

DIPLOMADO DE PROFUNDIZACION CISCO
PRUEBA DE HABILIDADES PRACTICAS CCNP

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA – UNAD
ESCUELA DE CIENCIAS BASICAS, TECNOLOGIA E INGENIERIA –ECBTII
INGENIERIA ELECTRONICA
PALMIRA 2022

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Diplomado de opción de grado presentado para optar el título de
INGENIERO ELECTRÓNICO

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ESCUELA DE CIENCIAS BASICAS, TECNOLOGIA E INGENIERIA –ECBTII
INGENIERIA ELECTRONICA
PALMIRA, VALLE DEL CAUCA
2022

NOTA DE ACEPTACIÓN

Firma del presidente del jurado

Firma del jurado

Firma del jurado

Palmira, 16 de noviembre 2022

AGRADECIMIENTOS

Primeramente a Dios por prestarme la vida, con pleno gozo de todas mis facultades física, mental y espiritual en perfecto estado, a mi madre la Señora María Naidú Ramírez, por tanto sacrificio y apoyo, a mi esposa Darlyn Yulieth Mora Flórez, por ese acompañamiento durante los momentos difíciles y su apoyo en mi proceso como esposo, trabajador y estudiante, a la UNAD y todo su cuerpo de Tutores y personal administrativo, quienes siempre estuvieron prestos a cualquier requerimiento durante mi tiempo como estudiante dentro y fuera del campus. Simplemente gracias por ser parte del cumplimiento de este gran sueño.

CONTENIDO

AGRADECIMIENTOS	4
CONTENIDO	5
LISTA DE TABLAS	6
LISTA DE FIGURAS	7
GLOSARIO	8
RESUMEN	9
ABSTRACT	9
INTRODUCCION	10
ESCENARIO 1	11
PARTE 1 Construir la red y configurar los ajustes básicos.....	11
Paso 1 Cablee la red como se muestra en la topología.....	11
Paso 2 Configure los ajustes básicos para cada dispositivo.....	12
PARTE 2 Configurar la red de capa 2 y la compatibilidad con el host.....	20
2.1 Configuración de las interfaces troncales IEEE 802.1Q en los enlaces de conmutador de interconexión.....	22
2.2 Cambio de la VLAN nativa en los enlaces troncales.....	23
2.3 Habilitación del protocolo Rapid Spanning-Tree.....	24
2.4 Configuración de los puentes raíz RSTP apropiados según la información del diagrama de la topología en D1 y D2.....	24
2.5 Crear LACP EtherChannels en todos los switches.....	25
2.6 Configuración de puertos de acceso de host que se conectan a PC1, PC2, PC3 y PC4.....	26
2.7 Verificación de los servicios DHCP IPv4.....	27
2.8 Verificación de la conectividad LAN local.....	28
PARTE 3 configurar protocolos de enrutamiento	30
3.1 en la "red de la empresa" (es decir, r1, r3, d1 y d2), configure ospfv2 de área única en el área 0.	32
3.2 en la "red de la empresa" (es decir, r1, r3, d1 y d2), configure ospfv2 de área única en el área 0.	33
3.3 en r2 en la "red isp", con la figura mp-bgp	34
3.4 en r1 en la "red isp", configure mp-bgp.	35
PARTE 4 configurar redundancia de primer salto	44
4.2 en d2, cree sla ip que prueben la accesibilidad de la interfaz r3 e1/0.	47
4.3 configuración para d1, configure hsrpv2.....	48
CONCLUSIONES	52
BIBLIOGRAFIA	53

LISTA DE TABLAS

Tabla 1: Tabla de direccionamiento.....	12
Tabla 2. Configurar la capa 2 de la red y el soporte de Host.....	20
Tabla 3. Configurar los protocolos de enrutamiento.....	30
Tabla 4. Configurar la Redundancia del Primer salto.....	44

LISTA DE FIGURAS

Figura 1. Escenario autoría propia.....	13
Figura 2. Direccionamiento de los host PC 1	21
Figura 3. Direccionamiento de los host PC 4	21
Figura 4. T PC2 cliente DHCP dirección IPv4 válida.....	28
Figura 5. PC3 cliente DHCP dirección IPv4 válida.....	28
Figure 6. PC1 ping a D1, D2 y PC4	29
Figure 7. PC2 ping a D1 y D2	29
Figure 8. PC3 ping a D1 y D2	30
Figure 9. PC4 ping a D1, D2 y PC1	30
Figure 10. show run section router ospf on R1.....	35
Figure 11. show run section router ospf on R2.....	36
Figure 12. show run section router ospf on D1.....	36
Figure 13. show run section router ospf on D2.....	37
Figure 14. show run section ipv6 router on R1.....	37
Figure 15. show run section ipv6 router on.....	38
Figure 16. show run section ipv6 router on D1.....	38
Figure 17. show run section ipv6 router on D2.....	39
Figure 18. show ipv6 ospf interface brief on R1.....	39
Figure 19. show ipv6 ospf interface brief on R3.....	40
Figure 20. show ipv6 ospf interface brief on D1.....	40
Figure 21. show ipv6 ospf interface brief on D2.....	41
Figure 22. show run section bgp and show run include route on R2	41
Figure 23. show run section bgp on R1.....	42
Figure 24. show ip route include O B on R1.....	42
Figure 25. show ipv6 route command on R1.....	43
Figure 26. show ipv6 route ospf command on R3	43
Figure 27. show run section ip sla command on D1.....	50
Figure 28. show standby brief command on D1	50
Figure 29. show run section ip sla command on D2.....	51

GLOSARIO

LAN: Local Area Network, (Red de Area Local). Básicamente es una red que interconecta ordenadores, servidores entre otros dispositivos en un área pequeña.

NAT: Network Address Translation, (Traducción de Dirección de Red). Es el mecanismo por el cual servidores, Routers, switches y ordenadores para intercambiar paquetes de datos, entre redes que se asignan con direcciones no compatibles o traducir su direccionamiento.

ROUTER: Un enrutador o encaminador es un dispositivo que permite interconectar redes con distinto prefijo en su dirección IP

VRF: El Enrutamiento Virtual y Reenvío (VRF) es una tecnología incluida en Routers de red IP (Internet Protocol) que permite a varias instancias de una tabla de enrutamiento existir en un Router y trabajar al simultáneamente.

VLAN: Virtual Local Area Network (Red de Area Local Virtual), Su función principal agrupar un conjunto de equipos por medio del direccionamiento, por medio de programación de red se limita la comunicación entre los diferentes equipos u ordenadores sin importar su arquitectura física.

WAN: Wide Area Network, (Red de Area Local). Como su nombre indica es una red de servidores y ordenadores que se prolonga en una gran extensión de tierra, puede ser intermunicipal, departamental, o incluso internacional.

RESUMEN

La cuarta revolución industrial requiere de grandes manejos de información, las nuevas tecnologías de información cada vez aumentan la infraestructura de comunicaciones y redes de transmisión de datos, con diferentes tipologías y tipos de conexión o cableado.

Es por este motivo la necesidad de profundizar mediante la plataforma Cisco, permite realizar comprensión de material teórico y práctico en la construcción, programación, conexión de redes LAN/WAN por medio de diferentes laboratorios remotos como Packet Tracer, GNS3, Smart LAB.

Palabras clave: LAN, NAT, ROUTER, VRF, VLAN, DHCP, EIGRP, RIPv2, DNS, OSPFv3.

ABSTRACT

The fourth industrial revolution requires great information management, new information technologies increasingly increase the communications infrastructure and data transmission networks, with different typologies and types of connection or wiring.

It is for this reason the need to deepen through the Cisco platform, allows understanding of theoretical and practical material in the construction, programming, connection of LAN / WAN networks through different remote laboratories such as Packet Tracer, GNS3, Smart LAB.

Keywords: LAN, NAT, ROUTER, VRF, VLAN, DHCP, EIGRP, RIPv2, DNS, OSPFv3.

INTRODUCCION

Con la solución de la prueba de habilidades, se llevará a cabo la configuración de una topología de red en la cual se podrá implementar una configuración de direccionamiento y enrutamiento de Routers en red, donde se permite tener varias tablas de enrutamiento trabajando simultáneamente, es por eso que se logró trabajar con una topología de red que contempla redes LAN independientes con hosts como dispositivos finales.

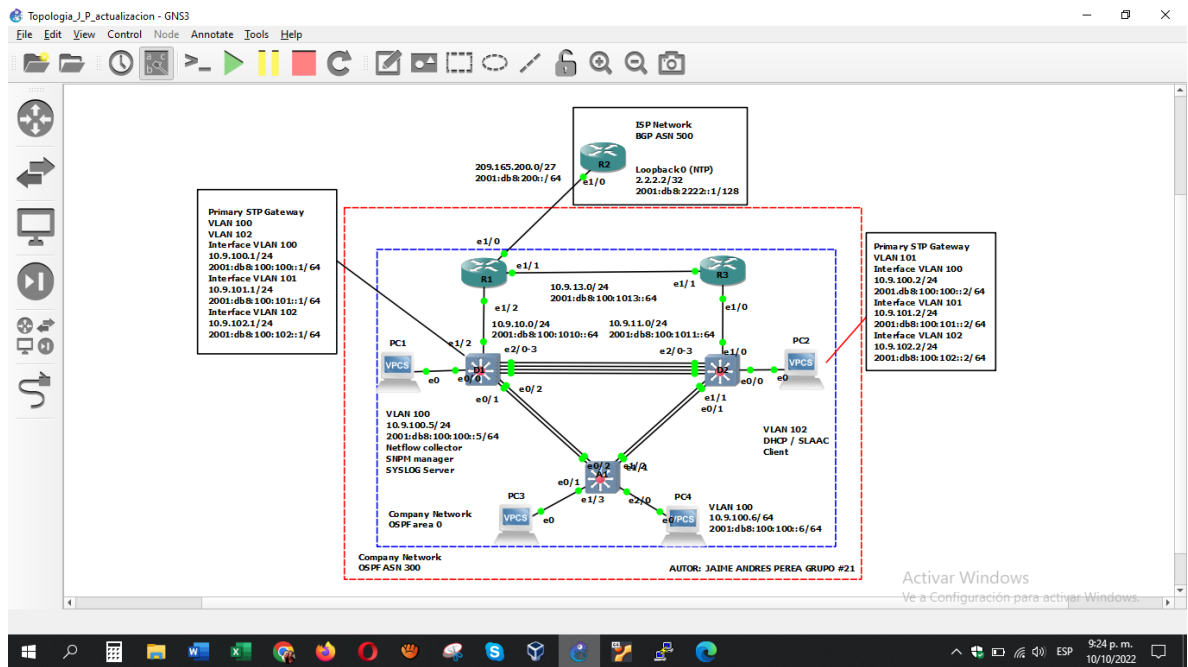
Se hará las configuraciones básicas de cada dispositivo, además de configurar la red de capa 2 y la compatibilidad con los hosts, se habilitará los enlaces troncales 802.1Q, se hará uso de la VLAN 999 como VLAN nativa, también se utilizará el árbol de expansión rápida, se configurará los puentes de raíz RSTP apropiados de acuerdo a la topología, se creará LACP EtherChannel y se llevará a cabo las configuraciones de los puertos de acceso de los hosts, por último, se hará la verificación de los servicios DHCP IPv4 e IPV6 y la conectividad LAN local.

Mediante comandos “show” y “ping” verificaran las configuraciones hechas en modo privilegiado de los equipos, dentro de la topología con los protocolos activos dentro los Router o switches, durante el desarrollo de este informe se adquirieron conocimientos con laboratorios remotos.

