1(config-if)# no shutdown //Se enciende las interfaces
A1(config-if)# exit
A1(config)#end

```

Figura 3. Prueba de conectividad en PC1.



```
PC1
```

```
PC1> ping 10.79.100.1
```

```
84 bytes from 10.79.100.1 icmp_seq=1 ttl=255 time=0.539 ms
```

```
84 bytes from 10.79.100.1 icmp_seq=2 ttl=255 time=0.315 ms
```

```
84 bytes from 10.79.100.1 icmp_seq=3 ttl=255 time=0.272 ms
```

```
84 bytes from 10.79.100.1 icmp_seq=4 ttl=255 time=0.264 ms
```

```
84 bytes from 10.79.100.1 icmp_seq=5 ttl=255 time=0.290 ms
```

```
PC1> ping 10.79.100.2
```

```
84 bytes from 10.79.100.2 icmp_seq=1 ttl=255 time=0.237 ms
```

```
84 bytes from 10.79.100.2 icmp_seq=2 ttl=255 time=0.756 ms
```

```
84 bytes from 10.79.100.2 icmp_seq=3 ttl=255 time=0.428 ms
```

```
84 bytes from 10.79.100.2 icmp_seq=4 ttl=255 time=0.483 ms
```

```
84 bytes from 10.79.100.2 icmp_seq=5 ttl=255 time=0.524 ms
```

```
PC1> ping 10.79.100.6
```

```
84 bytes from 10.79.100.6 icmp_seq=1 ttl=64 time=0.180 ms
```

```
84 bytes from 10.79.100.6 icmp_seq=2 ttl=64 time=0.485 ms
```

```
84 bytes from 10.79.100.6 icmp_seq=3 ttl=64 time=0.450 ms
```

```
84 bytes from 10.79.100.6 icmp_seq=4 ttl=64 time=0.400 ms
```

```
84 bytes from 10.79.100.6 icmp_seq=5 ttl=64 time=0.390 ms
```

```
PC1> █
```

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Windows taskbar: 10:41 a. m., 14/11/2022

Fuente: Autor.

Figura 4. Prueba de conectividad en PC2 y direccionamiento DHCP.

```
PC2> ip ?
ip ARG ... [OPTION]
Configure the current VPC's IP settings
ARG ...:
address [mask] [gateway]
address [gateway] [mask]
Set the VPC's ip, default gateway ip and network mask
Default IPv4 mask is /24, IPv6 is /64. Example:
ip 10.1.1.70/26 10.1.1.65 set the VPC's ip to 10.1.1.70,
the gateway to 10.1.1.65, the netmask to 255.255.255.192.
In tap mode, the ip of the tapx is the maximum host ID
of the subnet. In the example above the tapx ip would be
10.1.1.126
mask may be written as /26, 26 or 255.255.255.192
auto
Attempt to obtain IPv6 address, mask and gateway using SLAAC
dhcp [OPTION]
Attempt to obtain IPv4 address, mask, gateway, DNS via DHCP
-d Show DHCP packet decode
-r Renew DHCP lease
-x Release DHCP lease
dns ip Set DNS server ip, delete if ip is '0'
dns6 ipv6 Set DNS server ipv6, delete if ipv6 is '0'
domain NAME Set local domain name to NAME

PC2> ip dhcp
DDORA IP 10.79.102.210/24 GW 10.79.102.254

PC2> ip auto
GLOBAL SCOPE : 2001:db8:100:1010:2050:79ff:fe66:6801/64
ROUTER LINK-LAYER : ca:01:10:e2:00:1e

PC2> ping 10.79.102.1
84 bytes from 10.79.102.1 icmp_seq=1 ttl=255 time=0.210 ms
84 bytes from 10.79.102.1 icmp_seq=2 ttl=255 time=0.551 ms
84 bytes from 10.79.102.1 icmp_seq=3 ttl=255 time=0.440 ms
84 bytes from 10.79.102.1 icmp_seq=4 ttl=255 time=0.403 ms
84 bytes from 10.79.102.1 icmp_seq=5 ttl=255 time=0.411 ms

PC2> ping 10.79.102.2
84 bytes from 10.79.102.2 icmp_seq=1 ttl=255 time=0.140 ms
84 bytes from 10.79.102.2 icmp_seq=2 ttl=255 time=0.410 ms
84 bytes from 10.79.102.2 icmp_seq=3 ttl=255 time=0.381 ms
84 bytes from 10.79.102.2 icmp_seq=4 ttl=255 time=0.246 ms
84 bytes from 10.79.102.2 icmp_seq=5 ttl=255 time=0.254 ms

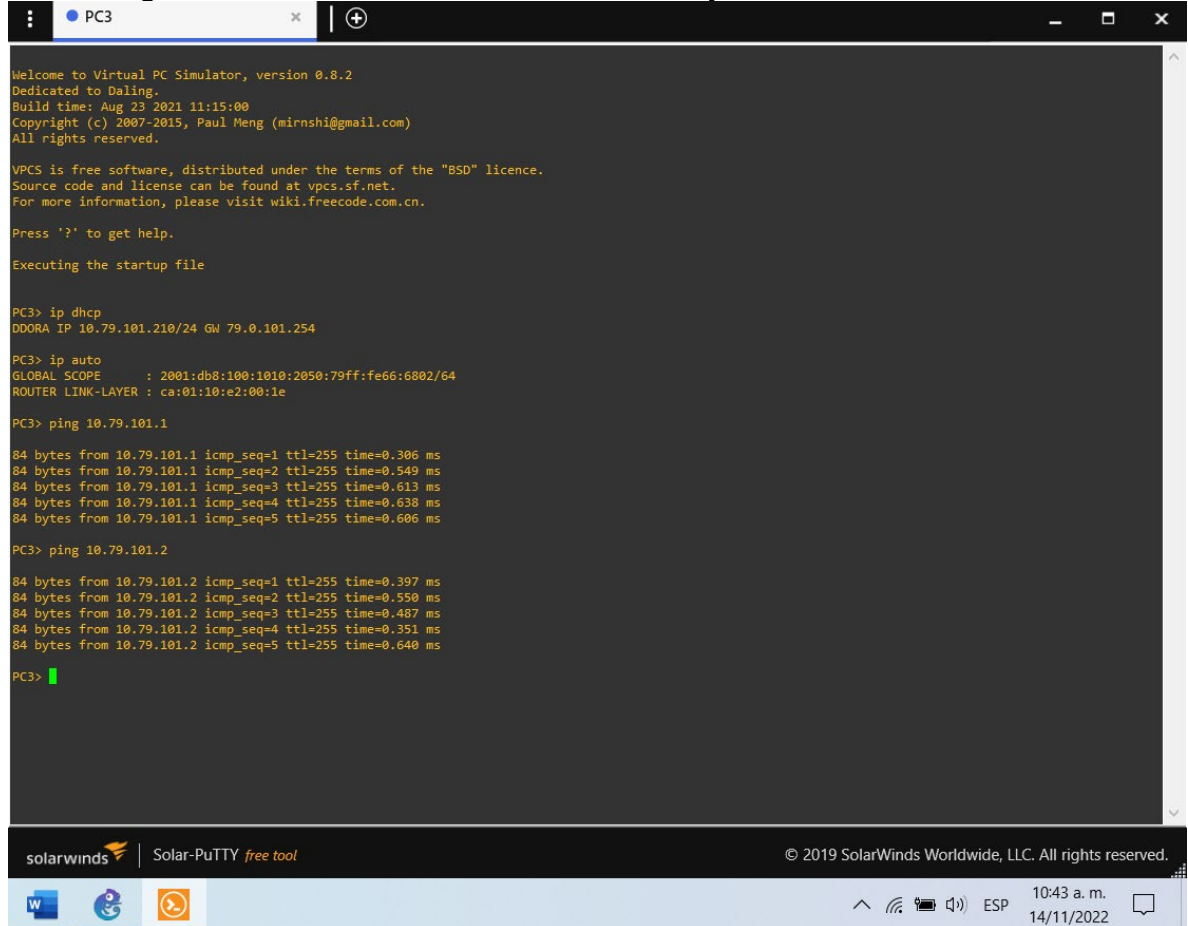
PC2> █
```

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Windows taskbar: 10:42 a.m. 14/11/2022

Fuente: Autor.

Figura 5. Prueba de conectividad en PC3 y direccionamiento DHCP.



```
Welcome to Virtual PC Simulator, version 0.8.2
Dedicated to Daling.
Build time: Aug 23 2021 11:15:00
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)
All rights reserved.

VPCS is free software, distributed under the terms of the "BSD" licence.
Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC3> ip dhcp
DDORA IP 10.79.101.210/24 GW 79.0.101.254

PC3> ip auto
GLOBAL SCOPE      : 2001:db8:100:1010:2050:79ff:fe66:6802/64
ROUTER LINK-LAYER : ca:01:10:e2:00:1e

PC3> ping 10.79.101.1

84 bytes from 10.79.101.1 icmp_seq=1 ttl=255 time=0.306 ms
84 bytes from 10.79.101.1 icmp_seq=2 ttl=255 time=0.549 ms
84 bytes from 10.79.101.1 icmp_seq=3 ttl=255 time=0.613 ms
84 bytes from 10.79.101.1 icmp_seq=4 ttl=255 time=0.638 ms
84 bytes from 10.79.101.1 icmp_seq=5 ttl=255 time=0.606 ms

PC3> ping 10.79.101.2

84 bytes from 10.79.101.2 icmp_seq=1 ttl=255 time=0.397 ms
84 bytes from 10.79.101.2 icmp_seq=2 ttl=255 time=0.550 ms
84 bytes from 10.79.101.2 icmp_seq=3 ttl=255 time=0.487 ms
84 bytes from 10.79.101.2 icmp_seq=4 ttl=255 time=0.351 ms
84 bytes from 10.79.101.2 icmp_seq=5 ttl=255 time=0.640 ms

PC3> █
```

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Windows taskbar: 10:43 a. m. 14/11/2022

Fuente: Autor.

Figura 6. Prueba de conectividad en PC4.

```
PC4> ping 10.79.100.1
84 bytes from 10.79.100.1 icmp_seq=1 ttl=255 time=0.215 ms
84 bytes from 10.79.100.1 icmp_seq=2 ttl=255 time=0.444 ms
84 bytes from 10.79.100.1 icmp_seq=3 ttl=255 time=0.891 ms
84 bytes from 10.79.100.1 icmp_seq=4 ttl=255 time=0.386 ms
84 bytes from 10.79.100.1 icmp_seq=5 ttl=255 time=0.443 ms

PC4> ping 10.79.100.2
84 bytes from 10.79.100.2 icmp_seq=1 ttl=255 time=0.409 ms
84 bytes from 10.79.100.2 icmp_seq=2 ttl=255 time=0.588 ms
84 bytes from 10.79.100.2 icmp_seq=3 ttl=255 time=0.535 ms
84 bytes from 10.79.100.2 icmp_seq=4 ttl=255 time=0.555 ms
84 bytes from 10.79.100.2 icmp_seq=5 ttl=255 time=0.463 ms

PC4> ping 10.79.100.5
84 bytes from 10.79.100.5 icmp_seq=1 ttl=64 time=0.175 ms
84 bytes from 10.79.100.5 icmp_seq=2 ttl=64 time=0.360 ms
84 bytes from 10.79.100.5 icmp_seq=3 ttl=64 time=0.568 ms
84 bytes from 10.79.100.5 icmp_seq=4 ttl=64 time=0.497 ms
84 bytes from 10.79.100.5 icmp_seq=5 ttl=64 time=0.486 ms

PC4> █
```

Fuente: Autor.

2.1.3. Part 3: Configure Routing Protocols

In this part, you will configure IPv4 and IPv6 routing protocols. At the end of this part, the network should be fully converged. IPv4 and IPv6 pings to the Loopback 0 interface from D1 and D2 should be successful.

Note: Pings from the hosts will not be successful because their default gateways are pointing to the HSRP address which will be enabled in Part 4.

Your configuration tasks are as follows:

Tabla 3. Actividades de la parte 3.

Task#	Task	Specification
3.1	On the “Company Network” (i.e., R1, R3, D1, and D2), configure single-area OSPFv2 in area 0.	<p>Use OSPF Process ID 4 and assign the following router-IDs:</p> <ul style="list-style-type: none"> • R1: 0.0.4.1 • R3: 0.0.4.3 • D1: 0.0.4.131 • D2: 0.0.4.132 <p>On R1, R3, D1, and D2, advertise all directly connected networks / VLANs in Area 0.</p> <ul style="list-style-type: none"> • 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. <p>Disable OSPFv2 advertisements on:</p> <ul style="list-style-type: none"> • D1: All interfaces except E1/2 • D2: All interfaces except E1/0
3.2	On the “Company Network” (i.e., R1, R3, D1, and D2), configure classic single-area OSPFv3 in area 0.	<p>Use OSPF Process ID 6 and assign the following router-IDs:</p> <ul style="list-style-type: none"> • R1: 0.0.6.1 • R3: 0.0.6.3 • D1: 0.0.6.131 • D2: 0.0.6.132 <p>On R1, R3, D1, and D2, advertise all directly connected networks / VLANs in Area 0.</p> <ul style="list-style-type: none"> • 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. <p>Disable OSPFv3 advertisements on:</p> <ul style="list-style-type: none"> • D1: All interfaces except E1/2 • D2: All interfaces except E1/0
3.3	On R2 in the “ISP Network”, configure MP-BGP.	<p>Configure two default static routes via interface Loopback 0:</p> <ul style="list-style-type: none"> • An IPv4 default static route. • An IPv6 default static route. <p>Configure R2 in BGP ASN 500 and use the router-id 2.2.2.2.</p>

Task#	Task	Specification
		<p>Configure and enable an IPv4 and IPv6 neighbor relationship with R1 in ASN 300.</p> <p>In IPv4 address family, advertise:</p> <ul style="list-style-type: none"> • The Loopback 0 IPv4 network (/32). • The default route (0.0.0.0/0). <p>In IPv6 address family, advertise:</p> <ul style="list-style-type: none"> • The Loopback 0 IPv4 network (/128). • The default route (::/0).
3.4	On R1 in the “ISP Network”, configure MP-BGP.	<p>Configure two static summary routes to interface Null 0:</p> <ul style="list-style-type: none"> • A summary IPv4 route for 10.79.0.0/8. • A summary IPv6 route for 2001:db8:100::/48. <p>Configure R1 in BGP ASN 300 and use the router-id 1.1.1.1.</p> <p>Configure an IPv4 and IPv6 neighbor relationship with R2 in ASN 500.</p> <p>In IPv4 address family:</p> <ul style="list-style-type: none"> • Disable the IPv6 neighbor relationship. • Enable the IPv4 neighbor relationship. • Advertise the 10.79.0.0/8 network. <p>In IPv6 address family:</p> <ul style="list-style-type: none"> • Disable the IPv4 neighbor relationship. • Enable the IPv6 neighbor relationship. • Advertise the 2001:db8:100::/48 network.

Fuente: Autor del documento.

Configuración en R1

```

R1(config)#router ospf 4 //Se configura OSPF IPv4
R1(config-router)# router-id 0.0.4.1 //Se asigna el id OSPF
R1(config-router)# network 10.79.10.0 0.0.0.255 area 0 //Se configura la red
conectada directamente en el área 0
R1(config-router)# network 10.79.13.0 0.0.0.255 area 0 //Se configura la red
conectada directamente en el área 0
R1(config-router)# default-information originate //Se desactiva el anuncio en
R1
R1(config-router)# exit

```

```

R1(config)#ipv6 router ospf 6 //Se configura OSPF IPv6
R1(config-rtr)# router-id 0.0.6.1 //Se asigna el id OSPF
R1(config-rtr)# default-information originate //Se desactiva la propagación en R1
R1(config-rtr)# exit
R1(config)#interface e1/2 //Se accede a la interfaz
R1(config-if)# ipv6 ospf 6 area 0 //Se configura el enrutamiento ospf
ipv6 en el área 0
R1(config-if)# exit
R1(config)#interface e1/1 //Se accede a la interfaz
R1(config-if)# ipv6 ospf 6 area 0 //Se configura el enrutamiento ospf
ipv6 en el área 0
R1(config-if)# exit
R1(config)#!
R1(config)#ip route 10.0.0.0 255.0.0.0 null0 //Se propaga una ruta estatica por
defecto
R1(config)#ipv6 route 2001:db8:100::/48 null0 //Se propaga una ruta estatica IPv6
por defecto
R1(config)#!
R1(config)#router bgp 300 //Se configura BGP con ASN 300
R1(config-router)# bgp router-id 1.1.1.1 //Se configura el id BGP
R1(config-router)# neighbor 209.165.200.226 remote-as 500 //Se configura la
relación IPv4 con R2 con ASN 500
R1(config-router)# neighbor 2001:db8:200::2 remote-as 500 //Se configura la
relación IPv4 con R2 con ASN 500
R1(config-router)# address-family ipv4 unicast
R1(config-router-af)# neighbor 209.165.200.226 activate //Se activa la relación
IPv4
R1(config-router-af)# no neighbor 2001:db8:200::2 activate //Se desactiva la
relación IPv6
R1(config-router-af)# network 10.0.0.0 mask 255.0.0.0 //Se configura la
dirección y la máscara de red
R1(config-router-af)# exit-address-family
R1(config-router)# address-family ipv6 unicast
R1(config-router-af)# no neighbor 209.165.200.226 activate //Se desactiva la
relación IPv4
R1(config-router-af)# neighbor 2001:db8:200::2 activate //Se activa la relación
IPv6
R1(config-router-af)# network 2001:db8:100::/48 //Se configura la
dirección
R1(config-router-af)# exit-address-family
R1(config-router)#

```

Configuración en R2

```

R2(config)#ip route 0.0.0.0 0.0.0.0 loopback 0 //Se configura una ruta
estatica por defecto IPv4 vía Loopback 0
R2(config)#ipv6 route ::/0 loopback 0 //Se configura una ruta
estatica por defecto IPv6 vía Loopback 0
R2(config)#router bgp 500 //Se configura BGP con ASN
500
R2(config-router)# bgp router-id 2.2.2.2 //Se configura el id BGP
R2(config-router)# neighbor 209.165.200.225 remote-as 300 //Se configura la
relación IPv4 con R1 con ASN 300
R2(config-router)# neighbor 2001:db8:200::1 remote-as 300 //Se configura la
relación IPv4 con R1 con ASN 300
R2(config-router)# address-family ipv4
R2(config-router-af)# neighbor 209.165.200.225 activate //Se anuncia la red
IPv4 de R1
R2(config-router-af)# no neighbor 2001:db8:200::1 activate //No se anuncia la red
IPv6 de R1
R2(config-router-af)# network 2.2.2.2 mask 255.255.255.255 //Se anuncia la
red IPv4 de la Loopback 0
R2(config-router-af)# network 0.0.0.0 //Se anuncia la ruta por
defecto
R2(config-router-af)# exit-address-family
R2(config-router)# address-family ipv6
R2(config-router-af)# no neighbor 209.165.200.225 activate //No se anuncia la red
IPv4 de R1
R2(config-router-af)# neighbor 2001:db8:200::1 activate //Se anuncia la red
IPv6 de R1
R2(config-router-af)# network 2001:db8:2222::/128 //Se anuncia la red
IPv4 de la Loopback 0 /128
R2(config-router-af)# network ::/0 //Se anuncia la ruta
por defecto
R2(config-router-af)# exit-address-family
R2(config-router)#

```

Configuración en R3

```

R3(config)#router ospf 4 //Se configura OSPF IPv4
R3(config-router)# router-id 0.0.4.3 //Se asigna el id OSPF
R3(config-router)# network 10.79.11.0 0.0.0.255 area 0 //Se configura la red
conectada directamente en el área 0
R3(config-router)# network 10.79.13.0 0.0.0.255 area 0 //Se configura la red
conectada directamente en el área 0
R3(config-router)# exit
R3(config)#ipv6 router ospf 6 //Se configura OSPF IPv6
R3(config-rtr)# router-id 0.0.6.3 //Se asigna el id OSPF
R3(config-rtr)# exit

```

```

R3(config)#interface e1/0 //Se accede a la interface
R3(config-if)# ipv6 ospf 6 area 0 //Se configura el enrutamiento ospf
ipv6 en el área 0
R3(config-if)# exit
R3(config)#interface e1/1 //Se accede a la interface
R3(config-if)# ipv6 ospf 6 area 0 //Se configura el enrutamiento ospf
ipv6 en el área 0
R3(config-if)# exit
R3(config)#end

```

Configuración en D1

```

D1(config)#router ospf 4 //Se configura OSPF IPv4
D1(config-router)# router-id 0.0.4.131 //Se asigna el id OSPF
D1(config-router)# network 10.79.100.0 0.0.0.255 area 0 //Se configura la red
conectada directamente en el área 0
D1(config-router)# network 10.79.101.0 0.0.0.255 area 0 //Se configura la red
conectada directamente en el área 0
D1(config-router)# network 10.79.102.0 0.0.0.255 area 0 //Se configura la red
conectada directamente en el área 0
D1(config-router)# network 10.79.10.0 0.0.0.255 area 0 //Se configura la red
conectada directamente en el área 0
D1(config-router)# passive-interface default //Se desactiva los anuncios en
todas las interfaces
D1(config-router)# no passive-interface e1/2 //Se activa el anuncio en la interface
D1(config-router)# exit
D1(config)#ipv6 router ospf 6 //Se configura OSPF IPv6
D1(config-rtr)# router-id 0.0.6.131 //Se asigna el id OSPF
D1(config-rtr)# passive-interface default //Se desactiva los anuncios en
todas las interfaces
D1(config-rtr)# no passive-interface e1/2 //Se activa el anuncio en la interface
D1(config-rtr)# exit
D1(config)#interface e1/2 //Se accede a la interface
D1(config-if)# ipv6 ospf 6 area 0 //Se configura el enrutamiento ospf
ipv6 en el área 0
D1(config-if)# exit
D1(config)#interface vlan 100 //Se accede a la interface
D1(config-if)# ipv6 ospf 6 area 0 //Se configura el enrutamiento ospf
ipv6 en el área 0
D1(config-if)# exit
D1(config)#interface vlan 101 //Se accede a la interface
D1(config-if)# ipv6 ospf 6 area 0 //Se configura el enrutamiento ospf
ipv6 en el área 0
D1(config-if)# exit
D1(config)#interface vlan 102 //Se accede a la interface

```

```

D1(config-if)# ipv6 ospf 6 area 0 //Se configura el enrutamiento ospf
ipv6 en el área 0
D1(config-if)# exit
D1(config)#end

```

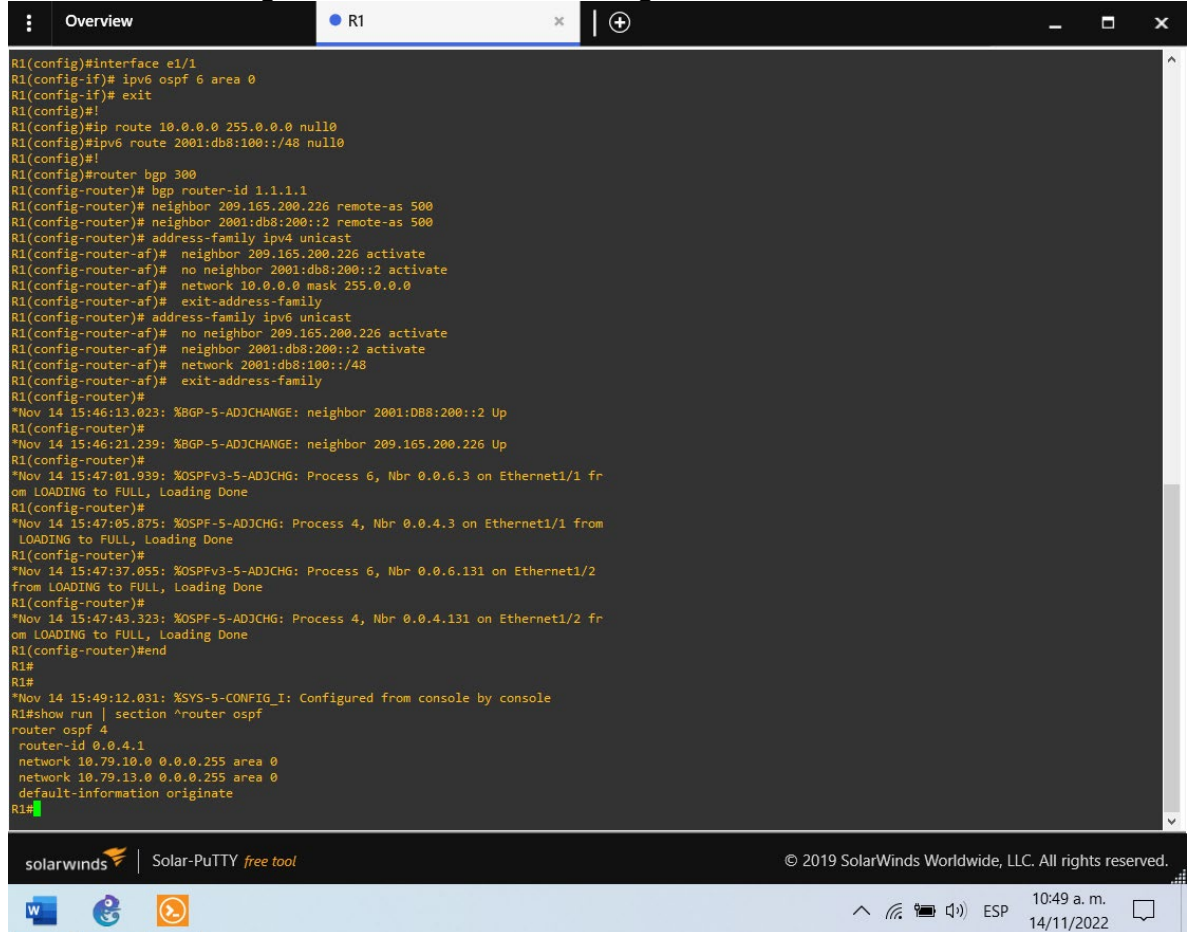
Configuración en D2