PARTE 1: construya la red y configure los ajustes básicos del dispositivo y el direccionamiento de la interfaz.

Paso 1: Cablee la red como se muestra en la topología. Conecte los dispositivos como se muestra en el diagrama de topología y cablee según sea necesario. Se realiza la topología planteada desde el simulador GNS3, usando la siguiente configuración en cada Router

Figura 1. Topología de red



Fuente: PEREA, J. (2022) autoría propia software GNS3

Paso 2: Configuración de los ajustes básicos para cada dispositivo.

Tabla 1: tabla de direccionamiento

Dis p.	Interfa z	Dirección IPv4	Dirección IPv6	IPv6
R1	E1/0	209.165.200.225/27	2001:db8:200::1/64	fe80::1:1
	E1/2	10.09.10.1/24	2001:db8:100:1010::1/64	fe80::1:2
	E1/1	10.09.13.1/24	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
	Bucle invertido	2.2.2.2/32	2001:db8:2222::1/128	fe80::2:3
R3	E1/0	10.09.11.1/24	2001:db8:100:1011::1/64	fe80::3:2
	E1/1	10.09.13.3/24	2001:db8:100:1013::3/64	fe80::3:3
D1	E1/2	10.09.10.2/24	2001:db8:100:1010::2/64	fe80::d1:1
	VLAN 100	10.09.100.1/24	2001:db8:100:100::1/64	fe80::d1:2
	VLAN 101	10.09.101.1/24	2001:db8:100:101::1/64	fe80::d1:3
	VLAN 102	10.09.102.1/24	2001:db8:100:102::1/64	fe80::d1:4
D2	E1/0	10.09.11.2/24	2001:db8:100:1011::2/64	fe80::d2:1
	VLAN 100	10.09.100.2/24	2001:db8:100:100::2/64	fe80::d2:2
	VLAN 101	10.09.101.2/24	2001:db8:100:101::2/64	fe80::d2:3
	VLAN 102	10.09.102.2/24	2001:db8:100:102::2/64	fe80::d2:4
A1	VLAN 100	10.09.100.3/23	2001:db8:100:100::3/64	fe80::a1:1
PC1	NIC	10.09.100.5/24	2001:db8:100:100::5/64	EUI-64
PC2	NIC	DHCP	SLAAC	EUI-64
PC3	NIC	DHCP	SLAAC	EUI-64
PC4	NIC	10.09.100.6/24	2001:db8:100:100::6/64	EUI-64

- a. Consola en cada dispositivo. Se ingresa al modo de configuración global y se aplica la configuración básica. Las configuraciones de inicio para cada dispositivo se proporcionan a continuación.

Router 1

```
Router>enable
Router configure terminal //ingreso a modo privilegiado//
Router(config)#hostname R1 //asignación de nombre//
R1(config)#ipv6 unicast-routing //habilitar IPV6 en router//
R1(config)#no ip domain lookup //habilita traducción de nombre a dirección//
R1(config)#banner motd # R1, ENCOR Skills Assessment, Scenario 1# //mensaje//
R1(config)#line con 0 //configurar la línea de consola //
R1(config-line) #exec-timeout 0 0 //tiempo de espera inactivo de sesión remota//
R1(config-line) #logging synchronous //mensaje de evento ingreso de comando//
R1(config-line) #exit // salir//
R1(config)#interface e1/0 //configuración de interfaz e1/0//
R1(config-if) #ip address 209.165.200. 225 255.255.255.224 //asigno ip interface//
R1(config-if) #ipv6 address fe80::1:1 link-local //asignación de ipv6//
R1(config-if) #ipv6 address 2001:db8:200::1/64 //ipv6 unicast global//
R1(config-if) #no shutdown //enciende la interfaz//
R1(config-if) #exit //salir de configuración de interfaz//
R1(config)#interface e1/2
R1(config-if) #ip address 10.09.10.1 255.255.255.0
R1(config-if) #ipv6 address fe80::1:2 link-local
R1(config-if) #ipv6 address 2001:db8:100:1010::1/64
R1(config-if) #no shutdown
R1(config-if) #exit
R1(config)#interface e1/1
R1(config-if) #ip address 10.09.13.1 255.255.255.0
R1(config-if) #ipv6 address fe80::1:3 link-local
R1(config-if) #ipv6 address 2001:db8:100:1013::1/64
R1(config-if) #no shutdown
R1(config-if) #exit
```

Router 2

```
Router>enable
Router# configure terminal
Router(config)#hostname R2
R2(config)#ipv6 unicast-routing
R2(config)#no ip domain lookup
R2(config)#banner motd # R2 ENCOR Skills Assessment, Scenario 1 #
R2(config)#line con 0
R2(config-line) #exec-timeout 0 0
R2(config-line) #logging synchronous
```

```
R2(config-line) #exit
R2(config)#interface e1/0
R2(config-if) #ip address 209.165.200.226 255.255.255.224
R2(config-if) #ipv6 address fe80::2:1 link-local
R2(config-if) #ipv6 address 2001:db8:200::2/64
R2(config-if) #no shutdown
R2(config-if) #exit
R2(config)#interface Loopback 0
R2(config-if) #ip address 2.2.2.2 255.255.255.255
R2(config-if) #ipv6 address fe80::2:3 link-local
R2(config-if) #ipv6 address 2001:db8:2222::1/128
R2(config-if) #no shutdown
R2(config-if) #exit
```

Router 3

```
Router>enable
Router# configure terminal
Router(config)#hostname R3
R3(config)#ipv6 unicast-routing
R3(config)#no ip domain lookup
R3(config)#banner motd # R3 ENCOR Skills Assessment, Scenario 1 #
R3(config)#line con 0
R3(config-line) #exec-timeout 0 0
R3(config-line) #logging synchronous
R3(config-line) #exit
R3(config)#interface e1/0
R3(config-if) #ip address 10.09.11.1 255.255.255.0
R3(config-if) #ipv6 address fe80::3:2 link-local
R3(config-if) #ipv6 address 2001:db8:100:1011::1/64
R3(config-if) #no shutdown
R3(config-if) #exit
R3(config)#interface e1/1
R3(config-if) #ip address 10.09.13.3 255.255.255.0
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
```

Switch D1

```
Switch>enable
Switch #configure terminal // ingresar al modo privilegiado//
Switch(config)#hostname D1 //asigno nombre al switch//
D1(config)#ip routing //table de direccionamiento//
D1(config)#ipv6 unicast-routing //habilitar dirección ipv6//
D1(config)#no ip domain lookup //habilita la traducción de nombre de dirección//
D1(config)#banner motd # D1, ENCOR Skills Assessment, Scenario 1#
D1(config)#line con 0 //configuración de numero de consola//
D1(config-line) #exec-timeout 0 0 //establecer tiempo de inactividad remoto//
D1(config-line) #logging synchronous //mensaje de evento en comandos//
D1(config-line) #exit //salir//
D1(config)#vlan 100 //crea vlan 100//
D1(config-vlan) #name Management //asignacion de nombre a vlan//
D1(config-vlan) #exit //salir//
D1(config)#vlan 101 //crea vlan 101//
D1(config-vlan) #name UserGroupA //nombre de la vlan//
D1(config-vlan) #exit //salir//
D1(config)#vlan 102 //crea vlan 102//
D1(config-vlan) #name UserGroupB //nombre de vlan//
D1(config-vlan) #exit //salir//
D1(config)#vlan 999 //crea vlan 999//
D1(config-vlan) #name NATIVE //nombre de vlan//
D1(config-vlan) #exit //salir//
D1(config)#interface e1/2 //configuración de interfaz//
D1(config-if) #no switchport //capacidad capa 3//
D1(config-if) #ip address 10.09.10.2 255.255.255.0 //asigna direccion ipv4//
D1(config-if) #ipv6 address fe80::d1:1 link-local //asigna direccion ipv6//
D1(config-if) #ipv6 address 2001:db8:100:1010::2/64 // ipv6 unicast global//
D1(config-if) #no shutdown //enciende interfaz//
D1(config-if) #exit //salir//
D1(config)#interface vlan 100
D1(config-if) #ip address 10.09.100.1 255.255.255.0
D1(config-if) #ipv6 address fe80::d1:2 link-local
D1(config-if) #ipv6 address 2001:db8:100:100::1/64
D1(config-if) #no shutdown
D1(config-if) #exit
D1(config)#interface vlan 101
D1(config-if) #ip address 10.09.101.1 255.255.255.0
D1(config-if) #ipv6 address fe80::d1:3 link-local
D1(config-if) #ipv6 address 2001:db8:100:101::1/64
D1(config-if) #no shutdown
D1(config-if) #exit
D1(config)#interface vlan 102
```

```

D1(config-if) #ip address 10.09.102.1 255.255.255.0
D1(config-if) #ipv6 address fe80::d1:4 link-local
D1(config-if) #ipv6 address 2001:db8:100:102::1/64
D1(config-if) #no shutdown
D1(config-if) #exit
D1(config)#ip dhcp excluded-address 10.09.101.1 10.09.101.109 // excluir rangos//
D1(config)#ip dhcp excluded-address 10.09.101.141 10.09.101.254
D1(config)#ip dhcp excluded-address 10.09.102.1 10.09.102.109
D1(config)#ip dhcp excluded-address 10.09.102.141 10.09.102.254
D1(config)#ip dhcp pool VLAN-101 //agrupa ipv4 con la vlan//
D1(dhcp-config) #network 10.09.101.0 255.255.255.0 //direccion de red//
D1(dhcp-config) #default-router 10.09.101.254 //direccion or defecto//
D1(dhcp-config) #exit //salir//
D1(config)#ip dhcp pool VLAN-102 //creacion DHCP//
D1(dhcp-config) #network 10.09.102.0 255.255.255.0 //asignar ip en red//
D1(dhcp-config) #default-router 10.09.102.254 // Puerta de enlace//
D1(dhcp-config) #exit //salir//
D1(config)#interface range e0/0-3,e1/0-1,e1/3,e2/0-3,e3/0-3
D1(config-if-range) #shutdown
D1(config-if-range) #exit

```

Switch D2

```

Switch>enable
Switch #configure terminal
Switch(config)#hostname D2
D2(config)#ip routing
D2(config)#ipv6 unicast-routing
D2(config)#no ip domain lookup
D2(config)#banner motd # D2, ENCOR Skills Assessment, Scenario 1 #
D2(config)#line con 0
D2(config-line) #exec-timeout 0 0
D2(config-line) #logging synchronous
D2(config-line) #exit
D2(config)#vlan 100
D2(config-vlan) #name Management
D2(config-vlan) #exit
D2(config)#vlan 101
D2(config-vlan) #name UserGroupA
D2(config-vlan) #exit
D2(config)#vlan 102
D2(config-vlan) #name UserGroupB
D2(config-vlan) #exit
D2(config)#vlan 999