```

D2(config)#router ospf 4 //Se configura OSPF IPv4
D2(config-router)# router-id 0.0.4.132 //Se asigna el id OSPF
D2(config-router)# network 10.79.100.0 0.0.0.255 area 0 //Se configura la red
conectada directamente en el área 0
D2(config-router)# network 10.79.101.0 0.0.0.255 area 0 //Se configura la red
conectada directamente en el área 0
D2(config-router)# network 10.79.102.0 0.0.0.255 area 0 //Se configura la red
conectada directamente en el área 0
D2(config-router)# network 10.79.11.0 0.0.0.255 area 0 //Se configura la red
conectada directamente en el área 0
D2(config-router)# passive-interface default //Se desactiva los anuncios en
todas las interfaces
D2(config-router)# no passive-interface e1/0 //Se activa el anuncio en la interface
D2(config-router)# exit
D2(config)#ipv6 router ospf 6 //Se configura OSPF IPv6
D2(config-rtr)# router-id 0.0.6.132 //Se asigna el id OSPF
D2(config-rtr)# passive-interface default //Se desactiva los anuncios en
todas las interfaces
D2(config-rtr)# no passive-interface e1/0 //Se activa el anuncio en la interface
D2(config-rtr)# exit
D2(config)#interface e1/0 //Se accede a la interface
D2(config-if)# ipv6 ospf 6 area 0 //Se configura el enrutamiento ospf
ipv6 en el área 0
D2(config-if)# exit
D2(config)#interface vlan 100 //Se accede a la interface
D2(config-if)# ipv6 ospf 6 area 0 //Se configura el enrutamiento ospf
ipv6 en el área 0
D2(config-if)# exit
D2(config)#interface vlan 101 //Se accede a la interface
D2(config-if)# ipv6 ospf 6 area 0 //Se configura el enrutamiento ospf
ipv6 en el área 0
D2(config-if)# exit
D2(config)#interface vlan 102 //Se accede a la interface
D2(config-if)# ipv6 ospf 6 area 0 //Se configura el enrutamiento ospf
ipv6 en el área 0
D2(config-if)# exit
D2(config)#end

```

Figura 7. Validación de configuración OSPF en R1.



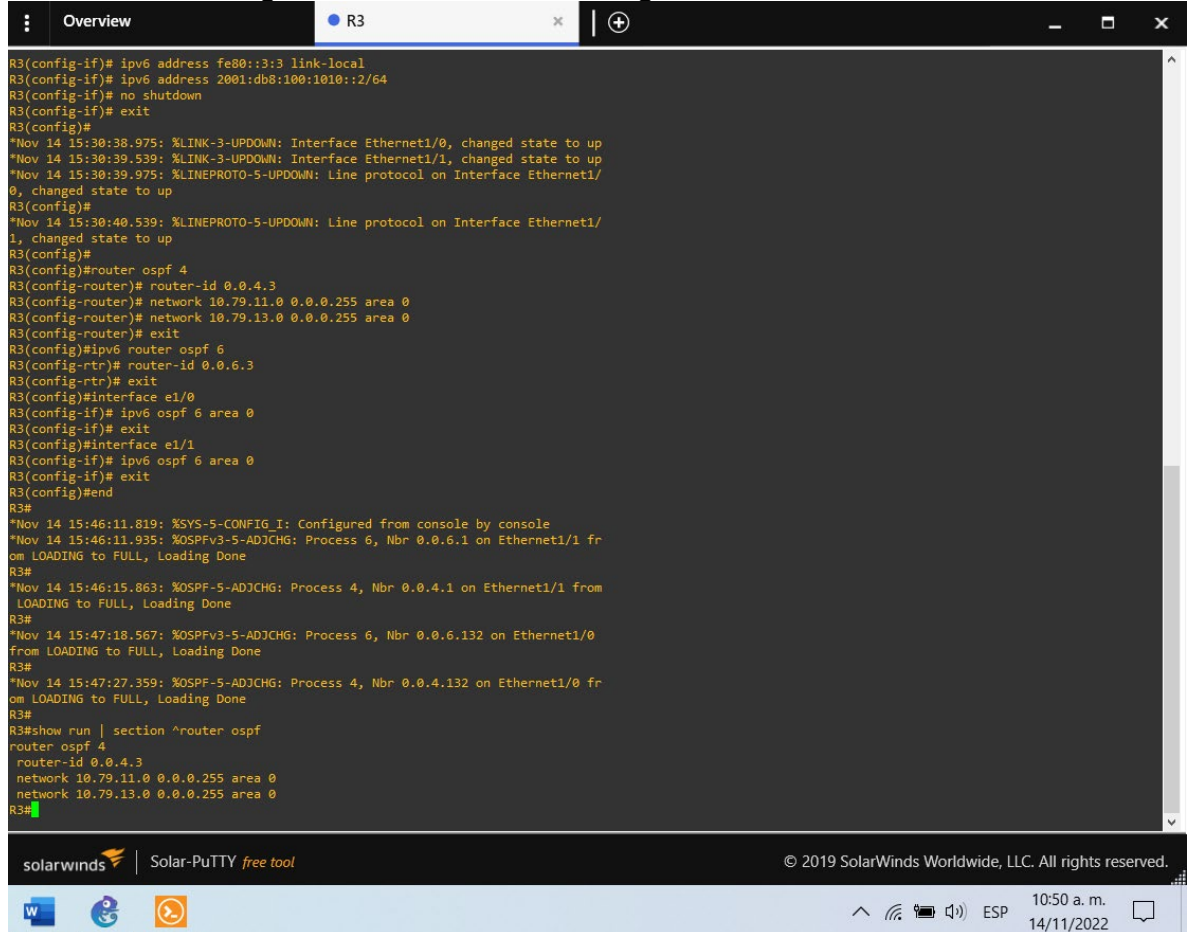
```
Overview R1
R1(config)#interface e1/1
R1(config-if)# ipv6 ospf 6 area 0
R1(config-if)# exit
R1(config)#!
R1(config)#ip route 10.0.0.0 255.0.0.0 null0
R1(config)#ipv6 route 2001:db8:100::/48 null0
R1(config)#!
R1(config)#router bgp 300
R1(config-router)# bgp router-id 1.1.1.1
R1(config-router)# neighbor 209.165.200.226 remote-as 500
R1(config-router)# neighbor 2001:db8:200::2 remote-as 500
R1(config-router)# address-family ipv4 unicast
R1(config-router-af)# neighbor 209.165.200.226 activate
R1(config-router-af)# no neighbor 2001:db8:200::2 activate
R1(config-router-af)# network 10.0.0.0 mask 255.0.0.0
R1(config-router-af)# exit-address-family
R1(config-router)# address-family ipv6 unicast
R1(config-router-af)# no neighbor 209.165.200.226 activate
R1(config-router-af)# neighbor 2001:db8:200::2 activate
R1(config-router-af)# network 2001:db8:100::/48
R1(config-router-af)# exit-address-family
R1(config-router)#
*Nov 14 15:46:13.023: %BGP-5-ADJCHANGE: neighbor 2001:DB8:200::2 Up
R1(config-router)#
*Nov 14 15:46:21.239: %BGP-5-ADJCHANGE: neighbor 209.165.200.226 Up
R1(config-router)#
*Nov 14 15:47:01.939: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.3 on Ethernet1/1 fr
om LOADING to FULL, Loading Done
R1(config-router)#
*Nov 14 15:47:05.875: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.3 on Ethernet1/1 from
LOADING to FULL, Loading Done
R1(config-router)#
*Nov 14 15:47:37.055: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.131 on Ethernet1/2
from LOADING to FULL, Loading Done
R1(config-router)#
*Nov 14 15:47:43.323: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.131 on Ethernet1/2 fr
om LOADING to FULL, Loading Done
R1(config-router)#end
R1#
R1#
*Nov 14 15:49:12.031: %SYS-5-CONFIG_I: Configured from console by console
R1#show run | section ^router ospf
router ospf 4
router-id 0.0.4.1
network 10.79.10.0 0.0.0.255 area 0
network 10.79.13.0 0.0.0.255 area 0
default-information originate
R1#
```

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10:49 a. m. 14/11/2022

Fuente: Autor.

Figura 8. Validación de configuración OSPF en R3.



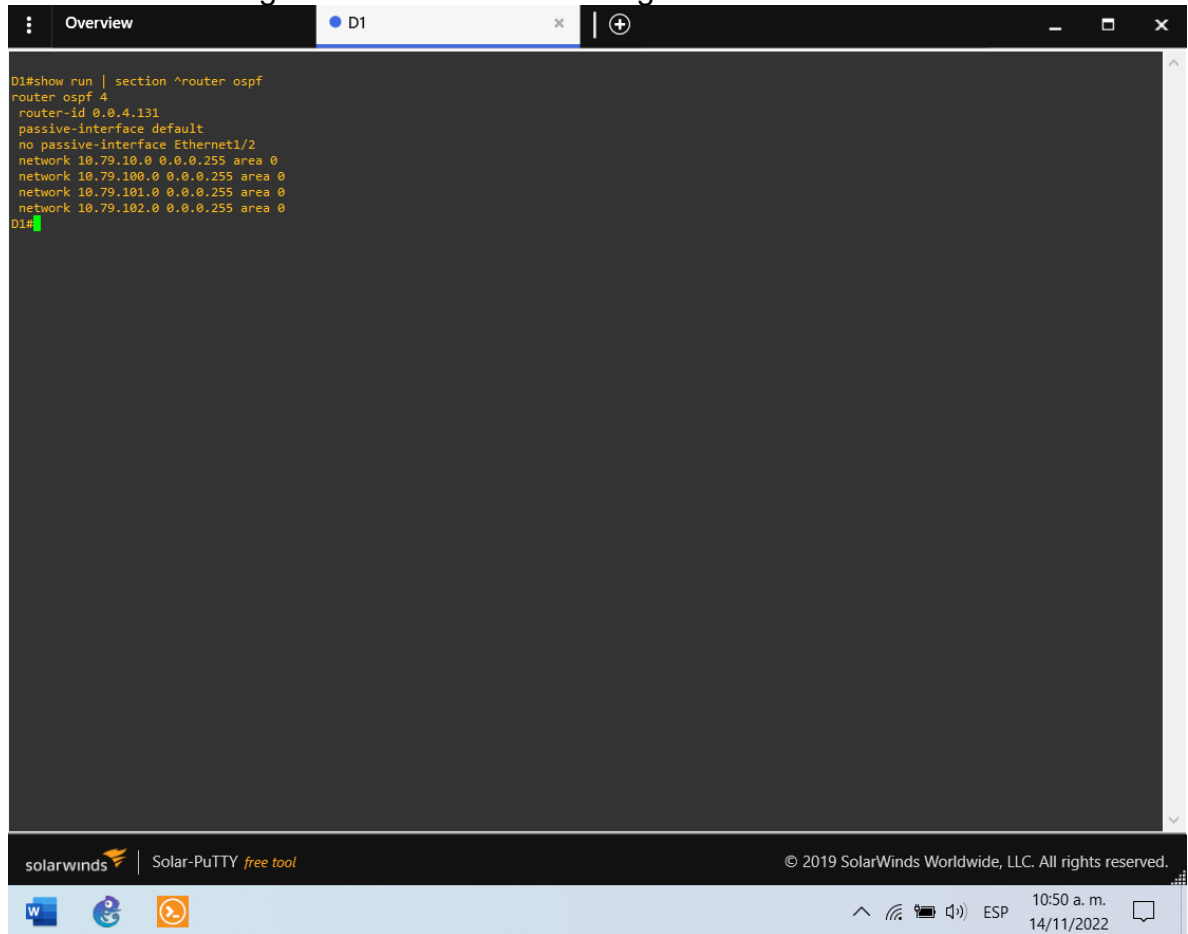
```
R3(config-if)# ipv6 address fe80::3:3 link-local
R3(config-if)# ipv6 address 2001:db8:100:1010::2/64
R3(config-if)# no shutdown
R3(config-if)# exit
R3(config)#
*Nov 14 15:30:38.975: %LINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
*Nov 14 15:30:39.539: %LINK-3-UPDOWN: Interface Ethernet1/1, changed state to up
*Nov 14 15:30:39.975: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
R3(config)#
*Nov 14 15:30:40.539: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to up
R3(config)#
R3(config)#router ospf 4
R3(config-router)# router-id 0.0.4.3
R3(config-router)# network 10.79.11.0 0.0.0.255 area 0
R3(config-router)# network 10.79.13.0 0.0.0.255 area 0
R3(config-router)# exit
R3(config)#ipv6 router ospf 6
R3(config-rtr)# router-id 0.0.6.3
R3(config-rtr)# exit
R3(config)#interface e1/0
R3(config-if)# ipv6 ospf 6 area 0
R3(config-if)# exit
R3(config)#interface e1/1
R3(config-if)# ipv6 ospf 6 area 0
R3(config-if)# exit
R3(config)#end
R3#
*Nov 14 15:46:11.819: %SYS-5-CONFIG_I: Configured from console by console
*Nov 14 15:46:11.935: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.1 on Ethernet1/1 from LOADING to FULL, Loading Done
R3#
*Nov 14 15:46:15.863: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.1 on Ethernet1/1 from LOADING to FULL, Loading Done
R3#
*Nov 14 15:47:18.567: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.132 on Ethernet1/0 from LOADING to FULL, Loading Done
R3#
*Nov 14 15:47:27.359: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.132 on Ethernet1/0 from LOADING to FULL, Loading Done
R3#
R3#show run | section ^router ospf
router ospf 4
router-id 0.0.4.3
network 10.79.11.0 0.0.0.255 area 0
network 10.79.13.0 0.0.0.255 area 0
R3#
```

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W | 10:50 a. m. 14/11/2022

Fuente: Autor

Figura 9. Validación de configuración OSPF en D1.



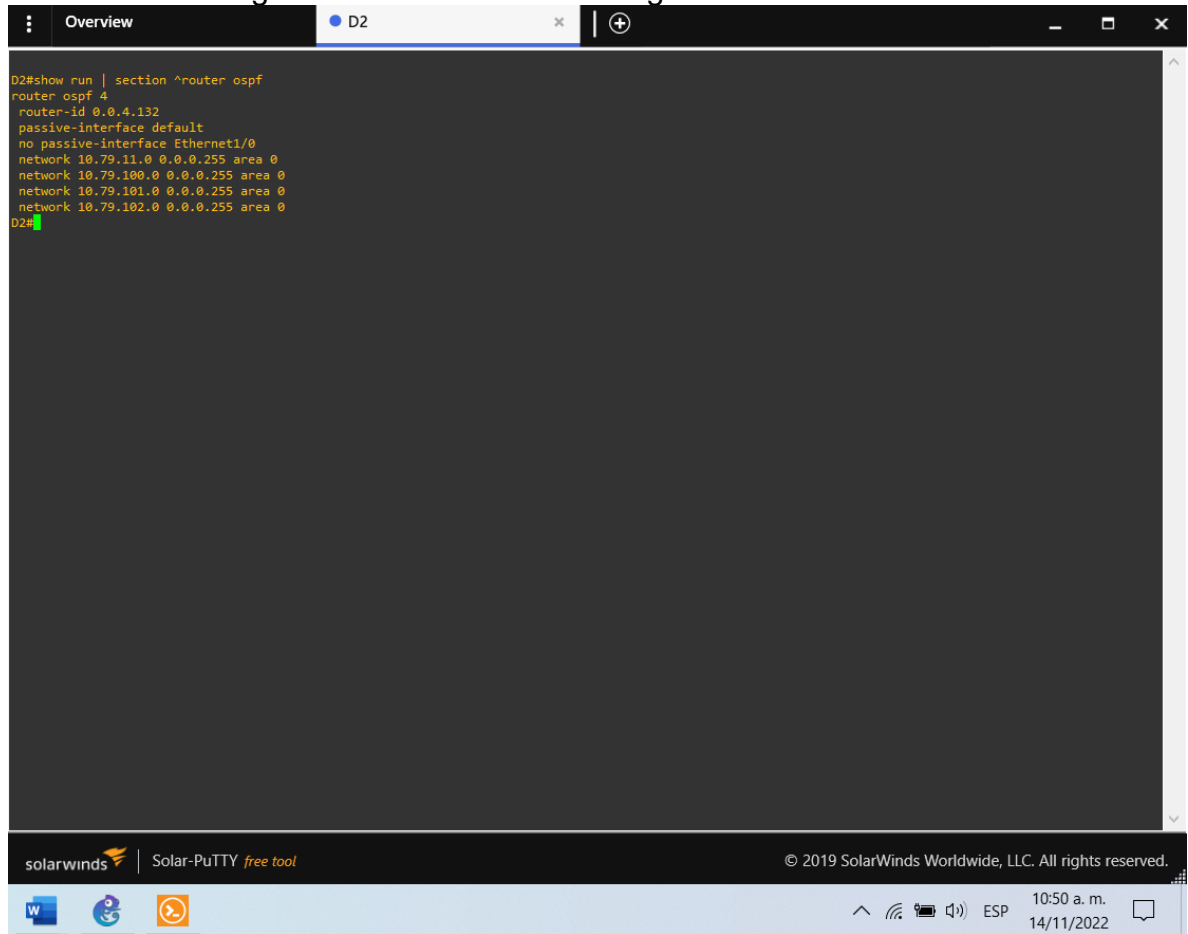
The image shows a terminal window titled "D1" within the SolarWinds Solar-PuTTY application. The terminal displays the output of the command "D1#show run | section ^router ospf". The configuration shown is for OSPF process 4, with router ID 0.0.4.131. It includes settings for passive interfaces and network statements for three interfaces: Ethernet1/2, Ethernet1/3, and Ethernet1/4, all in area 0. The terminal prompt "D1#" is visible at the bottom of the output.

```
D1#show run | section ^router ospf
router ospf 4
router-id 0.0.4.131
passive-interface default
no passive-interface Ethernet1/2
network 10.79.10.0 0.0.0.255 area 0
network 10.79.100.0 0.0.0.255 area 0
network 10.79.101.0 0.0.0.255 area 0
network 10.79.102.0 0.0.0.255 area 0
D1#
```

The SolarWinds logo and "Solar-PuTTY free tool" are visible in the bottom left of the terminal window. The system tray at the bottom of the screen shows the date and time as 10:50 a. m. on 14/11/2022, along with other system icons.

Fuente: Autor.

Figura 10. Validación de configuración OSPF en D2.



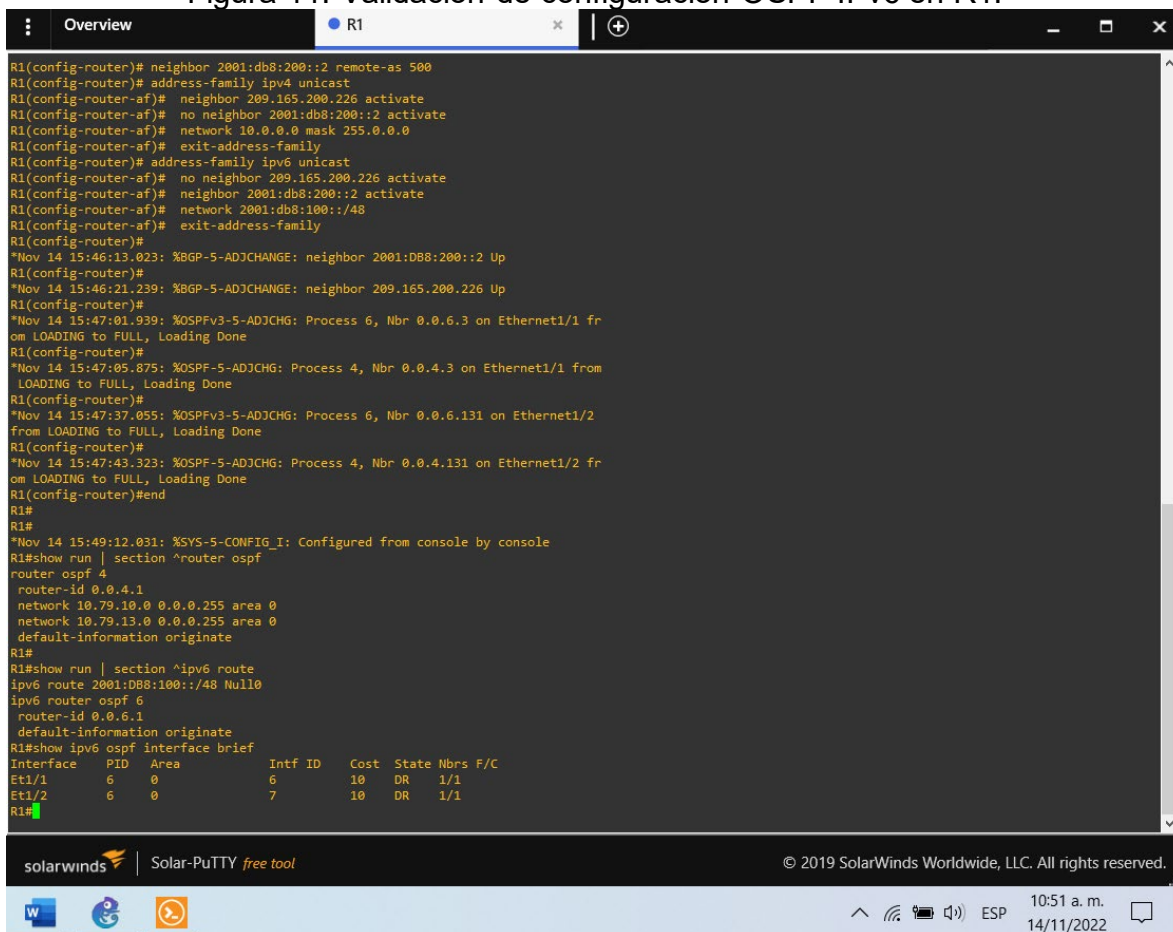
The image shows a terminal window titled "D2" within a SolarWinds Solar-PuTTY application. The terminal displays the output of the command "D2#show run | section ^router ospf". The configuration shown is for OSPF process 4, with router ID 0.0.4.132. It includes settings for passive interfaces and network statements for three interfaces: Ethernet1/0, Ethernet1/1, and Ethernet1/2, all in area 0. The terminal prompt "D2#" is visible at the bottom left of the output area.

```
D2#show run | section ^router ospf
router ospf 4
router-id 0.0.4.132
passive-interface default
no passive-interface Ethernet1/0
network 10.79.11.0 0.0.0.255 area 0
network 10.79.100.0 0.0.0.255 area 0
network 10.79.101.0 0.0.0.255 area 0
network 10.79.102.0 0.0.0.255 area 0
D2#
```

The terminal window footer includes "solarwinds Solar-PuTTY free tool" and "© 2019 SolarWinds Worldwide, LLC. All rights reserved." The Windows taskbar at the bottom shows the time as 10:50 a. m. on 14/11/2022.

Fuente: Autor.

Figura 11. Validación de configuración OSPF IPv6 en R1.



```
Overview R1
R1(config-router)# neighbor 2001:db8:200::2 remote-as 500
R1(config-router)# address-family ipv4 unicast
R1(config-router-af)# neighbor 209.165.200.226 activate
R1(config-router-af)# no neighbor 2001:db8:200::2 activate
R1(config-router-af)# network 10.0.0.0 mask 255.0.0.0
R1(config-router-af)# exit-address-family
R1(config-router)# address-family ipv6 unicast
R1(config-router-af)# no neighbor 209.165.200.226 activate
R1(config-router-af)# neighbor 2001:db8:200::2 activate
R1(config-router-af)# network 2001:db8:100::/48
R1(config-router-af)# exit-address-family
R1(config-router)#
*Nov 14 15:46:13.023: %BGP-5-ADJCHANGE: neighbor 2001:DB8:200::2 Up
R1(config-router)#
*Nov 14 15:46:21.239: %BGP-5-ADJCHANGE: neighbor 209.165.200.226 Up
R1(config-router)#
*Nov 14 15:47:01.939: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.3 on Ethernet1/1 fr
om LOADING to FULL, Loading Done
R1(config-router)#
*Nov 14 15:47:05.875: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.3 on Ethernet1/1 from
LOADING to FULL, Loading Done
R1(config-router)#
*Nov 14 15:47:37.055: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.131 on Ethernet1/2
from LOADING to FULL, Loading Done
R1(config-router)#
*Nov 14 15:47:43.323: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.131 on Ethernet1/2 fr
om LOADING to FULL, Loading Done
R1(config-router)#end
R1#
R1#
*Nov 14 15:49:12.031: %SYS-5-CONFIG_I: Configured from console by console
R1#show run | section ^router ospf
router ospf 4
  router-id 0.0.4.1
  network 10.79.10.0 0.0.0.255 area 0
  network 10.79.13.0 0.0.0.255 area 0
  default-information originate
R1#
R1#show run | section ^ipv6 route
ipv6 route 2001:DB8:100::/48 Null0
ipv6 router ospf 6
  router-id 0.0.6.1
  default-information originate
R1#show ipv6 ospf interface brief
Interface  PID Area      Intf ID  Cost  State Nbrs F/C
Et1/1     6   0         6        10   DR    1/1
Et1/2     6   0         7        10   DR    1/1
R1#
```

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10:51 a.m. 14/11/2022

Fuente: Autor.

Figura 12. Validación de configuración OSPF IPv6 en R3.

```
Overview R3
*Nov 14 15:30:39.975: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
R3(config)#
*Nov 14 15:30:40.539: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to up
R3(config)#
R3(config)#router ospf 4
R3(config-router)# router-id 0.0.4.3
R3(config-router)# network 10.79.11.0 0.0.0.255 area 0
R3(config-router)# network 10.79.13.0 0.0.0.255 area 0
R3(config-router)# exit
R3(config)#ipv6 router ospf 6
R3(config-rtr)# router-id 0.0.6.3
R3(config-rtr)# exit
R3(config)#interface e1/0
R3(config-if)# ipv6 ospf 6 area 0
R3(config-if)# exit
R3(config)#interface e1/1
R3(config-if)# ipv6 ospf 6 area 0
R3(config-if)# exit
R3(config)#end
R3#
*Nov 14 15:46:11.819: %SYS-5-CONFIG_I: Configured from console by console
*Nov 14 15:46:11.935: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.1 on Ethernet1/1 from LOADING to FULL, Loading Done
R3#
*Nov 14 15:46:15.863: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.1 on Ethernet1/1 from LOADING to FULL, Loading Done
R3#
*Nov 14 15:47:18.567: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.132 on Ethernet1/0 from LOADING to FULL, Loading Done
R3#
*Nov 14 15:47:27.359: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.132 on Ethernet1/0 from LOADING to FULL, Loading Done
R3#
R3#show run | section ^router ospf
router ospf 4
  router-id 0.0.4.3
  network 10.79.11.0 0.0.0.255 area 0
  network 10.79.13.0 0.0.0.255 area 0
R3#show run | section ^ipv6 route
ipv6 router ospf 6
  router-id 0.0.6.3
R3#show ipv6 ospf interface brief
Interface  PID  Area      Intf ID  Cost  State  Nbrs  F/C
Et1/1     6   0         6        10   BDR    1/1
Et1/0     6   0         5        10   DR     1/1
R3#
```

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Fuente: Autor.

Figura 13. Validación de configuración OSPF IPv6 en D1.