```



```

D2(config-vlan) #name NATIVE
D2(config-vlan) #exit
D2(config)#interface e1/0
D2(config-if) #no switchport
D2(config-if) #ip address 10.09.11.2 255.255.255.0
D2(config-if) #ipv6 address fe80::d1:1 link-local
D2(config-if) #ipv6 address 2001:db8:100:1011::2/64
D2(config-if) #no shutdown
D2(config-if) #exit
D2(config)#interface vlan 100
D2(config-if) #ip address 10.09.100.2 255.255.255.0
D2(config-if) #ipv6 address fe80::d2:2 link-local
D2(config-if) #ipv6 address 2001:db8:100:100::2/64
D2(config-if) #no shutdown
D2(config-if) #exit
D2(config)#interface vlan 101
D2(config-if) #ip address 10.09.101.2 255.255.255.0
D2(config-if) #ipv6 address fe80::d2:3 link-local
D2(config-if) #ipv6 address 2001:db8:100:101::2/64
D2(config-if) #no shutdown
D2(config-if) #exit
D2(config)#interface vlan 102
D2(config-if) #ip address 10.09.102.2 255.255.255.0
D2(config-if) #ipv6 address fe80::d2:4 link-local
D2(config-if) #ipv6 address 2001:db8:100:102::2/64
D2(config-if) #no shutdown
D2(config-if) #exit
D2(config)#ip dhcp excluded-address 10.09.101.1 10.09.101.209
D2(config)#ip dhcp excluded-address 10.09.101.241 10.09.101.254
D2(config)#ip dhcp excluded-address 10.09.102.1 10.09.102.209
D2(config)#ip dhcp excluded-address 10.09.102.241 10.09.102.254
D2(config)#ip dhcp pool VLAN-101
D2(dhcp-config) #network 10.09.101.0 255.255.255.0
D2(dhcp-config) #default-router 10.09.101.254
D2(dhcp-config) #exit
D2(config)#ip dhcp pool VLAN-102
D2(dhcp-config) #network 10.09.102.0 255.255.255.0
D2(dhcp-config) #default-router 10.09.102.254
D2(dhcp-config) #exit
D2(config)#interface range e0/0-3, e1/1-3, e2/0-3, e3/0-3
D2(config-if-range) #shutdown
D2(config-if-range) #exit

```

Switch A1

```
Switch>enable
Switch #configure terminal
Switch(config)#hostname A1
A1(config)#no ip domain lookup
A1(config)#banner motd # A1, ENCOR Skills Assessment, Scenario 1 #
A1(config)#line con 0
A1(config-line) #exec-timeout 0 0
A1(config-line) #logging synchronous
A1(config-line) #exit
A1(config)#vlan 100
A1(config-vlan) #name Management
A1(config-vlan) #exit
A1(config)#vlan 101
A1(config-vlan) #name UserGroupA
A1(config-vlan) #exit
A1(config)#vlan 102
A1(config-vlan) #name UserGroupB
A1(config-vlan) #exit
A1(config)#vlan 999
A1(config-vlan) #name NATIVE
A1(config-vlan) #exit
A1(config)#interface vlan 100
A1(config-if) #ip address 10.09.100.3 255.255.255.0
A1(config-if) #ipv6 address fe80::a1:1 link-local
A1(config-if) #ipv6 address 2001:db8:100:100::3/64
A1(config-if) #no shutdown
A1(config-if) #exit
A1(config)#interface range e0/0, e0/3, e1/0, e2/1-3, e3/0-3
A1(config-if-range) #shutdown
A1(config-if-range) #exit
```

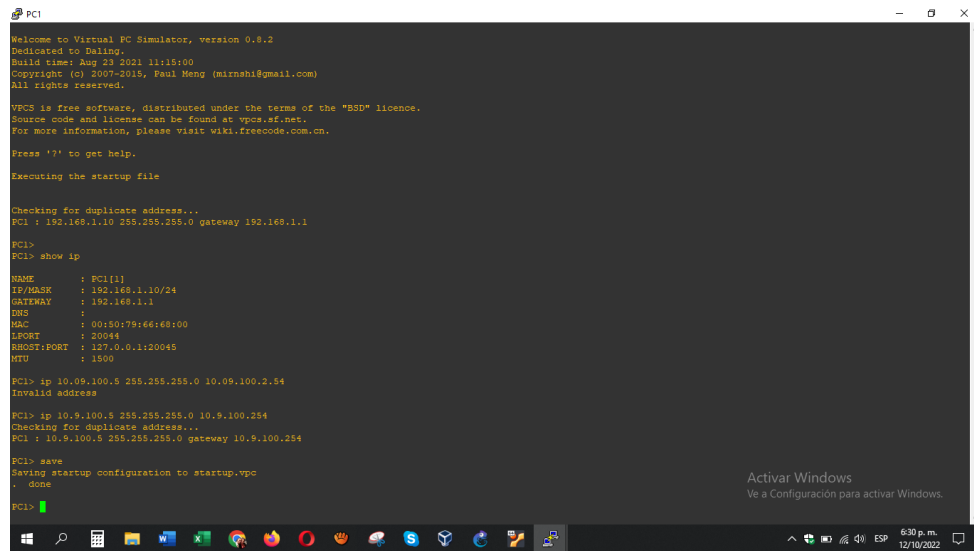
- b.** Guarde la configuración en ejecución en startup-config en todos los dispositivos.

En este punto se debe digitar en los dispositivos R1, R2, R3, D1, D2, y A1 el comando

```
copy running-config startup-config //Comando guardar en la NVRAM//
Destination filename [startup-config]? //Confirmación arranque de los equipos//
Building configuration... //compilando información//
[OK]
```

- c. Configure el direccionamiento de host de PC 1 y PC 4 como se muestra en la tabla de direccionamiento. Asigne una dirección de puerta de enlace predeterminada de 10.09.100.254, que será la dirección IP virtual de HSRP utilizada en la Parte 4

Figura 2. Show IP PC1



```
PC1
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 (mirzahi@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.af.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

Checking for duplicate address...
PC1 : 192.168.1.10 255.255.255.0 gateway 192.168.1.1

PC1>
PC1> show ip

NAME       : PC1[1]
IP/MASK    : 192.168.1.10/24
GATEWAY    : 192.168.1.1
DNS        :
MAC        : 00:50:79:66:68:00
LPORT     : 20044
RHOST:PORT : 127.0.0.1:20045
MTU        : 1500

PC1> ip 10.09.100.5 255.255.255.0 10.09.100.254
Invalid address

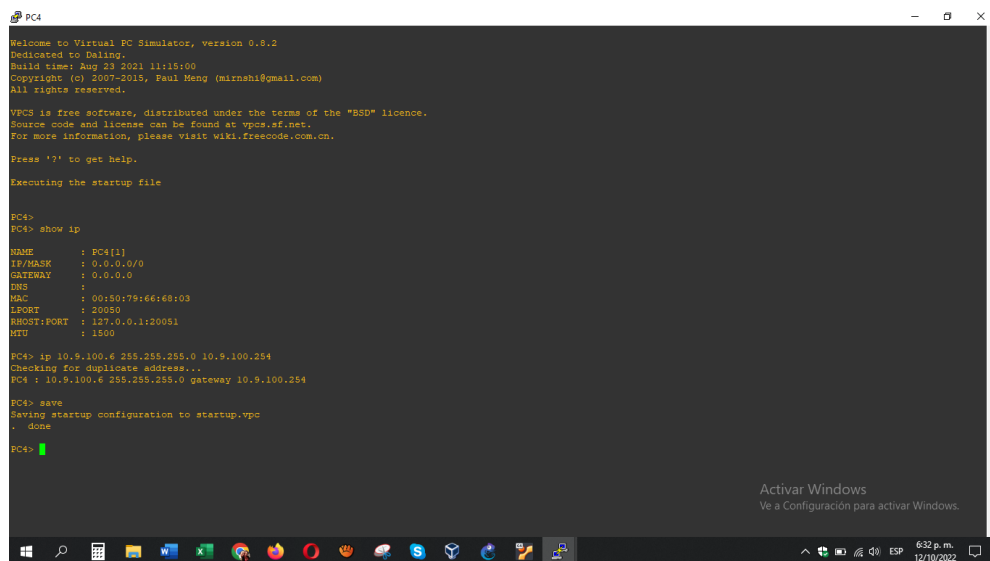
PC1> ip 10.9.100.5 255.255.255.0 10.9.100.254
Checking for duplicate address...
PC1 : 10.9.100.5 255.255.255.0 gateway 10.9.100.254

PC1> save
Saving startup configuration to startup.vpc
. done

PC1>
```

Fuente: PEREA, J. (2022) autoría propia software GNS3

Figura 3. Show IP PC4



```
PC4
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 (mirzahi@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.af.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC4>
PC4> show ip

NAME       : PC4[1]
IP/MASK    : 0.0.0.0/0
GATEWAY    : 0.0.0.0
DNS        :
MAC        : 00:50:79:66:68:03
LPORT     : 20050
RHOST:PORT : 127.0.0.1:20051
MTU        : 1500

PC4> ip 10.9.100.6 255.255.255.0 10.9.100.254
Checking for duplicate address...
PC4 : 10.9.100.6 255.255.255.0 gateway 10.9.100.254

PC4> save
Saving startup configuration to startup.vpc
. done

PC4>
```

Fuente: PEREA, J. (2022) autoría propia software GNS3

PARTE 2: Configurar la red de capa 2 y la compatibilidad con el host

En esta parte de la evaluación de habilidades, completará la configuración de la red de capa 2 y configurará el soporte de host básico. Al final de esta parte, todos los interruptores deberían poder comunicarse. PC2 y PC3 deben recibir direccionamiento de DHCP y SLAAC.

:

Tabla 2: configuraciones de red de capa 2 y soporte de Host.

Tarea#	Tarea	Especificación	Puntos
2.1	En todos los conmutadores, configure las interfaces troncales IEEE 802.1Q en los enlaces de conmutador de interconexión	Habilite enlaces troncales 802.1Q entre: <ul style="list-style-type: none">• D1 y D2• D1 y A1• D2 y A1	6
2.2	En todos los conmutadores, cambie la VLAN nativa en los enlaces troncales.	Utilice la VLAN 999 como la VLAN nativa.	6
2.3	En todos los conmutadores, habilite el protocolo Rapid Spanning-Tree.	Utilice el árbol de expansión rápida.	3
2.4	En D1 y D2, configure los puentes raíz RSTP apropiados según la información del diagrama de topología. D1 y D2 deben proporcionar respaldo en caso de falla del puente raíz.	Configure D1 y D2 como raíz para las VLAN apropiadas con prioridades que se apoyen mutuamente en caso de falla del conmutador.	2
2.5	En todos los switches, cree LACP EtherChannels como se muestra en el diagrama de topología.	Utilice los siguientes números de canal: <ul style="list-style-type: none">• D1 a D2 – Canal de puerto 12• D1 a A1 – Canal de puerto 1• D2 a A1 – Canal de puerto 2	3

Tarea#	Tarea	Especificación	Puntos
2.6	En todos los conmutadores, configure los puertos de acceso de host que se conectan a PC1, PC2, PC3 y PC4.	<p>Configure los puertos de acceso con la configuración de VLAN adecuada, como se muestra en el diagrama de topología.</p> <p>Los puertos de host deben pasar inmediatamente al estado de reenvío.</p>	4
2.7	Verifique los servicios DHCP IPv4.	PC2 y PC3 son clientes DHCP y deben recibir direcciones IPv4 válidas.	1
2.8	Verifique la conectividad LAN local.	<p>PC1 debería hacer ping con éxito:</p> <ul style="list-style-type: none"> • D1: 10.09.100.1 • D2: 10.09.100.2 • PC4: 10.09.100.6 <p>PC2 debería hacer ping con éxito:</p> <ul style="list-style-type: none"> • D1: 10.09.102.1 • D2: 10.09.102.2 <p>PC3 debería hacer ping con éxito:</p> <ul style="list-style-type: none"> • D1: 10.09.101.1 • D2: 10.09.101.2 <p>PC4 debería hacer ping con éxito:</p> <ul style="list-style-type: none"> • D1: 10.09.100.1 • D2: 10.09.100.2 • PC1: 10.09.100.5 	1

Tarea 2.1: En todos los switches configure interfaces troncales IEEE 802.1Q sobre los enlaces de interconexión entre switches.