```
D1#show run | section ^ipv6 route
ipv6 router ospf 6
router-id 0.0.6.131
passive-interface default
no passive-interface Ethernet1/2
D1#show ipv6 ospf interface brief
```

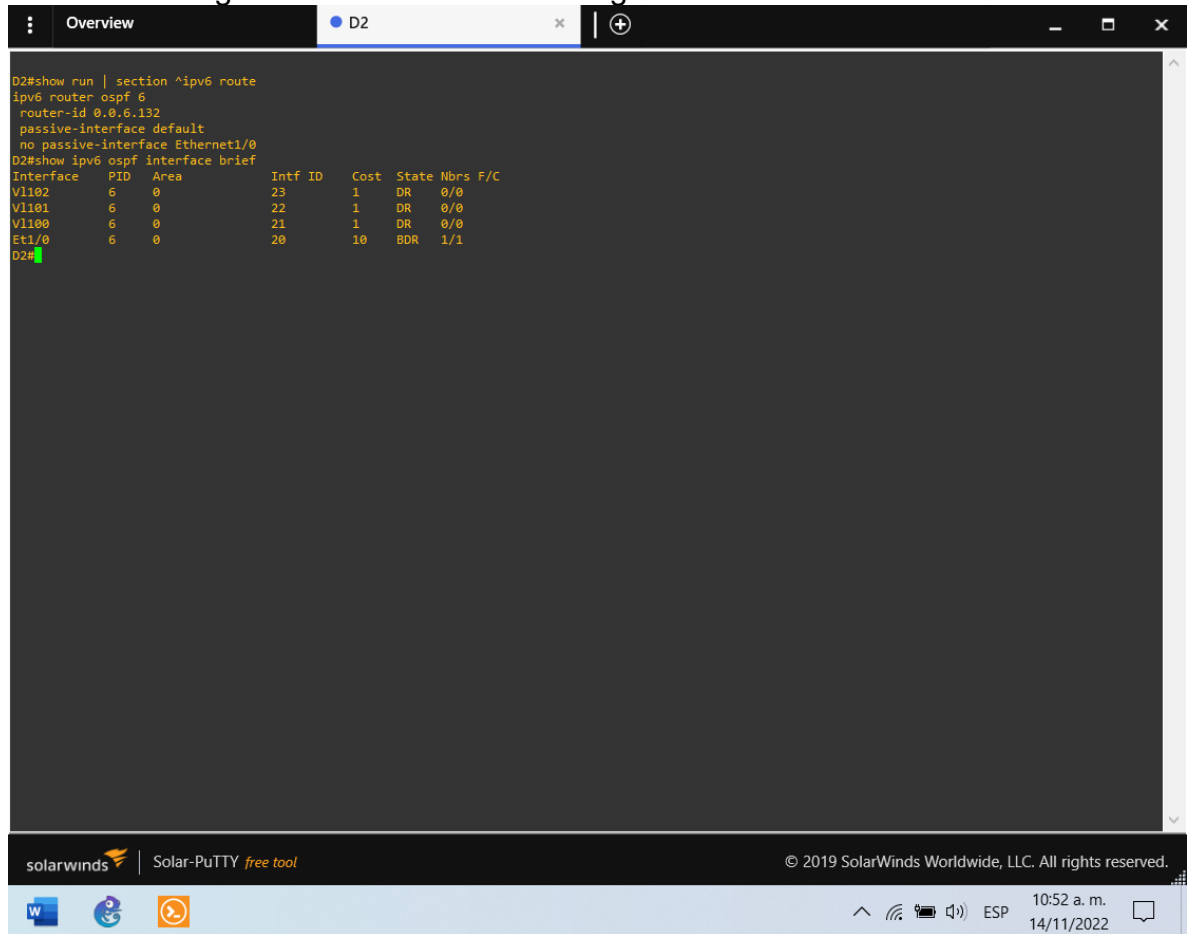
Interface	PID	Area	Intf ID	Cost	State	Nbrs	F/C
V1102	6	0	23	1	DR	0/0	
V1101	6	0	22	1	DR	0/0	
V1100	6	0	21	1	DR	0/0	
E1/2	6	0	20	10	BDR	1/1	

D1#

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Fuente: Autor.

Figura 14. Validación de configuración OSPF IPv6 en D2.

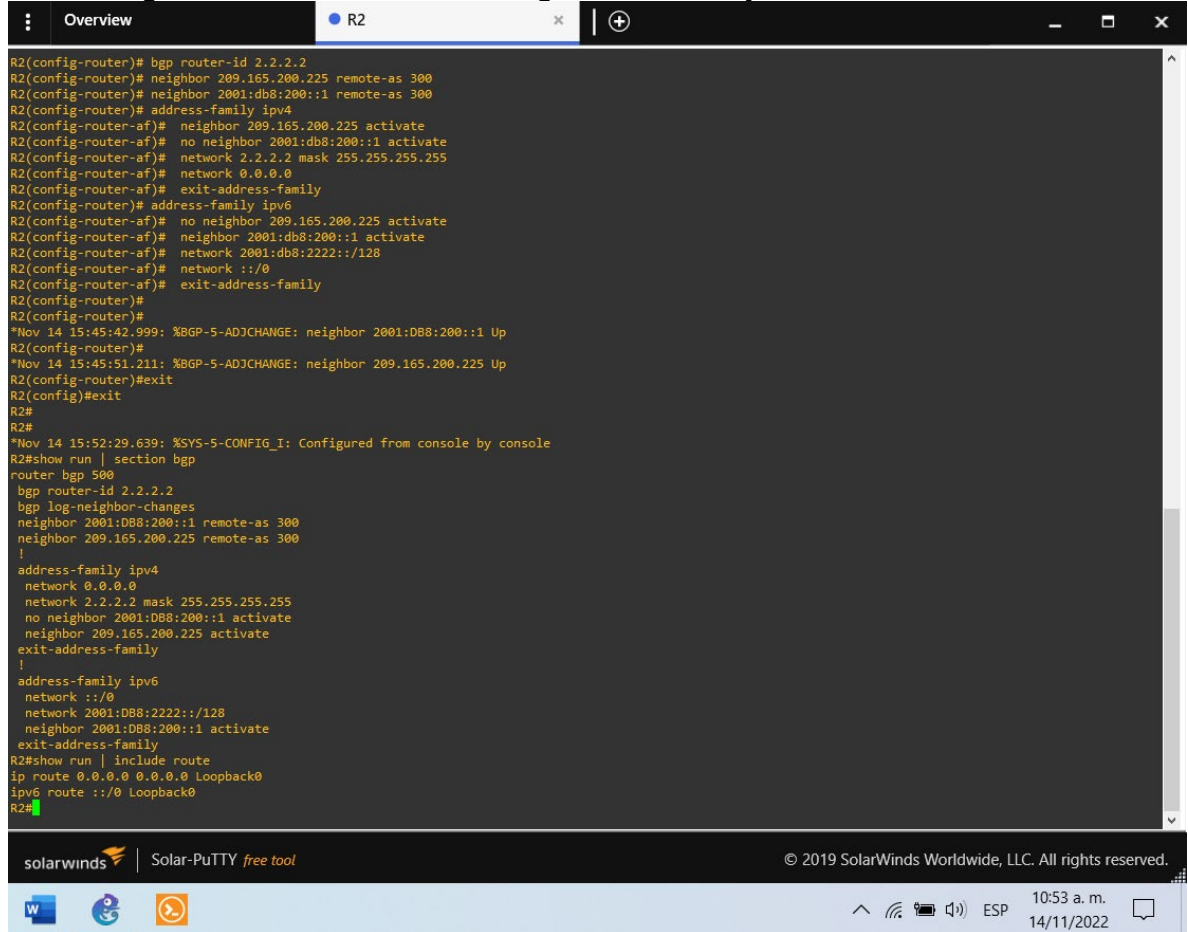