Switch D1

```
D1(config)#interface range e2/0-3 //rangos de interfaz//
D1(config-if-range) #switchport mode trunk //modo trunca//
D1(config-if-range) #switchport trunk encapsulation dot1q //etiqueta dot1q//
D1(config)#interface range e0/1-2 //rango de interfaz//
D1(config-if-range) #switchport mode trunk //modo trunca//
D1(config-if-range) #switchport trunk encapsulation dot1q //etiqueta dot1q//
```

Switch D2

```
D2(config)#interface range e2/0-3
D2(config-if-range) #switchport mode trunk
D2(config-if-range) #switchport trunk encapsulation dot1q
D2(config)#interface range e1/1-2
D2(config-if-range) #switchport mode trunk
D2(config-if-range) #switchport trunk encapsulation dot1q
```

Switch A1

```
A1(config)#interface range e0/1-2
A1(config-if-range) #switchport mode trunk
A1(config-if-range) #switchport trunk encapsulation dot1q
A1(config)#interface range e1/1-2
A1(config-if-range) #switchport mode trunk
A1(config-if-range) #switchport trunk encapsulation dot1q
```

Tarea 2.2 En todos los switches cambie la VLAN nativa en los enlaces troncales.

Switch D1

```
D1(config)#interface range e2/0-3 //rangos de las interfaces//
D1(config-if-range) #switchport trunk native vlan 999 //negociacion de enlaces//
D1(config-if-range) #exit //salir//
D1(config)#interface range e0/1-2
D1(config-if-range) #switchport trunk native vlan 999
D1(config-if-range) #exit
```

Switch D2

```
D2(config)#interface range e2/0-3
D2(config-if-range) #switchport trunk native vlan 999
D2(config-if-range) #exit
D2(config)#interface range e1/1-2
D2(config-if-range) #switchport trunk native vlan 999
D2(config-if-range) #exit
```

Switch A1

```
A1(config)#interface range e0/1-2
A1(config-if-range) #switchport trunk native vlan 999
A1(config-if-range) #exit
A1(config)#interface range e1/1-2
A1(config-if-range) #switchport trunk native vlan 999
A1(config-if-range) #exit
```

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

Switch D1

```
D1(config)#spanning-tree mode rapid-pvst // configuracion PVST rapida global//  
D1(config-if-range) #no shutdown //encender interfaz//  
D1(config-if-range) #exit //salir//
```

Switch D2

```
D2(config)#spanning-tree mode rapid-pvst  
D2(config-if-range) #no shutdown  
D2(config-if-range) #exit
```

Switch A1

```
A1(config)#spanning-tree mode rapid-pvst  
A1(config-if-range) #no shutdown  
A1(config-if) #exit
```

Tarea 2.4 En D1 y D2, configure los puentes raíz RSTP (root bridges) según la información del diagrama de topología.

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

Switch D1

```
D1(config)#spanning-tree vlan 100,102 root primary //raiz para vlan 110, 101//  
D1(config)#spanning-tree vlan 101 root secondary //raiz para vlan 101 apoyo//
```

Switch D2

```
D2(config)#spanning-tree vlan 101 root primary  
D2(config)#spanning-tree vlan 100,102 root secondary
```


Tarea 2.5 En todos los switches, cree EtherChannel LACP como se muestra en el diagrama de topología.

Switch D1

```
D1(config)#interface range e2/0-3           //rangos de interfaces o puertos//
D1(config-if-range) #channel-group 12 mode active //agrupar enlaces canal 12//
D1(config-if-range) #no shutdown           //encender interfaz//
D1(config-if-range) #exit                  //salir//
D1(config)#interface range e0/1-2         // Puerto e interfaz//
D1(config-if-range) #channel-group 1 mode active //agrupar enlace//
D1(config-if-range) #no shutdown          //encender interfaz//
D1(config-if-range) #exit                  //salir//
```

Switch D2

```
D2(config)#interface range e2/0-3
D2(config-if-range) #channel-group 12 mode active
D2(config-if-range) #no shutdown
D2(config-if-range) #exit
D2(config)#interface range e1/1-2
D2(config-if-range) #channel-group 1 mode active
D2(config-if-range) #no shutdown
D2(config-if-range) #exit
```

Switch A1

```
A1(config)#interface range e0/1-2
A1(config-if-range) #channel-group 1 mode active
A1(config-if-range) #no shutdown
A1(config)#interface range e1/1-2
A1(config-if-range) #channel-group 2 mode active
A1(config-if-range) #no shutdown
A1(config-if) #spanning-tree portfast
A1(config-if) #no shutdown
A1(config-if) #exit
```

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

Switch D1

```
D1(config)#interface e0/0 // interface a configurar//
D1(config-if-range) #switchport mode access // modo acceso al puerto//
D1(config-if-range) #switchport access vlan 100 // asigna el acceso a vlan 100//
D1(config-if-range) #spanning-tree portfast // acceso rapido//
D1(config-if-range) #no shutdown //encender interfaz//
D1(config-if-range) #exit //salir//
```

Switch D2

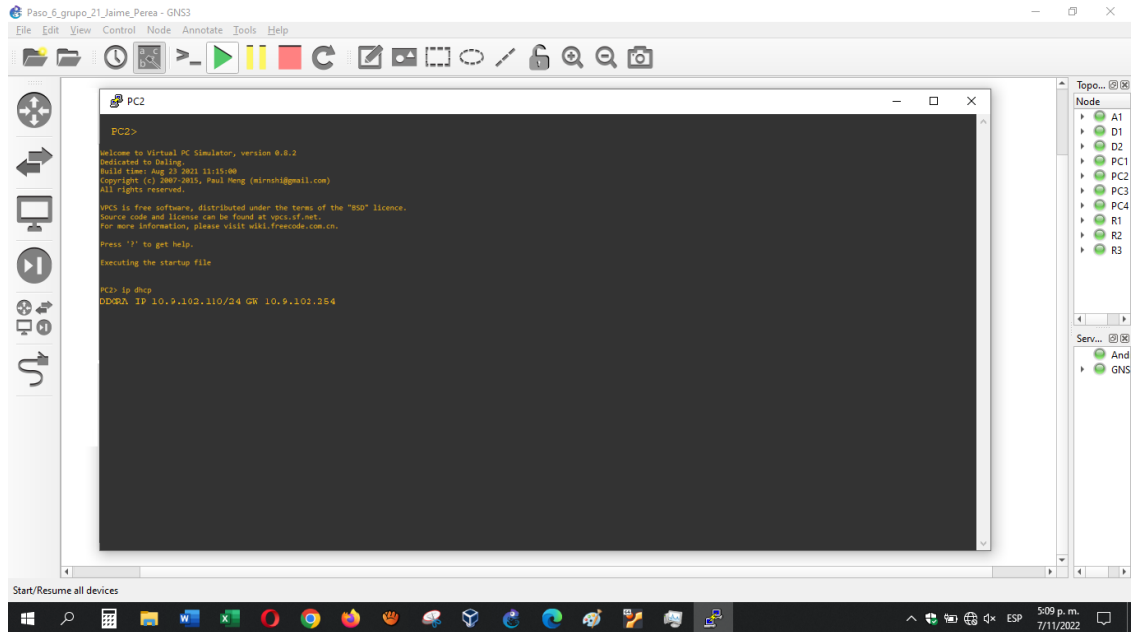
```
D2(config-if-range) #interface e0/0
D2(config-if-range) #switchport mode access
D2(config-if-range) #switchport access vlan 102
D2(config-if-range) #spanning-tree portfast
D2(config-if-range) #no shutdown
D2(config-if-range) #exit
```

Switch A1

```
A1(config)#interface e1/3
A1(config-if) #switchport mode access
A1(config-if) #switchport access vlan 101
A1(config-if) #spanning-tree portfast
A1(config-if) #no shutdown
A1(config)#interface e2/0
A1(config-if) #switchport mode access
A1(config-if) #switchport access vlan 100
A1(config-if) #spanning-tree portfast
A1(config-if) #no shutdown
A1(config-if) #exit
```

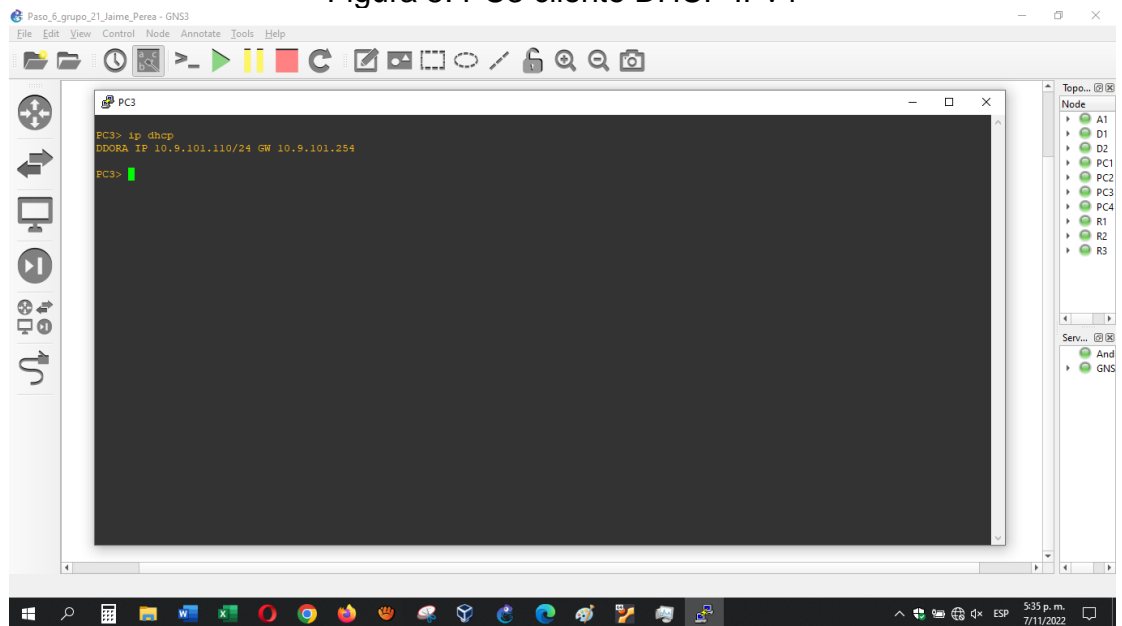
Tarea 2.7 Verifique los servicios DHCP IPv4