```
D2#show run | section ^ipv6 route
ipv6 router ospf 6
router-id 0.0.6.132
passive-interface default
no passive-interface Ethernet1/0
D2#show ipv6 ospf interface brief
Interface      PID   Area      Intf ID   Cost   State  Nbrs  F/C
-----
Vl102          6     0         23        1     DR     0/0
Vl101          6     0         22        1     DR     0/0
Vl100          6     0         21        1     DR     0/0
Et1/0         6     0         20        10    BDR    1/1
D2#
```

The screenshot shows a terminal window titled "D2" with a dark background. The text displays the configuration for OSPFv3 on a device named D2. The configuration includes setting the OSPF process to 6, the router ID to 0.0.6.132, and making all interfaces passive by default, except for Ethernet1/0. Below the configuration, the output of the "show ipv6 ospf interface brief" command is shown as a table with columns for Interface, PID, Area, Intf ID, Cost, State, Nbrs, and F/C. The table lists four interfaces: Vl102, Vl101, Vl100, and Et1/0. Vl102, Vl101, and Vl100 are in the DR state, while Et1/0 is in the BDR state. The terminal window is part of a SolarWinds Solar-PuTTY application, as indicated by the footer. The Windows taskbar at the bottom shows the time as 10:52 a.m. on 14/11/2022.

Fuente: Autor.

Figura 15. Validación de configuración BGP y rutas estáticas en R2.



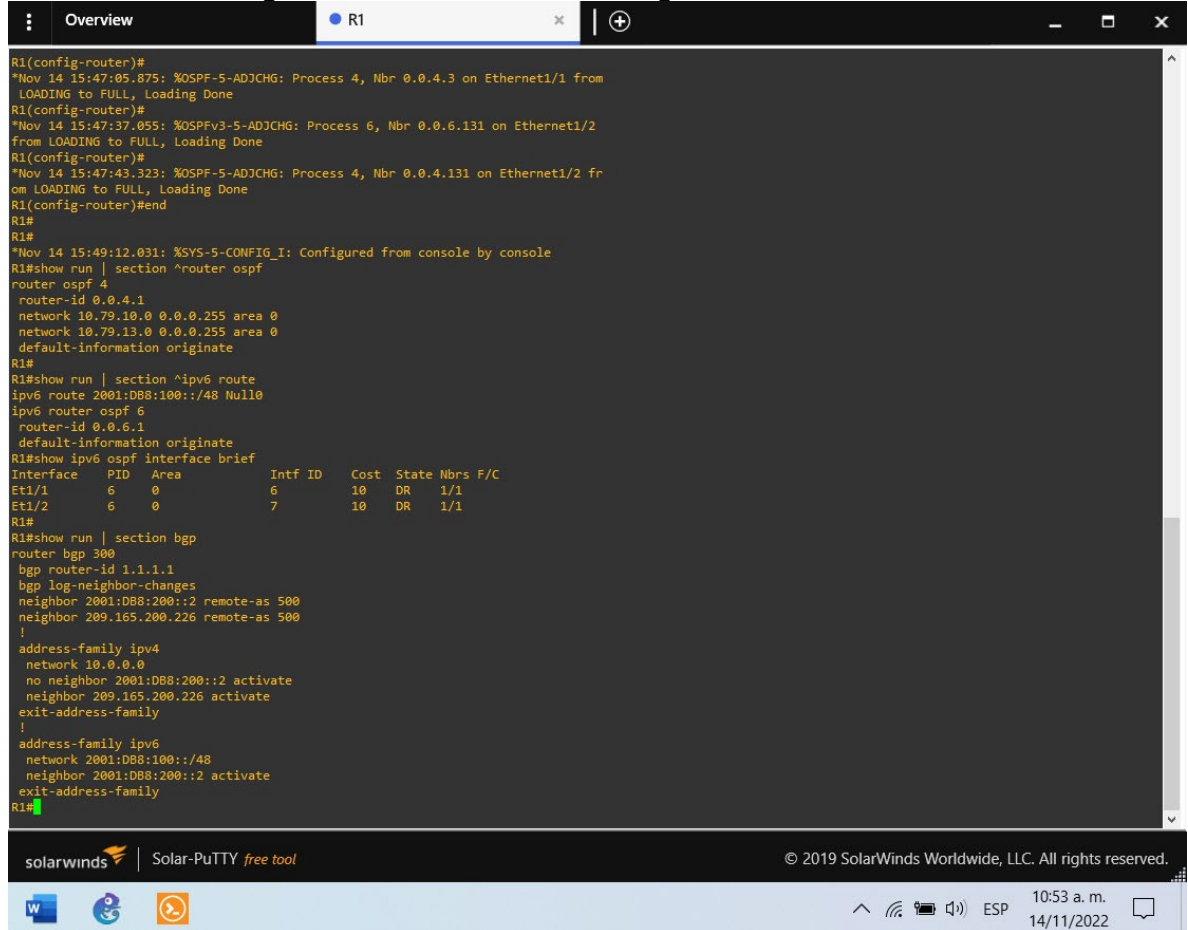
```
R2(config-router)# bgp router-id 2.2.2.2
R2(config-router)# neighbor 209.165.200.225 remote-as 300
R2(config-router)# neighbor 2001:db8:200::1 remote-as 300
R2(config-router)# address-family ipv4
R2(config-router-af)# neighbor 209.165.200.225 activate
R2(config-router-af)# no neighbor 2001:db8:200::1 activate
R2(config-router-af)# network 2.2.2.2 mask 255.255.255.255
R2(config-router-af)# network 0.0.0.0
R2(config-router-af)# exit-address-family
R2(config-router)# address-family ipv6
R2(config-router-af)# no neighbor 209.165.200.225 activate
R2(config-router-af)# neighbor 2001:db8:200::1 activate
R2(config-router-af)# network 2001:db8:2222::/128
R2(config-router-af)# network ::/0
R2(config-router-af)# exit-address-family
R2(config-router)#
R2#
*Nov 14 15:45:42.999: %BGP-5-ADJCHANGE: neighbor 2001:DB8:200::1 Up
R2(config-router)#
R2#show run | section bgp
router bgp 500
  bgp router-id 2.2.2.2
  bgp log-neighbor-changes
  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
R2#show run | include route
ip route 0.0.0.0 0.0.0.0 Loopback0
ipv6 route ::/0 Loopback0
R2#
```

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Fuente: Autor.

Figura 16. Validación de configuración BGP en R1.



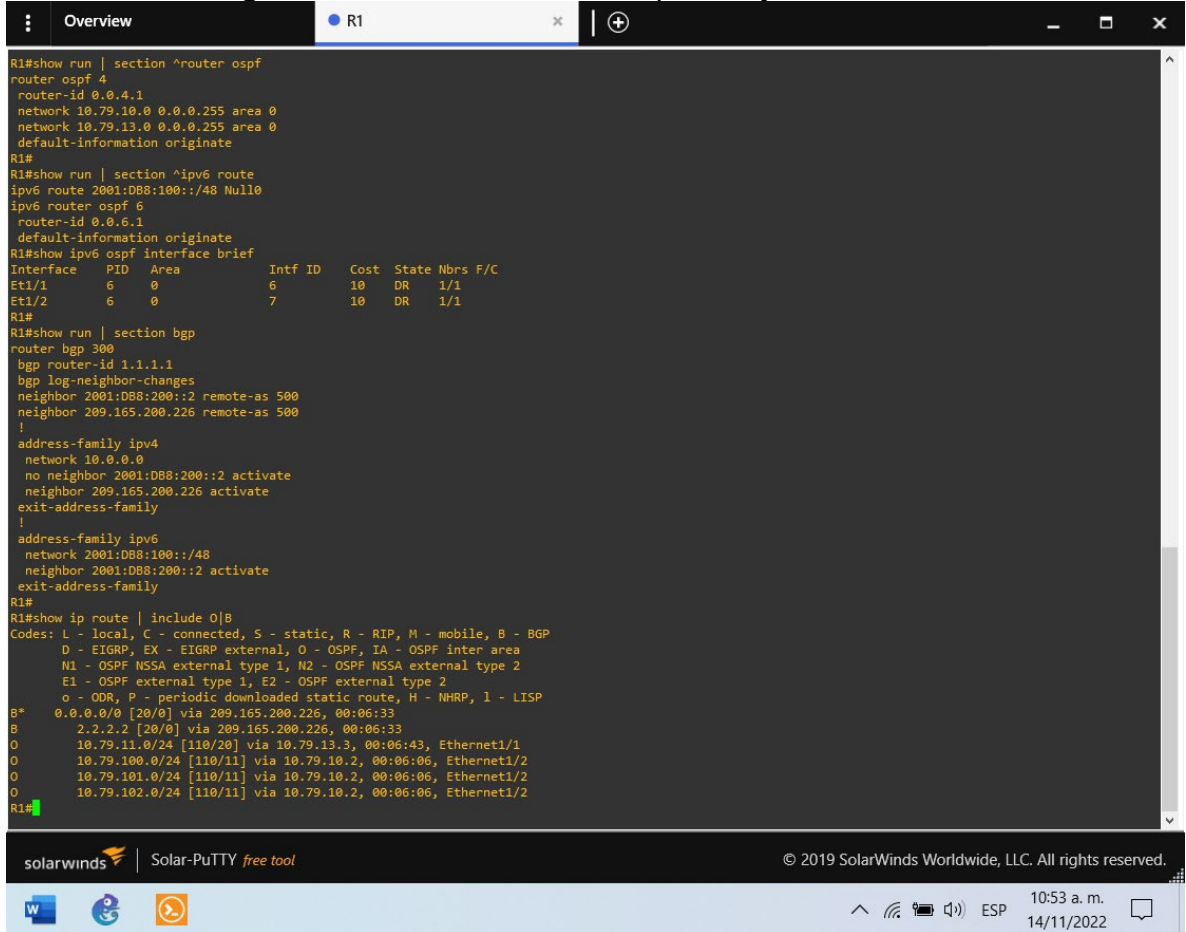
```
R1(config-router)#
*Nov 14 15:47:05.875: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.3 on Ethernet1/1 from
LOADING to FULL, Loading Done
R1(config-router)#
*Nov 14 15:47:37.055: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.131 on Ethernet1/2
from LOADING to FULL, Loading Done
R1(config-router)#
*Nov 14 15:47:43.323: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.131 on Ethernet1/2 fr
om LOADING to FULL, Loading Done
R1(config-router)#end
R1#
R1#
*Nov 14 15:49:12.031: %SYS-5-CONFIG_I: Configured from console by console
R1#show run | section ^router ospf
router ospf 4
  router-id 0.0.4.1
  network 10.79.10.0 0.0.0.255 area 0
  network 10.79.13.0 0.0.0.255 area 0
  default-information originate
R1#
R1#show run | section ^ipv6 route
ipv6 route 2001:DB8:100::/48 Null0
ipv6 router ospf 6
  router-id 0.0.6.1
  default-information originate
R1#show ipv6 ospf interface brief
Interface  PID  Area  Intf ID  Cost  State  Nbrs  F/C
Et1/1     6   0     6        10   DR    1/1
Et1/2     6   0     7        10   DR    1/1
R1#
R1#show run | section bgp
router bgp 300
  bgp router-id 1.1.1.1
  bgp log-neighbor-changes
  neighbor 2001:DB8:200::2 remote-as 500
  neighbor 209.165.200.226 remote-as 500
  !
  address-family ipv4
    network 10.0.0.0
    no neighbor 2001:DB8:200::2 activate
    neighbor 209.165.200.226 activate
  exit-address-family
  !
  address-family ipv6
    network 2001:DB8:100::/48
    neighbor 2001:DB8:200::2 activate
  exit-address-family
R1#
```

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W | 10:53 a.m. 14/11/2022

Fuente: Autor.

Figura 17. Validación de rutas ip BGP y OSPF en R1.



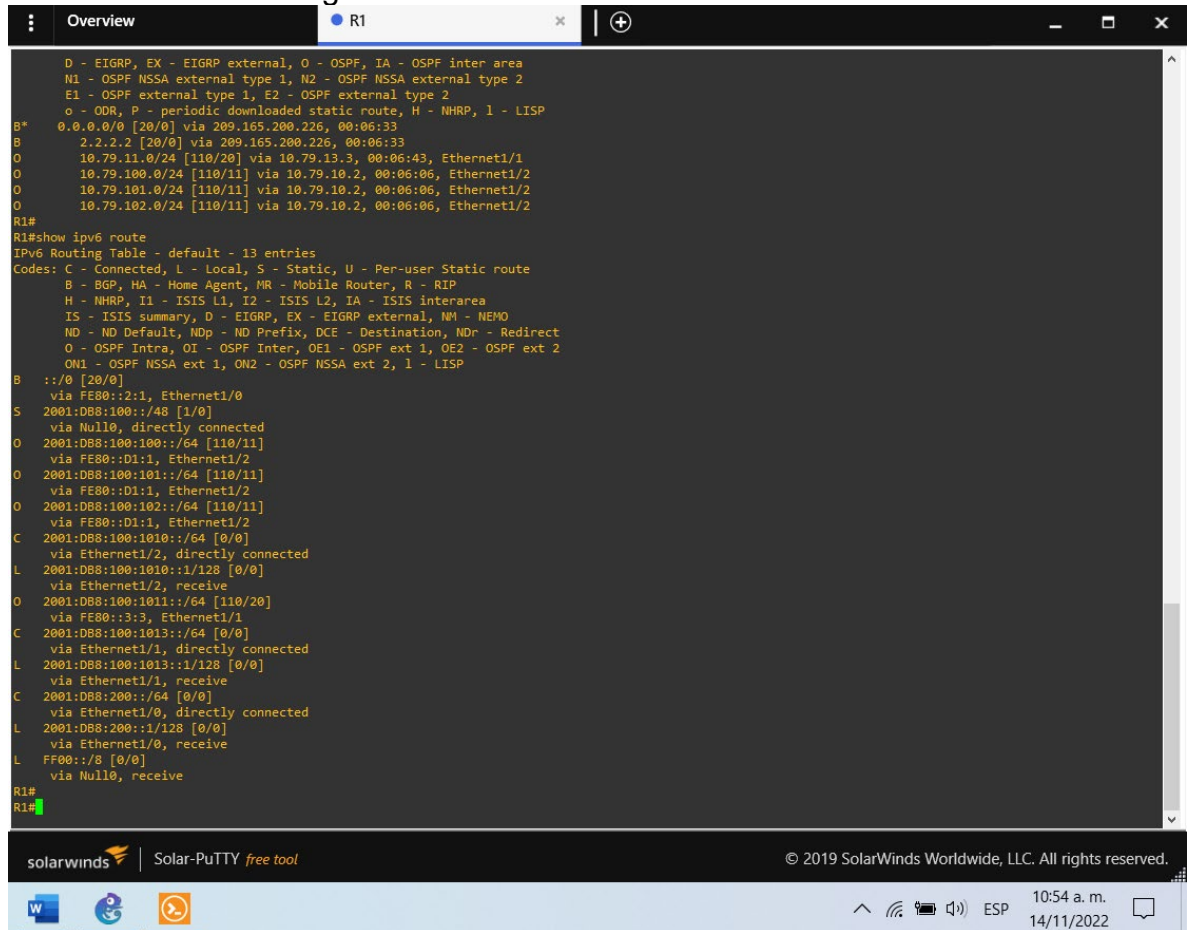
```
R1#show run | section ^router ospf
router ospf 4
  router-id 0.0.4.1
  network 10.79.10.0 0.0.0.255 area 0
  network 10.79.13.0 0.0.0.255 area 0
  default-information originate
R1#
R1#show run | section ^ipv6 route
ipv6 route 2001:DB8:100::/48 Null0
ipv6 router ospf 6
  router-id 0.0.6.1
  default-information originate
R1#show ipv6 ospf interface brief
Interface  PID Area          Intf ID Cost State Nbrs F/C
Et1/1     6  0             6      10 DR   1/1
Et1/2     6  0             7      10 DR   1/1
R1#
R1#show run | section bgp
router bgp 300
  bgp router-id 1.1.1.1
  bgp log-neighbor-changes
  neighbor 2001:DB8:200::2 remote-as 500
  neighbor 209.165.200.226 remote-as 500
  !
  address-family ipv4
    network 10.0.0.0
    no neighbor 2001:DB8:200::2 activate
    neighbor 209.165.200.226 activate
  exit-address-family
  !
  address-family ipv6
    network 2001:DB8:100::/48
    neighbor 2001:DB8:200::2 activate
  exit-address-family
R1#
R1#show ip route | include 0|B
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       o - ODR, P - periodic downloaded static route, H - NHRP, I - LISP
B* 0.0.0.0/0 [20/0] via 209.165.200.226, 00:06:33
B  2.2.2.2 [20/0] via 209.165.200.226, 00:06:33
O  10.79.11.0/24 [110/20] via 10.79.13.3, 00:06:43, Ethernet1/1
O  10.79.100.0/24 [110/11] via 10.79.10.2, 00:06:06, Ethernet1/2
O  10.79.101.0/24 [110/11] via 10.79.10.2, 00:06:06, Ethernet1/2
O  10.79.102.0/24 [110/11] via 10.79.10.2, 00:06:06, Ethernet1/2
R1#
```

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Fuente: Autor.

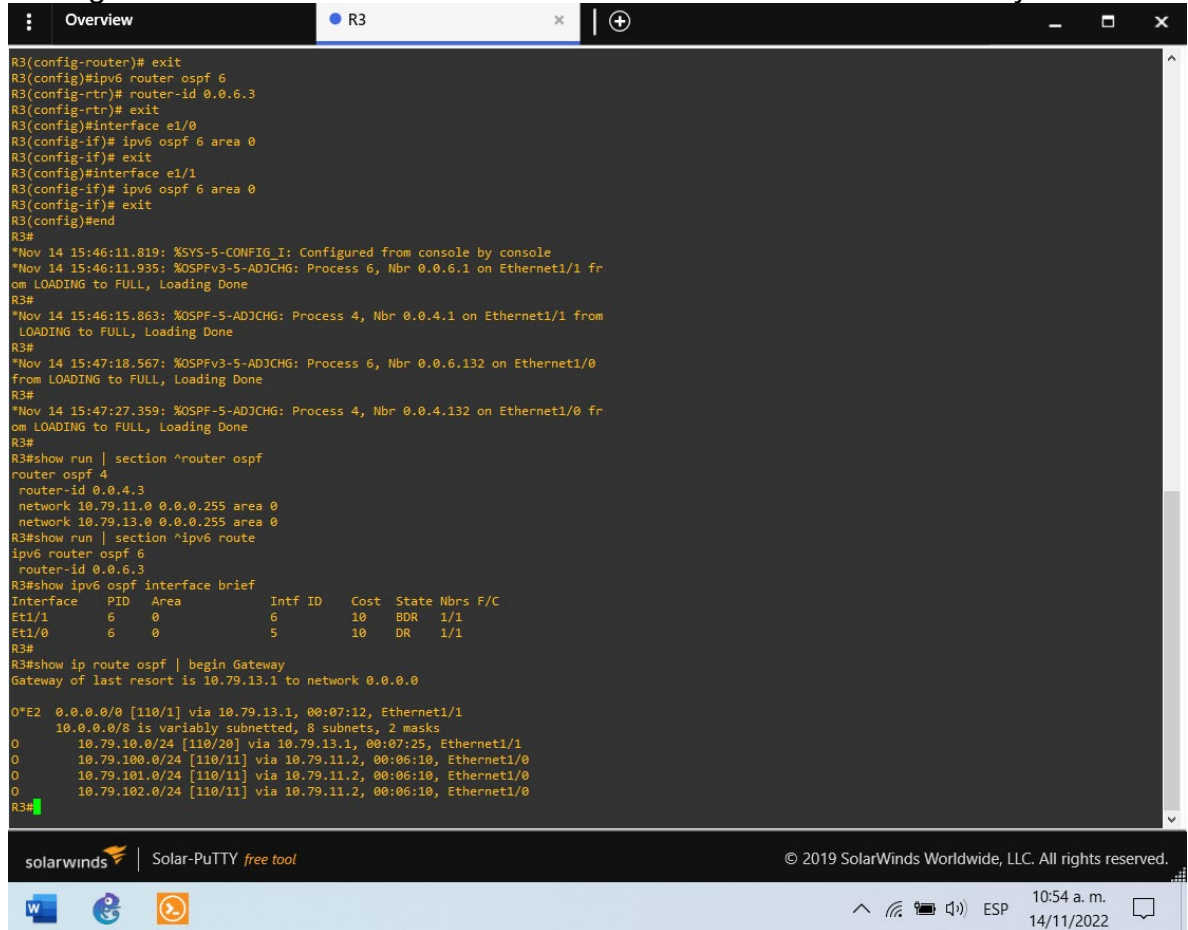
Figura 18. Validación de rutas IPv6 en R1.