Figura 4. PC2 cliente DHCP IPv4



Fuente: PEREA, J. (2022) autoría propia software GNS3

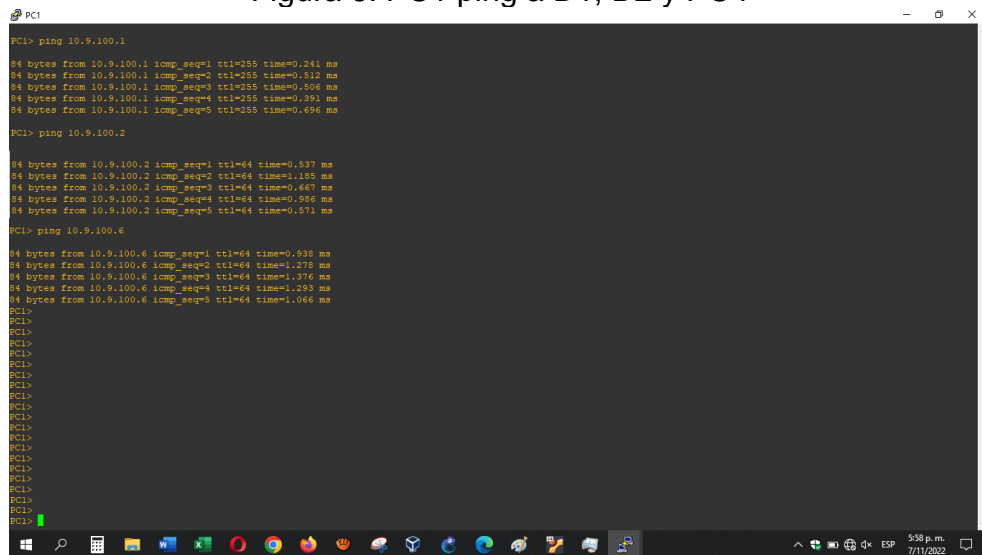
Figura 5. PC3 cliente DHCP IPv4



Fuente: PEREA, J. (2022) autoría propia software GNS3

Tarea 2.8 Verifique la conectividad de la LAN local

Figura 6. PC1 ping a D1, D2 y PC4



```
PC1
PC1> ping 10.9.100.1
84 bytes from 10.9.100.1 icmp_seq=1 ttl=255 time=0.241 ms
84 bytes from 10.9.100.1 icmp_seq=2 ttl=255 time=0.512 ms
84 bytes from 10.9.100.1 icmp_seq=3 ttl=255 time=0.506 ms
84 bytes from 10.9.100.1 icmp_seq=4 ttl=255 time=0.391 ms
84 bytes from 10.9.100.1 icmp_seq=5 ttl=255 time=0.696 ms

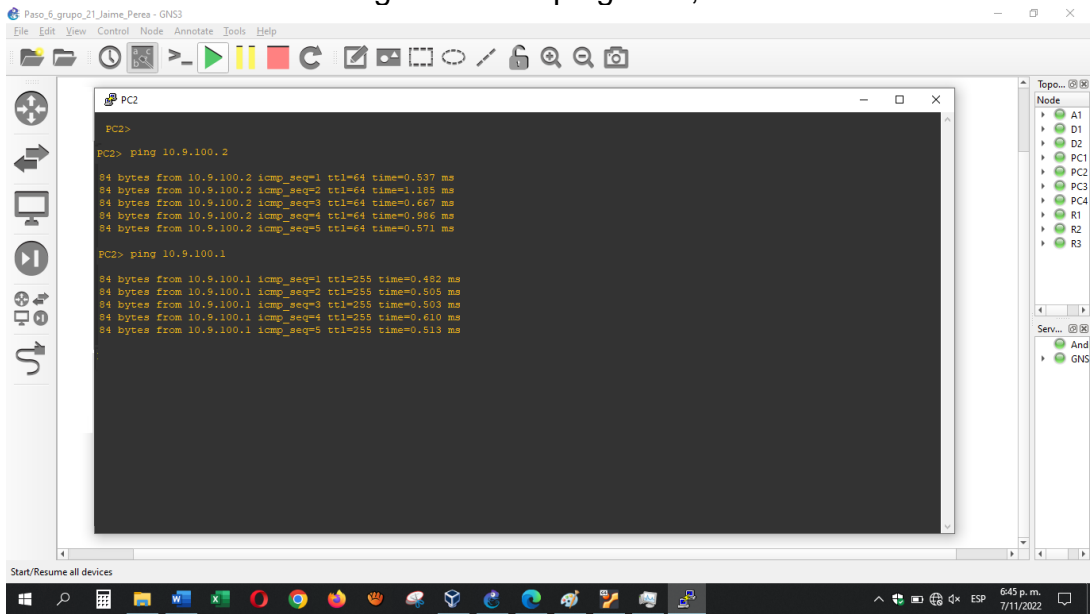
PC1> ping 10.9.100.2
84 bytes from 10.9.100.2 icmp_seq=1 ttl=64 time=0.537 ms
84 bytes from 10.9.100.2 icmp_seq=2 ttl=64 time=1.185 ms
84 bytes from 10.9.100.2 icmp_seq=3 ttl=64 time=0.667 ms
84 bytes from 10.9.100.2 icmp_seq=4 ttl=64 time=0.986 ms
84 bytes from 10.9.100.2 icmp_seq=5 ttl=64 time=0.571 ms

PC1> ping 10.9.100.6
84 bytes from 10.9.100.6 icmp_seq=1 ttl=64 time=0.938 ms
84 bytes from 10.9.100.6 icmp_seq=2 ttl=64 time=1.278 ms
84 bytes from 10.9.100.6 icmp_seq=3 ttl=64 time=1.376 ms
84 bytes from 10.9.100.6 icmp_seq=4 ttl=64 time=1.293 ms
84 bytes from 10.9.100.6 icmp_seq=5 ttl=64 time=1.066 ms

PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
PC1>
```

Fuente: PEREA, J (2022) autoría propia software GNS3

Figura 7. PC2 ping a D1, D2

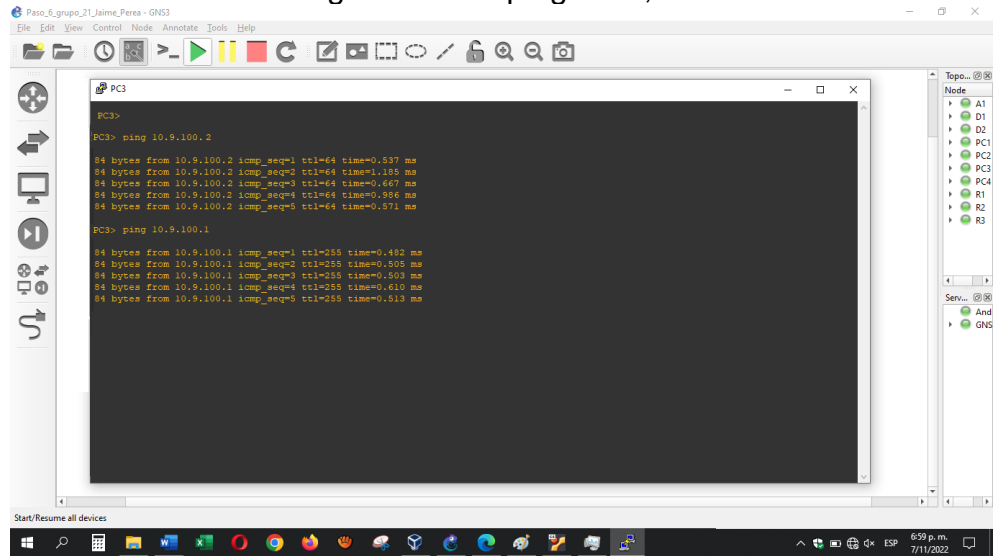


```
Paso_6_grupo_21_jaime_peres - GNS3
File Edit View Control Node Annotate Tools Help
PC2
PC2> ping 10.9.100.2
84 bytes from 10.9.100.2 icmp_seq=1 ttl=64 time=0.537 ms
84 bytes from 10.9.100.2 icmp_seq=2 ttl=64 time=1.185 ms
84 bytes from 10.9.100.2 icmp_seq=3 ttl=64 time=0.667 ms
84 bytes from 10.9.100.2 icmp_seq=4 ttl=64 time=0.986 ms
84 bytes from 10.9.100.2 icmp_seq=5 ttl=64 time=0.571 ms

PC2> ping 10.9.100.1
84 bytes from 10.9.100.1 icmp_seq=1 ttl=255 time=0.482 ms
84 bytes from 10.9.100.1 icmp_seq=2 ttl=255 time=0.505 ms
84 bytes from 10.9.100.1 icmp_seq=3 ttl=255 time=0.508 ms
84 bytes from 10.9.100.1 icmp_seq=4 ttl=255 time=0.610 ms
84 bytes from 10.9.100.1 icmp_seq=5 ttl=255 time=0.513 ms
```

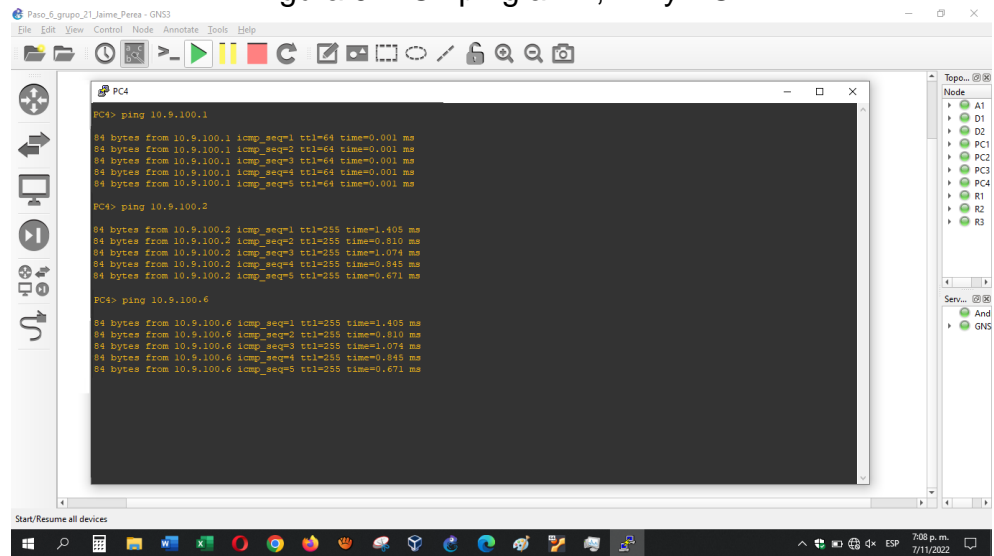
Fuente: PEREA J. (2022) autoría propia software GNS3

Figura 8. PC3 ping a D1, D2



Fuente: PEREA J. (2022) autoría propia software GNS3

Figura 9. PC4 ping a D1, D2 y PC1



Fuente: PEREA J. (2022) autoría propia software GNS3

PARTE 3: (Escenario 2)

Tabla 3. Configurar los protocolos de enrutamiento

Task#	Task	Specification	Points
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 	8
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 	8

Task#	Task	Specification	Points
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> <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). 	4
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.XY.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 10.09.0.0/8 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. 	4

Tarea 3.1 En la "Red de la empresa" (es decir, R1, R3, D1 y D2), configure OSPFv2 de área única en el área 0.

Router 1

```
R1(config)#router ospf 4 //protocolo ospf 4//
R1(config-router) #router-id 0.0.4.1 //id router//
R1(config-router) #network 10.09.10.0 0.0.0.255 area 0 //notificacion de red//
R1(config-router) #network 10.09.13.0 0.0.0.255 area 0 //notificacion de red//
R1(config-router) #default-information originate //propagación de ruta por defecto//
R1(config-router) #exit //salir//
```

Router 3

```
R3(config)#router ospf 4
R3(config-router) #router-id 0.0.4.3
R3(config-router) #network 10.09.11.0 0.0.0.255 area 0 32
R3(config-router) #network 10.09.13.0 0.0.0.255 area 0
R3(config-router) #exit
```

Switch D1

```
D1(config)#router ospf 4 //protocolo ospf 4//
D1(config-router) #router-id 0.0.4.131 //id router//
D1(config-router) #network 10.09.100.0 0.0.0.255 area 0 //notificacion de red//
D1(config-router) #network 10.09.101.0 0.0.0.255 area 0 //notificacion de red//
D1(config-router) #network 10.09.102.0 0.0.0.255 area 0 //notificacion de red//
D1(config-router) #network 10.09.10.0 0.0.0.255 area 0 //notificacion de red//
D1(config-router) #passive-interface default // desactivar interfaces//
D1(config-router) #no passive-interface e1/2 // exclusion de interfaz e1/2//
D1(config-router) #exit //salir//
```

Switch D2

```
D2(config)#router ospf 4
D2(config-router) #router-id 0.0.4.132
D2(config-router) #network 10.09.100.0 0.0.0.255 area 0
D2(config-router) #network 10.09.101.0 0.0.0.255 area 0
D2(config-router) #network 10.09.102.0 0.0.0.255 area 0
D2(config-router) #network 10.09.11.0 0.0.0.255 area 0
D2(config-router) #passive-interface default
D2(config-router) #no passive-interface e1/0
D2(config-router) #exit
```


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

Router 1

```
R1(config)#ipv6 router ospf 6           //protocolo ospf 6//
R1(config-rtr) #router-id 0.0.6.1      //id router//
R1(config-rtr) #default-information originate //propagación de la ruta por defecto//
R1(config-rtr) #exit                   //salir//
R1(config) #interface e1/2
R1(config-if) #ipv6 ospf 6 area 0
R1(config-if) #exit
R1(config) #interface e1/1
R1(config-if) #ipv6 ospf 6 area 0
R1(config-if) #exit
```

Router 3

```
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
```

Switch D1

```
D1(config) #ipv6 router ospf 6
D1(config-rtr) #router-id 0.0.6.131
D1(config-rtr) #passive-interface default
D1(config-rtr) #no passive-interface e1/2
D1(config-rtr) #exit
D1(config) #interface e1/2
D1(config-if) #ipv6 ospf 6 area 0
D1(config-if) #exit
D1(config) #interface vlan 100
D1(config-if) #ipv6 ospf 6 area 0
D1(config-if) #exit
D1(config) #interface vlan 101
D1(config-if) #ipv6 ospf 6 area 0
D1(config-if) #exit
D1(config) #interface vlan 102 34
D1(config-if) #ipv6 ospf 6 area 0
D1(config-if) #exit
```

Switch D2

```
D2(config) #ipv6 router ospf 6
D2(config-rtr) #router-id 0.0.6.132
D2(config-rtr) #passive-interface default
D2(config-rtr) #no passive-interface e1/0
D2(config-rtr) #exit
D2(config) #interface e1/0
D2(config-if) #ipv6 ospf 6 area 0
D2(config-if) #exit
D2(config) #interface vlan 100
D2(config-if) #ipv6 ospf 6 area 0
D2(config-if) #exit
D2(config) #interface vlan 101
D2(config-if) #ipv6 ospf 6 area 0
D2(config-if) #exit
D2(config) #interface vlan 102
D2(config-if) #ipv6 ospf 6 area 0
D2(config-if) #exit
```

Tarea 3.3 En R2 en la “Red ISP”, configure MP- BGP.

Router 2

```
R2(config)#ip route 0.0.0.0 0.0.0.0 loopback 0 //ruta predeterminada ipv4//
R2(config)#router bgp 500 //Sistema BGP 500 automatico//
R2(config-router) #bgp router-id 2.2.2.2 //id router//
R2(config-router) #neighbor 209.165.200.225 remote-as 300 //vecinos ipv4//
R2(config-router) #neighbor 2001:db8:200::1 remote-as 300 //vecinos ipv6//
R2(config-router) #address-family ipv4 //familias ipv4//
R2(config-router) #neighbor 209.165.200.225 activate //activacion vecino//
R2(config-router) #no neighbor 2001:db8:200::1 activate //negacion vecino ipv6//
R2(config-router) #network 2.2.2.2 mask 255.255.255.255 // asignar loopback//
R2(config-router) #network 0.0.0.0 //ruta por defecto//
R2(config-router) #exit-address-family //salir configuracion ipv4//
R2(config) #address-family ipv6 // direccion familias ipv6//
R2(config-router) #no neighbor 209.165.200.225 activate //negacion vecino ipv4//
R2(config-router) #neighbor 2001:db8:200::1 activate //activar vecino ipv6//
R2(config-router) #network 2001:db8:2222::/128 //asignar loopback//
R2(config-router) #network ::/0 //ruta por defecto//
R2(config-router) #exit-address-family //salir del modo configuracion//
```


Figura 11. Show run | section router ospf on R3

```
R3
*Nov 13 00:47:26.875: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half duplex), with
D2 Ethernet1/0 (half duplex).
R3#
*Nov 13 00:48:17.378: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half duplex), with
D2 Ethernet1/0 (half duplex).
R3#
*Nov 13 00:49:09.103: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half duplex), with
D2 Ethernet1/0 (half duplex).
R3#
*Nov 13 00:50:01.203: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half duplex), with
D2 Ethernet1/0 (half duplex).
R3#show run | section router ospf
router ospf 4
router-id 0.0.4.3
network 10.9.11.0 0.0.0.255 area 0
network 10.9.13.0 0.0.0.255 area 0
ipv6 router ospf 6
router-id 0.0.6.3
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

Figura 12. Show run | section router ospf on D1

```
D1
*Nov 13 23:41:56.539: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/2, changed state to up
*Nov 13 23:41:56.539: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/3, changed state to down
*Nov 13 23:41:56.539: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to down
*Nov 13 23:41:56.539: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to down
*Nov 13 23:41:56.539: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/3, changed state to down
*Nov 13 23:41:56.539: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/0, changed state to down
*Nov 13 23:41:56.539: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/1, changed state to down
*Nov 13 23:41:56.725: %SYS-5-RESTART: System restarted --
Cisco IOS Software (186BI LINUX2-ADVIPSERVICESK9-M), Version 15.2 (CML_NIGHTLY_20151103)FLO_DS
G57, EARLY DEPLOYMENT DEVELOPMENT BUILD, synced to FLO_DS657_POSTCOLLAPSE_TEAM_TRACK_DS65_PIS
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2015 by Cisco Systems, Inc.
Compiled Wed 04-Nov-15 02:31 by mmam
D1#show run | section router ospf
router ospf 4
router-id 0.0.4.131
passive-interface default
no passive-interface Ethernet1/2
network 10.9.101.0 0.0.0.255 area 0
network 10.9.100.0 0.0.0.255 area 0
network 10.9.101.0 0.0.0.255 area 0
network 10.9.102.0 0.0.0.255 area 0
ipv6 router ospf 6
router-id 0.0.6.131
passive-interface default
no passive-interface Ethernet1/2
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

Figura 15. Show run | section ipv6 router on R3

```
R3
*Nov 14 02:59:01.779: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half duplex), with D2 Ethernet1/0 (half duplex).
*Nov 14 02:59:51.703: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half duplex), with D2 Ethernet1/0 (half duplex).
*Nov 14 03:00:43.687: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half duplex), with D2 Ethernet1/0 (half duplex). R3, ENCOR Skills Assessment
R3#
*Nov 14 03:01:41.671: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half duplex), with D2 Ethernet1/0 (half duplex).
R3#
R3#
R3#
R3#show run | section ipv6
ipv6 unicast-routing
ipv6 cef
  ipv6 address FE80::3:2 link-local
  ipv6 address 2001:DB8:100:1011::1/64
  ipv6 ospf 6 area 0
  ipv6 address FE80::3:3 link-local
  ipv6 address 2001:DB8:100:1010:2/64
  ipv6 ospf 6 area 0
  ipv6 router ospf 6
  router-id 0.0.6.3
R3#
R3#show run | section ipv6
ipv6 unicast-routing
ipv6 cef
  ipv6 address FE80::3:2 link-local
  ipv6 address 2001:DB8:100:1011::1/64
  ipv6 ospf 6 area 0
  ipv6 address FE80::3:3 link-local
  ipv6 address 2001:DB8:100:1010:2/64
  ipv6 ospf 6 area 0
  ipv6 router ospf 6
  router-id 0.0.6.3
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

Figura 16. Show run | section ipv6 router on D1

```
D1#show run | section router ospf
router ospf 4
router-id 0.0.4.131
passive-interface default
no passive-interface Ethernet1/2
network 10.9.10.0 0.0.0.255 area 0
network 10.9.100.0 0.0.0.255 area 0
network 10.9.101.0 0.0.0.255 area 0
network 10.9.102.0 0.0.0.255 area 0
ipv6 router ospf 6
router-id 0.0.6.131
passive-interface default
no passive-interface Ethernet1/2
D1# show run | section ipv6
ipv6 unicast-routing
ipv6 cef
  ipv6 address FE80::D1:1 link-local
  ipv6 address 2001:DB8:100:1010:2/64
  ipv6 address FE80::D1:1 link-local
  ipv6 address 2001:DB8:100:1010:2/64
  ipv6 router ospf 6
  standby 126 ipv6 autoconfig
  ipv6 address FE80::D1:2 link-local
  ipv6 address 2001:DB8:100:100:1/64
  ipv6 router ospf 6
  standby 126 ipv6 autoconfig
  ipv6 address FE80::D1:3 link-local
  ipv6 address 2001:DB8:100:101:1/64
  ipv6 router ospf 6
  standby 126 ipv6 autoconfig
  ipv6 address FE80::D1:4 link-local
  ipv6 address 2001:DB8:100:102:1/64
  ipv6 ospf 6 area 0
  ipv6 router ospf 6
router-id 0.0.6.131
passive-interface default
no passive-interface Ethernet1/2
--More--
D1#
D1#
D1#
D1#
D1#
D1#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

Figure 17. Show run | section ipv6 router on D2

```
D2
b R3 Ethernet1/0 (full duplex).
*Nov 14 15:52:03.239: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), wit
b R3 Ethernet1/0 (full duplex).
*Nov 14 15:52:03.432: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), wit
b R3 Ethernet1/0 (full duplex).
*Nov 14 15:52:04.101: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), wit
b R3 Ethernet1/0 (full duplex).
*Nov 14 15:53:47.477: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), wit
b R3 Ethernet1/0 (full duplex).
*Nov 14 15:54:46.864: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), wit
b R3 Ethernet1/0 (full duplex).
*Nov 14 15:55:44.899: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), wit
b R3 Ethernet1/0 (full duplex).
*Nov 14 15:56:36.655: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), wit
b R3 Ethernet1/0 (full duplex).
*Nov 14 15:57:24.930: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex), wit
b R3 Ethernet1/0 (full duplex).D2, Encor Skills Assessment
D2#show run | section ipv6
ipv6 unicast-routing
ipv6 cef
  ipv6 address FE80::D2:1 link-local
  ipv6 address 2001:DB8:100:1011::2/64
  ipv6 ospf 6 area 0
  Standby 106 ipv6 autoconfig
  ipv6 address FE80::D2:2 link-local
  ipv6 address 2001:DB8:100:1001::2/64
  ipv6 ospf 6 area 0
  Standby 106 ipv6 autoconfig
  ipv6 address FE80::D2:3 link-local
  ipv6 address 2001:DB8:100:1012::2/64
  ipv6 ospf 6 area 0
  Standby 106 ipv6 autoconfig
  ipv6 address FE80::D2:4 link-local
  ipv6 address 2001:DB8:100:1021::2/64
  ipv6 ospf 6 area 0
  Standby 106 ipv6 autoconfig
  ipv6 router ospf 6
  router-id 0.0.0.192
  passive-interface default
  no passive-interface Ethernet1/0
D2#
D2#
D2#
D2#
D2#
```