```
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
O - ODR, P - periodic downloaded static route, H - NHRP, I - LISP
B* 0.0.0.0 [20/0] via 209.165.200.226, 00:06:33
B 2.2.2.2 [20/0] via 209.165.200.226, 00:06:33
O 10.79.11.0/24 [110/20] via 10.79.13.3, 00:06:43, Ethernet1/1
O 10.79.100.0/24 [110/11] via 10.79.10.2, 00:06:06, Ethernet1/2
O 10.79.101.0/24 [110/11] via 10.79.10.2, 00:06:06, Ethernet1/2
O 10.79.102.0/24 [110/11] via 10.79.10.2, 00:06:06, Ethernet1/2
R1#
R1#show ipv6 route
IPv6 Routing Table - default - 13 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
ND - ND Default, NDP - ND Prefix, DCE - Destination, NDR - Redirect
O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, I - LISP
B ::/0 [20/0]
  via FE80::2:1, Ethernet1/0
S 2001:DB8:100::/48 [1/0]
  via Null0, directly connected
O 2001:DB8:100:100::/64 [110/11]
  via FE80::D1:1, Ethernet1/2
O 2001:DB8:100:101::/64 [110/11]
  via FE80::D1:1, Ethernet1/2
O 2001:DB8:100:102::/64 [110/11]
  via FE80::D1:1, Ethernet1/2
C 2001:DB8:100:1010::/64 [0/0]
  via Ethernet1/2, directly connected
L 2001:DB8:100:1010::1/128 [0/0]
  via Ethernet1/2, receive
O 2001:DB8:100:1011::/64 [110/20]
  via FE80::3:3, Ethernet1/1
C 2001:DB8:100:1013::/64 [0/0]
  via Ethernet1/1, directly connected
L 2001:DB8:100:1013::1/128 [0/0]
  via Ethernet1/1, receive
C 2001:DB8:200::/64 [0/0]
  via Ethernet1/0, directly connected
L 2001:DB8:200::1/128 [0/0]
  via Ethernet1/0, receive
L FF00::/8 [0/0]
  via Null0, receive
R1#
R1#
```

Fuente: Autor.

Figura 19. Validación de rutas IPv4 OSPF comenzando en Gateway en R3.



```
R3(config-router)# exit
R3(config)#ipv6 router ospf 6
R3(config-rtr)# router-id 0.0.6.3
R3(config-rtr)# exit
R3(config)#interface e1/0
R3(config-if)# ipv6 ospf 6 area 0
R3(config-if)# exit
R3(config)#interface e1/1
R3(config-if)# ipv6 ospf 6 area 0
R3(config-if)# exit
R3(config)#end
R3#
*Nov 14 15:46:11.819: %SYS-5-CONFIG_I: Configured from console by console
*Nov 14 15:46:11.935: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.1 on Ethernet1/1 fr
om LOADING to FULL, Loading Done
R3#
*Nov 14 15:46:15.863: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.1 on Ethernet1/1 from
LOADING to FULL, Loading Done
R3#
*Nov 14 15:47:18.567: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.132 on Ethernet1/0
from LOADING to FULL, Loading Done
R3#
*Nov 14 15:47:27.359: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.132 on Ethernet1/0 fr
om LOADING to FULL, Loading Done
R3#
R3#show run | section ^router ospf
router ospf 4
  router-id 0.0.4.3
  network 10.79.11.0 0.0.0.255 area 0
  network 10.79.13.0 0.0.0.255 area 0
R3#show run | section ^ipv6 route
ipv6 router ospf 6
  router-id 0.0.6.3
R3#show ipv6 ospf interface brief
Interface  PID  Area      Intf ID  Cost  State  Nbrs  F/C
Et1/1     6   0         6        10   BDR    1/1
Et1/0     6   0         5        10   DR     1/1
R3#
R3#show ip route ospf | begin Gateway
Gateway of last resort is 10.79.13.1 to network 0.0.0.0

O*E2  0.0.0.0/0 [110/1] via 10.79.13.1, 00:07:12, Ethernet1/1
      10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks
O      10.79.10.0/24 [110/20] via 10.79.13.1, 00:07:25, Ethernet1/1
O      10.79.100.0/24 [110/11] via 10.79.11.2, 00:06:10, Ethernet1/0
O      10.79.101.0/24 [110/11] via 10.79.11.2, 00:06:10, Ethernet1/0
O      10.79.102.0/24 [110/11] via 10.79.11.2, 00:06:10, Ethernet1/0
R3#
```

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Fuente: Autor.

Figura 20. Validación de rutas IPv6 OSPF en R3.

```

from LOADING to FULL, Loading Done
R3#
*Nov 14 15:47:27.359: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.132 on Ethernet1/0 fr
om LOADING to FULL, Loading Done
R3#
R3#show run | section ^router ospf
router ospf 4
  router-id 0.0.4.3
  network 10.79.11.0 0.0.0.255 area 0
  network 10.79.13.0 0.0.0.255 area 0
R3#show run | section ^ipv6 route
ipv6 router ospf 6
  router-id 0.0.6.3
R3#show ipv6 ospf interface brief
Interface  PID  Area          Intf ID  Cost  State  Nbrs  F/C
Et1/1     6   0             6       10   BDR   1/1
Et1/0     6   0             5       10   DR    1/1
R3#
R3#show ip route ospf | begin Gateway
Gateway of last resort is 10.79.13.1 to network 0.0.0.0

O*E2  0.0.0.0/0 [110/1] via 10.79.13.1, 00:07:12, Ethernet1/1
      10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks
O      10.79.10.0/24 [110/20] via 10.79.13.1, 00:07:25, Ethernet1/1
O      10.79.100.0/24 [110/11] via 10.79.11.2, 00:06:10, Ethernet1/0
O      10.79.101.0/24 [110/11] via 10.79.11.2, 00:06:10, Ethernet1/0
O      10.79.102.0/24 [110/11] via 10.79.11.2, 00:06:10, Ethernet1/0
R3#
R3#show ipv6 route ospf
IPv6 Routing Table - default - 10 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
        B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
        H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
        IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
        ND - ND Default, NDp - ND Prefix, DCE - Destination, NDR - Redirect
        O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
        ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, L - LISP
OE2 ::/0 [110/1], tag 6
      via FE80::1:3, Ethernet1/1
O  2001:D88:100:100::/64 [110/11]
      via FE80::D1:1, Ethernet1/0
O  2001:D88:100:101::/64 [110/11]
      via FE80::D1:1, Ethernet1/0
O  2001:D88:100:102::/64 [110/11]
      via FE80::D1:1, Ethernet1/0
O  2001:D88:100:1013::/64 [110/10]
      via Ethernet1/1, directly connected
R3#
  
```

Fuente: Autor.

2.1.4. Part 4: Configure First Hop Redundancy

In this part, you will configure HSRP version 2 to provide first-hop redundancy for hosts in the “Company Network”.

Your configuration tasks are as follows:

Tabla 4. Actividades de la parte 4.

Task#	Task	Specification
4.1	On D1, create IP SLAs that test the reachability	Create two IP SLAs. <ul style="list-style-type: none"> • Use SLA number 4 for IPv4. • Use SLA number 6 for IPv6.

Task#	Task	Specification
	of R1 interface E1/2.	<p>The IP SLAs will test availability of R1 E1/2 interface every 5 seconds.</p> <p>Schedule the SLA for immediate implementation with no end time.</p> <p>Create an IP SLA object for IP SLA 4 and one for IP SLA 6.</p> <ul style="list-style-type: none"> • Use track number 4 for IP SLA 4. • Use track number 6 for IP SLA 6. <p>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.</p>
4.2	On D2, create IP SLAs that test the reachability of R3 interface E1/0.	<p>Create two IP SLAs.</p> <ul style="list-style-type: none"> • Use SLA number 4 for IPv4. • Use SLA number 6 for IPv6. <p>The IP SLAs will test availability of R3 E1/0 interface every 5 seconds.</p> <p>Schedule the SLA for immediate implementation with no end time.</p> <p>Create an IP SLA object for IP SLA 4 and one for IP SLA 6.</p> <ul style="list-style-type: none"> • Use track number 4 for IP SLA 4. • Use track number 6 for IP SLA 6. <p>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.</p>
4.3	On D1, configure HSRPv2.	<p>D1 is the primary router for VLANs 100 and 102; therefore, their priority will also be changed to 150.</p> <p>Configure HSRP version 2.</p> <p>Configure IPv4 HSRP group 104 for VLAN 100:</p> <ul style="list-style-type: none"> • Assign the virtual IP address 10.79.100.254. • Set the group priority to 150. • Enable preemption. • Track object 4 and decrement by 60. <p>Configure IPv4 HSRP group 114 for VLAN 101:</p>

Task#	Task	Specification
		<ul style="list-style-type: none"> • Assign the virtual IP address 10.79.101.254. • Enable preemption. • Track object 4 to decrement by 60. Configure IPv4 HSRP group 124 for VLAN 102: <ul style="list-style-type: none"> • Assign the virtual IP address 10.79.102.254. • Set the group priority to 150. • Enable preemption. • Track object 4 to decrement by 60. Configure IPv6 HSRP group 106 for VLAN 100: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Assign the virtual IP address 10.79.100.254. • Enable preemption. • Track object 4 and decrement by 60. Configure IPv4 HSRP group 114 for VLAN 101: <ul style="list-style-type: none"> • Assign the virtual IP address 10.79.101.254. • Set the group priority to 150. • Enable preemption. • Track object 4 to decrement by 60. Configure IPv4 HSRP group 124 for VLAN 102: <ul style="list-style-type: none"> • Assign the virtual IP address 10.79.102.254. • Enable preemption. • Track object 4 to decrement by 60.

Task#	Task	Specification
		Configure IPv6 HSRP group 106 for VLAN 100: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Assign the virtual IP address using ipv6 autoconfig. • Enable preemption. • Track object 6 and decrement by 60.

Fuente: Autor del documento.

Configuración en D1

```

D1(config)#ip sla 4 //Se configura SLA con numero 4
para IPv4
D1(config-ip-sla)# icmp-echo 10.79.10.1 //Se configura la interfaz de prueba
D1(config-ip-sla-echo)# frequency 5 //Se configura la frecuencia de la
prueba
D1(config-ip-sla-echo)# exit
D1(config)#ip sla 6 //Se configura SLA con numero 6
para IPv6
D1(config-ip-sla)# icmp-echo 2001:db8:100:1010::1 //Se configura la interfaz de
prueba
D1(config-ip-sla-echo)# frequency 5 //Se configura la frecuencia de la
prueba
D1(config-ip-sla-echo)# exit
D1(config)#ip sla schedule 4 life forever start-time now //Se programa SLA
para implementacion inmediata sin tiempo de finalización
D1(config)#ip sla schedule 6 life-forever start-time now //Se programa SLA
para implementacion inmediata sin tiempo de finalización
D1(config)#track 4 ip sla 4 //Se configura una pista con id 4
D1(config-track)# delay down 10 up 15 //Se configuran los tiempo de
notificación de abajo a arriba después de 10 sg o de arriba abajo después de 15 sg
D1(config-track)# exit
D1(config)#track 6 ip sla 6 //Se configura una pista con id 6
D1(config-track)# delay down 10 up 15 //Se configuran los tiempo de
notificación de abajo a arriba después de 10 sg o de arriba abajo después de 15 sg

```