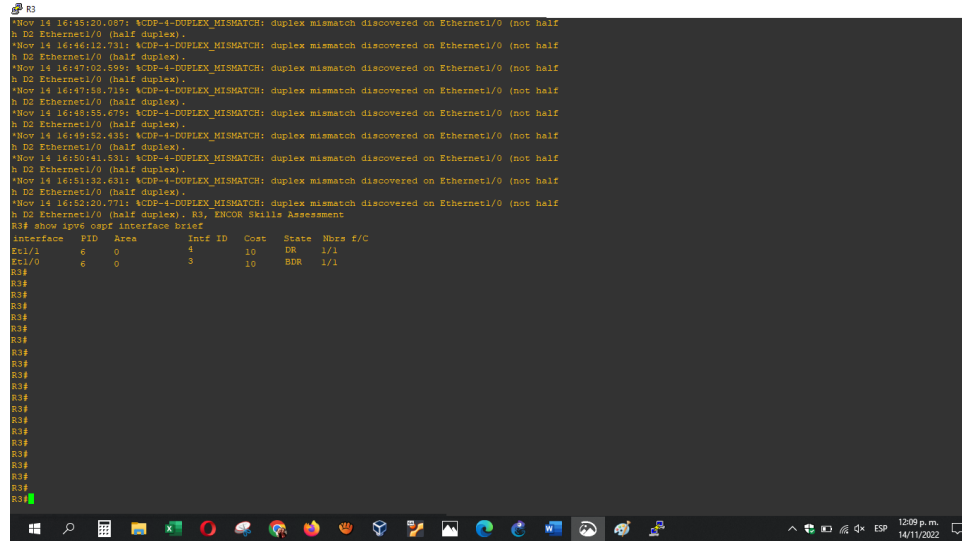
Fuente: PEREA, J (2022) autoría propia software GNS3

Figura 18. Show ipv6 ospf interface brief on R1

```
R1
*Nov 14 15:17:32.935: %LINK-5-CHANGED: Interface Ethernet2/1, changed state to adm
*Nov 14 15:17:33.263: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/2,
*Nov 14 15:17:33.267: %LINK-5-CHANGED: Interface Ethernet2/2, changed state to adm
*Nov 14 15:17:33.707: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/3,
*Nov 14 15:17:33.715: %LINK-5-CHANGED: Interface Ethernet2/3, changed state to adm
*Nov 14 15:17:33.719: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/0,
*Nov 14 15:17:33.939: %LINK-5-CHANGED: Interface Ethernet3/0, changed state to adm
*Nov 14 15:17:33.943: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/1,
*Nov 14 15:17:33.987: %SYS-5-CONFIG I: Configured from memory by console
*Nov 14 15:17:34.879: %LINK-5-CHANGED: Interface Ethernet3/1, changed state to adm
*Nov 14 15:17:34.883: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/2,
*Nov 14 15:17:34.937: %LINK-5-CHANGED: Interface Ethernet3/2, changed state to adm
*Nov 14 15:17:34.891: %LINK-5-CHANGED: Interface Ethernet1/3, changed state to adm
*Nov 14 15:17:34.895: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/3,
*Nov 14 15:17:34.974: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/0,
*Nov 14 15:17:36.215: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/4,
*Nov 14 15:17:36.219: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/2,
*Nov 14 15:17:36.223: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/3,
*Nov 14 15:17:41.967: %SYS-5-RESTART: System restarted --
Cisco IOS Software, 7200 Software (C7200-ADVIPSERVICESK9-M), Version 15.2(4)5S, RE
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2014 by Cisco Systems, Inc.
Compiled Thu 20-Feb-14 06:51 by prod_tel_team_R1, ENCOR Skills Assessment
R1#
R1#
R1#
R1#
R1#show ipv6 ospf interface brief
interface  PID Area          Intf ID  Cost  State  Nbrs  f/c
Et1/2      6   0             5       10   BDR   1/1
Et1/1      6   0             4       10   BDR   1/1
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

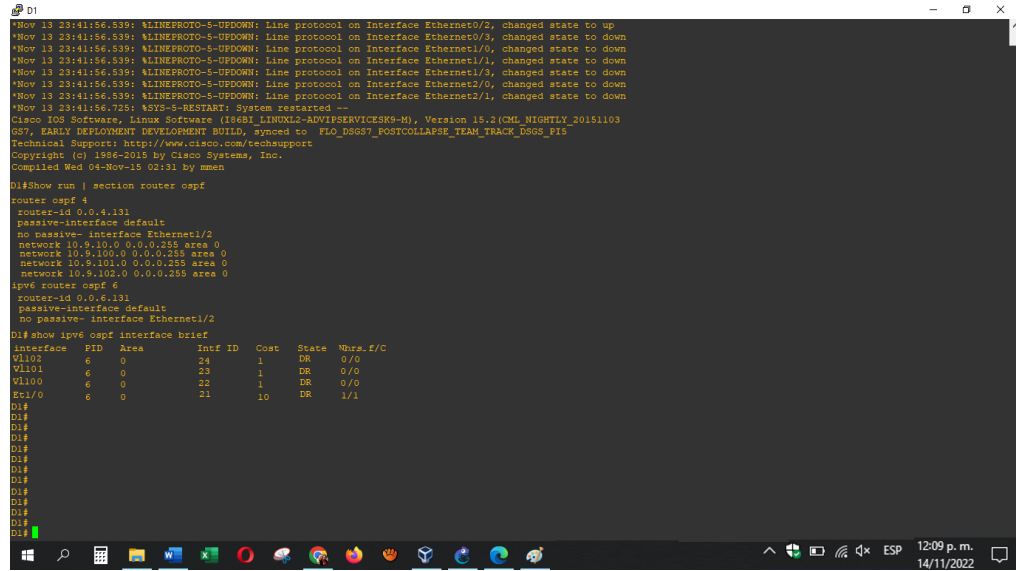
Figura 19. Show ipv6 ospf interface brief on R1



```
R1# show ipv6 ospf interface brief
Nov 14 16:45:00.087: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half
  duplex) between R1 and D2
Nov 14 16:46:12.731: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half
  duplex) between R1 and D2
Nov 14 16:47:02.559: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half
  duplex) between R1 and D2
Nov 14 16:47:58.719: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half
  duplex) between R1 and D2
Nov 14 16:48:55.479: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half
  duplex) between R1 and D2
Nov 14 16:49:52.433: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half
  duplex) between R1 and D2
Nov 14 16:50:41.531: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half
  duplex) between R1 and D2
Nov 14 16:51:32.431: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half
  duplex) between R1 and D2
Nov 14 16:52:20.771: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half
  duplex) between R1 and D2
R1# show ipv6 ospf interface brief
Interface  PID Area      Intf ID Cost State  Mbrs F/C
Et1/1      6   0         4      10 DR    1/1
Et1/0      6   0         3      10 DR    1/1
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

Figura 20. Show ipv6 ospf interface brief on D1



```
D1# show run | section router ospf
router ospf 4
  router-id 0.0.0.131
  passive-interface default
  no passive-interface Ethernet1/2
  network 10.9.110.0 0.0.0.255 area 0
  network 10.9.100.0 0.0.0.255 area 0
  network 10.9.101.0 0.0.0.255 area 0
  network 10.9.102.0 0.0.0.255 area 0
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  Mbrs F/C
Vl102     6   0         24     1 DR    0/0
Vl101     6   0         23     1 DR    0/0
Vl100     6   0         22     1 DR    0/0
Et1/0     6   0         21     10 DR    1/1
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
D1#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

Figura 21. Show ipv6 ospf interface brief on D2

```
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#show run | section router ospf
router ospf 4
router-id 0.0.4.132
passive-interface default
no passive-interface Ethernet1/0
network 10.5.100.0 0.0.0.255 area 0
network 10.5.100.0 0.0.0.255 area 0
network 10.5.101.0 0.0.0.255 area 0
network 10.5.102.0 0.0.0.255 area 0
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
V1102 6 0 26 1 DR 0/0
V1101 6 0 25 1 DR 0/0
V1100 6 0 24 1 DR 0/0
E21/2 6 0 22 10 DR 1/1
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
D2#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

Figura 22. show run | section bgp and show run | include route on R2

```
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
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 2.2.2.2/24 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 2001.DB8:2222::/128
neighbor 2001.DB8:200::1 activate
exit-address-family
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

Figura 23. show run | section bgp on R1

```
R1
R1#
R1#
R1#
R1#
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 200.165.200.226 activate
  exit-address-family
!
address-family ipv6
  network 2001.DB8:100::/48
  neighbor 2001.DB8:200:2 activate
  exit-address-family
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
R1#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

Figura 24. show ip route | include O/B on R1

```
R1
Nov 15 14:41:48.215: %LINK-3-CHANGED: Interface Ethernet3/9, changed state to adm
Nov 15 14:41:48.219: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2/3,
Nov 15 14:41:48.291: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/0,
Nov 15 14:41:49.543: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/1,
Nov 15 14:41:49.547: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/2,
Nov 15 14:41:49.551: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3/3,
Nov 15 14:41:52.959: %SYS-5-RESTART: System restarted --
Cisco IOS Software, 7200 Software (C7200-ADVIPSERVICESK9-M), Version 15.2(4)SE, RE
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2014 by Cisco Systems, Inc.
Compiled Thu 20-Feb-14 06:51 by prod_rel_team R1, ENCOR Skills Assessment
R1#
R1#
R1#show ip route
IPv6 Routing Table - default - 5 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
B - BGP, R - RIP, H - NHRP, I1 - ISIS L1
I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP
EX - EIGRP external, ND - ND Default, NDP - ND Prefix, DGT - 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, 1 - LISP
C 2001:DB8:100:1013::/64 [0/0]
   via Ethernet1/2, directly connected
L 2001:DB8:100:1013::1/128 [0/0]
   via Ethernet1/1, receive
C 2001:DB8:200:1/64 [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#show ip route | include O/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
OI - OSPF NSSA external type 1, OI2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
o - ODR, P - periodic downloaded static route, H - NHRP, 1 - LISP
R1#
R1#
R1#
R1#
R1#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

Figura 25. show ipv6 route command on R1