```

D1(config-track)# exit
D1(config)#interface vlan 100 //Se accede a la interfaz
D1(config-if)# standby version 2 //Se configura HSRP version 2
D1(config-if)# standby 104 ip 10.79.100.254 //Se asigna una dirección ip virtual
D1(config-if)# standby 104 priority 150 //Se configura la prioridad de grupo
D1(config-if)# standby 104 preempt //Se habilita preferencia
D1(config-if)# standby 104 track 4 decrement 60 //Se configura una pista con
decremento de 60
D1(config-if)# standby 106 ipv6 autoconfig //Se asigna una dirección ip virtual
autoconfigurable
D1(config-if)# standby 106 priority 150 //Se configura la prioridad de grupo
D1(config-if)# standby 106 preempt //Se habilita preferencia
D1(config-if)# standby 106 track 6 decrement 60 //Se configura una pista con
decremento de 60
D1(config-if)# exit
D1(config)#interface vlan 101 //Se accede a la interfaz
D1(config-if)# standby version 2 //Se configura HSRP version 2
D1(config-if)# standby 114 ip 10.79.101.254 //Se asigna una dirección ip virtual
D1(config-if)# standby 114 preempt //Se habilita preferencia
D1(config-if)# standby 114 track 4 decrement 60 //Se configura una pista con
decremento de 60
D1(config-if)# standby 116 ipv6 autoconfig //Se asigna una dirección ip virtual
autoconfigurable
D1(config-if)# standby 116 preempt //Se habilita preferencia
D1(config-if)# standby 116 track 6 decrement 60 //Se configura una pista con
decremento de 60
D1(config-if)# exit
D1(config)#interface vlan 102 //Se accede a la interfaz
D1(config-if)# standby version 2 //Se configura HSRP version 2
D1(config-if)# standby 124 ip 10.79.102.254 //Se asigna una dirección ip virtual
D1(config-if)# standby 124 priority 150 //Se configura la prioridad de grupo
D1(config-if)# standby 124 preempt //Se habilita preferencia
D1(config-if)# standby 124 track 4 decrement 60 //Se configura una pista con
decremento de 60
D1(config-if)# standby 126 ipv6 autoconfig //Se asigna una dirección ip virtual
autoconfigurable
D1(config-if)# standby 126 priority 150 //Se configura la prioridad de grupo
D1(config-if)# standby 126 preempt //Se habilita preferencia
D1(config-if)# standby 126 track 6 decrement 60 //Se configura una pista con
decremento de 60
D1(config-if)# exit
D1(config)#end

```

Configuración en D2

```
D2(config)#ip sla 4 //Se configura SLA con numero 4
para IPv4
D2(config-ip-sla)# icmp-echo 10.79.11.1 //Se configura la interfaz de prueba
D2(config-ip-sla-echo)# frequency 5 //Se configura la frecuencia de la
prueba
D2(config-ip-sla-echo)#exit
D2(config)#ip sla 6 //Se configura SLA con numero 6
para IPv6
D2(config-ip-sla)# icmp-echo 2001:db8:100:1011::1 //Se configura la interfaz de
prueba
D2(config-ip-sla-echo)# frequency 5 //Se configura la frecuencia de la
prueba
D2(config-ip-sla-echo)#exit
D2(config)#ip sla schedule 4 life forever start-time now //Se programa SLA
para implementacion inmediata sin tiempo de finalización
D2(config)#ip sla schedule 6 life forever start-time now //Se programa SLA
para implementacion inmediata sin tiempo de finalización
D2(config)#track 4 ip sla 4 //Se configura una pista con id 4
D2(config-track)# delay down 10 up 15 //Se configuran los tiempo de
notificación de abajo a arriba después de 10 sg o de arriba abajo después de 15 sg
D2(config-track)# exit
D2(config)#track 6 ip sla 6 //Se configura una pista con id 6
D2(config-track)# delay down 10 up 15 //Se configuran los tiempo de
notificación de abajo a arriba después de 10 sg o de arriba abajo después de 15 sg
D2(config-track)# exit
D2(config)#interface vlan 100 //Se accede a la interfaz
D2(config-if)# standby version 2 //Se configura HSRP version 2
D2(config-if)# standby 104 ip 10.79.100.254 //Se asigna una dirección ip virtual
D2(config-if)# standby 104 preempt //Se habilita preferencia
D2(config-if)# standby 104 track 4 decrement 60 //Se configura una pista con
decremento de 60
D2(config-if)# standby 106 ipv6 autoconfig //Se asigna una dirección ip virtual
autoconfigurable
D2(config-if)# standby 106 preempt //Se habilita preferencia
D2(config-if)# standby 106 track 6 decrement 60 //Se configura una pista con
decremento de 60
D2(config-if)# exit
D2(config)#interface vlan 101 //Se accede a la interfaz
D2(config-if)# standby version 2 //Se configura HSRP version 2
D2(config-if)# standby 114 ip 10.79.101.254 //Se asigna una dirección ip virtual
D2(config-if)# standby 114 priority 150
D2(config-if)# standby 114 preempt //Se habilita preferencia
```



```

D2(config-if)# standby 114 track 4 decrement 60 //Se configura una pista con
decremento de 60
D2(config-if)# standby 116 ipv6 autoconfig //Se asigna una dirección ip virtual
autoconfigurable
D2(config-if)# standby 116 priority 150
D2(config-if)# standby 116 preempt //Se habilita preferencia
D2(config-if)# standby 116 track 6 decrement 60 //Se configura una pista con
decremento de 60
D2(config-if)# exit
D2(config)#interface vlan 102 //Se accede a la interfaz
D2(config-if)# standby version 2 //Se configura HSRP version 2
D2(config-if)# standby 124 ip 10.79.102.254 //Se asigna una dirección ip virtual
D2(config-if)# standby 124 preempt //Se habilita preferencia
D2(config-if)# standby 124 track 4 decrement 60 //Se configura una pista con
decremento de 60
D2(config-if)# standby 126 ipv6 autoconfig //Se asigna una dirección ip virtual
autoconfigurable
D2(config-if)# standby 126 preempt //Se habilita preferencia
D2(config-if)# standby 126 track 6 decrement 60 //Se configura una pista con
decremento de 60
D2(config-if)# exit

```

Figura 21. Validación de la configuración IP SLA en D1.

```

Overview D1
*Nov 14 15:57:56.583: %HSRP-5-STATECHANGE: Vlan101 Grp 116 state Active -> Speak
*Nov 14 15:57:56.668: %HSRP-5-STATECHANGE: Vlan101 Grp 114 state Active -> Speak
D1(config)#
*Nov 14 15:58:08.354: %HSRP-5-STATECHANGE: Vlan101 Grp 114 state Speak -> Standb
y
*Nov 14 15:58:08.595: %HSRP-5-STATECHANGE: Vlan101 Grp 116 state Speak -> Standb
y
D1(config)#
D1(config)#exit
D1#
*Nov 14 15:59:06.577: XSYS-5-CONFIG_I: Configured from console by console
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 10.79.10.1
  frequency 5
ip sla schedule 4 life forever start-time now
ip sla 6
  icmp-echo 2001:DB8:100:1010::1
  frequency 5
ip sla schedule 6 life forever start-time now
D1#

```

Fuente: Autor.

Figura 22. Validación del standby en D1.

```

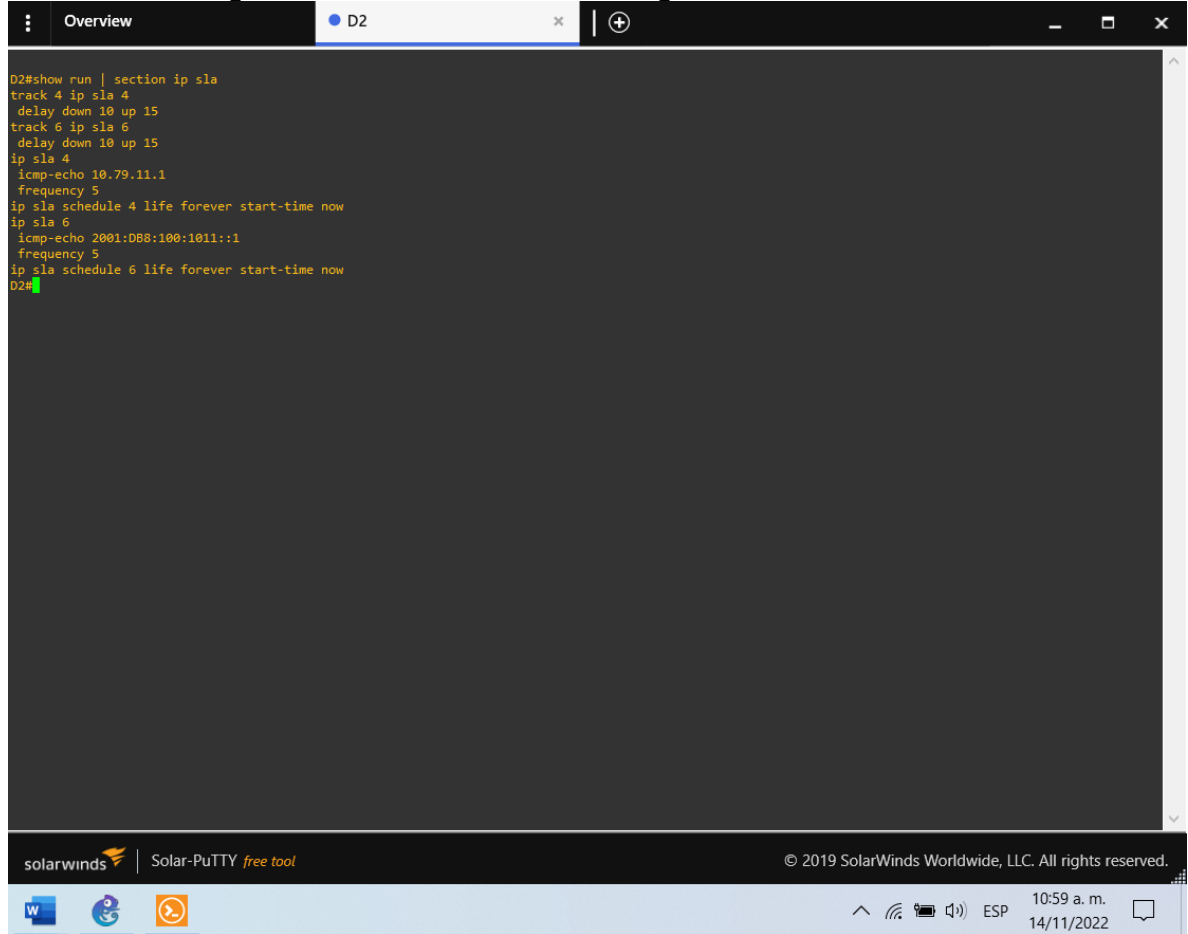
Overview | D1
*Nov 14 15:57:56.583: %HSRP-5-STATECHANGE: Vlan101 Grp 116 state Active -> Speak
*Nov 14 15:57:56.668: %HSRP-5-STATECHANGE: Vlan101 Grp 114 state Active -> Speak
D1(config)#
*Nov 14 15:58:08.354: %HSRP-5-STATECHANGE: Vlan101 Grp 114 state Speak -> Standb
y
*Nov 14 15:58:08.595: %HSRP-5-STATECHANGE: Vlan101 Grp 116 state Speak -> Standb
y
D1(config)#
D1(config)#exit
D1#
D1#
*Nov 14 15:59:06.577: %SYS-5-CONFIG_I: Configured from console by console
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 10.79.10.1
  frequency 5
ip sla schedule 4 life forever start-time now
ip sla 6
  icmp-echo 2001:DB8:100:1010::1
  frequency 5
ip sla schedule 6 life forever start-time now
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         10.79.100.2    10.79.100.254
Vl100      106  150 P Active local         FE80::D2:2    FE80::5:73FF:FEA0:6A
Vl101      114  100 P Standby 10.79.101.2   local         10.79.101.254
Vl101      116  100 P Standby FE80::D2:3    local         FE80::5:73FF:FEA0:74
Vl102      124  150 P Active local         10.79.102.2    10.79.102.254
Vl102      126  150 P Active local         FE80::D2:4    FE80::5:73FF:FEA0:7E
D1#
  
```

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Windows taskbar: 10:59 a.m. 14/11/2022

Fuente: Autor.

Figura 23. Validación de la configuración IP SLA en 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 10.79.11.1
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#
```

The screenshot shows a SolarWinds Solar-PuTTY terminal window with a dark background and light text. The terminal displays the output of the command 'show run | section ip sla' on a device named 'D2'. The output lists two IP SLA configurations: one for IP 10.79.11.1 (track 4) and one for IPv6 address 2001:DB8:100:1011::1 (track 6). Both configurations include a 10-second delay down and 15-second delay up, and are scheduled to run forever starting now. The terminal prompt 'D2#' is visible at the end of the output.

Fuente: Autor.

CONCLUSIONES

Cuando usaba las herramientas GNS3, tenía muchos problemas para encontrar imágenes con las que probar mis habilidades, algunas de ellas no reconocían la mayoría de los comandos necesarios para vincular estas herramientas. Equipo. El objetivo es reflejar las habilidades y responsabilidades involucradas en la realización de actividades de conectividad, así como demostraciones de implementación realizadas al ejecutar el contenido recomendado en una topología de red.

Esta prueba le permite comprender la aplicación de varios conceptos de redes, adiciones técnicas y presentación de aplicaciones en el dispositivo, incluida la adición de VLAN en un dispositivo de conmutador de capa 3, la habilitación del enrutamiento ipv6 y el uso de ASN especificado para bgp.

En última instancia, este enfoque permite que los administradores de red estén expuestos a una gran parte del contenido, ya que cada implementación debe cumplir con los requisitos, y los conceptos aprendidos en el curso son fundamentales para comprender y completar con éxito la operación.

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