```
R1
*Nov 15 14:41:46.907: ALINK-S-CHANGED: Interface Ethernet2/4, changed state to administratively down
*Nov 15 14:41:46.911: VLINEPROTO-S-UPDOWN: Line protocol on Interface Ethernet1/3, changed state to down
*Nov 15 14:41:47.043: ALINK-S-CHANGED: Interface Ethernet2/3, changed state to administratively down
*Nov 15 14:41:47.047: VLINEPROTO-S-UPDOWN: Line protocol on Interface Ethernet2/0, changed state to down
*Nov 15 14:41:47.263: ALINK-S-CHANGED: Interface Ethernet3/0, changed state to administratively down
*Nov 15 14:41:47.267: VLINEPROTO-S-UPDOWN: Line protocol on Interface Ethernet2/1, changed state to down
*Nov 15 14:41:47.311: %SYS-5-CONFIG_I: Configured from memory by console
*Nov 15 14:41:48.207: ALINK-S-CHANGED: Interface Ethernet3/1, changed state to administratively down
*Nov 15 14:41:48.211: VLINEPROTO-S-UPDOWN: Line protocol on Interface Ethernet2/2, changed state to down
*Nov 15 14:41:48.215: ALINK-S-CHANGED: Interface Ethernet3/3, changed state to administratively down
*Nov 15 14:41:48.219: VLINEPROTO-S-UPDOWN: Line protocol on Interface Ethernet2/3, changed state to down
*Nov 15 14:41:48.293: ALINK-S-CHANGED: Interface Ethernet3/0, changed state to administratively down
*Nov 15 14:41:49.543: VLINEPROTO-S-UPDOWN: Line protocol on Interface Ethernet3/1, changed state to down
*Nov 15 14:41:49.547: VLINEPROTO-S-UPDOWN: Line protocol on Interface Ethernet3/2, changed state to down
*Nov 15 14:41:49.551: VLINEPROTO-S-UPDOWN: Line protocol on Interface Ethernet3/3, changed state to down
*Nov 15 14:41:52.959: %SYS-5-RESTART: System restarted --
Cisco IOS Software, 7200 Software (C7200-ADVIPSERVICESK9-M), Version 15.2(4)5S, RELEASE SOFTWARE (fcl)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2014 by Cisco Systems, Inc.
Compiled Thu 20-Feb-14 06:51 by prod_rel_team R1, ENCOR Skills Assessment
R1#
R1#
R1#
R1#show ipv6 route
IPv6 Routing Table - default - 5 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
        B - BGP, R - RIP, H - NHRP, I1 - ISIS L1
        I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP
        EX - EIGRP external, 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 - IISP
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#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

Figura 26. show ipv6 route ospf command on R3

```
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#show
*Nov 15 14:43:00.039: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half duplex), with D2 Ethernet1/0 (half duplex).
R3#show ipv6 route
IPv6 Routing Table - default - 9 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
        B - BGP, R - RIP, H - NHRP, I1 - ISIS L1
        I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP
        EX - EIGRP external, 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 - IISP
C 2001:DB8:100:1010::/64 [0/0]
  via Ethernet1/1, directly connected
L 2001:DB8:100:1010::2/128 [0/0]
  via Ethernet1/1, receive
C 2001:DB8:100:1011::/64 [0/0]
  via Ethernet1/0, directly connected
L 2001:DB8:100:1011::1/128 [0/0]
  via Ethernet1/0, receive
L FF00::8 [0/0]
  via Null0, receive
R3#
*Nov 15 14:43:48.907: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half duplex), with D2 Ethernet1/0 (half duplex).
R3#
*Nov 15 14:44:44.107: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half duplex), with D2 Ethernet1/0 (half duplex).
R3#
*Nov 15 14:45:33.119: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not half duplex), with D2 Ethernet1/0 (half duplex).
R3#
```

Fuente: PEREA, J (2022) autoría propia software GNS3

PARTE 4: (Escenario 2)

Tabla 4. Configurar la Redundancia del Primer Salto

Task#	Task	Specification	Points
4.1	On D1, create IP SLAs that test the reachability of R1 interface G0/0/1.	<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 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>	2
4.2	On D2, create IP SLAs that test the reachability of R3 interface G0/0/1.	<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>	2

Task#	Task	Specification	Points
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 10.09.100.254. • 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> <ul style="list-style-type: none"> • Assign the virtual IP address 10.09.101.254. • Enable preemption. • Track object 4 to decrement by 60. <p>Configure IPv4 HSRP group 124 for VLAN 102:</p> <ul style="list-style-type: none"> • Assign the virtual IP address 10.09.102.254. • Set the group priority to 150. • Enable preemption. • Track object 4 to decrement by 60. <p>Configure IPv6 HSRP group 106 for VLAN 100:</p> <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. <p>Configure IPv6 HSRP group 116 for VLAN 101:</p> <ul style="list-style-type: none"> • Assign the virtual IP address using ipv6 autoconfig. • Enable preemption. • Track object 6 and decrement by 60. <p>Configure IPv6 HSRP group 126 for VLAN 102:</p> <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. 	8

Task#	Task	Specification	Points
	On D2, configure HSRPv2.	<p>D2 is the primary router for VLAN 101; therefore, the 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 10.09.100.254. • Enable preemption. • Track object 4 and decrement by 60. <p>Configure IPv4 HSRP group 114 for VLAN 101:</p> <ul style="list-style-type: none"> • Assign the virtual IP address 10.09.101.254. • Set the group priority to 150. • Enable preemption. • Track object 4 to decrement by 60. <p>Configure IPv4 HSRP group 124 for VLAN 102:</p> <ul style="list-style-type: none"> • Assign the virtual IP address 10.09.102.254. • Enable preemption. • Track object 4 to decrement by 60. <p>Configure IPv6 HSRP group 106 for VLAN 100:</p> <ul style="list-style-type: none"> • Assign the virtual IP address using ipv6 autoconfig. • Enable preemption. • Track object 6 and decrement by 60. <p>Configure IPv6 HSRP group 116 for VLAN 101:</p> <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. <p>Configure IPv6 HSRP group 126 for VLAN 102:</p> <ul style="list-style-type: none"> • Assign the virtual IP address using ipv6 autoconfig. • Enable preemption. • Track object 6 and decrement by 60. 	

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

Switch D1

```
D1(config)#ip sla 4 //asignar ip sla 4 para ipv4//
D1(config-ip-sla) #icmp-echo 10.09.10.1 //asignar ipv4//
D1(config-ip-sla-echo) #frequency 5 //frecuencia de 5//
D1(config-ip-sla-echo) #exit //salir//
D1(config) #ip sla 6 //asignar ip sla 6 para ipv6//
D1(config-ip-sla) #icmp-echo 2001:db8:100:1010::1 //asignar ipv6//
D1(config-ip-sla-echo) #frequency 5 //frecuencia de 5//
D1(config-ip-sla-echo) #exit //salir//
D1(config) #ip sla schedule 4 life forever start-time now //mantener tiempo e inicio//
D1(config) #ip sla schedule 6 life forever start-time now //mantener tiempo e inicio//
D1(config) #track 4 ip sla 4 //creacion de sla 4//
D1(config-track) #delay down 10 up 15 //temporizador alto y bajo//
D1(config-track) #exit //salir//
D1(config) #track 6 ip sla 6 //creacion de sla 6//
D1(config-track) #delay down 10 up 15 //temporizador alto y bajo//
D1(config-track) #exit //salir//
```

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

Switch D2

```
D2(config)#ip sla 4
D2(config-ip-sla) #icmp-echo 10.09.11.1
D2(config-ip-sla-echo) #frequency 5
D2(config-ip-sla-echo) #exit
D2(config) #ip sla 6
D2(config-ip-sla) #icmp-echo 2001:db8:100:1011::1
D2(config-ip-sla-echo) #frequency 5
D2(config-ip-sla-echo) #exit
D2(config) #ip sla schedule 4 life forever start-time now
D2(config) #ip sla schedule 6 life forever start-time now
D2(config) #track 4 ip sla 4
D2(config-track) #delay down 10 up 15
D2(config-track) #exit
D2(config)#track 6 ip sla 6
D2(config-track) #delay down 10 up 15
D2(config-track) #exit 38
```

4.3 En D1 configure HSRPv2.

Switch D1

```
D1(config)#interface vlan 100 //vlan a configurar//
D1(config-if) #standby version 2 //asignar HSRPv2//
D1(config-if) #standby 104 ip 10.09.100.254 //asignar de ip virtual//
D1(config-if) #standby 104 priority 150 //asignar prioridad grupo 150//
D1(config-if) #standby 104 preempt //habilitacion de preferencia//
D1(config-if) #standby 104 track 4 decrement 60 //seguir y decrementar 60//
D1(config-if) #standby 106 ipv6 autoconfig //autoconfiguracion para ipv6//
D1(config-if) #standby 106 priority 150 //asignar prioridad grupo 150//
D1(config-if) #standby 106 preempt //asignar preferencia//
D1(config-if) #standby 106 track 6 decrement 60 //seguir y decrementar 60//
D1(config-if) #exit //salir//
D1(config) #interface vlan 101
D1(config-if) #standby version 2
D1(config-if) #standby 114 ip 10.09.101.254
D1(config-if) #standby 114 preempt
D1(config-if) #standby 114 track 4 decrement 60
D1(config-if) #standby 116 ipv6 autoconfig
D1(config-if) #standby 116 preempt
D1(config-if) #standby 116 track 6 decrement 60
D1(config-if) #exit
D1(config) #interface vlan 102
D1(config-if) #standby version 2
D1(config-if) #standby 124 ip 10.09.102.254
D1(config-if) #standby 124 priority 150
D1(config-if) #standby 124 preempt
D1(config-if) #standby 124 track 4 decrement 60
D1(config-if) #standby 126 ipv6 autoconfig
D1(config-if) #standby 126 priority 150
D1(config-if) #standby 126 priority 150
D1(config-if) #standby 126 preempt
D1(config-if) #standby 126 track 6 decrement 60
D1(config-if) #exit
D1(config) #end
```


Switch D2

```
D2(config) #interface vlan 100
D2(config-if) #standby version 2
D2(config-if) #standby 104 ip 10.09.100.254
D2(config-if) #standby 104 preempt
D2(config-if) #standby 104 track 4 decrement 60
D2(config-if) #standby 106 ipv6 autoconfig
D2(config-if) #standby 106 preempt
D2(config-if) #standby 106 track 6 decrement 60
D2(config-if) #exit
D2(config) #interface vlan 101
D2(config-if) #standby version 2
D2(config-if) #standby 114 ip 10.09.101.254
D2(config-if) #standby 114 priority 150
D2(config-if) #standby 114 preempt
D2(config-if) #standby 114 track 4 decrement 60
D2(config-if) #standby 116 ipv6 autoconfig
D2(config-if) #standby 116 priority 150
D2(config-if) #standby 116 preempt
D2(config-if) #standby 116 track 6 decrement 60
D2(config-if) #exit
D2(config) #interface vlan 102
D2(config-if) #standby version 2
D2(config-if) #standby 124 ip 10.09.102.254
D2(config-if) #standby 124 preempt
D2(config-if) #standby 124 track 4 decrement 60
D2(config-if) #standby 126 ipv6 autoconfig
D2(config-if) #standby 126 preempt
D2(config-if) #standby 126 track 6 decrement 60
D2(config-if) #exit
D2(config) #end 41
```


CONCLUSIONES

Con el desarrollo de esta topología de red se afianzan los conocimientos sobre configuración, direccionamiento, enrutamiento de Routers y Switches, con uno de los principales fabricantes y el respaldo de la marca CISCO, líderes en el mercado, el conocimiento y digitación de los comandos, identificación de interfaces, protocolos como OSPF, BGP, interfaz loopback, direccionamiento IPV4, IPV6, VLAN, establecimientos de canales, árbol de expansión, encapsulamientos 809.1q, VTP.

El poder identificar redes, y establecer en ellas niveles de seguridad que permiten impedir el acceso no autorizado, este tipo de topologías son aplicables a redes administrativas, industriales, bancarias entre muchos otros tipos de aplicación, el manejo de este tipo de administración de redes, nos deja en un nivel avanzado y con las herramientas necesarias para ser parte del mundo laboral.

De acuerdo a pruebas de conexión y verificación de las diferentes topologías y los equipos que se encuentren conectados a la red podremos, realizar diagnósticos, mejoras, direccionar e implementar nuestras propias rutas, que pueden llegar a descongestionar las comunicaciones de los equipos, de acuerdo al tipo de redes que disponga la topología.

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